

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

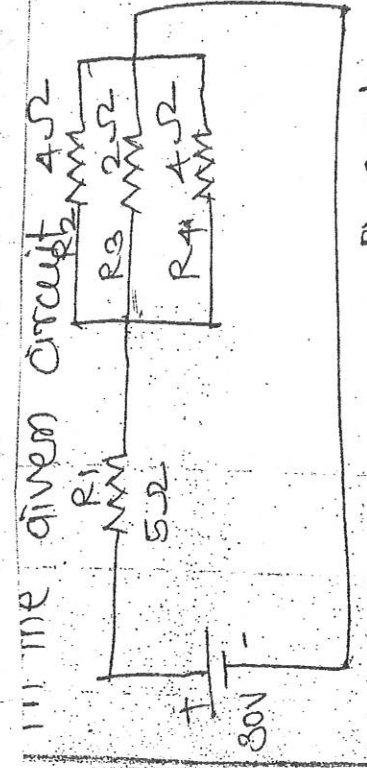
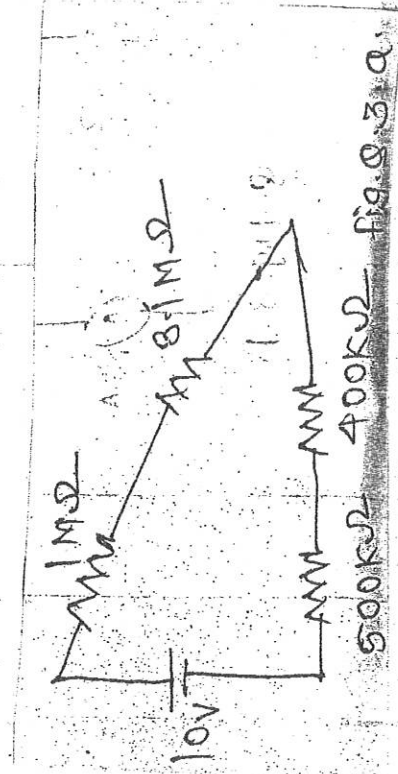
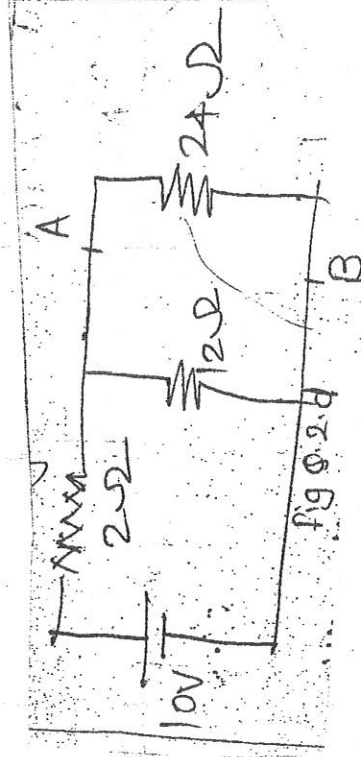
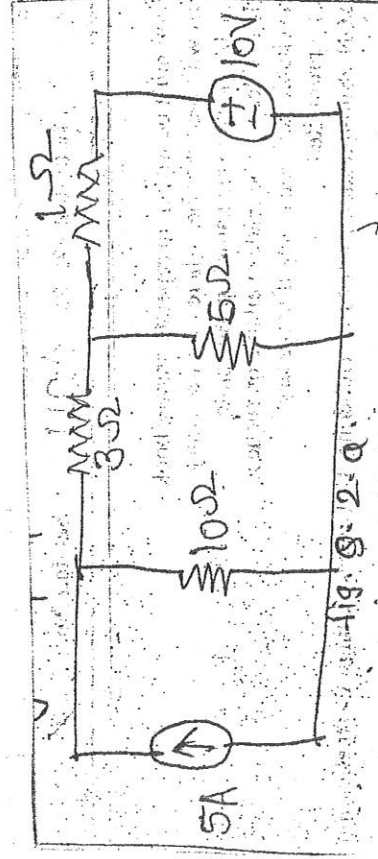
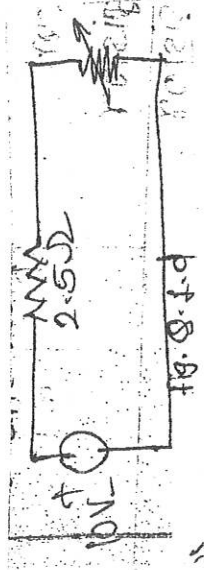
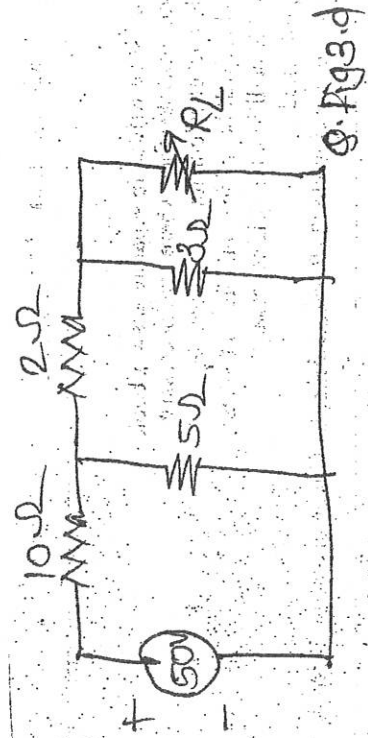
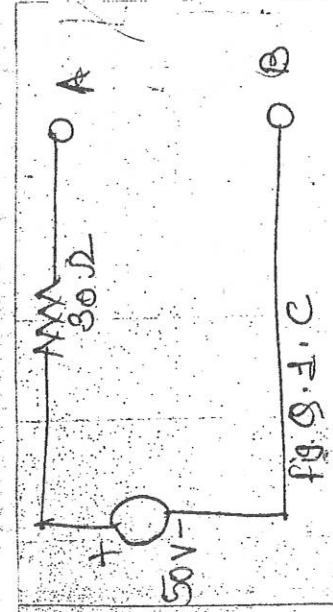
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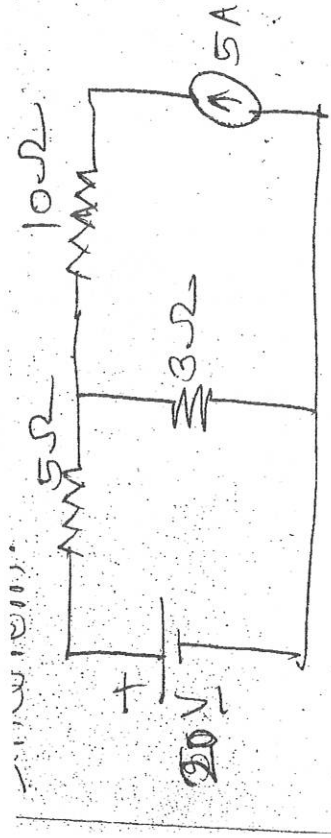
LEVEL: Third**PROGRAM: IE / E & TC****COURSE CODE: EIF 308/ETE 308/EJ112/IEE 308** **COURSE NAME: Circuits & Networks****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 14/05/2019****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQL**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application

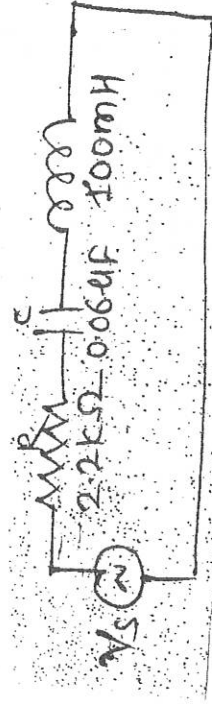
QN	SR. NO.	Question Text	Cognition Level R/U/A	Co Code	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define open circuit with diagram.	R	1	
	b)	Define AC circuit with diagram.	R	1	
	c)	Convert given circuit into equivalent current source. (Refer fig. page)	A	2	
	d)	State Thevenin's theorem.	R	3	
	e)	For given circuit estimate value of maximum power transferred to the load. (Refer fig. page)	U	3	
	f)	State superposition theorem.	R	3	
Q.2		Attempt any FOUR			(16)
	a)	Write the node voltage equations & determine the values of node voltage using following diagram. (Refer fig. page)	A	2	
	b)	Explain all steps for mesh analysis.	U	2	
	c)	State & Verify Norton's theorem with any one example.	U	3	
	d)	Determine Thevenin's equivalent circuit across 24Ω register in given diagram. (Refer fig. page)	A	3	
	e)	With diagram & equation explain voltage division & current division.	U	1	
	f)	Define 1) Ohm's law 2) Electric current 3) Energy in resistor 4) Power in resistor	R	1	
Q.3		Attempt any FOUR			(16)
	a)	Determine value of current & voltage across each resistor in given fig. (Refer fig. page)	U	1	
	b)	Calculate value of total current in the given circuit. (Refer fig. page)	A	1	
	c)	Explain concept of ground.	U	2	

d)	Determine maximum power delivered to a load in given current. (Refer fig. page)	A	3	
e)	Explain source transformation.	U	2	
f)	Find the value of current through 3Ω resistor using superposition theorem. (Refer fig. page)	A	3	
Q.4	Attempt any FOUR			(08)
a)	Define 1) roll of rate 2) decibel measurement	R	6	
b)	Define quality factor and write its formula of resonant circuit.	R	5	
c)	Define 1) admittance 2) impedance <i>Admitance 2) Impedance</i>	R	4	
d)	Draw the frequency response of R-C & R-L low pass filter.	R	6	
e)	List applications of resonance circuit (any four)	R	5	
f)	Draw wave form to present phase relation between current and voltage in an inductor.	R	4	
Q.5	Attempt any FOUR			(16)
a)	A $50\mu\text{F}$ capacitor is connected across a 230V, 50Hz supply calculate. 1) The reactance offered by the capacitor. 2) The maximum current.	A	4	
b)	Explain series resonance in R-L-C circuit. Derive the formula for resonant frequency.	U	5	
c)	With the neat circuit diagram explain series resonant band pass filters and also draw its frequency response.	U	6	
d)	Derive the equation of charging of capacitor with its curves.	A	4	
e)	What is the resonance frequency of a series RLC circuit where $R = 10\Omega$, $L = 25\text{mH}$, $C = 100\mu\text{F}$. Evaluate Q factor also.	A	4	
f)	Explain RC high pass filter with circuit diagram and frequency response.	U	6	
Q.6	Attempt any FOUR			(16)
a)	Explain parallel resonant band stop filter.	U	6	
b)	A resistor of 10Ω and an inductance of 0.1H are connected in series across 230V, 50Hz, supply. Find 1) Inductive Reactance 2) Impedance 3) Current 4) Phase angle	A	4	
c)	Compare series and parallel resonance circuit (Any four points).	U	5	
d)	Explain the series resonant band stop filter with neat circuit diagram and frequency response.	U	6	
e)	For each of the following input frequencies find the impedance in rectangle and polar form for the following fig. (Refer fig. page) 1) $f = 4\text{KHz}$ 2) $f = 2\text{KHz}$	A	4	
f)	With neat circuit diagram and frequency response explain parallel resonant band pass filter.	U	6	





Q. fig: 3. f.



Q. Fig 6 e

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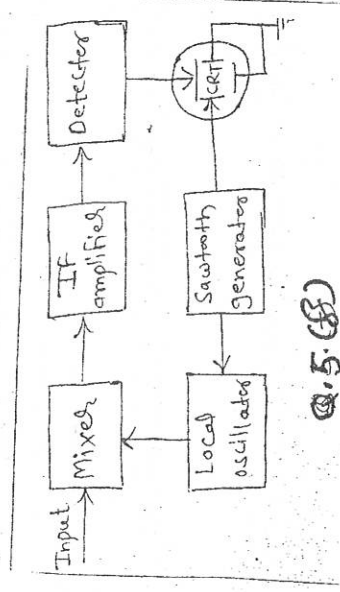
LEVEL :- THIRD**PROGRAM : IE & E & TC****COURSE CODE :- EIF303/ETEC303/EJ203/IX203/IEE303****COURSE NAME :- ELECTRONIC MEASURING INSTRUMENTS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 17/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co EIF 303	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define the term calibration and state any two need of it.	R	1	
	b)	State any four units of measuring fundamental quantities.	R	1	
	c)	Enlist any two types of DC bridges.	R	2	
	d)	Identify how DC bridge is in balanced condition.	U	2	
	e)	Define the term i) Resolution ii) Sensitivity.	R	3	
	f)	Define the term i) Average value ii) RMS value.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Discuss various types of standards with their classification.	U	1	
	b)	Compare analog and digital instruments (any 4 points)	U	3	
	c)	Derive the balance equation for schering's bridge.	A	2	
	d)	Compare Maxwell's bridge with Hay bridge (any 4 points)	U	2	
	e)	Draw and explain operation of LCR meter.	U	3	
	f)	Explain the working principle of Ramp type DVM.	U	3	
Q.3		Attempt any FOUR :			16
	a)	State where you can apply the principle of Guarded whetstone's bridge? Explain it in detail.	A	2	
	b)	Explain successive approximation type DVM. State its two applications.	U	3	
	c)	State any 4 applications of inductance comparison bridge.	R	2	
	d)	Draw and explain basic block diagram of digital frequency meter.	U	3	
	e)	Explain how unknown capacitor can be measured using schering's bridge.	A	2	
	f)	Explain following terms i) Reproducibility ii) Drift	U	1	

P.T.O.

Q.4	Attempt any FOUR :			08
a)	Define single beam dual trace CRO.	R	4	
b)	List the names of types of recorders.	R	5	
c)	Write the names of blocks present in horizontal deflection subsystem of CRO.	R	4	
d)	Draw diagram of passive voltage probe.	R	4	
e)	Define pulse generator.	R	5	
f)	Write the function of event marker in strip chart recorder.	R	5	
Q.5	Attempt any FOUR :			16
a)	Draw and explain block diagram of vertical amplifier of CRO.	U	4	
b)	Compare between time domain and frequency domain on basis of following points, i) Definition ii) Waveform iii) Example iv) Cost.	U	5	
c)	Draw lissajous patterns for following phase angles. i) $\theta = 0^\circ$ ii) $\theta = 90^\circ$ iii) $\theta = 0^\circ$ $\theta = 90^\circ$ iv) $\theta = 180^\circ$	A	5	
d)	Draw and explain block diagram of X-Y recorder.	U	5	
e)	Explain electrostatic deflection in CRO.	U	4	
f)	Identify given diagram shown in the fig & explain its working.	A	5	
Q.6	Attempt any FOUR :			16
a)	Compare between active and passive voltage probes on basis of i) Block diagram ii) Definition iii) Components used iv) Application	U	4	
b)	Define signal generator. Classify it and draw any one type of it.	U	5	
c)	State the procedure for measurement of frequency using CRO with diagram.	A	4	
d)	Write any four applications of strip chart recorder.	A	5	
e)	Draw and explain the type of CRO probe used to measure current in the circuit.	A	4	
f)	Write any four specifications of function generator.	A	5	



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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH**PROGRAM : IE & E & TC****COURSE CODE :- EIF406/EJ308/ETE311/ETE406/IX308/IEE406****COURSE NAME ELECTRONIC CIRCUIT DESIGN****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 20/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section- I	R/ U/ A	Co ITF 409	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Draw symbol of UJT and write any two specifications of it.	R	1	
	b)	Draw circuit diagram of L-section filter with bridge rectifier.	R	2	
	c)	Write the need of cascading amplifier stages.	U	3	
	d)	Define i) Zener voltage ii) Pinch off voltage.	R	1	
	e)	Write the formula of ripple factor for capacitor and CLC filter.	R	2	
	f)	Draw a circuit diagram of source follower.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain any four specifications of zener diode.	U	1	
	b)	Design a regulator using IC 723 to give the output of 5V at 100mA current. The input voltage is given as 10V and $V_{sc} = 0.65V$.	A	2	
	c)	Design a full wave rectifier using a capacitor filter to provide 12Vdc at 80 mA with a maximum ripple of 1%.	A	2	
	d)	Design current source using 78XX series for the reference voltage of 5V, that will deliver 0.5A current to the 10Ω load.	A	2	
	e)	Discuss the need of bootstrapping. Also draw a circuit diagram of bootstrapped darlington emitter follower.	U	3	
	f)	Explain types of transformer in detail.	U	1	
Q.3		Attempt any TWO :			16
	a)	Design a shunt regulator using zener diode to provide 6V output from a 15V unregulated power supply. Also calculate line and load regulations.	A	2	
	b)	Design a single stage CE amplifier for voltage swing of $9V_{(p-p)}$ with load resistance of 5 KΩ, BW = 20Hz to 20 KHz. Use $V_{cc} = 12V$, $R_S = 600\Omega$	U	3	

	c)	Design a source follower circuit for $R_i > 20\text{m}\Omega$, $R_o \leq 500\Omega$, $R_L = 1\text{K}\Omega$. Lower 3dB frequency $F_1 = 30\text{Hz}$. Use $V_{cc} = 20\text{V}$.	A	3	
QN	S Q N	Section- II	R/ U/ A	Co EIF 406	Mar ks
Q.4		Attempt any FOUR :			08
	a)	Draw the circuit diagram of Bistable multivibrator using op-amp.	U	6	
	b)	Give the classification of power amplifier with its conduction cycle.	R	4	
	c)	State Barkhausen's criterion.	R	5	
	d)	List any four features of IC 555.	R	6	
	e)	Draw circuit diagram of Wien bridge oscillator using op-amp.	U	5	
	f)	Define collector efficiency of power amplifier.	R	4	
Q.5		Attempt any FOUR :			16
	a)	Design class-A amplifier with resistive load to give output power (Po) of 4W across 5Ω resistance. Use $V_{cc} = 12\text{V}$.	A	4	
	b)	Design Hartely oscillator using transistor for $V_o = 4\text{V}_{\text{rms}}$, $F_o = 2\text{MHz}$, $R_L = 2.2\text{K}\Omega$ DC analysis only.	A	5	
	c)	Design monostable multivibrator using IC 555 that operates with 12V supply and turns ON LED for duration of approximately 8msec every time, it receives a negative trigger pulse. The high output of multivibrator (Timer) is $V_o = (V_{CC} - 2V_{BE} - V_{CEsat})\text{ Volts}$	A	6	
	d)	Design a Colpitt's oscillator for frequency of 30 KHz using op-amp. Use inductor of 200mH with the supply voltage of $\pm 10\text{V}$.	A	5	
	e)	Explain the design steps of op-amp based Wien bridge oscillator.	U	5	
	f)	Describe design steps of class AB power amplifier.	U	4	
Q.6		Attempt any TWO :			16
	a)	Design complimentary symmetry power amplifier to deliver a power of 700 mW to a load of 4Ω . The lower 3dB cut-off frequency is 25Hz.	A	4	
	b)	Design an RC phase shift oscillator for the following specifications using transistor frequency of oscillation = 750Hz, $V_{cc} = 14\text{V}$, and $R_L = 5\Omega$. <i>5k-2, VOPP > 5V</i>	A	5	
	c)	i) Design an astable multivibrator using op-amp to give output frequency $f_o = 2\text{KHz}$, peak to peak output voltage 7V and supply = $\pm 15\text{V}$. ii) Explain design steps of astable multivibrator using IC 555.	A	5	

Appendix - 1

ECD Datasheet

Appendix - 2

Table 1 : Standard Resistance Values $\pm 1\%$, $\pm 5\%$, $\pm 10\%$

Ohms (Ω)				Kilohms (K Ω)			Megohms (M Ω)	
0.10	1.0	10	100	1.0	10	100	1.0	10
0.11	1.1	11	110	1.1	11	110	1.1	11
0.12	1.2	12	120	1.2	12	120	1.2	12
0.13	1.3	13	130	1.3	13	130	1.3	13
0.15	1.5	15	150	1.5	15	150	1.5	15
0.16	1.6	16	160	1.6	16	160	1.6	16
0.18	1.8	18	180	1.8	18	180	1.8	18
0.20	2.0	20	200	2.0	20	200	2.0	20
0.22	2.2	22	220	2.2	22	220	2.2	22
0.24	2.4	24	240	2.4	24	240	2.4	
0.27	2.7	27	270	2.7	27	270	2.7	
0.30	3.0	30	300	3.0	30	300	3.0	
0.33	3.3	33	330	3.3	33	330	3.3	
0.36	3.6	36	360	3.6	36	360	3.6	
0.39	3.9	39	390	3.9	39	390	3.9	
0.43	4.3	43	430	4.3	43	430	4.3	
0.47	4.7	47	470	4.7	47	470	4.7	
0.51	5.1	51	510	5.1	51	510	5.1	
0.56	5.6	56	560	5.6	56	560	5.6	
0.62	6.2	62	620	6.2	62	620	6.2	
0.68	6.8	68	680	6.8	68	680	6.8	
0.75	7.5	75	750	7.5	75	750	7.5	
0.82	8.2	82	820	8.2	82	820	8.2	
0.91	9.1	91	910	9.1	91	910	9.1	

Table 2 : Standard Capacitor Values

Pico Farad (pF $\rightarrow 10^{-12}$)			Micro Farad ($\mu F \rightarrow 10^{-6}$)					
10	100	1000	0.01	0.1	1.0	10	100	1000
12	120	1200	-	-	-	-	-	-
15	150	1500	0.015	0.15	1.5	18	180	1800
22	220	2200	0.022	0.22	2.2	22	220	2200
27	270	2700	-	-	-	-	-	-
33	330	3300	0.033	0.33	3.3	33	330	3300
39	390	3900	-	-	-	-	-	-
47	470	4700	0.047	0.47	4.7	47	470	4700
56	560	5600	-	-	-	-	-	-
68	680	6800	0.068	0.68	6.8	-	-	-
82	820	8200	-	-	-	-	-	-

Table 3 : Rectifier Diode Specification Sheet

Type No.	Material (S/G)	$V_R(PIV)$ (V)	I_F (A)	V_F (V)	I_R (μA)
1N 4001	S	50	1.0	1.1	5
1N 4002	S	100	1.0	1.1	5
1N 4003	S	200	1.0	1.1	5
1N 4004	S	400	1.0	1.1	5
1N 4005	S	600	1.0	1.1	5
1N 4006	S	800	1.0	1.1	5
1N 4007	S	1000	1.0	1.1	10
1N 4148	S	75	0.1	1.0	25 (nA)
1N 5060	S	400	2.5	1.25	0.2
1N 5061	S	600	2.5	1.25	0.2
1N 5062	S	800	2.5	1.25	0.2
1N 5391	S	50	1.5	1.4	250
1N 5393	S	200	1.5	1.4	250
1N 5397	S	600	1.5	1.4	250
1N 5399	S	1000	1.5	1.4	250
1N 5402	S	200	3.0	1.0	10
1N 5408	S	1000	3.0	1.0	5
1N 5409	S	200	2.5	1.25	0.2
OA 47	G	25	0.05	0.6	30
OA 85	G	115	0.05	0.1	4.5
OA 90	G	30	0.008	0.1	2.4
OA 95	G	115	0.05	0.1	4.5
BA 100	G	60	0.09	-	-
BA 102	G	20	0.09	-	-
BY 100	S	1250	1.0	1.5	10
BY 125	S	150	1.0	-	10
BY 126	S	650	1.0	1.5	10
BY 127	S	1250	1.0	1.5	10
DR 25	G	25	0.25	-	-
Switching and Detector Diodes :			(mA)		
1N 914	S	75	10	-	5
1N 915	S	50	10	-	5
OA 70	G	22.5	50	0.1	30
OA 72	G	45	10	0.2	0.3
OA 73	G	30	50	0.1 - 0.2	18
OA 79	G	45	35	0.15 - 0.3	0.1 - 2.8

Table 4 : Zener Diode Specification Sheet

Type No.	Zener Voltage (V _Z) ₁₀	Zener Test Current (I _{ZT}) ₁₀	Zener Impedance (Z ₁₀) ₁₀	Max. Zener Current (I _{ZM}) ₁₀
IN 4370	2.4	20	20	150
IN 4371	2.7	20	20	135
IN 746	3.0	20	20	120
IN 747	3.3	20	20	110
IN 748	3.6	20	20	100
IN 749	3.9	20	20	95
IN 750	4.3	20	20	85
IN 751	4.7	20	20	75
IN 752	5.1	20	20	70
IN 753	5.6	20	20	65
IN 754	6.2	20	20	60
IN 755	6.8	20	20	55
IN 756	7.5	20	20	50
IN 757	8.2	20	20	45
IN 758	9.1	20	20	40
IN 759	10	20	20	35
IN 957A	12	20	20	30
IN 960A	6.8	18.5	4.5	30
IN 962A	9.1	14	7.5	47
IN 964A	13	11.5	9.5	35
IN 965A	15	9.5	13	28
IN 966A	16	8.5	16	24
IN 968A	20	7.8	17	21
IN 972A	30	6.2	25	19
IN 980A	62	4.2	49	15
IN 983A	82	2.0	185	10
IN 985A	100	1.5	330	4.9
IN 3993	3.9	500	3.7	3.0
IN 3994	4.3	640	2	2360
IN 3995	4.7	530	1.5	2130
IN 3996	5.1	490	1.2	1940
IN 3997	5.6	445	1.1	1780
IN 3998	6.2	405	1.0	1620
IN 3999	6.8	370	1.1	1460
IN 4000	7.5	355	1.2	1330
IN 4370 series : $\pm 10\%$				1210
IN 746 series : $\pm 10\%$				
suffix A for $\pm 5\%$ units, C for $\pm 2\%$, D for $\pm 1\%$				
IN 795 series : $\pm 10\%$				
suffix A for $\pm 10\%$ units, C for $\pm 2\%$, D for $\pm 1\%$				

Table 5 : Transistor Data Sheet

Transistor No	Material and Type	V _{CE} (V)	V _{CE} (V)	V _{CE} (V)	I _{C(max)} (mA)	P _T (mW)	h _{FE}	f _T (MHz)
AC105	PG	40	20	18	10	400	15	0.5
AC126	PG	32	10	12	10	50	30	75
AC127	NG	32	10	12	10	50	100	100
AC128	PG	32	10	16	10	500	50	1.5
AC130	PG	20	15	16	10	100	75	1
AC131	PG	45	32	18	10	145	67	45/165
AC153	PG	32	24	18	10	75	40/120	50
AC163	PG	32	24	18	10	1 W	40/120	50
AC166	PG	32	24	18	10	200	80	1
BC107	NS	32	20	45	6	900	45	0.8
BC108	NS	32	20	45	6	300	110	150
BC109	NS	32	20	45	6	300	120	150
BC115	NS	40	30	40	5	300	180	150
BC116	PS	45	40	40	5	300	80	40
BC119	NS	60	30	30	5	800	35	150
BC126	PS	35	40	30	5	300	40	40
BC138	NS	60	40	40	5	800	40	100
BC139	NS	40	40	40	5	700	35	40
BC142	NS	80	60	60	5	1 A	40	100
BC146	NS	80	60	60	5	1 A	20	80
BC147A	NS	80	60	60	5	50	80	150
BC147B	NS	50	45	45	6	250	110/220	150
BC148	NS	30	20	20	5	250	200/330	150
BC151	PS	25	20	20	5	250	110	150
BC158	PS	30	25	20	5	200	90/150	120
BC161	PS	60	45	45	5	3.2 W	70	100
BC177	PS	45	30	30	5	300	40	50
BC178B	PS	45	30	30	5	300	70	130
BC179A	PS	45	30	30	5	300	120	100
BC180	NS	40	30	30	5	300	100	150
BC194	NS	40	30	30	5	300	100	250
2N109	PG	35	25	25	12	100	40/250	0.15
2N244	NS	60	45	45	5	165	65	0.15
2N271	PG	30	10	10	20	750	50	4
2N312	NG	15	15	15	15	150	45	2
2N329B	PS	50	30	30	20	400	50	5
2N334A	NS	45	30	30	20	100	36/88	300
2N914	NS	40	30	30	20	500	18/86	300

Transistor No	Material and Type	V _{CH} (V)	V _{CE} (V)	V _{EB} (V)	I _{C(max)} (A)	P _T (W)	h _{FE}	f _T (MHz)
TIP62	PS	40	40	5	2	40	15/100	3
TIP120	NS	60	60	5	5	60	1000	-
TIP125	RS	60	60	5	5	60	1000	-
TIS45	NS	40	15	5	0.2	250	30/120	300
2N1481	NS	60	40	12	1.5	5	35/100	1
2N1721	NS	150	100	-	1	15	40/120	16
2N1722	NS	120	80	10	7.5	50	20/90	10
2N2067	PG	40	25	20	3	10	20	-
2N2033	NS	80	60	-	3	5	20/60	1
2N2017	NS	60	60	8	1	1	50/200	80
2N3053A	NS	80	60	5	700 mA	5	50	100
2N3055	NS	100	60	7	15	115	20/70	0.2
2N3140	NS	140	140	1	2	25	10	10
2N3180	PS	60	60	-	5	85	10/30	1
2N3878	NS	120	50	7	4	35	20	40
ECN100	NS	-	60	-	0.7	5	50	-
ECN149	NS	50	40	6	4	30	10	-
ECP149	PS	50	40	6	4	30	10	-

Table 6: Field Effect Transistors

Types	Channel	V _{DS} (V)	I _G (mA)	I _{GSS} (nA)	V _{GS(th)} (V)	I _{DSS} (mA)	V _{IS} (μV)	V _{CS} (μV)	P (W)
2N3821	N.CH	50	10	0.1	4	2.5	1.5 - 4.5	10	0.3
2N3822	"	50	10	0.1	6	2.1	3 - 6.5	20	0.3
2N4091	"	40	10	0.2	5-10	30	-	-	0.3
2N4221	"	30	15	-0.1	-6	-	2.5	20	0.3
2N4422	"	30	15	-0.1	-8	-	2.5 - 6	40	0.3
2N4416	"	30	10	0.1	6	-	4.5 - 7.5	50	0.3
2N4856	"	40	-	-0.25	-4, -10	50	-	-	0.30
2N5457	"	25	10	-1.0	-6	3	3000	10-50	0.3
2N5458	"	25	10	-1	-7	6-9	4000	10-50	0.3
BFW10	"	15	-	0.1	8	820	3.2 mA/V	50	0.3
BFW11	"	15	-	0.1	6	810	3.2 mA/V	-	0.3

Table 7: Uni Junction Transistor

Type	I _A (A)	η	I _r (μA)	I _V (mA)	V _{BE} (V)	P _D (W)	R _{th} (KΩ)
2N2646	2	0.56 - 0.78	1.5	6	3.5	0.3	4.7 - 9.1
2N3980	1.5	0.68 - 0.82	2	1 - 10	3	0.36	4 - 8
2N4851	1.5	0.56 - 0.75	2	2	2.5	0.3	-
2N4948	1	0.55 - 0.82	0.6	4	2.5	0.36	4 - 12

78XX Voltage Regulator Datasheet :- (3)

Device type with input Voltage	output Voltage (V)	output Current	Quiescent Current (mA)	Line regulation (mV)	Load regulation (mV)	Ripple rejection (dB)
78XXC (35)	5	1A	8	25	50	80
	12	1A	8	60	120	72
	15	1A	8	75	150	70
78LXXAC (35)	5	100 mA	3 to 5	10	5	62
	12	100 mA	3 to 5	20	10	54
	15	100 mA	3.1 to 5	25	12	51
78LXXC (35)	5	100 mA	3 to 5	10	5	60
	12	100 mA	3 to 6.5	20	10	52
	15	100 mA	3.1 to 6.5	25	12	49
78MXX (35)	5	0.5A	4.3 mA	50	100	78
	12	0.5A	4 to 10	120	240	71
	15	0.5A	4 to 10	150	300	69

79XX Voltage Regulator sheet:

Device type	output Voltage (V)	Max. Input voltage
7902	-2	-35
7905	-5	-35
7905.2	-5.2	-35
7906	-6	-35
7908	-8	-35
7912	-12	-35
7915	-15	-35
7918	-18	-35
7924	-24	-40

Transistor No	Material	V_{CE} (V)	V_{EB} (V)	$I_{C(max)}$ (mA)	PT	h_{FE}	f_T (MHz)
2N918	NS	30	15	50	200	20	600
2N930	NS	45	45	30	300	100	30
2N941	PS	25	8	50	250	10	16
2N1711	NS	75	50	600	800	100	70
2N1779	NG	25	-	200	100	20/60	3
2N1893	NS	120	80	500	800	40/120	50
2N2219	NS	60	30	800	100	100	250
2N2396	NS	60	40	300	450	40/120	40
2N2903	NS	60	30	50	300	125	60
2N2905	PS	60	40	600	100	100	200
2N2909	NS	60	40	500	400	40/120	50
2N2927	PS	25	25	500	400	30/130	100
2N2997	PG	30	15	50	75	40/500	400
2N2976	NS	45	45	30	250	60/240	60
2N3015	NS	60	30	500	800	30/120	30
2N3903	NS	60	40	200	310	50/150	250
2N3905	PS	40	40	200	310	50/150	300
2N5837	NS	10	5	300	2 W	25	1700
2N5843	PS	50	40	50	600	50/150	200
2N5855	PS	60	60	1 A	750	50/300	15
2N5856	NS	60	60	5	750	50/300	200

High Frequency Transistors

AF115	PG	32	15	2	10	75	75
AF116	PG	32	15	2	10	75	75
AF121	PG	25	25	-	10	140	30
AF181	PG	30	30	-	20	155	105
AF187	PG	18	-	12	100	185	3
AF194	PG	20	-	0.5	10	80	60
AF200	PG	25	-	0.3	10	225	100
AF282	PG	25	-	0.1	30	225	100
AF239S	PG	15	15	0.3	10	60	450
BF137	NS	160	160	5	25	300	200
BF154	NS	30	30	2	20	200	400
BF160	NS	30	30	2	20	200	400
BF179B	NS	220	115	5	50	600	60
BF183	NS	25	20	3	15	150	400
BF194	NS	30	20	5	30	250	130
BF195	NS	30	20	5	30	250	100
SF104	PS	20	18	4	50	250	250
BF248	NS	30	25	3	600	400	180
BF249	PS	30	25	3	600	400	180
BF315	PS	20	20	4	100	600	300

A Practical Approach to Electronic Circuit Design

Transistor No	Material	V_{CE} (V)	V_{EB} (V)	$I_{C(max)}$ (A)	PT	h_{FE}	f_T (MHz)
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Power Transistors

AD136/4	PG	40	55	40	30	35	0.3
AD140	PG	55	55	55	35	35	0.2
AD143-5	PG	45	35	10	30	50/110	0.45
AD156V	PG	32	16	10	8	50/130	1
AD157V	NG	32	16	10	8	50/150	1
AD161	NG	32	20	10	4	80	1
AD162	PG	32	20	10	6	50	1
AD165	NG	25	20	10	5	60	0.5
AD262	PG	35	20	10	10	30	0.45
ADY12	PG	60	45	10	0.25	60/100	0.35
BD115	NS	245	180	5	6	22	80
BD124	NS	70	45	2	15	35	60
BD131	NS	70	45	6	11	40	60
BD132	PS	45	45	4	11	40	60
BD135	NS	45	45	1	12	40/250	50
BD136	PS	45	45	1	12	40/250	50
BD137	NS	60	50	1	12	40/160	50
BD138	PS	60	60	1	12	40/180	50
BD141	NS	140	120	8	117	20/70	50
BD145	NS	60	60	5	15	45	50
BD151	PS	35	30	3	25	30/150	50
BD152	NS	50	45	3	25	30/150	50
BD165	NS	45	45	1.5	20	40	3
BD166	PS	45	45	1.5	20	40	3
BD181	NS	55	46	10	23	20/78	3
BD182	NS	70	60	15	117	20/70	2
BD187	NS	55	45	4	40	40	2
BD188	PS	55	45	4	40	40	2
BD232	NS	55	500	0.25	11	25/150	20
SL100	NS	60	50	0.5	4	40/300	-
SK100	PS	60	50	0.5	4	40/300	-
SL102	NS	30	30	1	3	50/280	-
SK102	PS	30	30	1	3	50/280	-
TIP29C	NS	100	100	1	30	40/200	3
TIP30C	PS	100	100	1	30	40/200	3
TIP31	NS	40	40	3	20	20/100	3
TIP32	PS	40	40	3	20	20/100	3
TIP33	NS	40	40	3	20	20	3
TIP34	PS	40	40	3	20	20	3
TIP41	NS	40	40	3	20	20	3
TIP42	PS	40	40	3	20	20	3

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF110/X111/CCE110

COURSE NAME: APPLIED MECHANICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 20/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S	Question Text	R U A	CO CCF 110	Marks
Q.1		Attempt any FOUR			(08)
	a)	Different between particle & body. (any two)	U	1	
	b)	State principle of transmissibility.	R	1	
	c)	Give field examples of i) Concurrent force system. ii) Parallel force system.	R	1	
	d)	Define equilibrant & state its effect on body.	R	2	
	e)	Define i) Angle of friction ii) Angle of Repose.	R	2	
	f)	State laws of friction. (any two)	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Determine the components of the force 500KN at 20° & 30° at either side of it.	A	1	
	b)	Two forces acts at an angle 120° , The bigger force is 50 N and resultant of both is perpendicular to smaller force. Find smaller force.	A	1	
	c)	Determine the magnitude & direction of resultant force of forces away from point 8 N, 10 N, 20 N and 12 N making an angle 30° , 120° , 200° & 310° with the x-axis measured in clockwise direction respectively. (solve by Analytical method)	A	1	
	d)	Three forces of 20 N, 40 N, & 60 N along the sides of equilateral triangle of side 30 cm respectively in order. Calculate the magnitude & position of resultant of force system from apex point.	A	1	
	e)	A light string ABCDE whose extremity 'A' is fixed, has 'W ₁ ' and 'W ₂ ' attached at 'B' & 'C'. It passes frictionless pulley at 'D' carrying a weight of 200 N at free end 'E'. If in equilibrium position BC is horizontal & AB & CD makes an angle 150° & 100° respectively with BC, Determine magnitudes 'W ₁ ' & 'W ₂ '	A	2	
	f)	Solve Q.No.2(C) by Graphical method.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Simply supported beam of 5m span carries UDL of 12 KN/m over half span from left side support & vertically downward point load of 27KN acting 1 m from right side support. Determine support reaction by analytical method.	A	2	
	b)	Solve Q. No 3(a) by graphical method.	U	3	
	c)	State advantages & limitations of graphical method over analytical method.	R	3	
	d)	A heavy stone of mass 400 kg is on hill of 45° inclined with horizontal. If coefficient of friction between stone & hill is 0.50, is stone stable?	A	2	

	e)	A block weighing 40KN resting on rough horizontal plane can be moved by a force of 22 KN applied at an angle 35° with the horizontal. Determine coefficient of friction.	A	2	
	f)	A ladder of 3 m weighing 100 N is kept 30° inclined with smooth horizontal ground and rough wall. If the man weighing 700 N is standing on mid of ladder, what is the force 'P', horizontal to ground contact surface, required to keep the ladder in rest. Take μ for ladder & wall is 0.3.	A	2	
Q.4		Attempt any FOUR			(08)
	a)	Define Kinematics.	R	5	
	b)	Define momentum.	R	5	
	c)	Define angular acceleration.	R	5	
	d)	State law of conservation of energy.	R	5	
	e)	Define work & power.	R	5	
	f)	Define velocity ratio.	R	6	
Q.5		Attempt any FOUR			(16)
	a)	Determine the co-ordinates of the centroid of the shaded area with respect to the axes shown in figure. no.1 in which a quarter circle of radius 80 mm is cut-off from a rectangle of size 120 mm x 80 mm.	A	4	
	b)	Determine the centroid of an unequal angle from the reference axes X & Y as shown in figure No.2.	A	4	
	c)	A ball is dropped from the top of a tower 30 m high. At the same instant a second ball is thrown upward from the ground with an initial velocity 15 m/sec when & where they cross?	A	5	
	d)	Power supply was cut off to a power driven wheel when it was rotating at a speed of 900 rpm. It was observed to come to rest after making 360 revolutions. Determine its angular retardation & time it took to come to rest after power supply cut-off.	A	5	
	e)	A stone is released from a height 30 m. Calculate velocity of stone when it strikes to the ground using law of conservation of energy.	A	5	
	f)	In a lifting machine an effort of 500 N is to be raise a load 10,000 N, velocity ratio of machine is 25. Determine efficiency of machine, ideal effort, effort lost in friction & load lost in friction,	A	6	
Q.6		Attempt any FOUR			(16)
	a)	A solid right circular cone of height 40 cm & diameter 20 cm is placed on a cylinder of diameter 20 cm & height 30 cm. Locate the position of center of gravity from the base of the cone.	A	4	
	b)	A railway wagon is moving at 108 kmph. The driver observes the red signal & applies brakes to stop the train & it covers a distance of 300 meter before coming to rest. Calculate the retardation produced & time taken to rest.	A	5	
	c)	A wheel starts from the rest & accelerates at 12 rad/sec^2 until it reaches a speed of 200 rpm. With this speed it rotates for 2 minutes & then retards uniformly for 150 seconds & stops. Determine total number of revolutions made, Acceleration time & angular retardation.	A	5	
	d)	Determine the power required to raise a lift containing 15 persons to a height of 150 m in 10 minutes. The average weight of each person may be taken as 650 N. The weight of lift is 2.5 KN.	A	5	
	e)	In a machine an effort of 15 N can lift a load of 300 N & an effort of 25 N can lift a load of 500N. Determine the law of machine & also effort required to lift a load of 1000N.	A	6	
	f)	In a lifting machine law of machine is $P = (0.025 W + 0.05) \text{ KN}$ & velocity ratio is 44.44. Calculate efficiency of machine at load 20 KN. and state machine is reversible or not at load 20 KN. Also determine maximum M.A & maximum efficiency of machine.	A	6	

Q.5) a) Figure No. 1

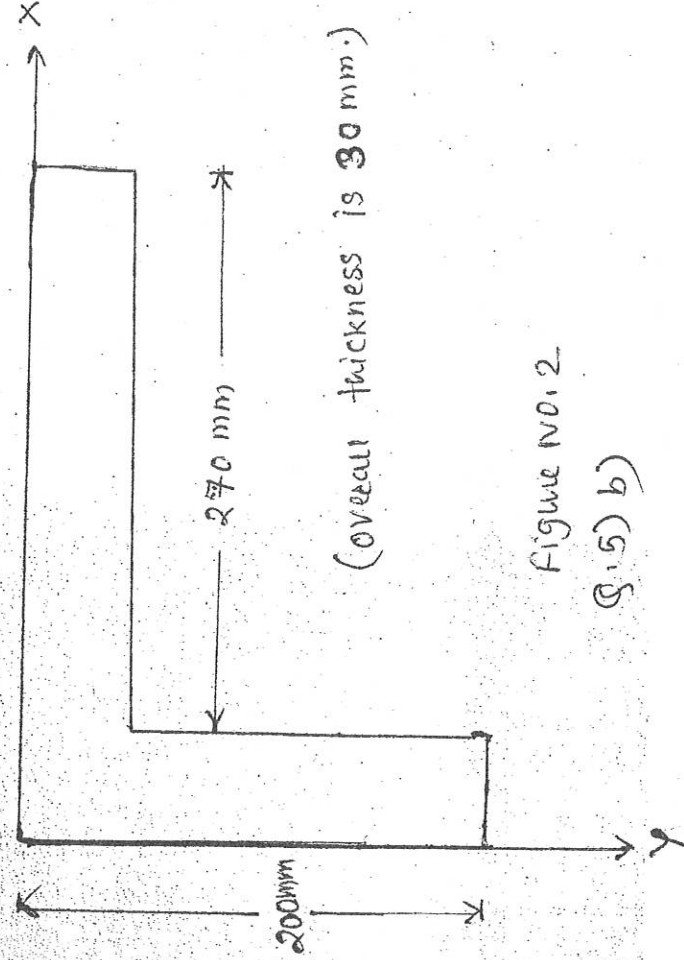
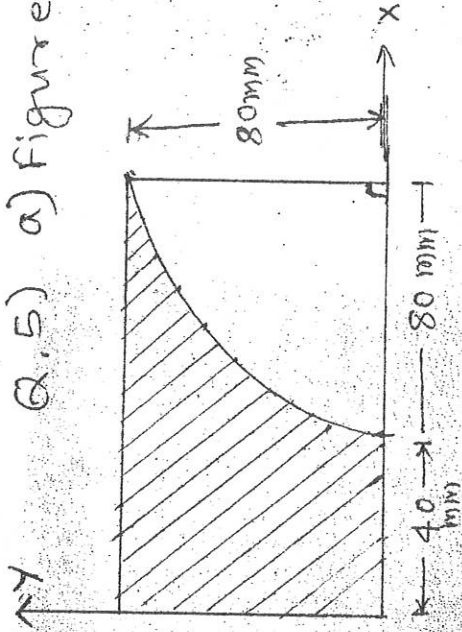


Figure No. 2
Q.5) b)

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : IE & E & TC****COURSE CODE :- EIF107/ETE107/ETF107/IEF107/IEE107****COURSE NAME :- BASIC ELECTRICAL ENGINEERING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 20/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.

7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co EIF 107	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define resistivity of material.	R	1	
	b)	Explain the magnetic form "Reluctance".	R	2	
	c)	State Ohms law for a magnetic circuit.	R	2	
	d)	State Flemings Right hand rule with suitable sketch.	R	3	
	e)	Discuss mutual inductance between two coil.	R	3	
	f)	State the equation of dynamically induced emf and its unit.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain the resistance with suitable sketches solve the given network to find the power dissipated in the load resistance of 10Ω as shown in fig 1.	A	1	
	b)	Explain the Kirchoff current law and voltage law, using suitable sketches of network example.	U	1	
	c)	Discuss the calculation of magneto motive force of simple series magnetic circuit.	U	2	
	d)	An iron ring of 500 mm^2 cross section area having relative permeability of 1000 H/m with mean length of 800mm & Magnetizing Coil turns of 1000 turns. Calculate mmf required to produce 0.5m Wb magnetic flux in an air gap of 1mm neglect leakage and fringing effects. (see fig. no. 2)	A	2	
	e)	Explain with labeled sketches concept of leakage flux and fringing effect in magnetic circuit.	U	2	
	f)	Sketch labeled diagrams and explain Faraday's first and second Law of electromagnetic induction.	U	3	

Q.3	Attempt any FOUR :			16
a)	Compare DC & AC current on account of following points i) Waveform ii) Power equation iii) Nature of flow of current iv) value of current v) Magnitude of load resistance vi) Effect on inductance and capacitance vii) Power factor.	U	1	
b)	Solve the given network to find the current flowing through load resistance using Kirchhoff's Laws as shown in fig no. 3	A	1	
c)	Explain with suitable labeled sketch the 'Magnetic Hysteresis Loop' of magnetic circuit.	U	2	
d)	Draw and label the hysteresis loop for hard and soft magnetic material and explain comparative terms between them.	U	2	
e)	An iron ring having circular C/S of dia 2 cm and mean length of 20cm wound with 3000 turns and a current of 0.5 A passed through coil produces magnetic flux of 0.5 Wb/m^2 in ring. Assume all these flux linked with each turn of coil then calculate. i) Relative permeability of magnetic material (iron ring) (μ_r) ii) Self inductance of coil (L) iii) Voltage induced in the coil (e_L)	A	3	
f)	Comment on mutual inductance using suitable circuit diagrams and equations of magnetic terms.	U	3	
Q.4	Attempt any FOUR :			08
a)	Name component that makes an ac circuit with lagging power factor.	U	5	
b)	Define Peak factor and form factor.	R	4	
c)	State the meaning of electric power.	R	5	
d)	Define Reactance and state its unit.	R	5	
e)	State voltage and current Relation in Delta connection	R	6	
f)	Define Transformer.	R	7	
Q.5	Attempt any FOUR :			16
a)	State the types of Earthing and explain any one in detail with neat sketch.	U	7	
b)	State any four advantages of polyphase system.	R	6	
c)	Draw circuit diagram and vector diagram of a.c. R-L series circuit.	U	5	
d)	In a circuit of $Z=8+j6$ ohm find the admittance in polar and rectangular form.	A	4	

EXAM SEAT NO.

P.T.O.

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM: IE & E & TC****COURSE CODE :- EIF309/IEE402/ETE402/EJ302****COURSE NAME :- 8051 MICROCONTROLLER****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 16/05/2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co EIF 309	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State the function of Data Bus and control bus.	R	1	
	b)	Give the function of $PSEN$ & ALE pin of 8051.	U	2	
	c)	List various menus (tabs) seen on Keil IDE compiler.	R	1	
	d)	Draw the general block diagram of microprocessor.	R	1	
	e)	State function of MUL AB and DIV AB instruction.	U	3	
	f)	When we reset microcontroller 8051, which value will be stored in PC, port0, port1 and SP register?	U	3	
Q.2		Attempt any FOUR :			16
	a)	Explain function of following instructions with example i) XCH A,@ Ri ii) CJNE A, direct, rel.	U	3	
	b)	Compare between microprocessor and microcontroller. (any 4 points)	U	1	
	c)	Draw the format of SCON register. Explain any 2 modes of serial communication.	U	2	
	d)	Write an assembly language program to arrange 10 numbers in ascending order. Write comments.	A	3	
	e)	Explain the function of following resistor of 8051 microcontroller. i) Program counter ii) Stack pointer iii) Data pointer iv) Accumulator.	U	2	
	f)	Write an assembly language program to exchange five bytes, stored in the internal RAM location 25H and 35H. Draw the flowchart.	A	3	
Q.3		Attempt any FOUR :			16
	a)	Differentiate between 8051 and 8052 microcontroller. (any 4 points)	U	1	
	b)	Draw the format of TMOD register. Give value of TMOD register select Timer 0 mode 1 and Timer 1 mode 2.	U	2	
	c)	State the use of following Bits/ Flags. i) RS0 ii) RS1 iii) Cy iv) P	U	2	
	d)	Write an assembly language program to find 2's complement of number 55H. Also count no of '1' s and '0' s in the result and store the count in R5 and R6 registers. Write comments for program.	.	U	2

	e)	State use of following pins of 8051 i) RST ii) $\overline{EA}$ iii) XTAL 1,2 iv) Vcc	U	2
	f)	Write an assembly language program to add 16-bit numbers stored in internal RAM location 30H onwards. Store the result at memory location 50H and 51 H. Draw flowchart for program.	A	3
Q.4		Attempt any FOUR :		08
	a)	State interrupt sources in 8051 microcontroller with their vector address.	R	4
	b)	Find the number of address lines required to interface 4K X 8 ROM and 8 K X 8 RAM to 8051 microcontroller.	U	5
	c)	Draw the labelled pin diagram of ADC 0808.	R	6
	d)	List various modes of timer in 8051 microcontroller.	R	4
	e)	Calculate the number of steps for revolution (360^0) of stepper motor with steep angle of 7.5^0 and 1.5^0 .	U	6
	f)	State any two input devices and output devices that can be interfaced with 8051 microcontroller.	R	5
Q.5		Attempt any FOUR :		16
	a)	Write an ALP to send "GPKP" on serial port of 8051 microcontroller at 4800 baud. Assume crystal frequency of 11.0592 MHz.	A	4
	b)	Draw interfacing diagram if 8 LED's are connected to port 1 of 8051. Write on ALP to toggle all LED's on port 1. Assume suitable delay.	A	5
	c)	Differentiate between absolute decoding and linear decoding technique (any 4 points)	U	5
	d)	Explain function of any four commands of 16 X 2 LCD with hex codes.	U	6
	e)	Draw the interfacing diagram of 4 X 4 matrix keyboard with 8051 microcontroller.	U	6
	f)	Explain MODE 1 & MODE 2 of data transmission and reception of serial port in 8051.	U	4
Q.6		Attempt any TWO :		16
	a)	Write an ALP to generate a continuous square wave of 2 KHz on pin P1.5 of 8051 microcontroller using mode 1 of timer 0. Assume crystal frequency as 12 MHz. Draw flow chart for the program and write the delay calculations.	A	4
	b)	Draw interfacing diagram of DAC 0808 with 8051 microcontroller. Write an assembly language program to generate triangular waveform. Assume suitable data. Write comments for program.	A	6
	c)	i) Draw interfacing diagram of 8K X 8 data ROM to 8051 microcontroller. Also draw memory map. Assume suitable data. ii) Draw interfacing diagram of seven-segment display with 8051 microcontroller.	A	5

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **FIRST**

PROGRAM: **IE/E&TC**

COURSE CODE: **EIF101/ETE101/IEF101** COURSE NAME: **ELECTRONICS COMPONENTS AND APPLICATIONS**

MAX. MARKS: **80**

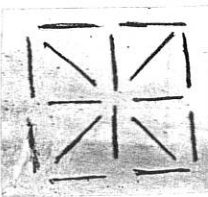
TIME: **3 HRS.**

DATE: **16/05/2019**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>Course outcome

S QN	S Q N	Question Text	R U A	CO EIF 101	Marks
Q.1	Attempt any FOUR				(08)
	a)	State the types of capacitors.	R	2	
	b)	Enlist various types of components.	R	2,3	
	c)	Define power factor & give its unit.	R	2	
	d)	Define resistor and draw its symbol.	R	2	
	e)	List applications of inductor. (any two)	R	2	
	f)	State various applications of resistors. (any two)	R	2	
Q.2	Attempt any FOUR				(16)
	a)	State any four specifications of capacitors.	R	2	
	b)	Draw the construction of carbon film resistors and explain it.	U	2,3	
	c)	Explain iron core inductor with neat diagram.	U	2,3	
	d)	Identify the colour codes for following resistors: i) $560\text{ k} \pm 0.2\%$ ii) $23.4\text{ k} \pm 0.2\%$	A	3	
	e)	Explain following terms i) Q factor ii) Inductive Reactance.	U	2	
	f)	Identify the capacitors from colour code. i) Orange orange blue ii) Yellow violet yellow.	A	3	
Q.3	Attempt any FOUR				(16)
	a)	Draw and explain characteristics curves of TDR.	U	2, 3	
	b)	Identify the colour code for the following capacitors i) 0.034 F ii) 47 nF	A	3	
	c)	Draw and explain construction working of tapped inductor.	U	2	
	d)	Differentiate linear and logarithmic potentiometer. (any four)	U	2, 3	
	e)	Identify colour coding of inductor with colour band system.	A	3	
	f)	Explain Tantalum electrolytic capacitor.	U	2, 3	
P.T.O					

Q.4	Attempt any FOUR			(08)
a)	List the types of PCB.	R	6	
b)	Identify the type of display shown in diagram below.			
		A	5	
c)	Define the following specification of cable i) Characteristic impedance. ii) Current carrying capacity.	U	4	
d)	State any four types of connector.	R	4	
e)	State any two advantages of PCB.	R	6	
f)	Define the following specification with respect to switch. i) Voltage rating ii) Mechanical life.	U	5	
Q.5	Attempt any FOUR			(16)
a)	Draw and explain construction of co-axial cable.	U	4	
b)	Show the numeric value three using common anode seven segment display and explain the common anode seven segment display.	A	5	
c)	Draw and explain dip soldering technique of PCB.	U	6	
d)	Draw and explain BNC connector. State any two applications of BNC connector.	U / R	4	
e)	Compare relay and switch on the basis of following parameter. i) Cost ii) Specification iii) Applications iv) Types	R	5	
f)	Explain the steps for preparation of PCB with the help of flowchart.	U	6	
Q.6	Attempt any FOUR			(16)
a)	Draw Dry Reed relay and state any two applications of Dry reed relay.	R	5	
b)	Suggest the suitable cable and connector for the following applications i) Input of CRO ii) Telephone handset	A	4	
c)	Draw and explain general purpose Relay.	U	5	
d)	Explain photo printing technique used in PCB manufacturing.	U	6	
e)	Describe D-type connector with the help of diagram.	U	4	
f)	Draw the diagram of 3 x 5 dot matrix display and explain dot matrix display.	U / R	5	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: **IE/E&TC**

COURSE CODE: **ETE309/IEE309/EJ209/IX209** COURSE NAME: **MICROPROCESSOR AND INTERFACING**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **16/05/2019**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) Define i) Data bus ii) Address bus iii) control bus. State the bus size of address and data bus of 8085 processor.
- b) What is the role of latch and tristate buffer in microprocessor based system?
- c) What will be the contents of accumulator after execution of following instructions?

XRA A

DCR A

- d) Define i) Machine cycle ii) Instruction cycle.
- e) Describe following instruction i) SI ii) DI
- f) Enlist 8085 interrupts with their priorities and vector locations.

Q.2 Attempt any **FOUR**

(16)

- a) Draw the architectural diagram of 8085 processor and label it.
- b) Draw the diagram of demultiplexing of low order address-data bus of 8085 and describe the principle of demultiplexing it.
- c) Draw the instruction cycle of following instruction (assume necessary data) - MVI A, FFH
- d) Describe following instruction with reference to their function and flags affected.
 - i) MOV A, B
 - ii) ADI OFH
 - iii) ANA C
 - iv) JNZ 2000H
- e) Write a assembly language program to transfer a block of 16 data bytes stored at 4000H to 6000H.
- f) Define i) Stack ii) Subroutine. Write advantages of using subroutine.

P.T.O

(16)

Q.3 Attempt any **FOUR**

- Draw the format of flag register and describe each bit.
- What will be output of following program and status of flag register?
MVI A, 0FH
ADI A, 0FH
INR A,
HLT
- Define – addressing mode. Describe with example i) Immediate addressing mode ii) Indirect addressing mode.
- State the function of following instructions i) ADC ii) DAA iii) LHLD iv) SBI
- Write an assembly language program to add to BCD numbers 66 and 33 store result at 3000H.
- Describe CALL and RET instructions.

Marks

(08)

Section – II

Q.4 Attempt any **FOUR**

- Give the specifications of RS-232 standard.
- Give the format of I/O control word register of 8255.
- What do you mean by memory mapping mad memory interfacing?
- State function of $\overline{CS}$ and A_0 - A_1 pin of 8259-PIC.
- State features of 2764 EPROM.
- What is meant by 1K x 8 memory?

(16)

Q.5 Attempt any **FOUR**

- Interface 4k x 8 memory to 8085 using 1k x 8 memory chips.
- Draw block diagram of 8255 PPI.
- Differentiate between I/O mapped IO and memory mapped I/O. (any 4 points)
- Draw & explain operational command words OCW_2 & OCW_3 8259 PIC.
- Interface two LED's using common anode & common cathode technique. Write a program to blink them alternately. Assume port address in I/O mapped I/O (using 8255)
- Explain operation of 'OUT' instruction with its timing diagram.

(16)

Q.6 Attempt any **FOUR**

- Interface 8259 PIC in cascade mode with microprocessor 8085. Explain in brief.
- Draw the interfacing diagram of 8255 with 8085 and explain.
- Interface input device (74LS244) with input address FFH. also interface output devices (74373- latch) with output address FEH to microprocessor 8085 (use decoder logic)
- Draw block diagram of 8259-PIC. Also draw format for ICW_1 , command word of 8259.
- Write a BSR control word subroutine to set bits PC_0 , PC_1 and PC_5 and reset them after some delay.
- Draw the multiplexed 7 segment display interfacing with 8085 diagram and explain.

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: First

COURSE CODE:CCF 102/CCE 102

MAX. MARKS: 80

PROGRAM: EE/IE/IT/ET

COURSE NAME: Engineering Physics

TIME: 3 HRS.

DATE: 09/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application

QN	S. Q. N	Question Text	Cognition Level	Code CCF	Marks
Q.1		Attempt any FOUR	R/U/A	102	(08)
	a)	Define specific mass and give its SI unit.	R	01	
	b)	Shape of a liquid drop is spherical. Explain.	U	01	
	c)	Define coefficient of viscosity & give its SI unit.	R	01	
	d)	State any two applications of nanotechnology in the field of automobile.	R	03	
	e)	Define surface tension. Give its SI unit.	R	01	
	f)	Define 1) Nanotechnology 2) Nanoparticle	R	03	
Q.2		Attempt any FOUR			(16)
	a)	Explain the behavior of wire under continuously increasing load.	U	01	
	b)	Derive an expression for coefficient of viscosity using Stoke's method.	A	01	
	c)	Define capillary action. Give any three examples of capillary action.	R	01	
	d)	State any four points of distinction between longitudinal and transverse waves.	U	02	
	e)	Mention any two applications each of nanotechnology in the field of textile and environment.	R	03	
	f)	A wire of diameter 2mm and length 2.5m extends by 1.5mm when a force of 15N is applied to it. Find the Young's modulus of the wire.	A	01	
Q.3		Attempt any FOUR			(16)
	a)	Explain the molecular theory of surface tension.	U	01	
	b)	Define 1) Amplitude 2) Period 3) Frequency 4) Wavelength of a wave.	R	02	
	c)	Derive expression $h_1/r_1 = h_2/r_2$ for capillary action.	A	01	
	d)	Define stress and explain the three types of stress.	R	01	
	e)	State any four applications of viscosity.	R	01	
	f)	Define resonance. Give any three examples of resonance.	R	02	

Q.4	Attempt any FOUR			(08)
a)	Define refraction of light.	R	04	
b)	State Ohm's law for electricity.	R	04	
c)	Define photoelectric effect.	R	05	
d)	State two properties of laser.	R	05	
e)	State the principle of production of X-rays.	R	05	
f)	Define critical angle.	R	06	
Q.5	Attempt any FOUR			(16)
a)	Derive prism formula to calculate refractive index of given prism.	A	04	
b)	A 6 m long copper wire has diameter 0.45 mm. If its resistance is $18\ \Omega$, calculate its resistivity.	A	04	
c)	State any four characteristics of photoelectric effect.	R	05	
d)	Distinguish between spontaneous and stimulated emission. (any four points.)	U	05	
e)	State any four applications of X-rays.	R	05	
f)	State any four applications of optical fibre.	R	06	
Q.6	Attempt any FOUR			(16)
a)	How long will light take in travelling a distance 500 m in water ? R.I. of water is $\frac{4}{3}$ and velocity of light in vacuum is 3×10^8 m/s.	A	04	
b)	Derive equation of equivalent resistance for parallel combination of three resistors.	A	04	
c)	Explain construction and working of photoelectric cell.	U	05	
d)	Describe the term population inversion.	U	05	
e)	Explain the term total internal reflection.	U	06	
f)	Obtain balancing condition for Wheatstone's network.	A	04	

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EXAM SEAT NO.

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PROGRAM: INDUSTRIAL ELECTRONICS

COURSE NAME: INSTRUMENTATION

TIME: 3 HRS. DATE: 09/05/2019

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- 1) Answer to two sections must be written in separate section answer book provided
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.

- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

Q.N	S.Q.N	Question Text	R.U.A	CO IEF 403	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	Explain transducer.	U	1	
	b)	Define seeback effect.	R	2	
	c)	Draw the diagram liquid level measurement using float.	R	3	
	d)	List two application of active transducer.	R	1	
	e)	Give the classification between NTC & PTC any two.	R	2	
	f)	List two disadvantages of LVDT.	R	3	
Q.2		Attempt any FOUR			(16)
	a)	Define the term active transducer and passive transducer with two examples of each.	R	1	
	b)	Explain construction of thermister. State its working principle.	U	2	
	c)	Explain working of RVDT with diagram.	U	3	
	d)	Explain with examples primary transducer and secondary transducer.	U	1	
	e)	Describe the working of thermocouple for temperature measurement.	U	2	
	f)	Explain capacitive level detector with neat diagram.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Give difference between analog transducer and digital transducer.	R	1	
	b)	Explain with neat sketch construction of RTD.	U	2	
	c)	Explain working of LVDT with diagram.	U	3	
	d)	Define an electrical transducer list four advantages of electrical transducer.	R	1	
P.T.O					

	e)	Explain the working of optical pyrometer.	R	2
	f)	Explain with diagram liquid level measurement using ultrasonic method.	U	3
Section-II				
Q.4		Attempt any FOUR		(08)
	a)	Define flow & give its classification.	R	4
	b)	Write any two advantages of strain gauge.	R	4
	c)	Draw construction diagram of ultrasonic flow meter.	R	4
	d)	Define telemetry.	R	5
	e)	Draw block diagram DC signal conditioning system.	R	6
	f)	State the need of preamplification & filtering.	U	6
Q.5		Attempt any FOUR		(16)
	a)	Explain construction & working of strain gauge with diagram.	U	4
	b)	Explain with neat diagram hot wire anemometer.	U	4
	c)	Explain any two types of telemetry system.	U	5
	d)	Draw & explain block diagram of telemetry.	U	5
	e)	Explain logarithmic compression with an example.	U	6
	f)	Draw & explain block diagram of AC signal conditioning system.	U	6
Q.6		Attempt any FOUR		(16)
	a)	Explain working of electromagnetic flow meter. Write any two advantages of it.	U	4
	b)	Draw construction & explain working of diaphragm.	U	4
	c)	Explain microwave & power line carrier channels used for telemetry.	U	5
	d)	Explain in detail PAM telemetry.	U	5
	e)	Draw block diagram of single channel data acquisition system & explain it.	U	6
	f)	Define sensor. Explain RFID sensor in detail.	U	6

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- **FIRST**

PROGRAM : **CE/ME/SM/MT**

COURSE CODE :- **CCF103/X103/X109/CCE103**

COURSE NAME :- **CHEMISTRY OF ENGINEERING MATERIALS /
ENGINEERING CHEMISTRY**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **09/05/2019**

Instruction :-

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 103	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Write electronic configuration of 20Ca^{40} , 7N^{14}	U	1	
	b)	State Aufbau principle.	R	1	
	c)	Define electroplating.	R	2	
	d)	State Faraday's first law of electrolysis.	R	2	
	e)	What is corrosion?	R	3	
	f)	Mention factors affecting Wet corrosion.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain Bohr's theory of atom.	U	1	
	b)	On the basis of electrovalency explain the formation of NaCl molecule.	A	1	
	c)	Distinguish between atom and ion.	U	2	
	d)	What is degree of ionization? Explain any three factors affecting on it	U	2	
	e)	With neat labelled diagram explain the process of galvanizing.	U	2	
	f)	Name and explain the process used to protect the large sized and irregular shaped articles.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Distinguish between i) Soft water and Hard water ii) Temporary Hardness and permanent hardness.	U	4	
	b)	Write any four reactions of hard water with soap.	A	4	
	c)	If hard water is used for drinking and cooking purpose then write its disadvantages.	U	4	
	d)	What is meant by scale formation in boilers? Explain its causes.	U	4	
	e)	How will you sterilize impure water by using bleaching powder? Explain with the help of chemical reactions.	U	4	
	f)	With the help of chemical reactions explain the regeneration of both the types of resins.	A	4	

P.T.O.

Q.4	Attempt any FOUR :			08
	a)	Distinguish between mineral and ore (any two points)	U	6
	b)	Define alloy and Gangue.	R	6
	c)	Select lubricants for sewing machine and state its properties.	A	7
	d)	State functions of Drying oil and pigment. (Each two functions)	R	7
	e)	Define Adhesive and composite materials.	R	7
	f)	Write preparation of Glass Wool.	R	7
Q.5	Attempt any FOUR :			16
	a)	With example state four purposes of making alloy.	R	6
	b)	With diagram explain extreme pressure lubrication.	U	7
	c)	Distinguish between paint and varnish (any four points)	U	7
	d)	State four engineering properties and their related applications of plastic	U	7
	e)	Explain with chemical reactions vulcanization of rubber.	U	7
	f)	Classify composite materials and state its applications.	U	7
Q.6	Attempt any FOUR :			16
	a)	Distinguish between calcination and roasting (any four points)	U	6
	b)	With diagram explain Electromagnetic separation method.	U	6
	c)	Define lubricant. Write functions of lubricants.	U	7
	d)	Write characteristics of oil paint. Write functions of plasticizer and Thinner (two each)	R	7
	e)	With example explain condensation polymerization.	U	7
	f)	Define i) Tack ii) Elasticity iii) Rebound iv) Abrasion resistance.	R	5

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF106/0108/X110/CCE106/R108 COURSE NAME: ENGINEERING MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 13/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.

7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U> Understanding, A>Application CO>Course outcome**

QN	S Q N	Question Text	R U A	CO CCF106	Marks
Q.1		Attempt any FOUR			(08)
	a)	Find centroid of a triangle whose vertices are (-1, 2), (3, 2), (4, 5)	R	1	
	b)	Find the distance between parallel lines $3x+2y-6=0$ and $3x+2y-12=0$	U	1	
	c)	Find equation of line passing through (-4, 6) and (8, -3)	R	1	
	d)	Find center and radius of circle $2x^2+2y^2+5x-6y+4=0$	U	1	
	e)	Find equation of circle having center (-1, -2) and radius $\sqrt{15}$	R	1	
	f)	Show that the root of equation $x^3 - 2x - 5 = 0$ lies between 2 and 3	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Find area of quadrilateral whose vertices are (4, 1), (-3, 0), (-2, 3) and (3, 4)	A	1	
	b)	Find the equation of straight line passing through (4, 5) and perpendicular to the line $7x - 5y = 420$	U / A	1	
	c)	Find the equation of circle whose center is at point of intersection of lines $2x+3y=13$, $5x-y=7$ and passing through the point (1, -1).	A	1	
	d)	Using Bisection method, find the approximate root of $x^2 + x - 3 = 0$ (Three iteration only)	A	2	
	e)	Using Regula falsi method find real root of the equation $xe^x = 3$ (Two iteration)	A	2	
	f)	Using Bisection method find value of $\sqrt{10}$ by performing three iteration	A	2	
Q.3		Attempt any FOUR			(16)
	a)	Find the angle between the lines $y = 5x + 6$, $y = x$	A	1	
	b)	Find the equation of circle whose center is at (-1, 3) and which touches the line $2x+y=4$	U / A	1	
	c)	Solve the following equation by Jacobi's method $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$	A	2	
	d)	Solve the equation by using Gauss-seidal method, $4x + y + 2z = 12$, $-x + 11y + 4z = 33$, $2x - 3y + 8z = 20$	A	2	

P.T.O

	e)	Solve the following equations by Gauss –seidal method $5x - y = 9$, $x - 5y + z = -4$, $y - 5z = 6$	A	2	
	f)	Solve the following equations by Jacobis method $10x + y + z = 12$, $x + 10y + z = 12$, $x + y + 10z = 12$	A	2	
Q.4		Attempt any FOUR			(08)
	a)	If $f(x) = \frac{x^2 + 2x + 5}{x^3 + 8}$ find $f(1) + f(-1)$	U	3	
	b)	Define odd and even functions	R	3	
	c)	Evaluate $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$	U / A	3	
	d)	Evaluate $\lim_{x \rightarrow 0} \frac{3 \sin x + 4x}{7x - 2 \tan x}$	U / A	3	
	e)	State the Quotient Rule of the Derivative.	U	4	
	f)	Find the slope of the tangent to the circle $x^2 + y^2 = 25$ at $(-3, 4)$	A	4	
Q.5		Attempt any FOUR			(16)
	a)	If $f(x) = \frac{1}{1-x}$ then show that $f(f(f(x))) = x$	U	3	
	b)	Evaluate $\lim_{x \rightarrow \infty} \left(\sqrt{x^2 + 3x + 2} - \sqrt{x^2 + x + 1} \right)$	A	3	
	c)	If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then show that $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$	U	4	
	d)	Find $\frac{dy}{dx}$ if $y = \tan^{-1} \sqrt{\frac{1-x}{1+x}}$	A	4	
	e)	Find $\frac{dy}{dx}$ if $y = (x)^{\sin x} + (\sin x)^x$	A	4	
	f)	Find the equations of the tangents to the curve $y = x^2 - 2x - 3$ where it meets the x-axis	A	4	
Q.6		Attempt any FOUR			(16)
	a)	Evaluate $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \frac{\pi}{4}}$	A	3	
	b)	Find $\frac{dy}{dx}$ if $\sin y = \log(x + y)$	A	4	
	c)	If $y = \cos^{-1} \left(\frac{\cos x + \sqrt{3} \sin x}{2} \right)$ show that $\frac{dy}{dx} = -1$	U	4	
	d)	If $x = 3 \cos \theta - 2 \cos^3 \theta$ and $y = 3 \sin \theta - 2 \sin^3 \theta$ find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$	A	4	
	e)	If $y = (\sin^{-1} x)^2$ prove that $(1 - x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - 2 = 0$	U	4	
	f)	A metal wire 36 cm long is bent to form a rectangle. Find its dimensions when its area is maximum.	A	4	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: THIRD

COURSE CODE:

PROGRAM: EE/E&TC/IE/IT

EEF301/EIF301/TF301/EE201/EEE305/0201/EJ201/ETE301/IX201/IEE301/IT201/IF201/TTE301/6201

COURSE NAME: APPLIED MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 10/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

S QN	S Q	N	Question Text	R U A	CO EEF301	Marks
Q.1			Attempt any FOUR			(08)
	a)		Evaluate $\int_{x-2}^{x+3} dx$	U	1	
	b)		Find the area under the curve $y = \cos x$ & $x = 0$ & $x = \pi$	A	1	
	c)		Evaluate $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}$	R	1	
	d)		Evaluate $\int \sqrt{1-\cos 2x} dx$	R	1	
	e)		Find the mean value of the function $y = 3e^{-x}$ over the range from $x = 0$ to $x = 1$	A	1	
	f)		Evaluate $\int_0^6 \frac{3-5x^2+9x^4-10x^6}{x^6} dx$	R	1	
Q.2			Attempt any FOUR			(16)
	a)		Evaluate $\int \frac{x^5}{1+x^{12}} dx$	U	1	
	b)		Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by integration method.	A	1	
	c)		Evaluate $\int \frac{1-\tan x}{1+\tan x} dx$	U	1	
	d)		Evaluate $\int_0^{\pi/2} \cos^2 x dx$	A	1	
	e)		Evaluate $\int \cot^{-1} x dx$	A	1	
	f)		Evaluate $\int_2^6 \frac{\sqrt{1-x} dx}{\sqrt{1-x} + \sqrt{x-7}}$	A	1	
Q.3			Attempt any FOUR			(16)
	a)		Evaluate $\int \frac{(x^2+1)dx}{x(2x-1)(1-x)}$	A	1	
	b)		Evaluate $\int_{-1}^1 \frac{x+x^2}{x^2+1} dx$	A	1	

P.T.O

	c)	Find the area enclosed between the parabola $y^2 = 4x$ and the line $2x - y = 4$	A	1	
	d)	Evaluate $\int \cos(\sqrt{x}) dx$	U	1	
	e)	If $i_1 = 10 \sin wt$ & $i_2 = 20 \cos wt$ Find $i_1 + i_2$ in the form $r \sin(wt + \alpha)$ & calculate the R.M.S value over the range from $t = 0$ to $t = \frac{\pi}{w}$	A	1	
	f)	Evaluate $\int \frac{dx}{(x+1)(x^2+4)}$	A	1	
Q.4		Attempt any FOUR			(08)
	a)	Define order and degree of a differential equation.	R	2	
	b)	Find order and degree of the following differential equation $\frac{y-x \frac{dy}{dx}}{\frac{dy}{dx}} = \left(\frac{dy}{dx} \right)^2$	R	2	
	c)	Define i) Conjugate of a complex number ii) Modulus of a complex number.	R	3	
	d)	Find real and imaginary part of $\frac{1+i}{1-i}$	R	3	
	e)	Find the value of $i^{30} + i^{40} + i^{60}$	R	3	
	f)	Separate into real and imaginary parts: $\cosh(x+iy)$	R	3	
Q.5		Attempt any FOUR			(16)
	a)	Show that $y^2 = ax^2$ is a solution of $x \left(\frac{dy}{dx} \right)^2 - 2y \frac{dy}{dx} + ax = 0$	U	2	
	b)	Find the equation of the curve whose slope of the tangent at any point (x, y) is $3x-4$ and which passes through the point $(3, 2)$	A	2	
	c)	Prove that $(1+i)^8 + (1-i)^8 = 32$, by using De-Moivre's theorem.	U	3	
	d)	Solve by using variable separable method $x - y \frac{dx}{dy} = a \left(x^2 + \frac{dx}{dy} \right)$	A	2	
	e)	Use De Moivre's theorem to find $\frac{(\cos 2\theta + i \sin 2\theta)^{3/2} (\cos \theta - i \sin \theta)^3}{(\cos 3\theta - i \sin 3\theta)^2 (\cos 5\theta - i \sin 5\theta)^{2/5}}$	A	3	
	f)	Solve $x(y-x) \frac{dy}{dx} = y(x+y)$	A	2	
Q.6		Attempt any FOUR			(16)
	a)	Show that $\frac{2x}{y^3} dx + \frac{y^2 - 3x^2}{y^4} dy = 0$ is exact differential equation and hence solve it.	U	2	
	b)	The particle starts from rest, its acceleration at any time is $(t+3)m/s^2$. Find the distance travelled in 4 seconds.	A	2	
	c)	Using Euler's formula, prove that $\cos A - \cos B = -2 \sin \left(\frac{A+B}{2} \right) \cdot \sin \left(\frac{A-B}{2} \right)$	U	3	
	d)	Solve $x \log x \frac{dy}{dx} + y = 2 \log x$	A	2	
	e)	Find modulus and amplitude of $\frac{(1+i)(2+i)}{3-i}$	A	3	
	f)	Find cube root of unity.	A	3	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **THIRD**

COURSE CODE:

CEF301/MEF301/MTE301/SMF310/1201/C201/CEE301/2201/M201/ME201/MEE301/MG201/SM201/SME301

COURSE NAME: **APPLIED MATHEMATICS**

MAX. MARKS: **80**

PROGRAM: **CE/ME/SM/MT**

TIME: **3 HRS.**

DATE: **10/05/2019**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO CEF301	Marks
Q.1		Attempt any FOUR			(08)
	a)	Evaluate $\int_{x-2}^{x+3} dx$	U	1	
	b)	Find the area under the curve $y = \cos x$ & $x = 0$ & $x = \pi$	A	1	
	c)	Evaluate $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}$	R	1	
	d)	Evaluate $\int \sqrt{1-\cos 2x} dx$	R	1	
	e)	Find the mean value of the function $y = 3e^{-x}$ over the range from $x = 0$ to $x = 1$	A	1	
	f)	Evaluate $\int \frac{3-5x^2+9x^4-10x^6}{x^6} dx$	R	1	
Q.2		Attempt any FOUR			(16)
	a)	Evaluate $\int \frac{x^5}{1+x^{12}} dx$	U	1	
	b)	Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by integration method.	A	1	
	c)	Evaluate $\int \frac{1-\tan x}{1+\tan x} dx$	U	1	
	d)	Evaluate $\int_0^{\frac{\pi}{2}} \cos^2 x dx$	A	1	
	e)	Evaluate $\int \cot^{-1} x dx$	A	1	
	f)	Evaluate $\int_2^6 \frac{\sqrt{1-x} dx}{\sqrt{1-x} + \sqrt{x-7}}$	A	1	
Q.3		Attempt any FOUR			(16)
	a)	Evaluate $\int \frac{(x^2+1)dx}{x(2x-1)(1-x)}$	A	1	
	b)	Evaluate $\int_{-1}^1 \frac{x+x^2}{x^2+1} dx$	A	1	
	c)	Find the area enclosed between the parabola $y^2 = 4x$ and the line $2x - y = 4$	A	1	
P.T.O					

	d)	Evaluate $\int \cos(\sqrt{x}) dx$	U	1										
	e)	If $i_1 = 10 \sin wt$ & $i_2 = 20 \cos wt$ Find $i_1 + i_2$ in the form $r \sin(wt + \alpha)$ & calculate the R.M.S value over the range from $t = 0$ to $t = \frac{\pi}{w}$	A	1										
	f)	Evaluate $\int \frac{dx}{(x+1)(x^2+4)}$	A	1										
Q.4		Attempt any FOUR			(08)									
	a)	Define order and degree of a differential equation.	R	2										
	b)	What is the solution of a linear differential equation $\frac{dy}{dx} + Py = Q$. Where P and Q are functions of x only or constants.	R	2										
	c)	Show that the differential equation $(ye^{xy} - 2y^2)dx + (xe^{xy} - 6xy^2 - 2y)dy = 0$ is exact.	U	2										
	d)	If C.V of a distribution is 4 with mean 80 find S.D.	R	3										
	e)	The two sets of observations are given below: <table><tr><td>Set I</td><td>Set II</td></tr><tr><td>$\bar{x} = 82.5$</td><td>$\bar{x} = 48.75$</td></tr><tr><td>$\sigma = 73$</td><td>$\sigma = 8.35$</td></tr></table> Which of the two sets is more consistent?	Set I	Set II	$\bar{x} = 82.5$	$\bar{x} = 48.75$	$\sigma = 73$	$\sigma = 8.35$						
Set I	Set II													
$\bar{x} = 82.5$	$\bar{x} = 48.75$													
$\sigma = 73$	$\sigma = 8.35$													
	f)	Two coins tossed simultaneously. Find the probability of getting at least one head.	R	4										
Q.5		Attempt any FOUR			(16)									
	a)	Solve $(1 + y^2)dx = (\tan^{-1} y - x)dy$	A	2										
	b)	Show that the solution of D.E $\left(4 - \frac{y^2}{x^2}\right)dx + \frac{2y}{x}dy = 0$ is $4x^2 + y^2 = cx$	U	2										
	c)	Solve $x \log x \frac{dy}{dx} + y = 2 \log x$	A	2										
	d)	Solve $x(x + y)dy - y^2dx = 0$	A	2										
	e)	Find the particular solution of D.E $y\sqrt{1 - x^2}dy + x\sqrt{1 - y^2}dx = 0$ When $x = \frac{3}{4}, y = \frac{4}{5}$	A	2										
	f)	A set of 18 items has mean and variance 7 and 16 respectively. But one number was taken 21 instead of 12 by mistake. Calculate correct mean and correct S.D.	U	3										
Q.6		Attempt any FOUR			(16)									
	a)	Two kinds of electric bulbs of the same wattage manufactured by a factory have mean life and S.D as given below: <table><tr><td>Sample</td><td>Mean life</td><td>S.D</td></tr><tr><td>A</td><td>1620hrs</td><td>300hrs</td></tr><tr><td>B</td><td>1940hrs</td><td>345hrs</td></tr></table> Which of the two bulbs has a greater variability?	Sample	Mean life	S.D	A	1620hrs	300hrs	B	1940hrs	345hrs	U	3	
Sample	Mean life	S.D												
A	1620hrs	300hrs												
B	1940hrs	345hrs												

b)	The following data gives the age in years of 100 voters of certain constituency.							A	3																																							
<table><tr><td>Age less than or equal to</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td></tr><tr><td>No of Voters</td><td>13</td><td>40</td><td>68</td><td>80</td><td>90</td><td>97</td><td>100</td></tr></table>									Age less than or equal to	30	40	50	60	70	80	90	No of Voters	13	40	68	80	90	97	100																								
Age less than or equal to	30	40	50	60	70	80	90																																									
No of Voters	13	40	68	80	90	97	100																																									
Find mean and S.D																																																
c)	Find the mean deviation from the mean for the following data							A	3																																							
<table><tr><td>C.I</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr><tr><td>Frequen cy</td><td>4</td><td>6</td><td>10</td><td>18</td><td>9</td><td>3</td></tr></table>									C.I	10-20	20-30	30-40	40-50	50-60	60-70	Frequen cy	4	6	10	18	9	3																										
C.I	10-20	20-30	30-40	40-50	50-60	60-70																																										
Frequen cy	4	6	10	18	9	3																																										
d)	The weights in gms of the tins are given below.							A	3																																							
<table><tr><td>Wt in gms</td><td>900-920</td><td>920-940</td><td>940-960</td><td>960-980</td><td>980-1000</td><td>1000-1020</td><td>1020-1040</td></tr><tr><td></td><td>920</td><td>940</td><td>960</td><td>980</td><td>1000</td><td>-</td><td>-</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>1020</td><td>1040</td><td>1060</td></tr><tr><td>No of tins</td><td>4</td><td>11</td><td>63</td><td>90</td><td>73</td><td>38</td><td>10</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>05</td></tr></table>									Wt in gms	900-920	920-940	940-960	960-980	980-1000	1000-1020	1020-1040		920	940	960	980	1000	-	-						1020	1040	1060	No of tins	4	11	63	90	73	38	10								05
Wt in gms	900-920	920-940	940-960	960-980	980-1000	1000-1020	1020-1040																																									
	920	940	960	980	1000	-	-																																									
					1020	1040	1060																																									
No of tins	4	11	63	90	73	38	10																																									
							05																																									
Calculate S.D by using step deviation method.																																																
e)	A box contains 10 radio valves of which 4 are defective. Show that the probability is $\frac{2}{15}$ if two of them valves are taken from the box such that both are defective.							U	4																																							
f)	The probability that a student passes H.S.C examination is $\frac{2}{3}$ and the probability that he passes both H.S.C and IIT entrance examinations is $\frac{14}{45}$. The probability that he passes atleast one examination is $\frac{4}{5}$. What is the probability that he passes the IIT entrance examination?							A	4																																							

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- FOURTH **PROGRAM : IE & E& TC**

COURSE CODE :- EIF402/IEE502

COURSE NAME EMBEDDED SYSTEMS

MAX. MARKS : 80 **TIME : 3 HRS.** **DATE :- 13/05 / 2019**

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I	R/ U/ A	Co EIF 402	Mar ks
Q.1		Attempt any FOUR :			08
	a)	State the data types used for 8051 C programming.	R	1	
	b)	Write an 8051 C program to send the values -4 to +4 to port 1.	U	1	
	c)	State advantages of serial communication over parallel communication.	R	2	
	d)	Enlist the interrupts of 8051 priority wise with their vector addresses	R	3	
	e)	Find out the value to be loaded in TMOD SFR to configure Timer 0 in mode 1 and counter 1 in mode 0.	U	2	
	f)	Draw the format of IE SFR mentioning all the bits from D7 to D0.	R	3	
Q.2		Attempt any FOUR :			16
	a)	State DB-9 signals for RS232 standard and explain the function of any two signals.	R	2	
	b)	State why we use TCON register in 8051 interrupt programming. Draw its suitable format and explain in detail.	R	3	
	c)	Write an 8051 C program to toggle all bits of port 1 after 250ms delay. Use MSdelay () Function. Use logical operator to toggle the bits of port 1.	U	1	
	d)	Write a 8051 C program to perform following, i) To read a single bit of data from P1.7 and send it to P1.0 continuously. ii) Create a square wave of 200 ms period on pin P2.5. Use timer 0 to create the square wave. Assume XTAL= 11.0592 MHz.	A	3	
	e)	Write a C language program for 8051 to toggle bits of port 0 continuously using timer 0 in mode 1 at an interval of 10m Sec. Assume X TAL = 12 KHz.	A	2	
	f)	Write a C language program for 8051 microcontroller using interrupts to do the following. i) To use timer 0 as an event counter to count the external pulses fed to pin T0 (P 3.4) of 8051 and display it on P0. ii) Simultaneously create a square wave of 2 KHz frequency at P2.0 using T1 in 8 bit auto reload mode (mode 2)	A	3	

P.T.O.

Q.3	Attempt any FOUR :			16
a)	Assuming that a door sensor is connected to pin P2.0, write a 8051 C program to monitor the status of door sensor switch (SW) and transmit the two messages on serial port as following. i) If SW=0 (closed) : "DOOR OPENED" ii) If SW=1 (open) : "DOOR CLOSED" Set Band rate = 4800, 8 bit UART mode. Assume XTAL = 11.0592 KHz	A	2	
b)	Assume 4 bytes of hexadecimal data : 25H,62H, 3FH & 52H. write a 8051 C program to i) Calculate the checksum byte for above data ii) Checksum operation to ensure data integrity.	A	1	
c)	State the steps involved in programming 8051 timers in mode 1 and mode 2.	R	2	
d)	Give the interrupt priority upon Reset. Draw the format of IP register and explain the significance of each bit.	R	3	
e)	Write an 8051 C program to convert FDH to decimal and display on port P0, P1,P2. (P0 as LSB)	A	1	
f)	Two switches (SW 1 & SW 2) are connected to $\overline{INT0}$ & $\overline{INT1}$ of 8051 microcontroller. Write a 8051 c program to perform following. i) When SW 1 is pressed, turn ON all LEDs connected to port 0. ii) When SW2 is pressed, turn ON all LEDs connected to port 1.	A	3	
		R/ U/ A	Co EIF 402	Mar ks
Q.4	Section- II Attempt any FOUR :			08
a)	State formula through which step voltage can be calculated in DAC.	R	4	
b)	Give functions of EOC and SOC pins in ADC 0808/0809.	R	4	
c)	True or Falls following i) IRQ is an input pin ii) SQW is output pin	R	5	
d)	How much NV-RAM present for DS 12887?	R	5	
e)	State the tips for writing efficient programs in C for embedded systems.	P	6	
f)	State selection criteria for ADC.	R	6	
Q.5	Attempt any FOUR :			16
a)	Write C program to generate staircase waveform using DAC 0808.	A	4	
b)	Write C program to generate Triangular waveform using DAC 0808.	A	5	
c)	Write 'C' program to display "WELCOME" on LCD.	A	6	
d)	Write 'C' program to rotate stepper motor in clockwise direction using angle 1.8° .	A	5	
e)	Draw an interfacing diagram of DC motor using L293 D with 8051 μ C.	R	5	
f)	Draw flow chart for sensor interfacing system for 8051 μ C.	U	6	

Q.6	Attempt any FOUR :		16
		U	4
a)	Write a flowchart and algorithm to read data from ADC 0808.	U	4
b)	Draw an interfacing diagram of 4 X 4 matrix keypad with 8051 μ C.	U/ A	5
c)	Write 'C' program to rotate DC motor in clockwise direction.	A	5
d)	Write 'C' program to set time <u>9:15:00PM</u> of RTC 12887.	A	5
e)	Write 'C' program to generate 512Hz square wave on SQW pin.	A	5
f)	Design 8051 μ C based data acquisition system with its labels for parameters like temperature, pressure etc.	A	6

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL : - FIRST

COURSE CODE :-

CCF104/CCE104

COURSE NAME

PROGRAM : EE / IE / IT / E & TC

CHEMISTRY OF ENGINEERING MATERIALS /

ENGINEERING CHEMISTRY

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 08/05/2019

Instruction :-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Q	N	Question Text	R/ U/ A	Co CCF 104	Ma rks
Q.1				Attempt any FOUR:			08
	a)			Explain fundamental particles of atom.	U	1	
	b)			Define i) Atomic number ii) Mass number.	R	1	
	c)			State Faraday's second law of electrolysis.	R	2	
	d)			Define i) Electro plating ii) Electrode.	R	2	
	e)			Define i) Atmospheric corrosion. ii) Electrochemical corrosion.	R	3	
	f)			Explain why Porous oxide film is called as non-protective film.	U	3	
Q.2				Attempt any FOUR:			16
	a)			i) State Pauli's exclusion principle.	R	1	
				i) Write electronic configuration of 20Ca^{40} , 12Mg^{24} .			
	b)			Differentiate between metallic conduction and electrolytic conduction.	U	2	
	c)			Explain Tinning method of electroplating with diagram.	U	3	
	d)			Explain disadvantages of hard water in i) Textile industry ii) Dyeing industry	U	4	
	e)			Write any four reactions of hard water with soap.	U	4	
	f)			Explain causes of scale formation in boilers.	U	4	
Q.3				Attempt any FOUR:			16
	a)			Explain Lewis and Langmuir's concept of stable electronic configuration.	U	1	
	b)			An electric current is passed through a solution of ZnSO_4 and CuSO_4 connected in series. If in a given time 0.716 gm of Zn is deposited, what would be the weight of Cu that would deposit in the same time? (At. Wt. of Cu = 63.5 and Zn = 65)	A	2	
	c)			Explain with diagram the method which is used to coat the metal in form of sheet.	U	3	
	d)			Explain the method for sterilization of water by using Chloroamine.	U	4	

P.T.O.

	e)	Define pH. Draw pH scale. Write impurities in water.	R	4
	f)	Differentiate between Hard water and Soft water. (any four points)	U	4
				08
Q.4		Attempt any FOUR :		
	a)	Draw a neat labelled diagram of gravity separation method.	U	5
	b)	Define i) E.M.F. ii) Discharge	R	5
	c)	Give important ores of copper with their molecular formula.	A	6
	d)	Distinguish between ferrous and non ferrous alloys (any 2 points)	U	6
	e)	Write two properties of graphitic.	R	6
	f)	Classify the composite materials with example.	R	7
				16
Q.5		Attempt any FOUR :		
	a)	Give charging and discharging reactions of lead acid storage cell.	R	5
	b)	Draw a neat labelled diagram of dry cell. Explain its construction and working.	U	5
	c)	Name and explain method used for concentration of Sulphide ores.	A	6
	d)	State and explain purposes of making alloys (any four)	R	6
	e)	Write properties and applications of germanium as a semiconductor.	R	6
	f)	Distinguish between thermosetting and thermosetting plastics.	U	7
				16
Q.6		Attempt any FOUR :		
	a)	Draw a neat labelled diagram and explain working and advantages of hydrogen-oxygen fuel cell.	R	5
	b)	Define i) Flux ii) Mineral iii) Ore iv) Gangue.	R	5
	c)	Distinguish between calcination and roasting. (any 4 points)	U	6
	d)	Explain with diagram electro refining of copper.	U	6
	e)	Give preparation, properties and applications of thermocole.	U	7
	f)	Write properties and applications of Teflon.	U	7

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EVEN TERM ENDE EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH**PROGRAM : IE / E & TC****COURSE CODE :- EIF401/IX211/IEE401/ETE401****COURSE NAME :- POWER ELECTRONICS - I****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 08/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I	R/ U/ A	Co EIF 401	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Draw symbol of DIAC and TRIAC.	R	1	
	b)	Describe turn on specification of SCR.	U	1	
	c)	Draw V-I characteristic of DIAC.	R	1	
	d)	Explain voltage triggering of SCR.	U	2	
	e)	Define commutation.	R	3	
	f)	Construct a diagram and waveform of Class F commutation.	A	3	
Q.2		Attempt any FOUR :			16
	a)	Explain with diagram V-I characteristic of TRIAC.	U	1	
	b)	Give any four differences between PUT & UJT.	U	1	
	c)	Draw symbol, construction diagram and V-I characteristic of power transistor.	R	1	
	d)	Explain light triggering and $\frac{dv}{dt}$ triggering of SCR.	U	2	
	e)	Derive equation for time period of PUT relaxation oscillator.	A	2	
	f)	Explain with diagram class C commutation.	U	3	
Q.3		Attempt any TWO :			16
	a)	Explain with diagram Mode II & Mode III of TRIAC.	U	1	
	b)	i) Draw and explain TRIAC triggering using DIAC. ii) Identify advantages of PUT over UJT.	U	2	
			A	2	
	c)	Draw diagram and waveform of class B commutation and explain its working.	R	2	

P.T.O.

QN		Section- II		R/ U/ A	Co MEF 503	Mar ks
Q.4	S Q N	Attempt any FOUR :				08
	a)	State the need of parallel connection of SCR.		U	4	
	b)	What is the reason of unequal distribution of current? (state any two)		U	4	
	c)	Define i) T.U.F. ii) Ripple factor with respect of uncontrolled rectifier.		R	5	
	d)	Draw the input/output waveforms of 3 ϕ uncontrolled bridge rectifier circuit for resistive load.		R	5	
	e)	State the need of controlled rectifier circuit.		U	6	
	f)	State the function of freewheeling diode in controlled rectifier circuits.		U	6	
Q.5		Attempt any FOUR :				16
	a)	Compare uncontrolled and controlled rectifier (any four points)		U	6	
	b)	Draw the circuit diagram and input/output waveforms of single phase half wave controlled rectifier with RL load and freewheeling diode.		R	6	
	c)	Explain the need of series and parallel connection of SCR.		U	4	
	d)	List any four advantages of 3 ϕ uncontrolled rectifier.		U	5	
	e)	Explain with neat circuit diagram operating principle of 3 ϕ half wave uncontrolled rectifier.		U	5	
	f)	Explain operation of current equalization network.		U	4	
Q.6		Attempt any FOUR :				16
	a)	With neat circuit diagram explain static voltage equalization circuit.		U	4	
	b)	Compare 1 ϕ & 3 ϕ uncontrolled rectifier. (any four points)		R	5	
	c)	State the operating principle of 3 ϕ uncontrolled bridge rectifier. Draw vector diagram for the same.		U/ R	5	
	d)	Describe with neat circuit diagram operating principle of 1 ϕ half wave controlled rectifier with R-load.		U	6	
	e)	Explain concept of two quadrant operation for fullwave controlled rectifier.		U	6	
	f)	Explain concept of inductive load for 1 ϕ fullwave controlled rectifier.		U	6	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: Third

PROGRAM: IE/E & TC

COURSE CODE: EIF 307/ETE 307/IEE 307/COURSE NAME: LINEAR INTEGRATED CIRCUITS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 09/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application

QN	S. Q. N	Question Text	Cognition Level R/U/A	Co Code EIF 307	Marks
Q.1		Attempt any FOUR			(08)
	a)	Draw Symbol of OP-amp.	R	01	
	b)	Define 1) Input offset current 2) Power Consumption	R	01	
	c)	Calculate output voltage of inverting op-amp with $R_1 = 20k\Omega$ and $R_f = 100k\Omega$ and input voltage $V_i = 20mv$.	A	02	
	d)	Explain Virtual ground Concept.	U	02	
	e)	Draw transfer characteristics of a comparator.	R	03	
	f)	Draw circuit diagram of Current to Voltage Converter using op-amp and give its output expression.	R	03	
Q.2		Attempt any FOUR			(16)
	a)	Draw the block diagram of an op-amp and Explain the purpose of each block.	U	01	
	b)	List Characteristics of an ideal op-amp (any four).	R	01	
	c)	Derive output expression for subtractor with diagram.	A	02	
	d)	Draw inverting summing amplifier and determine output voltage if $V_1 = 4V$, $V_2 = 5V$ and $V_3 = 6V$ with $R_1 = R_2 = R_3 = 2k\Omega$ and $R_f = 2k\Omega$	A	02	
	e)	Derive output expression for 3-op-amp instrumentation amplifier.	A	03	
	f)	Explain full-wave precision rectifier using op-amp with output waveform.	U	03	
Q.3		Attempt any FOUR			(16)
	a)	Define 1) Input offset voltage 2) SVRR 3) Slew rate 4) CMRR	R	01	
	b)	Explain need and circuit diagram of level shifting stage	U	01	
	c)	Derive output expression for non-inverting summing amplifier.	A	02	
	d)	Design a practical differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 1 KHz	A	02	
	e)	Derive output expression for voltage to current converter with grounded load	A	03	
				P.T.O	

	f)	Explain window detector with the help of circuit diagram and waveform.	U	03	
Q.4		Attempt any FOUR			(08)
	a)	Draw pin diagram of IC 566.	R	04	
	b)	Give classification of Filters.	R	05	
	c)	Define the following parameter with respect to filter 1) cut-off Frequency 2) Q-Factor	R	05	
	d)	Draw Transfer characteristics of PLL.	R	06	
	e)	Define the following parameter with respect to PLL 1) Centre frequency 2) Lock range	R	06	
	f)	Draw a neat circuit diagram of Quadrature oscillator.	R/A	04	
Q.5		Attempt any FOUR			(16)
	a)	Define order of Filter. Explain with proper graph state one advantage of Higher order filters and one disadvantage of higher order filters.	U	05	
	b)	Describe with neat circuit diagram RC phase shift oscillator using op-amp.	U/A	04	
	c)	Explain with neat diagram how PLL can be used as frequency multiplier.	U/A	06	
	d)	Draw and explain monostable multi vibrator using IC555 with the help of wave forms.	VV	06	
	e)	Describe the operation of Opamp as astable multi vibrator with the help of circuit diagram and a wave form.	VV	06	
	f)	Define second order high pass filter for cut-off frequency of 20KHz & passband gain of 1.586.	A	04	
Q.6		Attempt any FOUR			(16)
	a)	Draw block diagram of PLL. State operating principle of it.	U	06	
	b)	Describe the operation of Frequency Synthesizer.	U	06	
	c)	With neat circuit diagram explain the operation of narrow band pass filter.	U	05	
	d)	Describe the operation of bistable multi vibrator using OPAMP.	U	04	
	e)	Design a low pass Butterworth filter with a cut off frequency of 1.5KHz and passband gain of 2. Draw frequency response curve for the same.	A	05	
	f)	Describe the operation of triangular wave from generator circuit.	U	04	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.****LEVEL :- THIRD****PROGRAM : IE & E & TC****COURSE CODE :- EIF306/ETE306/IEE306****COURSE NAME :- DIGITAL TECHNIQUES AND APPLICATIONS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 30 / 05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co EIF 306	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Add the following i) $(01011)_2 + (01111)_2$ ii) $(05)_8 + (05)_8$	A	1	
	b)	State and prove distributive law.	A	3	
	c)	Draw CMOS NOR gate.	R	3	
	d)	Define Minterm and Maxterm.	R	2	
	e)	Draw internal Pin diagram of IC 7402.	R	3	
	f)	State any four Boolean laws.	R	2	
Q.2		Attempt any FOUR :			16
	a)	Subtract the following decimal numbers by using 9's complement method. $(93)_{10} - (615)_{10}$.	A	1	
	b)	Apply DeMorgan's theorem to each of following expression. i) $\overline{\overline{P}(\overline{Q}+R)}$ ii) $\overline{\overline{P}+\overline{Q}}(\overline{R}+S)$	A	2	
	c)	Explain working of CMOS NAND gate with neat circuit diagram.	U	3	
	d)	Perform the following conversions. i) $(120.25)_{10} \longrightarrow (X)_2$ ii) $(12)_{10} \longrightarrow (X)_{\text{Gray code}}$	A	1	
	e)	Convert following SOP to its canonical SOP form $f(A,B,C) = AB + BC + \overline{A}\overline{C}$	A	2	
	f)	Explain working of CMOS NOR gate	U	3	
Q.3		Attempt any FOUR :			16
	a)	Perform the following subtraction by 2's complement method. $(01010101)_2 - (00010001)_2$.	A	1	
	b)	Compare TTL and CMOS logic family (any 4 points)	U	3	
	c)	Reduce the following Boolean expression by using K-map $f(R,S,T) = \overline{R}\overline{S}T + \overline{R}S\overline{T} + \overline{R}\overline{S}T + RST + R\overline{S}T$	A	2	

P.T.O.

	d)	Convert (10110) ₂ to i) Gray code ii) () ₁₆ iii) () ₁₀ iv) Excess – 3 code.	A	1
	e)	Explain the interfacing of TTL logic family to CMOS.	U	3
	f)	Using K-map, reduce the following expression. $f(A,B, \lambda) = \sum m(0,1,4,6,7) + \sum d(2)$	A	2
Q.4		Attempt any FOUR :		08
	a)	Explain half adder in brief with its truth table.	U	4
	b)	Name the IC used for Binary to BCD converter and state how many bit converter it is.	R	4
	c)	State the difference in Edge triggering and level triggering. Which one is preferred?	U	5
	d)	State the function of IC 6116. Give its capacity.	R	6
	e)	List any four applications of Demultiplexer.	R	4
	f)	Define sequential logic systems. State two sequential logic systems.	R	5
Q.5		Attempt any FOUR :		16
	a)	Describe all modes of operation in shift register in brief.	U	5
	b)	Explain operation of 4 bit binary asynchronous up counter with block diagram.	U	5
	c)	Explain the working of single slope ADC with block diagram.	U	6
	d)	Define decoder. How IC 74154 is used as a decoder?	R & U	4
	e)	Implement the following using multiplexer. $Y = \sum m(2, 3, 5, 6)$	A	4
	f)	Sketch interfacing diagram for BCD to 7 segment decoder using IC 7447.	R	4
Q.6		Attempt any FOUR :		16
	a)	Explain one digit BCD adder by using IC 7483.	U	4
	b)	Explain the operation of multiplexer with the help of block schematic.	U	4
	c)	Sketch logic diagram of IC74193. Give its application.	R	5
	d)	Sketch Edge-triggered S-R flip flop using NAND gate, explain its working with truth table.	R & U	5
	e)	Explain the following ROM, PROM, EPROM, EEPROM.	U	6
	f)	Design half subtractor using logic gates.	A	4

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EVEN TERM ENDE EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : E & TC & IE****COURSE CODE :- ETF310/ETET310/EJ208/IX208****COURSE NAME :- DIGITAL COMMUNICATION****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 21/05/2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co EIF 310	Ma rks
Q.1		Attempt any FOUR :			08
	a)	List the applications of PCM.	R	2	
	b)	State the bandwidth requirement of BPSK & QPSK.	R	3	
	c)	State the effects of noise on the channel.	R	1	
	d)	Define aliasing and write its two effects.	R	2	
	e)	Define QAM.	R	3	
	f)	State Shannon-Hartley theorem.	R	1	
Q.2		Attempt any FOUR :			16
	a)	Draw basic digital communication system and explain each block.	U	1	
	b)	With suitable example, explain sampling theorem. What is Nyquist rate?	U	2	2
	c)	Compare DM and ADM (any 4 points)	U	2	
	d)	Draw and explain block diagram of BPSK transmitter.	U	3	
	e)	Explain compounding in PCM.	U	2	
	f)	Explain frequency shift keying with the help of waveform.	U	3	
Q.3		Attempt any FOUR :			16
	a)	State the advantages and disadvantages of digital communication (any two each)	R	1	
	b)	Describe QPSK generator with waveforms.	U	3	
	c)	With sketches, explain the terms: i) Slope overload ii) Granular noise.	U	2	
	d)	Draw BASK and BFSK receiver block diagram.	R	3	
	e)	Compare PAM, PWM & PPM (any 4 points)	U	2	
	f)	Describe 16 QAM transmitter with block diagram.	U	3	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) Draw block diagram of SS digital communication system.	R	6	
	b) Write any two advantages of TDMA	R	5	
	c) Define hamming code and write its codeword structure.	R	4	
	d) Define PN sequence.	R	6	
	e) Write the need of multiplexing.	R	5	
	f) Define i) Unipolar code ii) Bipolar code.	R	4	
Q.5	Attempt any FOUR :			16
	a) Explain in detail OFDM.	U	5	
	b) Write any four applications of SS modulation.	U	6	
	c) Define line coding. Draw bipolar BRZ, unipolar RZ and manchester pattern for binary data stream 11000010.	A	4	
	d) Compare between TDM and FDM on basis of following points i) Definition ii) Synchronization iii) Cost iv) Application.	U	5	
	e) A receiver received the hamming code 01010101011 with even parity. Find the error in received code and give the corrected data.	A	4	
	f) Draw and explain block diagram of slow frequency hopping receiver.	U	6	
Q.6	Attempt any FOUR :			16
	a) Draw and explain block diagram of FDM transmitter.	U	5	
	b) Explain with example error detection by using parity method.	U	4	
	c) Compare between direct sequence spread spectrum and frequency hopping spread spectrum on the basis of following points. i) Definition ii) Chip rate ii) Modulation technique. iv) Processing gain.	U	6	
	d) Construct hamming code for data 110010111 with even parity.	A	4	
	e) The codeword received is 1100100101011 Check whether there are errors in the received codeword, if the divisor is 10101.	A	4	
	f) Explain with diagram WDM.	U	5	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: THIRD

COURSE CODE: IEF310/IEE310

MAX. MARKS: 80

PROGRAM: INDUSTRIAL ELECTRONICS

COURSE NAME: ELECTRIC MACHINES

TIME: 3 HRS.

DATE: 21/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO IEF 310	Marks
Q.1		Attempt any FOUR			(08)
	a)	Give classification of D.C generator.	R	1	
	b)	State principle of operation of D.C motor.	R	1	
	c)	Describe in brief the importance of Neutral wire for distribution transformer.	A	2	
	d)	Define voltage ratio of transformer and write the formula of it.	R	2	
	e)	Define- i) Slip and ii) Synchronous speed with respect to 3-phase induction motor.	R	3	
	f)	A 6-pole alternator running at 1000 rpm supplies to an 8 pole induction motor. Find the actual speed of the motor if the slip is 2.5 %.	A	3	
Q.2		Attempt any FOUR			(16)
	a)	Derive the emf equation of D.C generator.	U	1	
	b)	Explain in brief plate earthing with neat diagram.	A	2	
	c)	Explain the working of single phase transformer.	U	2	
	d)	Draw the equivalent circuit of single phase transformer referred to primary side and state the meaning of each term.	U +	2	
	e)	List four special feature of isolation transformer. Also state its four applications.	A U +	2	
	f)	A 25 KVA, 2200/220 V, single phase transformer has a primary resistance of 1Ω and secondary resistance of 0.01Ω . Find the full load efficiency at 0.8 p.f lagging, if the iron loss in the transformer is 200W.	R A	2	
Q.3		Attempt any FOUR			(16)
	a)	State four applications of following motors i) D.C series motor and ii) D.C shunt motor	R	1	
	b)	Compare squirrel cage induction motor with slip ring induction motor on four points.	U	3	
P.T.O					

c)	With neat diagram describe the Auto-transformer starter used for starting of three phase induction motor.	U A	3	
d)	Draw and explain Torque-speed characteristics of three phase induction motor.	U	3	
e)	A three phase, 400/200 V, star-star connected wound rotor induction motor has 0.06Ω rotor resistance and 0.3Ω Stand still reactance per phase. Find the additional resistance required in the rotor circuit to make the starting torque equal to the maximum torque.	A	3	
f)	A 6 pole, 50Hz, three phase induction motor runs at 960 r.p.m. When the torque on the shaft is 200 N-m. If the stator losses are 1500 W & friction and windage losses are 500 W, Find i) Rotor copper loss and ii) Efficiency of motor.	A	3	
Q.4	Attempt any FOUR			(08)
a)	What happens when the centrifugal starting switch fails to close?	U	4	
b)	Define voltage regulation of 3 ϕ alternator.	R	5	
c)	A variable reluctance stepper motor is constructed of ... material with salient poles. i) Paramagnetic ii) Ferromagnetic iii) Diamagnetic iv) Non- magnetic.	U	6	
d)	List the types of alternator according to the rotor construction.	R	5	
e)	State the principle of operation of shaded pole motor.	U	4	
f)	List the applications of D.C servo motor.	U	4	
Q.5	Attempt any FOUR			(16)
a)	What is stepper motor? Explain variable reluctance stepper motor.	U	6	
b)	Explain why the 1 ϕ I.M is not self starting.	U	4	
c)	State the advantages of stationary armature in case of alternator.	U	5	
d)	Explain two phase AC servo motor.	U	6	
e)	With neat diagram explain capacitor start, capacitor run motor.	U	4	
f)	Explain the method to find the voltage regulation by synchronous impedance method.	U	5	
Q.6	Attempt any FOUR			(16)
a)	A 3 ϕ , 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.03 Wb, sinusoidally distributed & the speed is 375 rpm. Find the frequency rpm, the phase & line emf. Assume full –pitched coil.	A	5	
b)	List the applications of i) Capacitors start capacitor run motor. ii) Shaded pole I.M	U	4	
c)	Explain with neat diagram characteristics of ac servomotor.	U	6	
d)	Explain the construction of an alternator.	U	5	
e)	Explain drag cup servo motor.	U	6	
f)	With schematic diagram explain A.C series motor.	U	4	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIFTH PROGRAM : IE & E & TC**COURSE CODE :- EEF512/ETE512****COURSE NAME PIC MICROCONTROLLER****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 27/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No. SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section-I			R/ U/ A	Co EIF 512	Mar ks
		Attempt any	FOUR:				
Q.1		Attempt any	FOUR:				08
	a)	Write the function of following pins of PIC18			R	1	
		i) RB3/PGM ii) RC7 / RX/DT					
	b)	State any four table processing instructions.			R	2	
	c)	Define the term i) Two byte instruction ii) Four byte instruction.			R	2	
	d)	Draw Format of T ₁ CON & T ₂ CON registers.			R	3	
	e)	Write an assembly language program to add two BCD numbers, the numbers are 25 and 49. Store the resultant at file registers 60H and 61H.			A	2	
	f)	Draw the block diagram of Timer 2.			R	3	
Q.2		Attempt any	FOUR:				16
	a)	Explain any four assembler directives of PIC18.			R	1	
	b)	Explain the timer 3 programming with neat block diagram. Also write the steps for programming of timer 3.			U	3	
	c)	Write an assembly language program to find the square of 10 numbers stored in an array starting at file register 50H onwards and store the square of numbers at file register 60H onwards.			A	2	
	d)	Show the status of C, DC & Z flags after the addition of 88H and 93H in the following instructions. MOV LW 88 H ADD LW 93H			U	2	
	e)	Draw and explain the program memory of PIC18 microcontroller.			R	1	
	f)	Assume XTAL = 10MHz. Write an assembly language program to generate the square wave of 50Hz frequency on pin port B-7. Use timer 3 16 bit mode with maximum prescaler is allowed.			A	3	

Q.3	Attempt any TWO:			16
a)	With the help of neat diagram explain the architecture of PIC18F microcontroller.	R	1	
b)	What is addressing mode. Explain any three addressing modes with suitable examples.	U	2	
c)	Write steps to program timer 0 in 16 bit mode.	U	3	
QN	Section- II	R/ U/ A	Co EF 512	Mar ks
Q.4	Attempt any FOUR:			08
a)	Give the importance of TXIF flag bit in PIR1 register.	U	4	
b)	State any four sources of interrupts in PIC18F.	R	4	
c)	Give the two ways used by PIC 18 for key press detection.	R	5	
d)	State the difference between single byte and burst modes in terms of the CE signal.	R	5	
e)	Define the step angle of stepper motor. Calculate the number of steps per revolution if step angle is 2.5° .	R	6	
f)	Give the advantages of solid state relays over electromechanical relays.	R	6	
Q.5	Attempt any FOUR :			16
a)	Draw the format of INT CON register. Give the significance of each bit.	R	4	
b)	Explain the operation of CCP1 module in compare mode with diagram.	U	4	
c)	Write the steps for writing data to an SPI device.	R	5	
d)	Draw the interfacing diagram of DS1306 to PIC18	R	5	
e)	Write assembly language program to turn ON & OFF the relay. Also draw the interfacing diagram of relay with PIC18 F.	U	6	
f)	Draw the interfacing diagram for DC motor with PIC18F using optoisolator.	U	6	
Q.6	Attempt any FOUR:			16
a)	Write assembly language program to create square wave of 100Hz and 50% duty cycle on CCP1 pin using compare mode.	A	4	
b)	Write a program for the PIC18 to transfer the letter 'G' serially at S7600 baud rate continuously. Assume XTAL = 10MHz BRGH= 1.	A	4	

c)	Draw the format ADCON1 register format and explain the significance of each bit.	R	5	
d)	Write assembly language program to display "YES" on LCD which is interfaced to PIC18 using busy flag method.	A	5	
e)	Write assembly language program for PIC 18 to rotate the stepper motor in counter clockwise direction.	A	6	
f)	Explain the bidirectional control of DC motor using H- Bridge.	R	6	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : ALLIED****COURSE CODE :- EEE311/EIF311/MEF312/MTF408/ETE311/IEE311/****R227/MEE312/MG227/MET311****COURSE NAME :- NON CONVENTIONAL ENERGY SOURCES****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 24 / 05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R	CO EIF311/ MEF312 MTF408	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Enlist four indirect applications of solar energy.	R	1	
	b)	State the need of non-conventional energy sources.	U	1	
	c)	Define i) Solar azimuth angle ii) Solar declination angle.	R	1	
	d)	Explain the different types of winds. Why local winds are generated?	U	2	
	e)	Explain the disadvantages of KVIC digester plant.	R	3	
	f)	Describe the various biomass conversion technologies.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain solar furnace with neat sketch.	U	1	
	b)	Describe the working of Domestic Solar Cooker with neat sketch.	U	1	
	c)	Classify the wind mills.	U	2	
	d)	Discuss the safety systems in wind energy conservation systems.	U	2	
	e)	Draw the neat sketch of Deenbandhu biogas plant & explain its working.	U	3	
	f)	Discuss the various biomass resources.	U	3	
Q.3		Attempt any TWO :			16
	a)	i) State advantages and disadvantages of solar concentrators over flat plate collectors ii) Explain the working of parabolic through reflector with neat sketch.	R U	1 1	
	b)	i) State the instruments used to measure various aspects of solar radiations. ii) Explain the working of pyraheliometer with neat sketch.	R U	1 1	

	c)	i) Explain the working of Horizontal Axis Wind Turbine (HAWT) Generator with neat sketch. ii) Discuss various power control mechanisms used in the Wind Mills.	U	2	
Q.4		Attempt any FOUR :			08
	a)	Define Ocean Thermal Electric conversion.	R	5	
	b)	State two limitations of tidal power generation.	R	5	
	c)	Explain principle of MHD.	U	5	
	d)	Write limitation of fuel cell.	R	1	
	e)	List the types of Energy Audits.	R	1	
	f)	Define ROI.	R	1	
Q.5		Attempt any FOUR :			16
	a)	Explain open and closed OTEC cycle.	A	5	
	b)	Select a site for tidal power plant & list requirements.	A	5	
	c)	List the requirement of source for Geo thermal power plant.	A	5	
	d)	List components of SHP(small hydro plant). Draw neat sketch.	R	5	
	e)	State the future prospects of MHD system.	R	5	
	f)	State different methods of energy conservation.	R	5	
Q.6		Attempt any FOUR :			16
	a)	Explain the principle of fuel cell with neat sketch.	A	5	
	b)	Draw and sketch of fuel cell and explain in brief.	U	5	
	c)	Draw and explain in brief MHD generation.	U	5	
	d)	Explain how principle of Energy conservation is applied in daily life.	U	6	
	e)	Explain to examples where waste heat recovery is effectively applied.	R	5	
	f)	Draw Sunkey diagram and explain in brief.	U	5	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: IE/E&TC/IT

COURSE CODE: EIF312/EITE312/EJ210/IX210/IEE312/ITE312

COURSE NAME: **HIGHER MATHEMATICS**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **24/05/2019**

Instruction:-

- Answers must be written in the main answer book provided. (and supplements if required)
- Illustrate your answers with sketches where ever necessary.
- Use of non-programmable pocket calculator is permissible.
- Mathematical and other tables will be made available on request.
- Assume and mention suitable additional data necessary.
- Use of Mobile is strictly prohibited.
- QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO EIF 312	Marks												
Q.1		Attempt any FOUR			(08)												
	a)	Define forward and backward difference operator.	R	1													
	b)	Prove that $EV = VE = \Delta$	U	1													
	c)	Find $\left(\frac{\Delta^2}{E}\right)x^3$	A	1													
	d)	If $z = 3^x \tan y$ find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$	R	2													
	e)	If $u = e^{xyz}$ find $\frac{\partial^3 u}{\partial x \partial y \partial z}$	A	2													
	f)	If $u = \sin^{-1}\left(\frac{x}{y}\right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$	U	2													
Q.2		Attempt any FOUR			(16)												
	a)	Using Lagrange's interpolation formula estimate u_4 and u_6 with $u_0 = -18, u_1 = 0, u_5 = -248$	A	1													
	b)	Express $y = 3x^3 + x^2 + x + 1$ in the factorial notation. Hence find $\Delta^3 y$	A	1													
	c)	Find missing term in the following table <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>y</td><td>2</td><td>5</td><td>7</td><td>-</td><td>32</td></tr></table>	x	1	2	3	4	5	y	2	5	7	-	32	A	1	
x	1	2	3	4	5												
y	2	5	7	-	32												
	d)	Using Newton's forward interpolation formula find $f(8)$ <table><tr><td>x</td><td>5</td><td>10</td><td>15</td><td>20</td></tr><tr><td>f(x)</td><td>50</td><td>70</td><td>100</td><td>145</td></tr></table>	x	5	10	15	20	f(x)	50	70	100	145	A	1			
x	5	10	15	20													
f(x)	50	70	100	145													
	e)	If $u = \log(\tan x + \tan y + \tan z)$ prove that $\sin 2x \frac{\partial u}{\partial x} + \sin 2y \frac{\partial u}{\partial y} + \sin 2z \frac{\partial u}{\partial z} = 2$	U	2													
	f)	If $u = \frac{x^3 y + y^3 x}{y - x}$ prove that $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$	U	2													
Q.3		Attempt any FOUR			(16)												
	a)	Given <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>7</td><td>17</td><td>45</td><td>103</td><td>203</td></tr></table> Find y when $x = 3.6$ using suitable interpolation.	x	0	1	2	3	4	y	7	17	45	103	203	A	1	
x	0	1	2	3	4												
y	7	17	45	103	203												

Using Newton's forward interpolation formula find $\sin 45^\circ$							
x	0°	30°	60°	90°	A	1	
$\sin x$	0	0.5	0.87	1			
b)							
c)	If $x = u \cos v$, $y = u \sin v$ prove that $JJ' = 1$					U	2
d)	if $u = \tan^{-1}(x^2 + 2y^2)$ prove that i) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$ ii) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 2 \sin u \cos 3u$					U	2
e)	If $u = \log \left(\frac{x^3 + y^3}{x^2 + y^2} \right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$					U	2
f)	If $z^3 - xz - y = 0$ Find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$					A	2
Q.4	Attempt any FOUR						(08)
a)	State first shifting theorem in Laplace transform.					R	3
b)	Evaluate $L[t \sin at]$					U	3
c)	Find $L^{-1} \left[\frac{2}{s} - \frac{1}{s^3} + \frac{1}{s+4} \right]$					A	3
d)	Find the Fourier constant a_n for $f(x) = e^x$, $-\pi < x < \pi$					R	4
e)	Find the Fourier constant a_0 for $f(x) = x^2$ in $(-1, 1)$					U	4
f)	Find the Fourier constant b_n for $f(x) = x$ in $(0, 2\pi)$					A	4
Q.5	Attempt any FOUR						(16)
a)	Evaluate $L(t e^{3t} \sin 2t)$					U	3
b)	Evaluate $L^{-1} \left[\frac{2s^2 - 4}{(s+1)(s-2)(s-3)} \right]$					A	3
c)	Evaluate $L^{-1} \left[\frac{1}{(s+2)^3} + \frac{2s}{s^2 + 6s - 16} \right]$					A	3
d)	Using Convolution theorem find $L^{-1} \left[\frac{1}{s(s^2 + 4)} \right]$					A	3
e)	Evaluate using Laplace transform $\int_0^\infty e^{-2t} t \sin^3 t \, dt$					A	3
f)	Solve using Laplace transform $\frac{dy}{dt} + y = t^2 e^{-t}$ Given that $y=3$ when $t=0$					A	3
Q.6	Attempt any TWO						(16)
a)	Find Fourier expansion of $f(x) = x - x^2$, $-\pi < x < \pi$ hence deduce that $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$					A	4
b)	Obtain the Fourier expansion of following function $f(x) = \begin{cases} x, & 0 < x < 1 \\ 1-x, & 1 < x < 2 \end{cases}$					A	4
c)	Obtain the Fourier expansion for $f(x) = \sqrt{1 - \cos x}$ in $(0, 2\pi)$ Hence deduce that $\frac{1}{2} = \sum_{n=1}^\infty \frac{1}{4n^2 - 1}$					A	4

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EXAM SEAT NO.

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LEVEL: **THIRD**

COURSE CODE: **IX307**

MAX. MARKS: **80**

PROGRAM: **INDUSTRIAL ELECTRONICS**

COURSE NAME: **INDUSTRIAL DRIVES**

TIME: **3 HRS.**

DATE: **27/05/2019**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I		Marks
Q.1	Attempt any FOUR	(08)
a)	State the function of electric drive.	
b)	Give the advantages of converter fed induction motor over line fed motor.	
c)	Draw the torque-speed characteristic of synchronous motor.	
d)	State different methods of speed control for induction motor.	
e)	Give any two specifications of DC motor.	
f)	Draw circuit diagram of star-delta connection.	

Q.2	Attempt any FOUR	(16)
a)	Compare between AC and DC drives (any four points)	
b)	Explain the factors considered for selection of drive.	
c)	With the help of neat diagram, explain stator voltage and frequency control method of induction motor.	
d)	Explain the concept of stability of drives.	
e)	With necessary diagram explain frequency controlled inverter (with RL load) using power MOSFET method of speed control of induction motor.	
f)	Explain rotor resistance control method of speed control of induction motor.	

Q.3	Attempt any TWO	(16)
a)	i) Explain requirements of adjustable speed drive. ii) State the advantages and disadvantages of stator voltage control method.	
b)	Draw and explain speed torque characteristics of induction motor.	
c)	Explain any one method used for starting and braking of electric motor.	

P.T.O

Section – II

Marks

Q.4 Attempt any **FOUR**

(08)

- a) Draw and name the speed-torque relation of DC motor.
- b) Enlist types of single phase converters drive.
- c) Draw a phase lock loop control and Give names to it.
- d) Give various applications of advance technique of motor control.
- e) Give importance of DC drive performance.
- f) Draw 3 ϕ dual converter drive.

Q.5 Attempt any **FOUR**

(16)

- a) How a stepper motor can be controlled using microcontroller? Draw its block diagram give detail information.
- b) Draw and explain class A principle with waveforms.
- c) Draw and explain single phase half wave converter drive.
- d) Draw four quadrant chopper drive circuit. Explain its operation in second and third quadrant.
- e) With neat block diagram explain the application of motor control in paper mills.
- f) Explain in detail DC drive performance with its any four specifications.

Q.6 Attempt any **FOUR**

(16)

- a) Explain multiphase chopper drive circuit with waveforms.
- b) With neat block diagram explain the application of sugar mill where motor can be controlled using advance techniques.
- c) Explain working of 2 ϕ semiconductor drive with neat waveforms.
- d) Draw and explain microprocessor based DC motor control with block diagram.
- e) Write sequence of stages in textile mills. And explain in brief drives required at any two stages.
- f) Draw and explain 3 ϕ full converter drive with w/f.

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EXAM SEAT NO.

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LEVEL: FOURTH

PROGRAM: IE/E&TC

COURSE CODE: EIF404/EJ303/ETE404/IX303/IEE404

COURSE NAME: PRINCIPLES OF

CONTROL SYSTEM

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 29/05/2019

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

QN	S Q N	Question Text	R U A	CO EIF 404	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	List any four examples of open loop system.	R	1	
	b)	Define linear Time in varying system.	R	1	
	c)	State any two limitations of time down analysis.	R	3	
	d)	Define poles of the system.	R	2	
	e)	State order of system. Give any two practical example of second order system.	R	1	
	f)	Define Transient Response.	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Derive transfer function for close loop control system.	A	2	
	b)	Draw and explain the standard test signals used in time domain analysis and state the mathematical statement for each.	U	2	
	c)	State two advantages and two disadvantages of frequency response analysis.	U	3	
	d)	Find out transfer function of fig (a)	A	1	
	e)	Define time response specifications of second order control system. i) Delay time ii) Rise time iii) Peak time iv) Settling time	R	2	
	f)	Define i) Resonance frequency ii) Bandwidth iii) Cut off rate iv) Gain margin	R	3	
Q.3		Attempt any TWO			(16)
	a)	Find transfer functions of given system fig (b)	A	1	
P.T.O					

b)	A unity feedback control system has $G(s) = \frac{100}{s(s+15)}$. If it is subjected to unit step input has output response as $c(t) = 1 - \frac{e^{-\xi \omega_n t}}{\sqrt{1-\xi^2}} \sin(\omega_n t + \theta)$ Determine i) Damped frequency of oscillations ii) Max. overshoot iii) Time for first overshoot iv) Settling time v) output Response Explain stepwise procedure to draw bode plot.	A	2	
c)		U	3	
Section-II				
Q.4	Attempt any FOUR			(08)
a)	Define offset in proportional control action.	R	6	
b)	Enlist any four servo components.	U	5	
c)	State transfer function of armature controlled and field controlled DC servo motors.	R	5	
d)	State any two advantages of PI mode.	U	6	
e)	State two special cases in Routh's criterion.	R	4	
f)	Define Auxiliary equation.	R	4	
Q.5	Attempt any FOUR			(16)
a)	Explain stable, unstable, critically stable and conditionally stable system.	U	4	
b)	Explain synchro as error detector.	U	5	
c)	Define discontinuous control action. Explain discontinuous control action used in industrial applications.	U	6	
d)	Draw electronic PID controller. Write its equation.	R	6	
e)	Explain Root locus technique.	U	4	
f)	Compare stepper motor with DC servo motor (any four points)	U	5	
Q.6	Attempt any FOUR			(16)
a)	Draw schematic diagram of AC servo system. Write its working principle.	U		
b)	Draw locations of roots in S-Plane for following systems. i) Stable system ii) Unstable system iii) Critically stable system iv) Relative stable system	A	4	
c)	Draw block diagram of process control system. State the need of process control system in industry.	U	6	
d)	Write mathematical equation for derivative control action. Explain why derivative control action is not used alone.	R / U	6	
e)	For a system with characteristic equation $5^4 + 6s^3 + 26s^2 + 56s + 80 = 0$. Examine stability by Routh's criterion	A	4	
f)	With block diagram, explain servo system.	U	5	

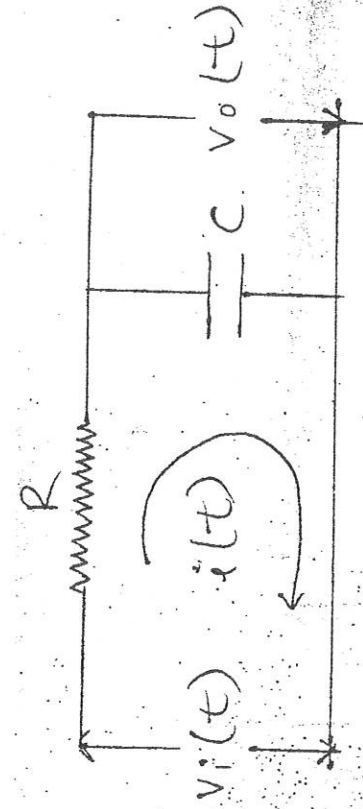


Fig (a)

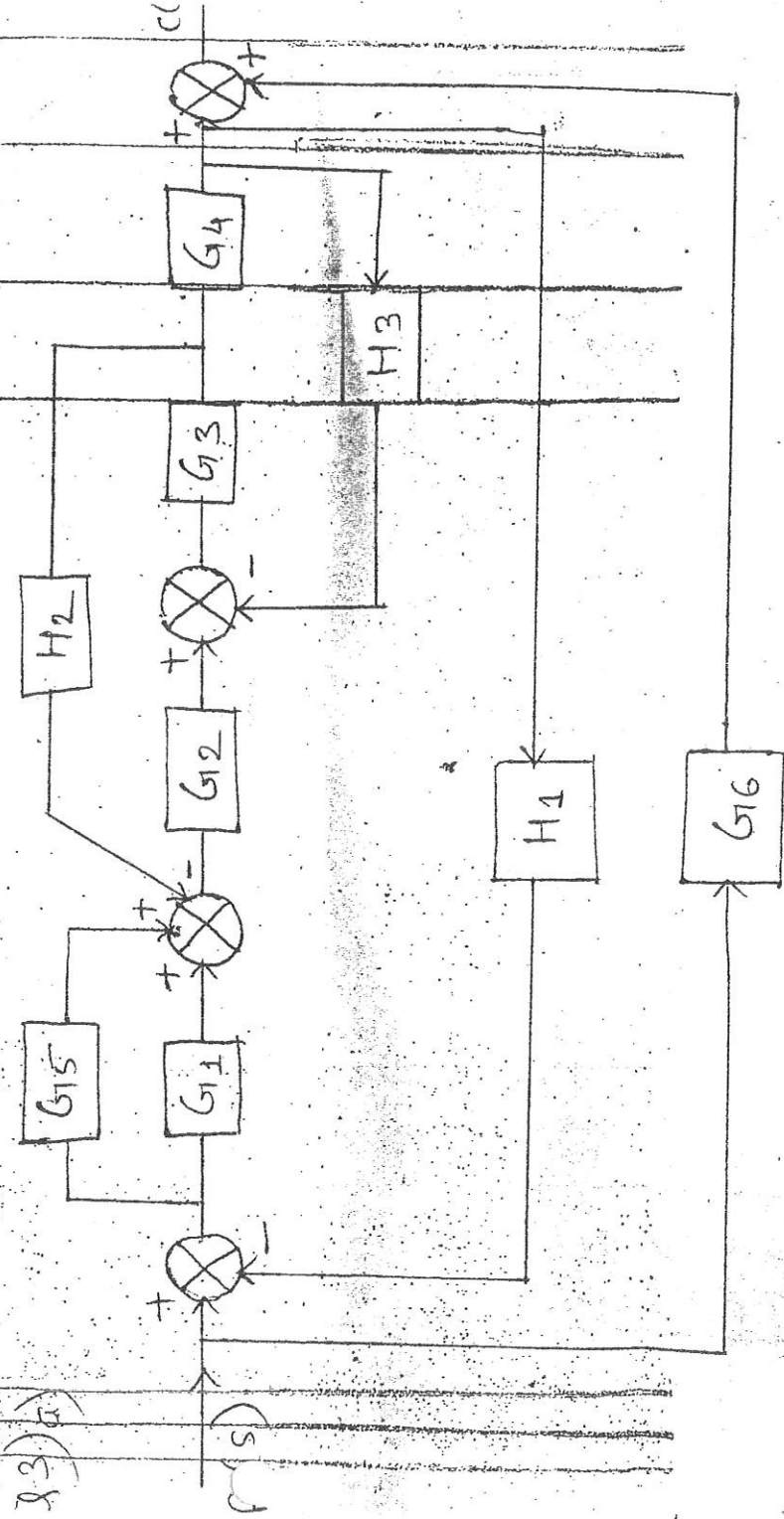


Fig (b)

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIFTH PROGRAM : INDUSTRIAL ELECTRONICS**COURSE CODE :- IEF505/IEE505****COURSE NAME OPTOELECTRONICS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 23/05/2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I			R/ U/ A	Co IEF 505	Mar ks
Q.1		Attempt any FOUR :					08
	a)	Define light intensity and write its unit.		R	1		
	b)	Define i) Refractive index ii) Optical power.		R	1		
	c)	Draw structure of planar LED.		R	2		
	d)	Define modulation bandwidth of LED.		R	2		
	e)	Compare between LED and laser with following points i) Operating principle ii) Nature of light beam.		U	3		
	f)	State any two semiconductor materials used for laser.		R	3		
Q.2		Attempt any FOUR :					16
	a)	Explain the concept of quantum nature of light and concept of photon.		U	1		
	b)	Draw and explain construction of surface emitting LED.		U	2		
	c)	Explain heterojunction LED with diagram.		U	2		
	d)	Explain with diagram the following two processes. i) Absorption ii) Spontaneous emission.		U	3		
	e)	Discuss the characteristics of laser. Also state any two applications of laser.		U	3		
	f)	Explain construction and working of fabry perot resonant cavity laser with neat diagram.		U	3		
Q.3		Attempt any FOUR :					16
	a)	Explain refraction and polarization with diagram.		U	1		
	b)	Draw and explain construction of dome LED.		U	2		
	c)	Explain construction of edge emitting LED with neat diagram.		U	2		
	d)	Explain homojunction LED with neat diagram.		U	2		
	e)	Explain with diagram the working principle of laser.		U	3		
	f)	State any four advantages and four disadvantages of laser.		U	3		

P.T.O.

QN	S Q N	Section- II			R/ U/ A	Co IEF 5 05	Mar ks
Q.4		Attempt any FOUR :					08
	a)	Draw construction of avalanche photodiode.		R	5		
	b)	Give classification of photo detector with examples.		R	4		
	c)	State types of LED displays.		R	6		
	d)	List the applications of phototransistor. (any two)		R	5		
	e)	Enlist various advantages of Opto-couplers.		R	6		
	f)	State applications of photo resistors.		R	4		
Q.5		Attempt any FOUR :					16
	a)	With neat diagram, explain working of P-I-N photodiode.		U	5		
	b)	Explain following photo detector characteristics i) Spectral Response Range ii) Detector Responsivity iii) Quantum Efficiency iv) Response time		U	4		
	c)	Compare LED and LCD display (any 4 points)		U	6		
	d)	Explain optical and electrical characteristics of PN-photodiode.		R	5		
	e)	Differentiate between photoresistor and photodiode.		U	4		
	f)	Draw and explain construction and working of solar cells.		U	6		
Q.6		Attempt any FOUR :					16
	a)	Explain construction and working principle of PN-photodiode.		U	5		
	b)	Explain any two types of LCD display with diagram.		U	5		
	c)	Compare between photodiode and phototransistor.		U	5		
	d)	Draw and explain any two combinations of Opto-couplers.		U	6		
	e)	Explain construction and working of Photo-Darlington.		U	5		
	f)	State merits and demerits of photoresistor. Draw construction of photoresistor.		U	4		

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EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: IE/E&TC

COURSE CODE: EIF103/ETE103/ETTF103/IEF103/IEE103 COURSE NAME: BASIC ELECTRONICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 29/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

QN	S	Question Text	R U A	CO EIF 103	Marks
Q.1		Attempt any FOUR			(08)
	a)	State the typical values of Knee voltage for silicon and germanium diode.	R	1	
	b)	State the need of filter. Give its types.	R	2	
	c)	Give the difference in silicon PN junction diode and zener diode.	R	1	
	d)	Which configuration of transistor is suitable for amplification of signal and why?	U	3	
	e)	Define doping process. Give its importance.	R	2	
	f)	State any two applications of bridge rectifier.	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Draw and explain the V-I characteristics of zener diode.	U	1	
	b)	Compare CB, CE and CC configurations of BJT.	U	3	
	c)	Draw a circuit diagram of center tap full wave rectifier with LC filter and explain the operations with waveforms.	U	2	
	d)	Explain the formation of depletion region in unbiased P-N Junction diode with suitable diagram.	U	1	
	e)	Compare Half wave and Full wave rectifier w. r. t following points i) Number of diodes ii) Ripple factor iii) Rectification efficiency iv) Circuit diagram	R	2	
	f)	Draw input and output characteristics of common base configuration.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Draw construction of NPN transistor and explain.	U	3	
P.T.O					

	b)	Draw a setup for operation of P-N junction diode in forward and reverse bias mode. Explain its operation with its characteristics.	U	1	
	c)	Define i) Ripple factor ii) Rectification efficiency iii) TUF iv) PIV	R	2	
	d)	Explain the process for formation of P-type extrinsic semiconductor.	U	1	
	e)	For a BJT if $\alpha = 0.99$ and $I_E = 12\text{mA}$. Find β , I_C and I_B .	A	3	
	f)	Draw Half wave rectifier and give the values for PIV, ripple frequency, rectification efficiency and TUF in it.	U	2	
Q.4		Attempt any FOUR			(08)
	a)	Define the operating point (Q point) of the transistor.	R	4	
	b)	Define amplification.	R	4	
	c)	Draw the drain characteristics of n-channel JFET.	R	5	
	d)	State any four specifications of FET.	R	5	
	e)	Give the comparison between BJT and JFET. (any 2 points)	R	5	
	f)	State any two applications of regulated power supply.	R	6	
Q.5		Attempt any FOUR			(16)
	a)	With neat circuit diagram explain the working of single stage RC coupled CE amplifier.	U	4	
	b)	Draw and explain fixed bias with emitter resistor method.	U	4	
	c)	With neat diagram explain the construction of p-channel enhancement MOSFET.	U	5	
	d)	Draw and explain the operation of p-channel JFET.	U	5	
	e)	Give the comparison between series voltage regulator and shunt voltage regulator (any four points)	U	6	
	f)	With neat diagram explain IC723 voltage regulator.	U	6	
Q.6		Attempt any FOUR			(16)
	a)	Explain the factors affecting the stability of Q point of transistor.	U	4	
	b)	Define i) DC load line ii) AC load line	R	4	
	c)	Define the following terms w.r.t JFET, i) Amplification factor (μ) ii) Transconductance (g_m)	U	5	
	d)	Draw and explain the working of N-channel depletion MOSFET.	U	5	
	e)	Explain zener diode as a voltage regulator.	U	6	
	f)	Explain IC 79XX series of voltage regulator.	U	6	

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- THIRD

PROGRAM : IE & E & TC

COURSE CODE :- EIF305/ETE305/IEF305/IX205

COURSE NAME :- ANALOG COMMUNICATION

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 22/05 / 2019

Instruction :-

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co EIF 305	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define bandwidth of a communication system. Write formula of Shannon's limit on information capacity.	R	1	
	b)	Write electromagnetic frequency range for i) MF ii) HF	R	1	
	c)	Justify the statement : “ the modulation index in AM is a number lying between 0 and 1”.	U	1	
	d)	Differentiate between low-level and high-level modulation in AM, with reference to how modulation is achieved in AM.	U	2	
	e)	Define i) Modulation index ii) Deviation ratio	R	3	
	f)	Write the basic principle of varactor diode modulator.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Identify the block diagram given in Fig: 2.(a) label the block which is blank, and describe its function.	A	1	
	b)	Using the information given below, find bandwidth of AM signal and draw its frequency spectrum Carrier $V_c = 10 \sin (2 \Pi 10^7 t)$ Modulating signal $V_m = 6 \sin (2 \Pi 10^4 t)$	A	2	
	c)	Draw trapezoidal patterns for following modulation indices and interpret them i) $m = 1$ ii) $m > 1$ iii) $m < 1$	A	2	
	d)	Draw and describe transistorized amplitude modulator circuit.	U	2	
	e)	Interpret following equation of FM wave $V = A \{ J_0 (m_f) \sin W_c t + J_1 (m_f) [\sin (W_c + W_m) t - \sin (W_c - W_m) t] + J_2 (m_f) [\sin (W_c + 2W_m) t + \sin (W_c - 2W_m) t] + \dots \}$	U	3	

P.T.O.

	f)	If FM signal is given by $V_{FM} = 12 \sin (2 \Pi 10^6 t + 4 \sin 2 \Pi 10^4 t)$ Find i) Carrier and modulating signal frequency. ii) Modulation index iii) Power developed across 100Ω .	A	2	
Q.3		Attempt any TWO :			16
	a)	Describe following terms : i) Signal to noise ratio ii) Noise figure/Noise factor. 2) An amplifier operating over the frequency range of 455 to 460 KHz has a $200k\Omega$ input resistor. What is the rms noise voltage at the input to this amplifier if the ambient temperature is $27^\circ C$?	U	1	04
	b)	i) Write advantages and disadvantages of SSB technique. ii) A 400 W carrier is amplitude modulated to 60% depth of modulation. Find total transmitted power in AM wave. iii) For the above problem (given in b(ii)). Find % power saving in transmitted power for following modulation techniques 1) DSBSC 2) SSBSC	R A A	2 2 2	02 02 4
	c)	Draw the block diagram of FM transmitter using indirect method and describe each block.	U	3	08
Q.4		Attempt any FOUR :			08
	a)	Define virtual height with a neat diagram.	R	6	
	b)	Classify types of antennas.	U	5	
	c)	"FM reception is noise free". Justify the sentence.	A	4	
	d)	Define sensitivity. Draw graph of sensitivity of a radio receiver and label X & Y coordinates.	R	4	
	e)	Explain the term image frequency is AM receiver.	U	4	
	f)	Draw the block diagram of AM superhetrodyne radio receiver.	R	4	
Q.5		Attempt any FOUR :			16
	a)	State any two advantages and disadvantages of sky wave propagation.	A	6	
	b)	List functions of a receiver	R	4	
	c)	Identify the following diagram. Label blocks A,B,C,D, E. State functions of block D & B	A	4	
	d)	Explain Yagi-uda antenna with neat labelled diagram and radiation pattern.	U	5	
	e)	Explain the working of PLL using block diagram.	U	4	
	f)	State whether true or false :- "Signal reception is better at night". If true justify answer.	A	6	

Q.6	Attempt any FOUR :				16
a)	Explain Half wave dipole antenna with diagram and its radiation pattern.	U	5		
b)	Compare ground wave & space wave propagation. (any 4 points)	U	6		
c)	Explain the working principle of ratio detector with neat diagram.	U	4		
d)	Define fading. List is causes.	R/ U	6		
e)	Identify the given curve and label the curve.. Explain any two curves.	A	4		
f)	Define the terms with respect to antenna: i) Beam width ii) Polarization iii) Gain iv) Resistance.	R	5		

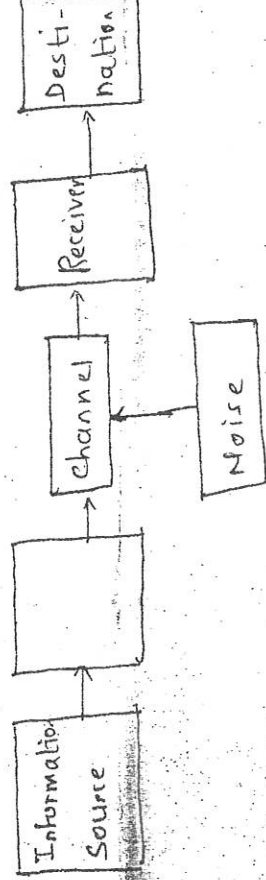
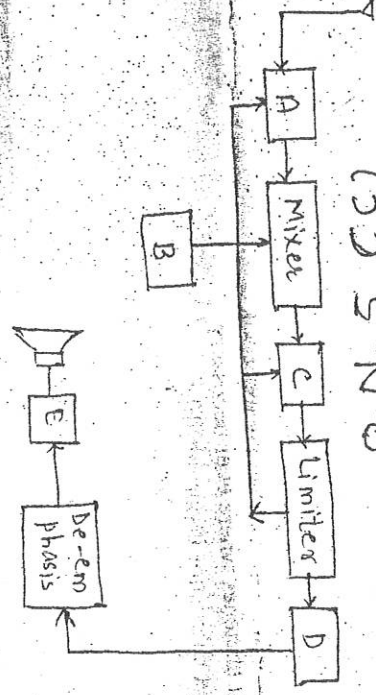
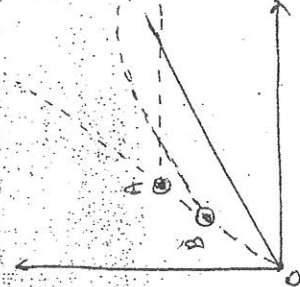


Fig: 2.a Q.No. 2 (c4)



Q.No. 5 (C5)



Q.No. 6 (C6)

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **FIFTH**

PROGRAM: **IE/E&TC**

COURSE CODE: **ETE508/IEE508/IX404** COURSE NAME: **INDUSTRIAL ORGANIZATION AND**

MANAGEMENT

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **22/05/2019**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) What is globalization?
- b) What is trading?
- c) Why is planning required?
- d) List functions of management (any four)
- e) What is responsibility?
- f) Define organization.

Q.2 Attempt any **FOUR**

(16)

- a) List advantages of Globalization in context of India.
- b) What are types of business? Explain any one in brief.
- c) Why textile industry to be promoted by Government? Explain in short.
- d) Explain with block diagram levels of management.
- e) List principles of Henry Fayol on management.
- f) Explain function of controlling in process management.

Q.3 Attempt any **FOUR**

(16)

- a) Explain concept of F.W.Taylor on scientific management.
- b) Describe the steps in organization formation.
- c) Compare line staff and functional types of organizations with suitable block diagram.
- d) What are advantages of centralised departmentation over decentralised departmentation?
- e) How responsibility is fixed in project type organization.
- f) Explain with block diagram functional type organization.

P.T.O

Section – II

Marks
(08)

Q.4 Attempt any **FOUR**

- a) Define the term 'Personnel management'.
- b) State the importance of skill developments.
- c) Define the term 'Finance'.
- d) What is budget?
- e) Define the term 'EOQ'.
- f) State 'Kaizen's theory.

Q.5 Attempt any **FOUR**

(16)

- a) Define the term 'Accident'. Enlist its causes.
- b) Enlist the contents of workmen compensation act.
- c) Write about recruitment procedure with respect to HR department.
- d) State the importance of industrial dispute act.
- e) Write format for balance sheet. State its advantages.
- f) Describe various taxes in practice.

Q.6 Attempt any **FOUR**

(16)

- a) Enlist the objectives of financial management.
- b) What is 6 sigma principle?
- c) Enlist advantages of ERP.
- d) Describe the objectives of JIT.
- e) Describe various time estimates used in PERT.
- f) Define 'Quality'. What is quality assurance?

	b)	Draw the format of SQI instruction and explain function of each bit.	U	3	
	c)	Explain w.r.t PLC sinking and sourcing of input module with their wiring details.	U	2	
	d)	Calculate the output in each of the following case if source A=N7:3=400 and source B=N7:4=200 i) ADD ii) SUB iii) DIV iv) MUL	A	3	
	e)	With help of diagram, describe operation of DC input module.	U	2	
	f)	Describe the classification based on type and size of PLC.	U	1	
Section-II					
Q.4		Attempt any FOUR			(08)
	a)	Draw the ladder diagram for AND gate.	A	4	
	b)	State the use of sequential function chart in PLC.	U	4	
	c)	Draw the ladder diagram for Boolean equation $Y = (A+B).(C+D)$	A	4	
	d)	Enlist any four industrial application of PLC.	R	5	
	e)	State the importance of Groundings in PLC.	U	6	
	f)	The enclosure door of a PLC installation is not kept closed. What practical problem could this create?	A	6	
Q.5		Attempt any FOUR			(16)
	a)	Draw the ladder diagram for, when start button is pressed pump is switch ON. After 10 seconds pump is switched OFF and heater is switch ON. After 20 second heater is switched OFF.	A	4	
	b)	A classroom has a capacity of maximum 120 students There are two doors, one for entry and the other for exit. When number of students in a classroom are less than 120, entry door has a green light on it which remains ON. When no. of students in the classroom are 120 or more than that, red light goes ON turning OFF the green light which indicates that the classroom has reached its maximum capacity and is full. Develop the ladder diagram for above system and also mention list of input and output address.	A	5	
	c)	List the various parameters considered while PLC Installation. Explain any two in brief.	U	6	
	d)	Draw and explain the ladder diagram for following Boolean expression. $AB + \overline{C}D + E = Y_1$ $FGH + I\overline{J} = Y_2$ $Y_1 + Y_2 = Q$	U	4	
	e)	Develop the ladder diagram for box packing system having following condition: five boxes are stacked at a time and then bound with wrapper consider:- i) Box present signal = I:0/1 ii) Wrapper machine relay =0:0/1 iii) Goto step(i)	A	5	
	f)	Explain speed control of AC/DC motor using programmable drives and PLC.	U	5	
P.T.O					

Q.6	Attempt any TWO			(16)
a)	Explain the following terms w.r.t PLC i) Maintenance steps for PLC system. ii) Troubleshooting methods for ladder program.	U	6	
b)	A coal handling plant has three coal conveyors C ₁ , C ₂ and C ₃ . C ₁ is fed from the output of the crusher, C ₂ is the mid-belt and C ₃ pushes coal to the bunker. The requirements of the plant are as follows: a) C ₁ and C ₂ will be ON only when C ₃ is ON b) C ₁ will be ON only when C ₂ and C ₃ are ON c) C ₁ and C ₂ trip when C ₃ trips. d) C ₁ trips when C ₂ trips but C ₃ is ON e) C ₁ trips when C ₂ and C ₃ trips. Design a ladder diagram for the above and explain function of each rang.	A	5	
c)	i) Create a 12 hours time delay that will give an alarm of 10 seconds duration after which the entire system is reset. Draw the ladder diagram for this system. ii) Draw a ladder diagram for two motor operations for a start switch starts motor 1 and motor 2. The stop switch stops motor 1 first, after 15 seconds motor 2 stops.	A	4	
		A	4	

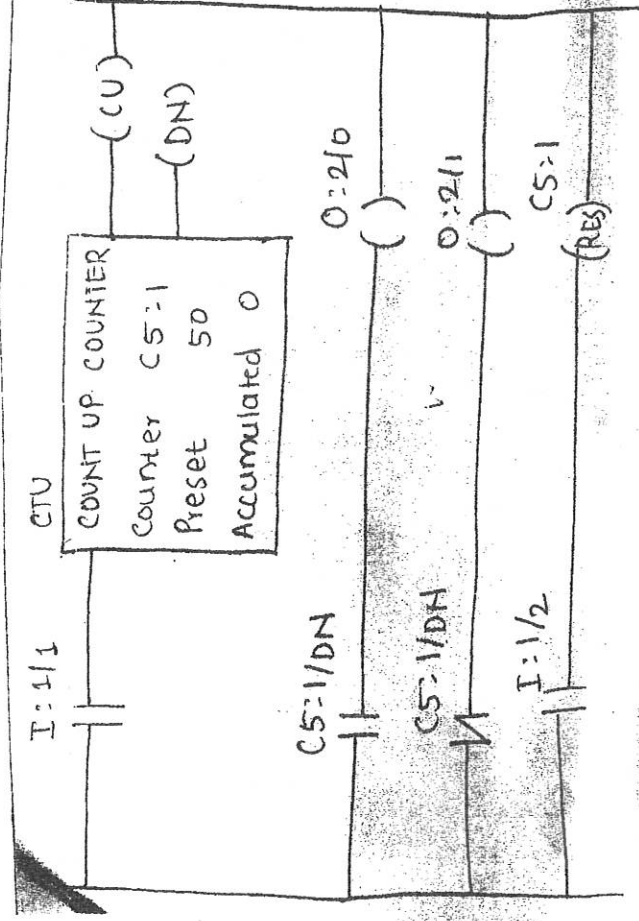


Fig:- Ladder Logic program Q.2.cd)

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EVEN TERM END EXAMMAY -2019

EXAM SEAT NO.

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LEVEL: **FIFTH**

COURSE CODE: **IEE 511**

MAX. MARKS: **80**

PROGRAM: **INDUSTRIAL ELECTROINCS**

COURSE NAME: **PLC AND DRIVES**

TIME: **3 HRS.**

DATE: **17/05/2019**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Marks
(08)

Section – I

Q.1 Attempt any **FOUR**

- a) State the factors affecting stability of drive.
- b) Draw a Neat diagram of star – delta connection.
- c) State any 4 advantages of converter fed IM.
- d) Give the disadvantages of microcomputer in DC Drive speed control.
- e) Enlist different methods of speed control. (any 4)
- f) Enlist 4 applications where DC drives can be used.

Q.2 Attempt any **FOUR**

- a) Draw and explain load torque – speed characteristics of induction motor.
- b) With neat circuit diagram explain any one method of slip energy system used in controlling AC drives.
- c) Explain how speed of AC drive can be controlled using frequency control technique.
- d) With neat diagram explain the use of drives in paper mills.
- e) Draw and explain stator current control technique for AC drive.
- f) Explain the use of microprocessor for controlling DC motor.

(16)

Q.3 Attempt any **FOUR**

- a) Enlist factors considered for drive selection and explain any two in detail.
- b) Explain with neat diagram how textile mills can be controlled using DC drives.
- c) Draw and explain micro controller based stopper motor control technique.
- d) By using rotor voltage control technique, Explain how the speed of AC drive can be controlled?
- e) Explain the use of DC drive in sugar mills, in detail.
- f) With neat diagram explain controlled rectifier fed AC motor drive.

(16)

P.T.O

Section – II

Marks
(08)

Q.4 Attempt any **FOUR**

- List the advantages of PLC over conventional relay logic.
- Draw the structure of modular PLC.
- State different PLC programming languages. Give one example of each.
- Give any four feature of ladder language.
- Define bits and words used in PLC.
- List four compare instructions and four logical instructions in PLC.

Q.5

Attempt any **FOUR**

- Explain the following instruction of PLC.
a) MOV b) SCP c) JSR d) REI
- Develop ladder diagram for 4:1 multiplexer along with its truth table.
- State any four input modules used with PLC.
Give function of each module.
- List any four relay type instruction of PLC with its functions and symbol.
- Draw the ladder diagram for the following Boolean equations

$$Y1 = A+B+C\bar{D}E$$

$$Y2 = F\oplus G$$

$$Y3 = Y1+Y2$$

$$Y4 = Y1.Y2$$
- Explain any two types of application specific modules of PLC.

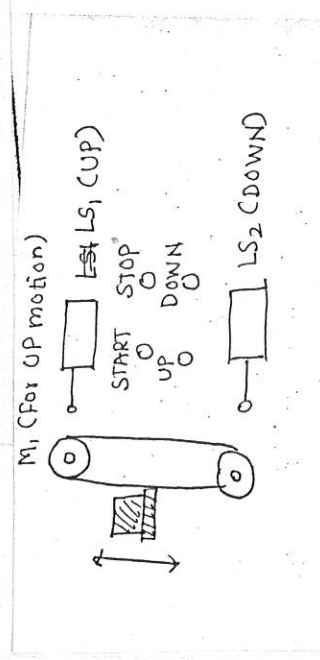
(16)

Q.6

Attempt any **TWO**

- Draw block diagram of PLC. Explain the function of CPU and memory organization of PLC.
- Explain TON timer instruction with proper diagrams. Also explain the status bits CD, DN and OV of counter. Draw 1st word of counter memory that stores these status bits.
- Draw a ladder diagram for elevator control system which uses following equipments.
 Output elements :
 M1 – Motor to drive the platform UP
 M2 – Motor to drive the platform DOWN
 Input elements :
 LS1 – NC limit switch to indicate UP position
 LS2 – NC limit switch to indicate DOWN position
 START – No push button for start
 STOP – No push button for stop
 UP – No push button for UP command
 DOWN – No push button for DOWN command

(16)



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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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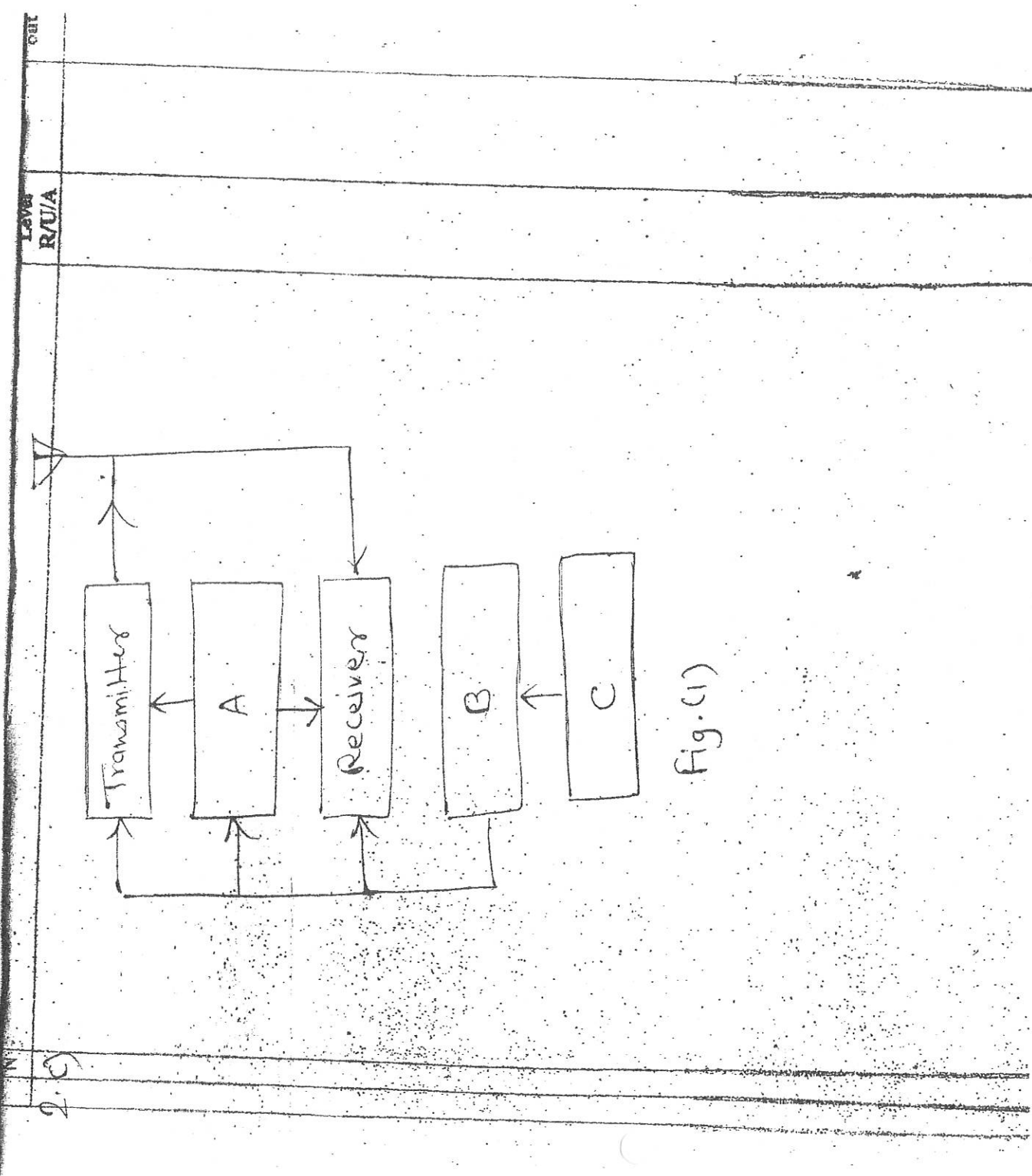
LEVEL :- FIFTH PROGRAM : ELECTRONICS & TELECOMMUNICATION**COURSE CODE :- ETF501/ETE501****COURSE NAME MOBILE COMMUNICATION AND NETWORKING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 15/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I	R/ U/ A	Co ETF 501	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Define i) Handoff ii) Mobile station.,	R	1	
	b)	Draw a diagram of receiver unit of mobile phone.	R	2	
	c)	State the function of logic unit in mobile phone.	R	2	
	d)	Define co-channel cell and co-channel interference.	R	3	
	e)	State any two advantages of repeaters.	R	3	
	f)	Define cell splitting	R	3	
Q.2		Attempt any FOUR :			16
	a)	Compare between 3G and 4G standard with following points, i) Year of Introduction ii) Technology used iii) Features iv) Speed.	U	1	
	b)	Explain IS-95 mobile radio system.	U	1	
	c)	Identify the block diagram shown in fig. (1). Name the blocks A,B and C and write function of A, B & C.	A	2	
	d)	Describe the effect of co-channel interference on system capacity.	U	3	
	e)	Explain with neat diagram, sectoring in cellular system.	U	3	
	f)	Draw and explain block diagram of transmitter unit of mobile.	U	2	
Q.3		Attempt any FOUR :			16
	a)	Compare between AMPS and GSM with following points i). Year of Introduction ii) Modulation iii) Multiple access. iv) channel bandwidth.	U	1	
	b)	Draw a timing diagram illustrating a call procedure from mobile user to landline user.	U	1	
	c)	Explain with block diagram, control unit of mobile phone.	U	2	
	d)	Describe the use of repeaters for range extension in mobile communication.	U	3	
	e)	Explain with diagram soft hand-off.	U	3	
	f)	Explain the concept for improving capacity of cellular system which is particularly used along highways.	A	3	

P.T.O.

QN	S Q N	Section- II	R/ U/ A	Co ETP 501	Mar ks
Q.4		Attempt any FOUR :			08
	a)	Enlist the different services offered by GSM.	R	4	
	b)	State the key features of IS-95 (any four)	R	5	
	c)	Give any four Bluetooth advantages.	R	6	
	d)	State different types of GSM channel.	R	4	
	e)	Draw the IS-95 system architecture.	R	5	
	f)	State applications of 3G wireless systems.	R	6	
Q.5		Attempt any FOUR :			16
	a)	With diagram explain location updating in GSM.	U	4	
	b)	Compare GSM and IS-95 with i) Type of multiple access ii) Type of modulating iii) Frame duration iv) Number of user per channel.	U	5	
	c)	Describe operation of WLL with suitable diagram.	U	6	
	d)	State the type of hand off` used in IS-95. Describe it with diagram.	U	5	
	e)	Describe operation of mobile IP with suitable diagram.	U	6	
	f)	State the function of i) MSC ii) Authenticating Center iii) Equipment Identify Register iv) Data message handler in IS -95	R	4	
Q.6		Attempt any FOUR :			16
	a)	How the security and authentication is maintained in IS-95 CDMA?	U	5	
	b)	State features of 3G W-CDMA	R	6	
	c)	Explain GSM radio subsystem and list GSM air interface specification.	U	4	
	d)	Describe frequency and channel specification of IS-95.	U	5	
	e)	Explain any four applications of Bluetooth.	U	6	
	f)	Describe call processing in GSM system with suitable diagram. (from mobile to landline telephone)	U	4	



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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIFTH

PROGRAM: INDUSTRIAL ELECTRONICS

COURSE CODE: IEF501/IEE 501

COURSE NAME: POWER ELECTRONICS II

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 15/05/2019

Instruction:-

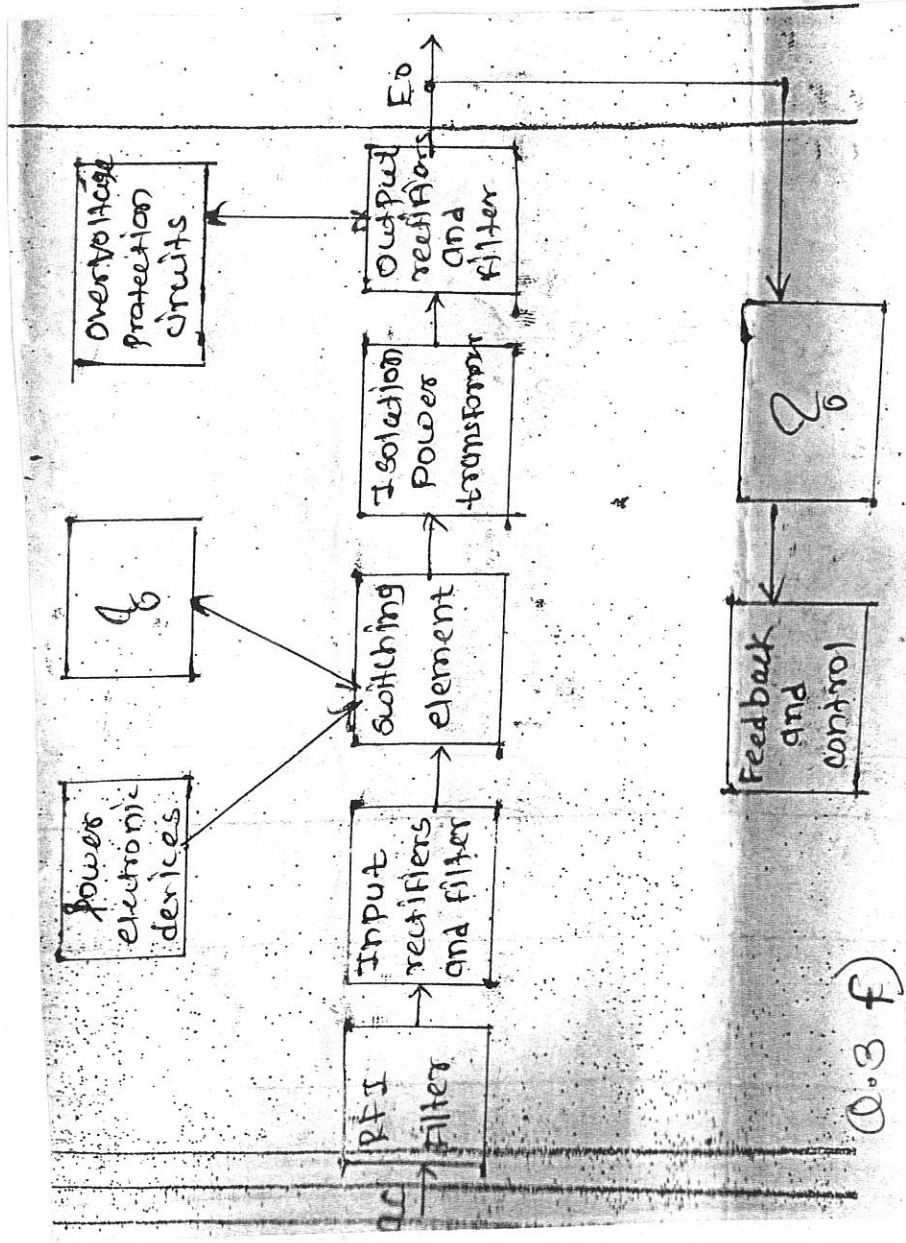
- 1) Answer to two sections must be written in separate section answer book provided
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO IEF501	Marks
Section - I					
Q.1		Attempt any FOUR			(08)
	a)	State the need of power electronics devices.	U	1	
	b)	Draw and label the symbol of the following devices: i) IGBT ii) Enhancement MOSFET.	R	1	
	c)	Draw the symbol of SCR. State the use of gate terminal in device.	A	1	
	d)	Define the term chopper in power electronics.	R	2	
	e)	Determine the output DC level (E_o) of step-down chopper for duty cycle $\alpha=1$ & $\alpha=0$	A	2	
	f)	State the need of AC voltage regulator.	U	2	
Q.2		Attempt any FOUR			(16)
	a)	Explain the operation of GTO with the neat structural diagram.	U	1	
	b)	Explain the operating principle of an IGBT on the basis of i) Creation of an inversion – layer ii) Conductivity modulation of the drift layer.	U	1	
	c)	Derive an expression for output voltage (E_o) in terms of duty cycle (α) for step-up chopper.	A	2	
	d)	Classify the different types of chopper on the basis of: i) Input- output voltage level. ii) According to the directions of output voltage and current. iii) According to circuit operation. iv) According to commutation method.	R	2	
	e)	Explain the working of a single phase to single phase cycloconverter with neat circuit diagram (with R load.)	U	2	
	f)	List the different requirements of power supply and describe any four.	R	3	
Q.3		Attempt any FOUR			(16)
	a)	Differentiate between IGBT and GTO with reference to the following parameters : i) Voltage and current rating ii) Turn on and turn off time iii) Leakage current. iv) Applications	U	1	
P.T.O					

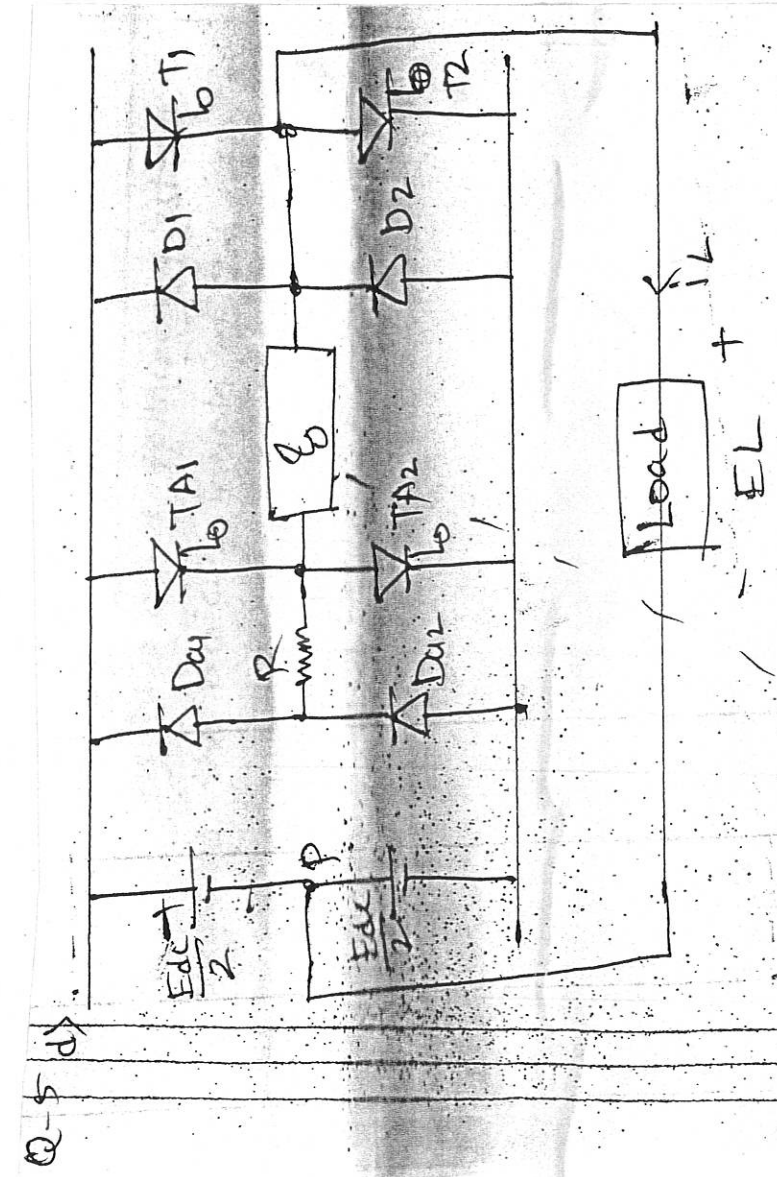
b)	Explain the working of step-down chopper with neat circuit diagram and output waveform.	U	2
c)	Draw the three phase to single phase cycloconverter circuit diagram and its output current and voltage waveform.	U	2
d)	Explain the servo type regulator with neat circuit diagram.	U	3
e)	Compare linear regulator with switching mode regulator on the basis of following parameter i) Design flexibility ii) Efficiency iii) Vin range iv) Application	U	3
f)	Complete the given block SMPS with missing block and explain the use of following blocks: (Refer diag. Page.) i) Isolation power transformer ii) Feedback and control.	A	3

Section-II

Q.4	Attempt any FOUR			(08)
a)	State the basic principle of inverter.	R	4	
b)	Draw circuit diagram of inverter of PWM inverter.	R	4	
c)	State the basic principle of induction heating.	U	5	
d)	List the different types of inverters.	R	4	
e)	State the need of protection circuits.	R	6	
f)	Draw the Snubber circuit. And gives its two applications.	R	6	
Q.5	Attempt any FOUR			(16)
a)	Explain series inverter with circuit diagram and output waveform.	U	4	
b)	Explain parallel inverter with R load.	U	4	
c)	Explain the block diagram of UPS with operating principle & its need.	U	5	
d)	Complete the given circuit diagram of Mc Murry half bridge inverter with missing components and draw its output waveform (fig.1)	A	4	
e)	Draw and explain the crowbar protection circuit and give its two applications.	U	6	
f)	Explain pulse transformer isolation circuits with diagram.	U	6	
Q.6	Attempt any FOUR			(16)
a)	Explain simple bridge inverter with R Load.	R	4	
b)	Explain bridge inverter with Mc Murry Bed ford.	U	4	
c)	List the different applications of induction heating and explain any two in detail.	R	5	
d)	Explain off line UPS in detail.	A	5	
e)	Explain circuit breaker protection circuit in detail.	U	6	
f)	Explain isolation circuit optoisolator with circuit diagram.	R	6	



Q.3 f)



Q-5 d) Fill the missing components.

Fig.1 (Q5-d)

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF105/0107/R107/X104/CEE105 COURSE NAME: BASIC MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 14/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.

7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO CCF10 5	Mar ks
Q.1		Attempt any FOUR			(08)
	a)	Expand $\begin{vmatrix} 1 & 3 & -1 \\ 2 & 0 & 5 \\ 6 & -2 & -7 \end{vmatrix}$	R / U	1	
	b)	Resolve into partial fractions: $\frac{x+1}{x^2-2x+1}$	R / U	2	
	c)	Resolve into partial fractions: $\frac{1}{(x^2+2)(x^2+5)}$	R / U	2	
	d)	Expand $(3a-b)^4$ by using Binomial theorem.	R / U	4	
	e)	Find the values of 'a' and 'b' if $\begin{bmatrix} a-4b & 5 \\ 6 & -a+b \end{bmatrix} = \begin{bmatrix} 11 & 5 \\ 6 & -5 \end{bmatrix}$	A	3	
	f)	If $A = \begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix}$ find matrix x such that $2x + 3A - 4B = I$	A	3	
Q.2		Attempt any FOUR			(16)
	a)	Show that the following equation are consistent $4x - 3y + 1 = 0$, $7x - 8y + 10 = 0$, $x + y - 5 = 0$	U	1	
	b)	Resolve into partial fractions: $\frac{x^2}{(x+1)(x+2)(x+3)}$	A / U	2	
	c)	Resolve into partial fractions: $\frac{3x^2+17x+14}{x^3-8}$	A / U	2	
	d)	Expand $\left(x^2 - \frac{2}{y^3}\right)^6$ by using Binomial theorem.	A	4	
	e)	Express the following matrix as the sum of symmetric and skew symmetric matrices. $A = \begin{bmatrix} -1 & 7 & 1 \\ 2 & 3 & 4 \\ 5 & 0 & 5 \end{bmatrix}$	U	3	
	f)	Find x, y, z if $\begin{bmatrix} 1 & 0 \\ 5 & 0 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ -2 & 3 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} x \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$	A / U	3	

P.T.O

Q.3	Attempt any FOUR			(16)
a)	Solve by Cramer's Rule $\frac{2}{x-1} + \frac{3}{y-2} = 5, \frac{4}{x-1} - \frac{1}{y-2} = 3$	A	1	
b)	Resolve into partial fractions : $\frac{x^4 - x^5 + 1}{x^3(1-x)}$	A	2	
c)	By using Binomial theorem expand $\left(\frac{4}{3x} + \frac{y^2}{2}\right)^6$	A	4	
d)	If $A = \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix}, B = \begin{pmatrix} 4 & 2 & -5 \\ 1 & 0 & 3 \end{pmatrix}$ and $C = \begin{bmatrix} 6 & -7 & 0 \\ -1 & 2 & 5 \\ 1 & 0 & 3 \end{bmatrix}$ verify that $A(BC) = (AB)C$	U	3	
e)	If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ show that $adj A = 3A^T$	U	3	
f)	Solve by matrix method $x + y + z = 3$ $x + 2y + 3z = 4$ $x + 4y + 9z = 6$	A	3	
Q.4	Attempt any FOUR			(08)
a)	Prove that $\cos ec^2 \theta - \cos^2 \theta \cos ec^2 \theta = 1$	U	5	
b)	Without using calculator, find the value of $\sec(3660^\circ)$	A	5	
c)	Prove that $\cos 2\theta = 1 - 2\sin^2 \theta$	U	5	
d)	Without using calculator find $\sin(15^\circ)$	A	5	
e)	If $2\sin 40^\circ \cos 10^\circ = \sin A + \sin B$ find A and B	U	5	
f)	Find principal value of $\cos\left[\frac{\pi}{2} - \sin^{-1}\left(\frac{1}{2}\right)\right]$	U	5	
Q.5	Attempt any FOUR			(16)
a)	Prove that $\frac{1+2\sin^2 \theta}{1+3\tan^2 \theta} = \cos^2 \theta$	U	5	
b)	Without using calculator, find the value of $\frac{\sec^2(135^\circ)}{\cos(-240^\circ) - 2\sin(930^\circ)}$	U	5	
c)	If $\tan(x+y) = \frac{3}{4}$, and $\tan(x-y) = \frac{8}{15}$ then show that $\tan 2x = \frac{77}{36}$	A	5	
d)	Prove that $\frac{1 - \tan 2\theta \tan \theta}{1 + \tan 2\theta \tan \theta} = \frac{\cos 3\theta}{\cos \theta}$	A	5	
e)	Prove that $\cos 10^\circ \cos 50^\circ \cos 70^\circ = \frac{\sqrt{3}}{8}$	A	5	
f)	Prove that $\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{27}{11}\right)$	A	5	
Q.6	Attempt any FOUR			(16)
a)	Without using calculator find the value of $\sin 150^\circ - \tan 315^\circ + \cos 300^\circ + \sec^2 3660^\circ$	U	5	
b)	If A and B are obtuse angle such that $\sin A = \frac{5}{13}, \cos B = \frac{-4}{5}$ find $\tan(A+B)$	U	5	
c)	prove that $\frac{\cos 3A - \cos 7A}{\sin 9A + \sin A} = \cos 2A \tan 4A - \sin 2A$	A	5	
d)	Prove that $\cos C + \cos D = 2 \cos\left(\frac{C+D}{2}\right) \cos\left(\frac{C-D}{2}\right)$	A	5	
e)	Prove that $\cos^{-1}\left(\frac{4}{5}\right) - \sin^{-1}\left(\frac{5}{13}\right) = \cos^{-1}\left(\frac{63}{65}\right)$	A	5	
f)	Prove that $2 \tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{4}{3}\right) = \frac{\pi}{2}$	A	5	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : IE & E & TC****COURSE CODE :- EIF306/ETE306/IEE306****COURSE NAME :- DIGITAL TECHNIQUES AND APPLICATIONS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 30 / 05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.

7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co EIF 306	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Add the following i) $(01011)_2 + (01111)_2$ ii) $(05)_8 + (05)_8$	A	1	
	b)	State and prove distributive law.	A	3	
	c)	Draw CMOS NOR gate.	R	3	
	d)	Define Minterm and Maxterm.	R	2	
	e)	Draw internal Pin diagram of IC 7402.	R	3	
	f)	State any four Boolean laws.	R	2	
Q.2		Attempt any FOUR :			16
	a)	Subtract the following decimal numbers by using 9's complement method. $(93)_{10} - (615)_{10}$.	A	1	
	b)	Apply DeMorgan's theorem to each of following expression. i) $\overline{P(Q+\overline{R})}$ ii) $\overline{(P+\overline{Q})}(\overline{R}+S)$	A	2	
	c)	Explain working of CMOS NAND gate with neat circuit diagram.	U	3	
	d)	Perform the following conversions. i) $(120.25)_{10} \longrightarrow (X)_2$ ii) $(12)_{10} \longrightarrow (X)_{\text{Gray code}}$	A	1	
	e)	Convert following SOP to its canonical SOP form $f(A,B,C) = \overline{A}B + BC + AC$	A	2	
	f)	Explain working of CMOS NOR gate	U	3	
Q.3		Attempt any FOUR :			16
	a)	Perform the following subtraction by 2's complement method. $(01010101)_2 - (00010001)_2$.	A	1	
	b)	Compare TTL and CMOS logic family (any 4 points)	U	3	
	c)	Reduce the following Boolean expression by using K-map $f(R,S,T) = \overline{R}\overline{S}T + \overline{R}S\overline{T} + \overline{R}\overline{S}T + RST + R\overline{S}T$	A	2	

P.T.O.

	d)	Convert $(10110)_2$ to i) Gray code ii) $()_{16}$ iii) $()_{10}$ iv) Excess – 3 code.	A	1
	e)	Explain the interfacing of TTL logic family to CMOS.	U	3
	f)	Using K-map, reduce the following expression. $f(A,B, \lambda) = \sum m(0,1,4,6,7) + \sum d(2)$	A	2
Q.4		Attempt any FOUR :		08
	a)	Explain half adder in brief with its truth table.	U	4
	b)	Name the IC used for Binary to BCD converter and state how many bit converter it is.	R	4
	c)	State the difference in Edge triggering and level triggering. Which one is preferred?	U	5
	d)	State the function of IC 6116. Give its capacity.	R	6
	e)	List any four applications of Demultiplexer.	R	4
	f)	Define sequential logic systems. State two sequential logic systems.	R	5
Q.5		Attempt any FOUR :		16
	a)	Describe all modes of operation in shift register in brief.	U	5
	b)	Explain operation of 4 bit binary asynchronous up counter with block diagram.	U	5
	c)	Explain the working of single slope ADC with block diagram.	U	6
	d)	Define decoder. How IC 74154 is used as a decoder?	R & U	4
	e)	Implement the following using multiplexer. $Y = \sum m(2, 3, 5, 6)$	A	4
	f)	Sketch interfacing diagram for BCD to 7 segment decoder using IC 7447.	R	4
Q.6		Attempt any FOUR :		16
	a)	Explain one digit BCD adder by using IC 7483.	U	4
	b)	Explain the operation of multiplexer with the help of block schematic.	U	4
	c)	Sketch logic diagram of IC74193. Give its application.	R	5
	d)	Sketch Edge-triggered S-R flip flop using NAND gate, explain its working with truth table.	R & U	5
	e)	Explain the following ROM, PROM, EPROM, EEPROM.	U	6
	f)	Design half subtractor using logic gates.	A	4

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIFTH PROGRAM : IE & E & TC**COURSE CODE :- EEF512/ETE512****COURSE NAME PIC MICROCONTROLLER****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 27/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No. SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section- I		R/ U/ A	Co EIF 512	Mar ks
Q.1		Attempt any FOUR :				08
	a)	Write the function of following pins of PIC18 i) RB3/PGM ii) RC7 / RX/DT		R	1	
	b)	State any four table processing instructions.		R	2	
	c)	Define the term i) Two byte instruction ii) Four byte instruction.		R	2	
	d)	Draw Format of T ₁ CON & T ₂ CON registers.		R	3	
	e)	Write an assembly language program to add two BCD numbers, the numbers are 25 and 49. Store the resultant at file registers 60H and 61H.		A	2	
	f)	Draw the block diagram of Timer 2.		R	3	
Q.2		Attempt any FOUR :				16
	a)	Explain any four assembler directives of PIC18.		R	1	
	b)	Explain the timer 3 programming with neat block diagram. Also write the steps for programming of timer 3.		U	3	
	c)	Write an assembly language program to find the square of 10 numbers stored in an array starting at file register 50H onwards and store the square of numbers at file register 60H onwards.		A	2	
	d)	Show the status of C, DC & Z flags after the addition of 88H and 93H in the following instructions. MOV LW 88 H ADD LW 93H		U	2	
	e)	Draw and explain the program memory of PIC18 microcontroller.		R	1	
	f)	Assume XTAL = 10MHz. Write an assembly language program to generate the square wave of 50Hz frequency on pin port B-7. Use timer 3 16 bit mode with maximum prescaler is allowed.		A	3	

Q.3	Attempt any TWO :			16
a)	With the help of neat diagram explain the architecture of PIC18F microcontroller.	R	1	
b)	What is addressing mode. Explain any three addressing modes with suitable examples.	U	2	
c)	Write steps to program timer 0 in 16 bit mode.	U	3	
QN	S Q N	R/ U/ A	Co EF 512 ks	Mar ks
Q.4	Section-II Attempt any FOUR :			08
a)	Give the importance of TXIF flag bit in PIR1 register.	U	4	
b)	State any four sources of interrupts in PIC18F.	R	4	
c)	Give the two ways used by PIC 18 for key press detection.	R	5	
d)	State the difference between single byte and burst modes in terms of the CE signal.	R	5	
e)	Define the step angle of stepper motor. Calculate the number of steps per revolution if step angle is 2.5° .	R	6	
f)	Give the advantages of solid state relays over electromechanical relays.	R	6	
Q.5	Attempt any FOUR :			16
a)	Draw the format of INT CON register. Give the significance of each bit.	R	4	
b)	Explain the operation of CCP1 module in compare mode with diagram.	U	4	
c)	Write the steps for writing data to an SPI device.	R	5	
d)	Draw the interfacing diagram of DS1306 to PIC18	R	5	
e)	Write assembly language program to turn ON & OFF the relay. Also draw the interfacing diagram of relay with PIC18 F.	U	6	
f)	Draw the interfacing diagram for DC motor with PIC18F using optoisolator.	U	6	
Q.6	Attempt any FOUR :			16
a)	Write assembly language program to create square wave of 100Hz and 50% duty cycle on CCP1 pin using compare mode.	A	4	
b)	Write a program for the PIC18 to transfer the letter 'G' serially at S7600 baud rate continuously. Assume XTAL = 10MHz, BRGH= 1.	A	4	

c)	Draw the format ADCON1 register format and explain the significance of each bit.	R	5	
d)	Write assembly language program to display "YES" on LCD which is interfaced to PIC18 using busy flag method.	A	5	
e)	Write assembly language program for PIC 18 to rotate the stepper motor in counter clockwise direction.	A	6	
f)	Explain the bidirectional control of DC motor using H- Bridge.	R	6	

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EVEN TERM ENDE EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : ALLIED****COURSE CODE :- EEE311/EIF311/MEF312/MTF408/ETE311/IEE311/****R227/MEE312/MG227/MET311****COURSE NAME :- NON CONVENTIONAL ENERGY SOURCES****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 24 / 05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R / U / A	CO EIF311/ MEF312 MTF408	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Enlist four indirect applications of solar energy.	R	1	
	b)	State the need of non-conventional energy sources.	U	1	
	c)	Define i) Solar azimuth angle ii) Solar declination angle.	R	1	
	d)	Explain the different types of winds. Why local winds are generated?	U	2	
	e)	Explain the disadvantages of KVIC digester plant.	R	3	
	f)	Describe the various biomass conversion technologies.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain solar furnace with neat sketch.	U	1	
	b)	Describe the working of Domestic Solar Cooker with neat sketch.	U	1	
	c)	Classify the wind mills.	U	2	
	d)	Discuss the safety systems in wind energy conservation systems.	U	2	
	e)	Draw the neat sketch of Deenbandhu biogas plant & explain its working.	U	3	
	f)	Discuss the various biomass resources.	U	3	
Q.3		Attempt any TWO :			16
	a)	i) State advantages and disadvantages of solar concentrators over flat plate collectors ii) Explain the working of parabolic through reflector with neat sketch.	R U	1 1	
	b)	i) State the instruments used to measure various aspects of solar radiations. ii) Explain the working of pyraheliometer with neat sketch.	R U	1 1	

	c)	i) Explain the working of Horizontal Axis Wind Turbine (HAWT) Generator with neat sketch. ii) Discuss various power control mechanisms used in the Wind Mills.	U	2	
Q.4		Attempt any FOUR :			08
	a)	Define Ocean Thermal Electric conversion.	R	5	
	b)	State two limitations of tidal power generation.	R	5	
	c)	Explain principle of MHD.	U	5	
	d)	Write limitation of fuel cell.	R	1	
	e)	List the types of Energy Audits.	R	1	
	f)	Define ROI.	R	1	
Q.5		Attempt any FOUR :			16
	a)	Explain open and closed OTEC cycle.	A	5	
	b)	Select a site for tidal power plant & list requirements.	A	5	
	c)	List the requirement of source for Geo thermal power plant.	A	5	
	d)	List components of SHP(small hydro plant). Draw neat sketch.	R	5	
	e)	State the future prospects of MHD system.	R	5	
	f)	State different methods of energy conservation.	R	5	
Q.6		Attempt any FOUR :			16
	a)	Explain the principle of fuel cell with neat sketch.	A	5	
	b)	Draw and sketch of fuel cell and explain in brief.	U	5	
	c)	Draw and explain in brief MHD generation.	U	5	
	d)	Explain how principle of Energy conservation is applied in daily life.	U	6	
	e)	Explain to examples where waste heat recovery is effectively applied.	R	5	
	f)	Draw Sunkey diagram and explain in brief.	U	5	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: IE/E&TC/IT

COURSE CODE: EIF312/ETE312/EJ210/IX210/IEE312/ITE312

COURSE NAME: HIGHER MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 24/05/2019

Instruction:-

- Answers must be written in the main answer book provided. (and supplements if required)
- Illustrate your answers with sketches where ever necessary.
- Use of non-programmable pocket calculator is permissible.
- Mathematical and other tables will be made available on request.
- Assume and mention suitable additional data necessary.
- Use of Mobile is strictly prohibited.
- QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S	Question Text	R	CO	EIF	Marks												
Q.1		Attempt any FOUR			A 312	(08)												
	a)	Define forward and backward difference operator.	R	1														
	b)	Prove that $E \nabla = \nabla E = \Delta$	U	1														
	c)	Find $\left(\frac{\Delta^2}{E}\right)x^3$	A	1														
	d)	If $z = 3^x \tan y$ find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$	R	2														
	e)	If $u = e^{xyz}$ find $\frac{\partial^3 u}{\partial x \partial y \partial z}$	A	2														
	f)	If $u = \sin^{-1}\left(\frac{x}{y}\right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$	U	2														
Q.2		Attempt any FOUR				(16)												
	a)	Using Lagrange's interpolation formula estimate u_4 and u_6 with $u_0 = -18, u_1 = 0, u_5 = -248$	A	1														
	b)	Express $y = 3x^3 + x^2 + x + 1$ in the factorial notation. Hence find $\Delta^3 y$	A	1														
	c)	Find missing term in the following table <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>y</td><td>2</td><td>5</td><td>7</td><td>-</td><td>32</td></tr></table>	x	1	2	3	4	5	y	2	5	7	-	32	A	1		
x	1	2	3	4	5													
y	2	5	7	-	32													
	d)	Using Newton's forward interpolation formula find f(8) <table><tr><td>x</td><td>5</td><td>10</td><td>15</td><td>20</td></tr><tr><td>f(x)</td><td>50</td><td>70</td><td>100</td><td>145</td></tr></table>	x	5	10	15	20	f(x)	50	70	100	145	A	1				
x	5	10	15	20														
f(x)	50	70	100	145														
	e)	If $u = \log(\tan x + \tan y + \tan z)$ prove that $\sin 2x \frac{\partial u}{\partial x} + \sin 2y \frac{\partial u}{\partial y} + \sin 2z \frac{\partial u}{\partial z} = 2$	U	2														
	f)	If $u = \frac{x^3 y + y^3 x}{y - x}$ prove that $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$	U	2														
Q.3		Attempt any FOUR				(16)												
	a)	Given <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>7</td><td>17</td><td>45</td><td>103</td><td>203</td></tr></table> Find y when x = 3.6 using suitable interpolation.	x	0	1	2	3	4	y	7	17	45	103	203	A	1		
x	0	1	2	3	4													
y	7	17	45	103	203													

	b)	Using Newton's forward interpolation formula find $\sin 45^\circ$							A	1		
		x	0°	30°	60°	90°						
		$\sin x$	0	0.5	0.87	1						
	c)	If $x = u \cos v$, $y = u \sin v$ prove that $JJ' = 1$									U	2
	d)	if $u = \tan^{-1}(x^2 + 2y^2)$ prove that										
		i)	$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$							U	2	
		ii)	$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 2 \sin u \cos 3u$									
	e)	If $u = \log \left(\frac{x^3 + y^3}{x^2 + y^2} \right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$									U	2
	f)	If $z^3 - xz - y = 0$ Find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$									A	2
Q.4		Attempt any FOUR										(08)
	a)	State first shifting theorem in Laplace transform.									R	3
	b)	Evaluate $L[\sin at]$									U	3
	c)	Find $L^{-1} \left[\frac{2}{s} + \frac{1}{s^3} + \frac{1}{s+4} \right]$									A	3
	d)	Find the Fourier constant a_n for $f(x) = e^x, -\pi < x < \pi$									R	4
	e)	Find the Fourier constant a_0 for $f(x) = x^2$ in $(-1, 1)$									U	4
	f)	Find the Fourier constant b_n for $f(x) = x$ in $(0, 2\pi)$									A	4
Q.5		Attempt any FOUR										(16)
	a)	Evaluate $L(te^{3t} \sin 2t)$									U	3
	b)	Evaluate $L^{-1} \left[\frac{2s^2 - 4}{(s+1)(s-2)(s-3)} \right]$									A	3
	c)	Evaluate $L^{-1} \left[\frac{1}{(s+2)^3} + \frac{2s}{s^2 + 6s - 16} \right]$									A	3
	d)	Using Convolution theorem find $L^{-1} \left[\frac{1}{s(s^2 + 4)} \right]$									A	3
	e)	Evaluate using Laplace transform $\int_0^\infty e^{-2t} t \sin^3 t \, dt$									A	3
	f)	Solve using Laplace transform $\frac{dy}{dt} + y = t^2 e^{-t}$ Given that $y=3$ when $t=0$									A	3
Q.6		Attempt any TWO										(16)
	a)	Find Fourier expansion of $f(x) = x - x^2, -\pi < x < \pi$ hence deduce that $\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \dots$									A	4
	b)	Obtain the Fourier expansion of following function $f(x) = \begin{cases} x, & 0 < x < 1 \\ 1-x, & 1 < x < 2 \end{cases}$									A	4
	c)	Obtain the Fourier expansion for $f(x) = \sqrt{1 - \cos x}$ in $(0, 2\pi)$ Hence deduce that $\frac{1}{2} = \sum_{n=1}^\infty \frac{1}{4n^2 - 1}$									A	4

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **FOURTH**

PROGRAM: **IE/E&TC**

COURSE CODE: **EIF404/EJ303/ETE404/IX303/IEE404**

COURSE NAME: **PRINCIPLES OF CONTROL SYSTEM**

MAX. MARKS: **80**

TIME: **3 HRS.**

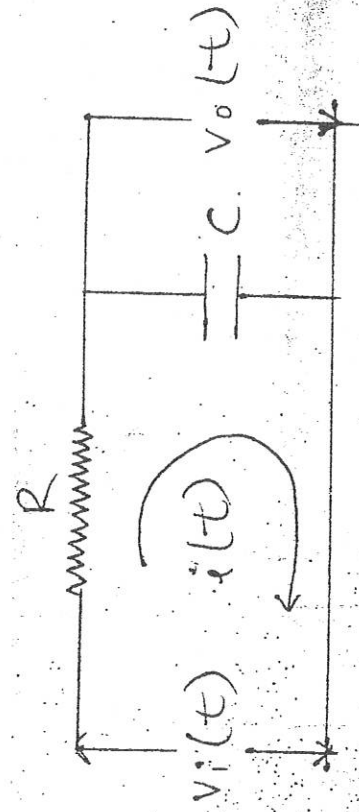
DATE: **29/05/2019**

Instruction:-

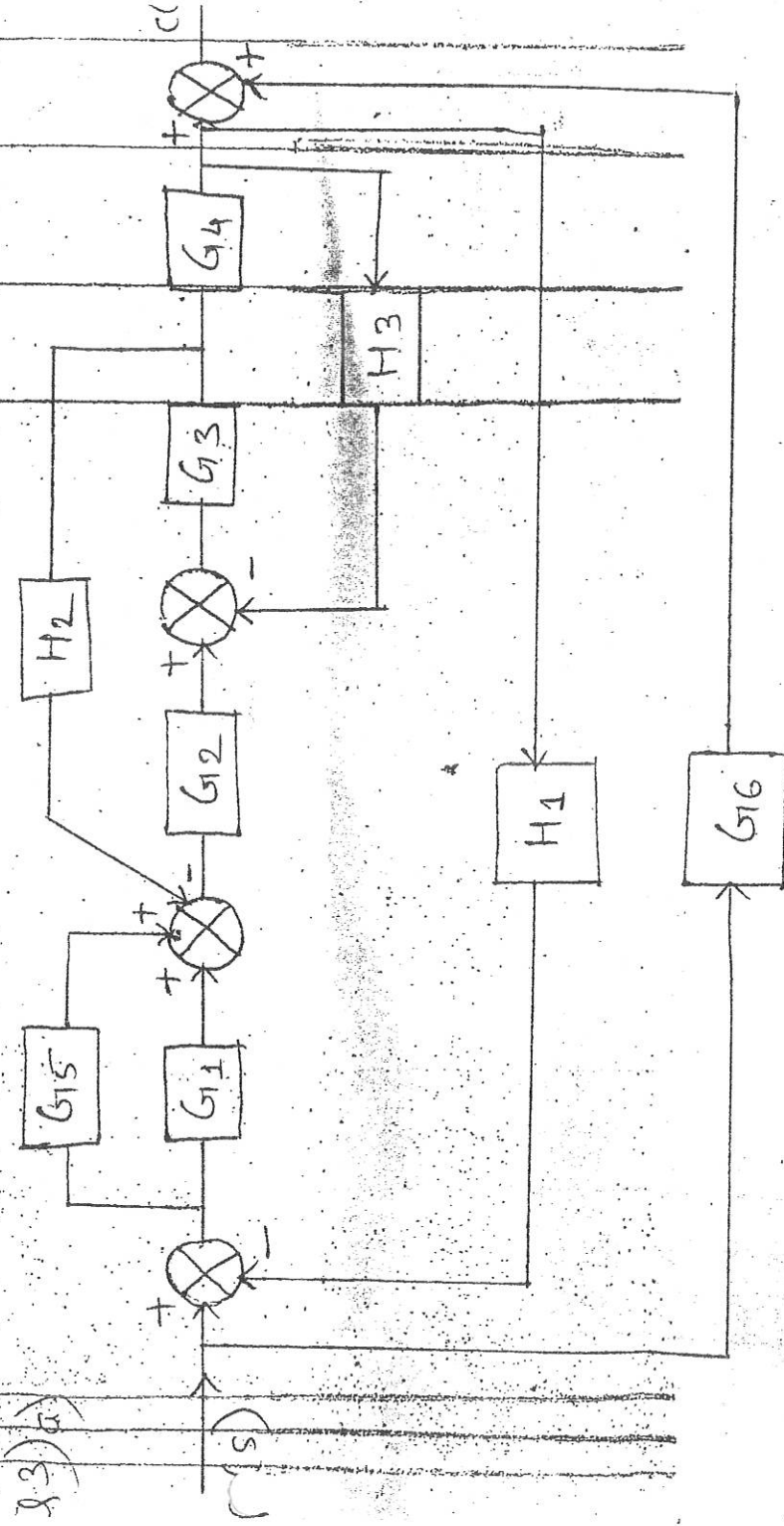
- 1) Answer to two sections must be written in separate section answer book provided
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>Course outcome

QN	S Q N	Question Text	R U A	CO EIF A	Marks
Section - I					
Q.1		Attempt any FOUR			(08)
	a)	List any four examples of open loop system.	R	1	
	b)	Define linear Time in varying system.	R	1	
	c)	State any two limitations of time down analysis.	R	3	
	d)	Define poles of the system.	R	2	
	e)	State order of system. Give any two practical example of second order system.	R	1	
	f)	Define Transient Response.	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Derive transfer function for close loop control system.	A	2	
	b)	Draw and explain the standard test signals used in time domain analysis and state the mathematical statement for each.	U	2	
	c)	State two advantages and two disadvantages of frequency response analysis.	U	3	
	d)	Find out transfer function of fig (a)	A	1	
	e)	Define time response specifications of second order control system. i) Delay time ii) Rise time iii) Peak time iv) Settling time	R	2	
	f)	Define i) Resonance frequency ii) Bandwidth iii) Cut off rate iv) Gain margin	R	3	
Q.3		Attempt any TWO			(16)
	a)	Find transfer functions of given system fig (b)	A	1	
P.T.O					

b)	A unity feedback control system has $G(s) = \frac{100}{s(s+15)}$. If it is subjected to unit step input has output response as $c(t) = 1 - \frac{e^{-\xi \omega_n t}}{\sqrt{1-\xi^2}} \sin(\omega_d t + \theta)$ Determine i) Damped frequency of oscillations ii) Max. overshoot iii) Time for first overshoot iv) Settling time v) output Response	A	2	
c)	Explain stepwise procedure to draw bode plot.	U	3	
Section-II				
Q.4	Attempt any FOUR			(08)
a)	Define offset in proportional control action.	R	6	
b)	Enlist any four servo components.	U	5	
c)	State transfer function of armature controlled and field controlled DC servo motors.	R	5	
d)	State any two advantages of PI mode.	U	6	
e)	State two special cases in Routh's criterion.	R	4	
f)	Define Auxiliary equation.	R	4	
Q.5	Attempt any FOUR			(16)
a)	Explain stable, unstable, critically stable and conditionally stable system.	U	4	
b)	Explain synchro as error detector.	U	5	
c)	Define discontinuous control action. Explain discontinuous control action used in industrial applications.	U	6	
d)	Draw electronic PID controller. Write its equation.	R	6	
e)	Explain Root locus technique.	U	4	
f)	Compare stepper motor with DC servo motor (any four points)	U	5	
Q.6	Attempt any FOUR			(16)
a)	Draw schematic diagram of AC servo system. Write its working principle.	U		
b)	Draw locations of roots in S-Plane for following systems. i) Stable system ii) Unstable system iii) Critically stable system iv) Relative stable system	A	4	
c)	Draw block diagram of process control system. State the need of process control system in industry.	U	6	
d)	Write mathematical equation for derivative control action. Explain why derivative control action is not used alone.	R / U	6	
e)	For a system with characteristic equation $s^4 + 6s^3 + 26s^2 + 56s + 80 = 0$. Examine stability by Routh's criterion	A	4	
f)	With block diagram, explain servo system.	U	5	



②
II



②
③
II

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIFTH PROGRAM : ELECTRONICS & TELECOMMUNICATION**COURSE CODE :- ETF506/ETE506****COURSE NAME AUDIO AND VIDEO ENGINEERING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 23/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

Section- I			R/ U/ A	Co ITF 409	Mar ks
QN	S Q N				
Q.1		Attempt any FOUR :			08
	a)	Define graphic equalizer.	R	1	
	b)	State the function of colour burst.	R	3	
	c)	List any four controls available on Hi-Fi amplifier.	R	1	
	d)	Write horizontal and vertical trace and retrace period values.	R	3	
	e)	Draw the diagram of additive colour mixing.	R	3	
	f)	State the need of compression.	R	2	
Q.2		Attempt any FOUR :			16
	a)	Explain stereo amplifier with neat diagram.	U	1	
	b)	Explain the type of scanning that reduces flicker noise.	U	3	
	c)	Draw and explain JPEG architecture.	U	2	
	d)	Explain horizontal sync pulse with diagram.	U	3	
	e)	Draw and explain cross over network circuit for woofer and tweeter.	U	1	
	f)	Explain the type of colour mixing used in printers.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Define i) compatibility ii) Saturation iii) Luminance iv) Contrast	R	3	
	b)	Write a short note on AVI.	U	2	
	c)	Define resolution. Explain vertical resolution with neat diagram.	U	3	
	d)	Draw and explain block diagram of Hi-Fi amplifier.	U	1	
	e)	Compare between MPEG2 & MPEG4 on the basis of following points i) Bit rate ii) Compression ratio iii) Cost iv) Application.	U	2	
	f)	List any 8 CCIR B standards and its specifications for colour signal transmission and reception.	A	3	

P.T.O.

QN	S Q N	Section- II	R/ U/ A	Co ETF 506	Mar ks
Q.4		Attempt any FOUR :			08
	a)	Define negative modulation.	R	4	
	b)	----- is passive electronic circuit to reduce signal strength by a specific value. Expressed in --- (unit).	A	6	
	c)	Draw circuit diagram of ACC amplifier.	R	5	
	d)	State function of colour delay line signal in PAL system.	R	5	
	e)	List any two application of MATV.	R	6	
	f)	State two drawback of delta gun picture tube.	R	4	
Q.5		Attempt any FOUR :			16
	a)	Justify AM is preferred for picture and FM for sound signal transmission.	R	4	
	b)	Compare positive and negative modulation.	U	4	
	c)	Develop circuit for EHT generation for line output stage using transistor.	A	5	
	d)	Draw neat diagram and explain how U & V signals are separated.	U	5	
	e)	Distinguish between CATV & CCTV	U	6	
	f)	Describe working principle of LCD with neat sketch.	U	6	
Q.6		Attempt any FOUR :			16
	a)	State working of PIL picture tube with diagram.	U	4	
	b)	Describe block diagram of colour signal matrix.	U	5	
	c)	Compare NTSC & PAL with following points. i) Colour sub camera ii) Video bandwidth iii) Polarity of modulation iv) Phase distortion.	U	5	
	d)	With diagram explain CCTV. State two applications.	U	5	
	e)	Illustrate RGB drive amplifier with diagram.	U	5	
	f)	Describe need of multiplexer and alternator in cable TV.	U	6	

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: FIRST**PROGRAM: IE/E&TC****COURSE CODE: EIF103/ETE103/ETTF103/IEF103/IEE103 COURSE NAME: BASIC ELECTRONICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 29/05/2019****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application **CO**>Course outcome

QN	S Q N	Question Text	R U A	CO EIF 103	Marks
Q.1		Attempt any FOUR	A		(08)
	a)	State the typical values of Knee voltage for silicon and germanium diode.	R	1	
	b)	State the need of filter. Give its types.	R	2	
	c)	Give the difference in silicon PN junction diode and zener diode.	R	1	
	d)	Which configuration of transistor is suitable for amplification of signal and why?	U	3	
	e)	Define doping process. Give its importance.	R	2	
	f)	State any two applications of bridge rectifier.	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Draw and explain the V-I characteristics of zener diode.	U	1	
	b)	Compare CB, CE and CC configurations of BJT.	U	3	
	c)	Draw a circuit diagram of center tap full wave rectifier with LC filter and explain the operations with waveforms.	U	2	
	d)	Explain the formation of depletion region in unbiased P-N Junction diode with suitable diagram.	U	1	
	e)	Compare Half wave and Full wave rectifier w. r. t following points i) Number of diodes ii) Ripple factor iii) Rectification efficiency iv) Circuit diagram	R	2	
	f)	Draw input and output characteristics of common base configuration.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Draw construction of NPN transistor and explain.	U	3	
P.T.O					

	b)	Draw a setup for operation of P-N junction diode in forward and reverse bias mode. Explain its operation with its characteristics.	U	1
	c)	Define i) Ripple factor ii) Rectification efficiency iii) TUF iv) PIV	R	2
	d)	Explain the process for formation of P-type extrinsic semiconductor.	U	1
	e)	For a BJT if $\alpha = 0.99$ and $I_E = 12\text{mA}$. Find β , I_C and I_B .	A	3
	f)	Draw Half wave rectifier and give the values for PIV, ripple frequency, rectification efficiency and TUF in it.	U	2
Q.4		Attempt any FOUR		(08)
	a)	Define the operating point (Q point) of the transistor.	R	4
	b)	Define amplification.	R	4
	c)	Draw the drain characteristics of n-channel JFET.	R	5
	d)	State any four specifications of FET.	R	5
	e)	Give the comparison between BJT and JFET. (any 2 points)	R	5
	f)	State any two applications of regulated power supply.	R	6
Q.5		Attempt any FOUR		(16)
	a)	With neat circuit diagram explain the working of single stage RC coupled CE amplifier.	U	4
	b)	Draw and explain fixed bias with emitter resistor method.	U	4
	c)	With neat diagram explain the construction of p-channel enhancement MOSFET.	U	5
	d)	Draw and explain the operation of p-channel JFET.	U	5
	e)	Give the comparison between series voltage regulator and shunt voltage regulator (any four points)	U	6
	f)	With neat diagram explain IC723 voltage regulator.	U	6
Q.6		Attempt any FOUR		(16)
	a)	Explain the factors affecting the stability of Q point of transistor.	U	4
	b)	Define i) DC load line ii) AC load line	R	4
	c)	Define the following terms w.r.t JFET, i) Amplification factor(μ) ii) Transconductance (gm)	U	5
	d)	Draw and explain the working of N-channel depletion MOSFET.	U	5
	e)	Explain zener diode as a voltage regulator.	U	6
	f)	Explain IC 79XX series of voltage regulator.	U	6

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

LEVEL :- THIRD **PROGRAM : IE & E & TC**

COURSE CODE :- EIF305/ETE305/IEE305/IX205

COURSE NAME :- ANALOG COMMUNICATION

MAX. MARKS : 80 **TIME : 3 HRS.** **DATE :- 22/05/2019**

Instruction :-

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co EIF 305	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define bandwidth of a communication system. Write formula of Shannon's limit on information capacity.	R	1	
	b)	Write electromagnetic frequency range for i) MF ii) HF	R	1	
	c)	Justify the statement : “ the modulation index in AM is a number lying between 0 and 1”.	U	1	
	d)	Differentiate between low-level and high-level modulation in AM, with reference to how modulation is achieved in AM.	U	2	
	e)	Define i) Modulation index ii) Deviation ratio	R	3	
	f)	Write the basic principle of varactor diode modulator.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Identify the block diagram given in Fig: 2.(a) label the block which is blank, and describe its function.	A	1	
	b)	Using the information given below, find bandwidth of AM signal and draw its frequency spectrum Carrier $V_c = 10 \sin (2 \Pi 10^7 t)$ Modulating signal $V_m = 6 \sin (2 \Pi 10^4 t)$	A	2	
	c)	Draw trapezoidal patterns for following modulation indices and interpret them i) $m = 1$ ii) $m > 1$ iii) $m < 1$	A	2	
	d)	Draw and describe transistorized amplitude modulator circuit.	U	2	
	e)	Interpret following equation of FM wave $V = A \{ J_0 (m_f) \sin W_c t + J_1 (m_f) [\sin (W_c + W_m) t - \sin (W_c - W_m) t] + J_2 (m_f) [\sin (W_c + 2W_m) t + \sin (W_c - 2W_m) t] + \dots \}$	U	3	

P.T.O.

	f) If FM signal is given by $V_{FM} = 12 \sin (2 \Pi 10^6 t + 4 \sin 2 \Pi 10^4 t)$ Find i) Carrier and modulating signal frequency. ii) Modulation index iii) Power developed across 100Ω .	A	2	
Q.3	Attempt any TWO :			16
	a) 1) Describe following terms : i) Signal to noise ratio ii) Noise figure/Noise factor. 2) An amplifier operating over the frequency range of 455 to 460 KHz has a $200k\Omega$ input resistor. What is the rms noise voltage at the input to this amplifier if the ambient temperature is $27^\circ C$?	U	1	04
	b) i) Write advantages and disadvantages of SSB technique. ii) A 400 W carrier is amplitude modulated to 60% depth of modulation. Find total transmitted power in AM wave. iii) For the above problem (given in b(ii)). Find % power saving in transmitted power for following modulation techniques 1) DSBSC 2) SSBSC	R A A	2 2 2	02 02 4
	c) Draw the block diagram of FM transmitter using indirect method and describe each block.	U	3	08
Q.4	Attempt any FOUR :			08
	a) Define virtual height with a neat diagram.	R	6	
	b) Classify types of antennas.	U	5	
	c) "FM reception is noise free". Justify the sentence.	A	4	
	d) Define sensitivity. Draw graph of sensitivity of a radio receiver and label X & Y coordinates.	R	4	
	e) Explain the term image frequency is AM receiver.	U	4	
	f) Draw the block diagram of AM superhetrodyne radio receiver.	R	4	
Q.5	Attempt any FOUR :			16
	a) State any two advantages and disadvantages of sky wave propagation.	A	6	
	b) List functions of a receiver	R	4	
	c) Identify the following diagram. Label blocks A,B,C,D, E. State functions of block D & B	A	4	
	d) Explain Yagi-uda antenna with neat labelled diagram and radiation pattern.	U	5	
	e) Explain the working of PLL using block diagram.	U	4	
	f) State whether true or false :- "Signal reception is better at night". If true justify answer.	A	6	

Q.6	Attempt any FOUR:			16
a)	Explain Half wave dipole antenna with diagram and its radiation pattern.	U	5	
b)	Compare ground wave & space wave propagation. (any 4 points)	U	6	
c)	Explain the working principle of ratio detector with neat diagram.	U	4	
d)	Define fading. List its causes.	R/ U	6	
e)	Identify the given curve and label the curve.. Explain any two curves.	A	4	
f)	Define the terms with respect to antenna: i) Beam width ii) Polarization iii) Gain iv) Resistance.	R	5	

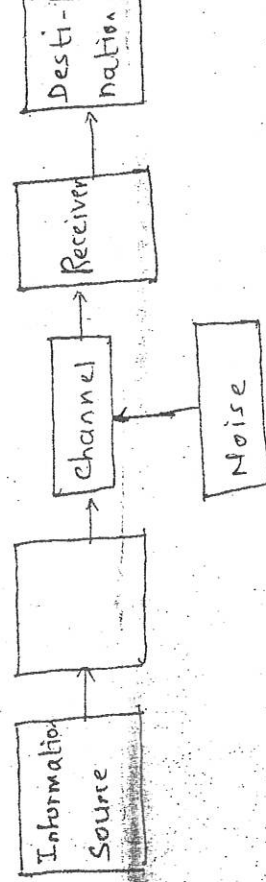
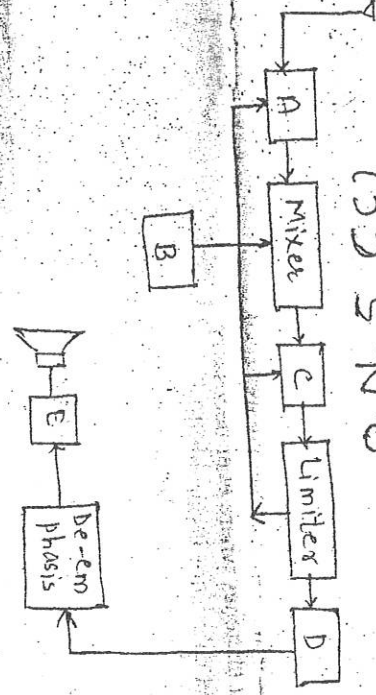
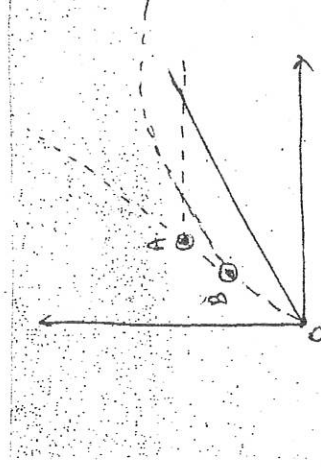


Fig: 2.a

Q.No. 2 (c)



Q.No. 5 (c)



Q.No. 6 (c)

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **FIFTH**

PROGRAM: **IE/E&TC**

COURSE CODE: **ETE508/IEE508/IX404** COURSE NAME: **INDUSTRIAL ORGANIZATION AND MANAGEMENT**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **22/05/2019**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

(08)

Q.1 Attempt any **FOUR**

- a) What is globalization?
- b) What is trading?
- c) Why is planning required?
- d) List functions of management (any four)
- e) What is responsibility?
- f) Define organization.

Q.2 Attempt any **FOUR**

(16)

- a) List advantages of Globalization in context of India.
- b) What are types of business? Explain any one in brief.
- c) Why textile industry to be promoted by Government? Explain in short.
- d) Explain with block diagram levels of management.
- e) List principles of Henry Fayol on management.
- f) Explain function of controlling in process management.

Q.3 Attempt any **FOUR**

(16)

- a) Explain concept of F.W.Taylor on scientific management.
- b) Describe the steps in organization formation.
- c) Compare line staff and functional types of organizations with suitable block diagram.
- d) What are advantages of centralised departmentation over decentralised departmentation?
- e) How responsibility is fixed in project type organization.
- f) Explain with block diagram functional type organization.

P.T.O

Section – II

Marks
(08)

Q.4 Attempt any **FOUR**

- a) Define the term 'Personnel management'.
- b) State the importance of skill developments.
- c) Define the term 'Finance'.
- d) What is budget?
- e) Define the term 'EOQ'.
- f) State 'Kaizen's theory.

Q.5 Attempt any **FOUR**

(16)

- a) Define the term 'Accident'. Enlist its causes.
- b) Enlist the contents of workmen compensation act.
- c) Write about recruitment procedure with respect to HR department.
- d) State the importance of industrial dispute act.
- e) Write format for balance sheet. State its advantages.
- f) Describe various taxes in practice.

Q.6 Attempt any **FOUR**

(16)

- a) Enlist the objectives of financial management.
- b) What is 6 sigma principle?
- c) Enlist advantages of ERP.
- d) Describe the objectives of JIT.
- e) Describe various time estimates used in PERT.
- f) Define 'Quality'. What is quality assurance?

	e)	Compare class 'A', class 'B' & class 'C' power amplifiers.(any four points)	U	3	
	f)	Describe limitation of single tuned voltage amplifier.	U	3	
Q.4		Attempt any FOUR			(08)
	a)	State classification of wave shaping circuits.	R	6	
	b)	Define multivibrator. State classification of it.	R	4	
	c)	Draw circuit diagram of transistor switch sweep generator.	R	5	
	d)	List any two applications of astable multivibrator.	R	4	
	e)	Draw a neat circuit diagram of negative clamper.	R	6	
	f)	List different sweep generators.	R	5	
Q.5		Attempt any FOUR			(16)
	a)	With neat circuit diagram describe working of astable multivibrator.	U	4	
	b)	Explain how transistor can be used as a switch?	U	4	
	c)	Compare RC-differentiator & integrator.	U	6	
	d)	Describe with neat circuit diagram operation of exponential sweep circuit.	U	5	
	e)	With neat circuit diagram & waveforms explain series positive clipper.	U	6	
	f)	Draw & explain Bootstrap sweep generator.	U	5	
Q.6		Attempt any FOUR			(16)
	a)	Explain Schmitt trigger with input & output waveforms.	U	4	
	b)	Describe with neat circuit diagram operation of UJT switch sweep generator.	U	5	
	c)	In astable multivibrator, $R_1=R_2=2k\Omega$, $C_1=C_2=1nf$. Determine period & frequency of oscillation	A	4	
	d)	Explain with neat circuit diagram & waveforms positive clamper.	U		
	e)	Describe transistorized constant current sweep generator.	U		
	f)	Draw output waveforms for given circuit diagrams (reg.fig 6.6(a) and 6.6(b))	A		

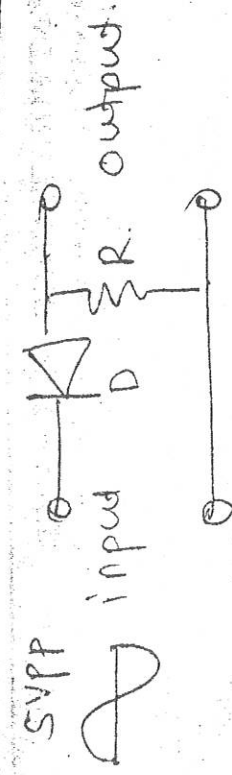


Fig. 6.6 (a)

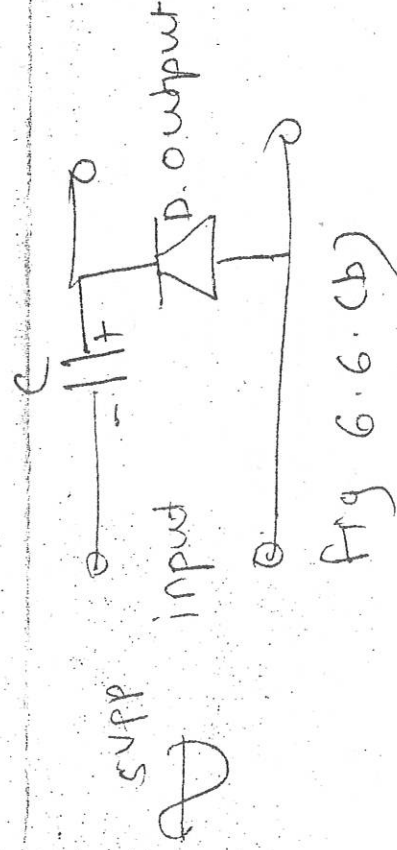


Fig 6.6. (b)

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : IE & E & TC****COURSE CODE :- EIF309/IEE402/ETE402/EJ302****COURSE NAME :- 8051 MICROCONTROLLER****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 16/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co EIF 309	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State the function of Data Bus and control bus.	R	1	
	b)	Give the function of $PSEN$ & ALE pin of 8051.	U	2	
	c)	List various menus (tabs) seen on Keil IDE compiler.	R	1	
	d)	Draw the general block diagram of microprocessor.	R	1	
	e)	State function of MUL AB and DIV AB instruction.	U	3	
	f)	When we reset microcontroller 8051, which value will be stored in PC, port0, port1 and SP register?	U	3	
Q.2		Attempt any FOUR :			16
	a)	Explain function of following instructions with example i) XCH A,@ Ri ii) CJNE A, direct, rel.	U	3	
	b)	Compare between microprocessor and microcontroller. (any 4 points)	U	1	
	c)	Draw the format of SCON register. Explain any 2 modes of serial communication.	U	2	
	d)	Write an assembly language program to arrange 10 numbers in ascending order. Write comments.	A	3	
	e)	Explain the function of following resistor of 8051 microcontroller. i) Program counter ii) Stack pointer iii) Data pointer iv) Accumulator.	U	2	
	f)	Write an assembly language program to exchange five bytes, stored in the internal RAM location 25H and 35H. Draw the flowchart.	A	3	
Q.3		Attempt any FOUR :			16
	a)	Differentiate between 8051 and 8052 microcontroller. (any 4 points)	U	1	
	b)	Draw the format of TMOD register. Give value of TMOD register select Timer 0 mode 1 and Timer 1 mode 2.	U	2	
	c)	State the use of following Bits/ Flags. i) RS0 ii) RS1 iii) Cy iv) P	U	2	
	d)	Write an assembly language program to find 2's complement of number 55H. Also count no of '1' s and '0' s in the result and store the count in R5 and R6 registers. Write comments for program.	.	U	2

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	e)	State use of following pins of 8051 i) RST ii) $\overline{EA}$ iii) XTAL 1,2 iv) Vcc	U	2
	f)	Write an assembly language program to add 16-bit numbers stored in internal RAM location 30H onwards. Store the result at memory location 50H and 51 H. Draw flowchart for program.	A	3
Q.4		Attempt any FOUR :		08
	a)	State interrupt sources in 8051 microcontroller with their vector address.	R	4
	b)	Find the number of address lines required to interface 4K X 8 ROM and 8 K X 8 RAM to 8051 microcontroller.	U	5
	c)	Draw the labelled pin diagram of ADC 0808.	R	6
	d)	List various modes of timer in 8051 microcontroller.	R	4
	e)	Calculate the number of steps for revolution (360°) of stepper motor with steep angle of 7.5° and 1.5° .	U	6
	f)	State any two input devices and output devices that can be interfaced with 8051 microcontroller.	R	5
Q.5		Attempt any FOUR :		16
	a)	Write an ALP to send "GPKP" on serial port of 8051 microcontroller at 4800 baud. Assume crystal frequency of 11.0592 MHz.	A	4
	b)	Draw interfacing diagram if 8 LED's are connected to port 1 of 8051. Write on ALP to toggle all LED's on port 1. Assume suitable delay.	A	5
	c)	Differentiate between absolute decoding and linear decoding technique (any 4 points)	U	5
	d)	Explain function of any four commands of 16 X 2 LCD with hex codes.	U	6
	e)	Draw the interfacing diagram of 4 X 4 matrix keyboard with 8051 microcontroller.	U	6
	f)	Explain MODE 1 & MODE 2 of data transmission and reception of serial port in 8051.	U	4
Q.6		Attempt any TWO :		16
	a)	Write an ALP to generate a continuous square wave of 2 KHz on pin P1.5 of 8051 microcontroller using mode 1 of timer 0. Assume crystal frequency as 12 MHz. Draw flow chart for the program and write the delay calculations.	A	4
	b)	Draw interfacing diagram of DAC 0808 with 8051 microcontroller. Write an assembly language program to generate triangular waveform. Assume suitable data. Write comments for program.	A	6
	c)	i) Draw interfacing diagram of 8K X 8 data ROM to 8051 microcontroller. Also draw memory map. Assume suitable data. ii) Draw interfacing diagram of seven-segment display with 8051 microcontroller.	A	5

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **FIRST**

PROGRAM: **COMMON**

COURSE CODE: **CCF110/X111/CCE110**

COURSE NAME: **APPLIED MECHANICS**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **20/05/2019**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S	Question Text	R	CO	Marks
	Q		U	CCF	
	N		A	110	
Q.1		Attempt any FOUR			(08)
	a)	Different between particle & body. (any two)	U	1	
	b)	State principle of transmissibility.	R	1	
	c)	Give field examples of i) Concurrent force system. ii) Parallel force system.	R	1	
	d)	Define equilibrant & state its effect on body.	R	2	
	e)	Define i) Angle of friction ii) Angle of Repose.	R	2	
	f)	State laws of friction. (any two)	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Determine the components of the force 500KN at 20° & 30° at either side of it.	A	1	
	b)	Two forces acts at an angle 120°, The bigger force is 50 N and resultant of both is perpendicular to smaller force. Find smaller force.	A	1	
	c)	Determine the magnitude & direction of resultant force of forces away from point 8 N, 10 N, 20 N and 12 N making an angle 30°, 120°, 200° & 310° with the x-axis measured in clockwise direction respectively. (solve by Analytical method)	A	1	
	d)	Three forces of 20 N, 40 N, & 60 N along the sides of equilateral triangle of side 30 cm respectively in order. Calculate the magnitude & position of resultant of force system from apex point.	A	1	
	e)	A light string ABCDE whose extremity 'A' is fixed, has 'W ₁ ' and 'W ₂ ' attached at 'B' & 'C'. It passes frictionless pulley at 'D' carrying a weight of 200 N at free end 'E'. If in equilibrium position BC is horizontal & AB & CD makes an angle 150° & 100° respectively with BC, Determine magnitudes 'W ₁ ' & 'W ₂ '	A	2	
	f)	Solve Q.No.2(C) by Graphical method.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Simply supported beam of 5m span carries UDL of 12 KN/m over half span from left side support & vertically downward point load of 27KN acting 1 m from right side support. Determine support reaction by analytical method.	A	2	
	b)	Solve Q. No 3(a) by graphical method.	U	3	
	c)	State advantages & limitations of graphical method over analytical method.	R	3	
	d)	A heavy stone of mass 400 kg is on hill of 45° inclined with horizontal. If coefficient of friction between stone & hill is 0.50, is stone stable?	A	2	

	e)	A block weighing 40KN resting on rough horizontal plane can be moved by a force of 22 KN applied at an angle 35° with the horizontal. Determine coefficient of friction.	A	2	
	f)	A ladder of 3 m weighing 100 N is kept 30° inclined with smooth horizontal ground and rough wall. If the man weighing 700 N is standing on mid of ladder, what is the force 'P', horizontal to ground contact surface, required to keep the ladder in rest. Take μ for ladder & wall is 0.3.	A	2	
Q.4		Attempt any FOUR			(08)
	a)	Define Kinematics.	R	5	
	b)	Define momentum.	R	5	
	c)	Define angular acceleration.	R	5	
	d)	State law of conservation of energy.	R	5	
	e)	Define work & power.	R	5	
	f)	Define velocity ratio.	R	6	
Q.5		Attempt any FOUR			(16)
	a)	Determine the co-ordinates of the centroid of the shaded area with respect to the axes shown in figure. no.1 in which a quarter circle of radius 80 mm is cut-off from a rectangle of size 120 mm x 80 mm.	A	4	
	b)	Determine the centroid of an unequal angle from the reference axes X & Y as shown in figure No.2.	A	4	
	c)	A ball is dropped from the top of a tower 30 m high. At the same instant a second ball is thrown upward from the ground with an initial velocity 15 m/sec when & where they cross?	A	5	
	d)	Power supply was cut off to a power driven wheel when it was rotating at a speed of 900 rpm. It was observed to come to rest after making 360 revolutions. Determine its angular retardation & time it took to come to rest after power supply cut-off.	A	5	
	e)	A stone is released from a height 30 m. Calculate velocity of stone when it strikes to the ground using law of conservation of energy.	A	5	
	f)	In a lifting machine an effort of 500 N is to be raise a load 10,000 N, velocity ratio of machine is 25. Determine efficiency of machine, ideal effort, effort lost in friction & load lost in friction,	A	6	
Q.6		Attempt any FOUR			(16)
	a)	A solid right circular cone of height 40 cm & diameter 20 cm is placed on a cylinder of diameter 20 cm & height 30 cm. Locate the position of center of gravity from the base of the cone.	A	4	
	b)	A railway wagon is moving at 108 kmph. The driver observes the red signal & applies brakes to stop the train & it covers a distance of 300 meter before coming to rest. Calculate the retardation produced & time taken to rest.	A	5	
	c)	A wheel starts from the rest & accelerates at 12 rad/sec^2 until it reaches a speed of 200 rpm. With this speed it rotates for 2 minutes & then retards uniformly for 150 seconds & stops. Determine total number of revolutions made, Acceleration time & angular retardation.	A	5	
	d)	Determine the power required to raise a lift containing 15 persons to a height of 150 m in 10 minutes. The average weight of each person may be taken as 650 N. The weight of lift is 2.5 KN.	A	5	
	e)	In a machine an effort of 15 N can lift a load of 300 N & an effort of 25 N can lift a load of 500N. Determine the law of machine & also effort required to lift a load of 1000N.	A	6	
	f)	In a lifting machine law of machine is $P = (0.025 W + 0.05) \text{ KN}$ & velocity ratio is 44.44. Calculate efficiency of machine at load 20 KN. and state machine is reversible or not at load 20 KN. Also determine maximum M.A & maximum efficiency of machine.	A	6	

Q.5) a) Figure NO.1

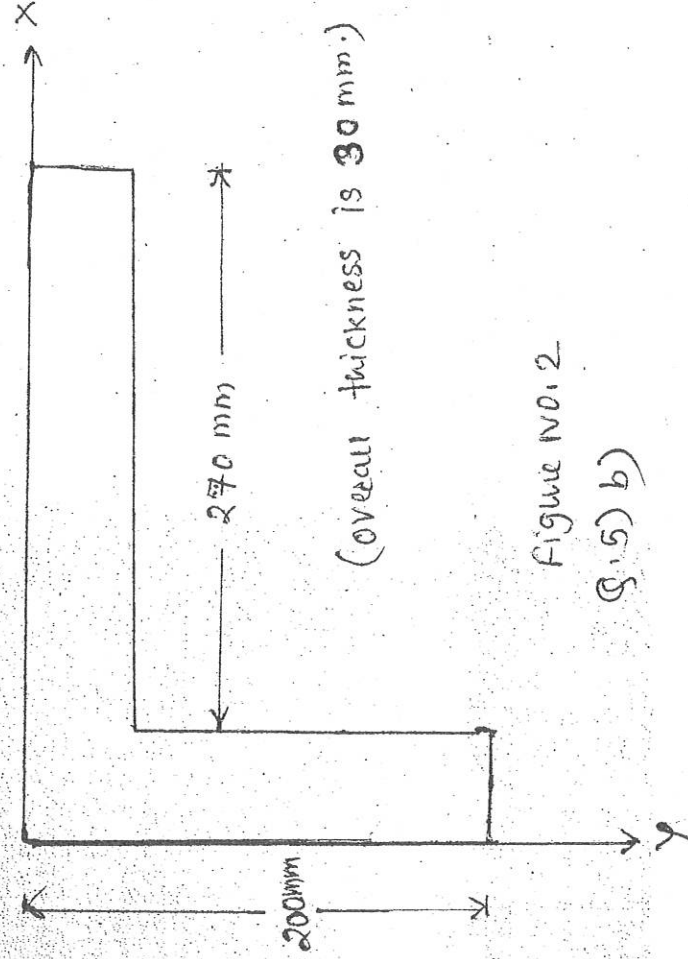
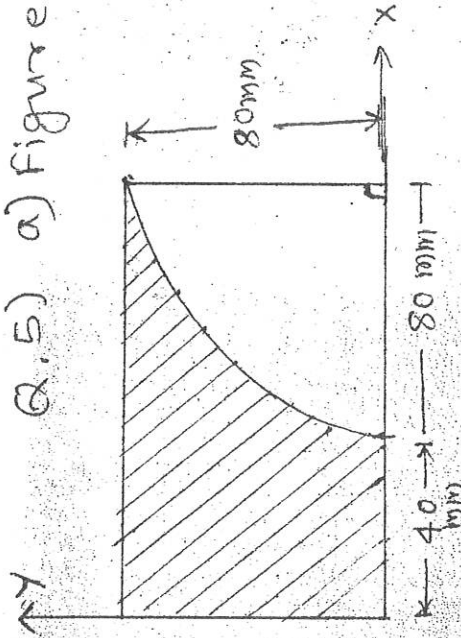


Figure NO.2
Q.5) b)

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : IE & E & TC****COURSE CODE :- EIF107/ETE107/ETTF107/IEF107/IEE107****COURSE NAME :- BASIC ELECTRICAL ENGINEERING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 20/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

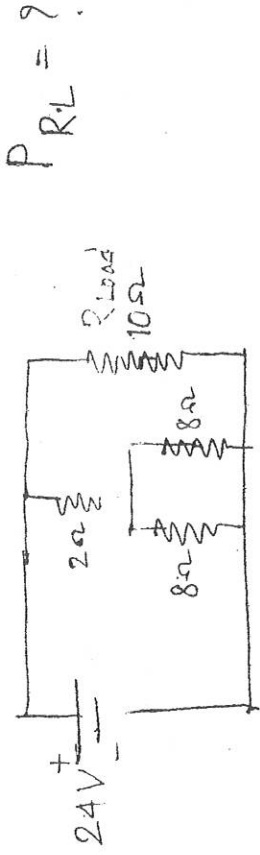
QN	S Q N	Question Text	R/ U/ A	Co EIF 107	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define resistivity of material.	R	1	
	b)	Explain the magnetic form "Reluctance".	R	2	
	c)	State Ohms law for a magnetic circuit.	R	2	
	d)	State Flemings Right hand rule with suitable sketch.	R	3	
	e)	Discuss mutual inductance between two coil.	R	3	
	f)	State the equation of dynamically induced emf and its unit.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain the resistance with suitable sketches solve the given network to find the power dissipated in the load resistance of 10Ω as shown in fig 1.	A	1	
	b)	Explain the Kirchhoff current law and voltage law, using suitable sketches of network example.	U	1	
	c)	Discuss the calculation of magneto motive force of simple series magnetic circuit.	U	2	
	d)	An iron ring of 500 mm^2 cross section area having relative permeability of 1000 H/m with mean length of 800mm & Magnetizing Coil turns of 1000 turns. Calculate mmf required to produce 0.5m Wb magnetic flux in an air gap of 1mm neglect leakage and fringing effects. (see fig. no. 2)	A	2	
	e)	Explain with labeled sketches concept of leakage flux and fringing effect in magnetic circuit.	U	2	
	f)	Sketch labeled diagrams and explain Faraday's first and second Law of electromagnetic induction.	U	3	

P.T.O.

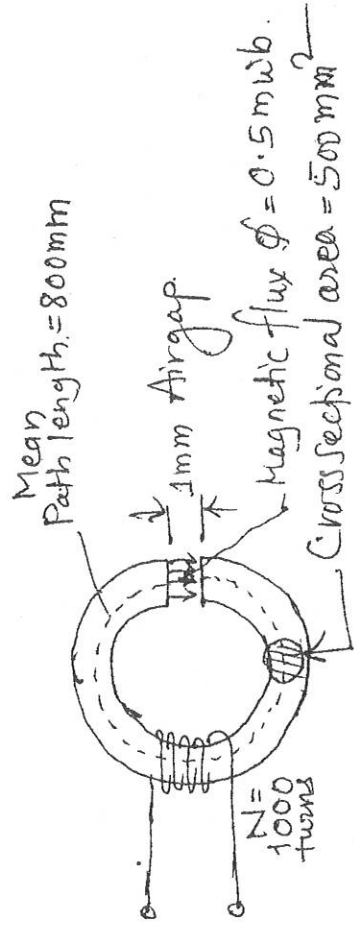
Q.3	Attempt any FOUR :			16
a)	Compare DC & AC current on account of following points i) Waveform ii) Power equation iii) Nature of flow of current iv) value of current v) Magnitude of load resistance vi) Effect on inductance and capacitance vii) Power factor.	U	1	
b)	Solve the given network to find the current flowing through load resistance using Kirchoff's Laws as shown in fig no. 3	A	1	
c)	Explain with suitable labeled sketch the 'Magnetic Hysteresis Loop' of magnetic circuit.	U	2	
d)	Draw and label the hysteresis loop for hard and soft magnetic material and explain comparative terms between them.	U	2	
e)	An iron ring having circular C/S of dia 2 cm and mean length of 20cm wound with 3000 turns and a current of 0.5 A passed through coil produces magnetic flux of 0.5 Wb/m^2 in ring. Assume all these flux linked with each turn of coil then calculate. i) Relative permeability of magnetic material (iron ring) (μ_r) ii) Self inductance of coil (L) iii) Voltage induced in the coil (e_L)	A	3	
f)	Comment on mutual inductance using suitable circuit diagrams and equations of magnetic terms.	U	3	
Q.4	Attempt any FOUR :			08
a)	Name component that makes an ac circuit with lagging power factor.	U	5	
b)	Define Peak factor and form factor.	R	4	
c)	State the meaning of electric power.	R	5	
d)	Define Reactance and state its unit.	R	5	
e)	State voltage and current Relation in Delta connection	R	6	
f)	Define Transformer.	R	7	
Q.5	Attempt any FOUR :			16
a)	State the types of Earthing and explain any one in detail with neat sketch.	U	7	
b)	State any four advantages of polyphase system.	R	6	
c)	Draw circuit diagram and vector diagram of a.c. R-L series circuit.	U	5	
d)	In a circuit of $Z=8 + j6 \text{ ohm}$ find the admittance in polar and rectangular form.	A	4	

e)	An a. c. voltage is represented by $e=141.4 \sin 377 t$. Determine rms value of voltage, angular frequency and cycle frequency.	A	4
f)	State the meaning of lag and lead related with alternating quantity with necessary waveform.	U	4
Q.6	Attempt any FOUR :		16
a)	Define the following quantities i) Phase Angle ii) Active power iii) Reactive power iv) Apparent power.	R	5
b)	Draw circuit diagram and vector diagram of a.c. R-L-C series circuit.	U	5
c)	Define average, RMS, instantaneous, peak value of an a.c. quantity.	R	4
d)	Draw a sinusoidal quantity and label on it the cycle, periodic time and peak value.	U	4
e)	Draw and explain 3 phase 3 wire system.	U	6
f)	State the applications of transformer in electronic circuit.	U	7

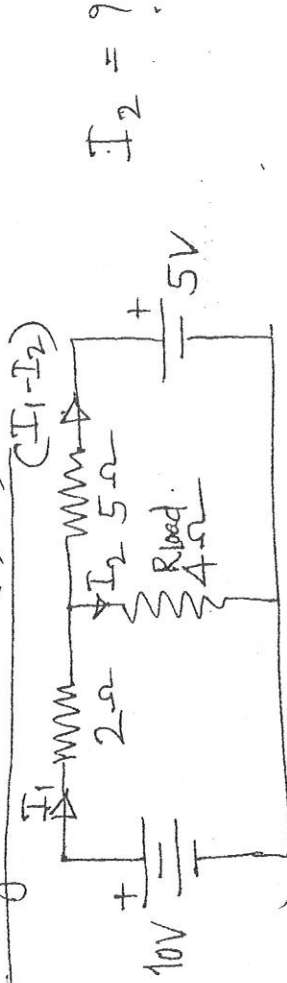
1) Fig(1) - Que(2)(a)



2) Fig(2) - Que(2)(d)



3) Fig(3) - Que(3)(b)



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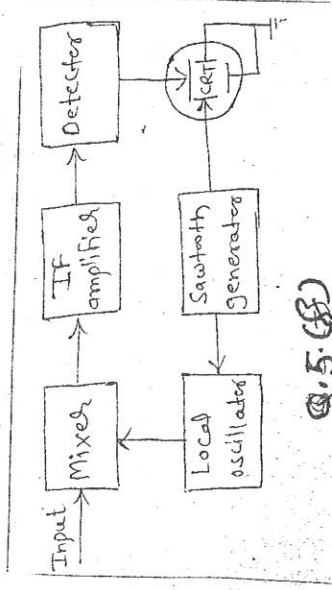
LEVEL :- THIRD**PROGRAM : IE & E & TC****COURSE CODE :- EIF303/ETE303/EJ203/IX203/IEE303****COURSE NAME :- ELECTRONIC MEASURING INSTRUMENTS****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 17/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co EIF 303	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define the term calibration and state any two need of it.	R	1	
	b)	State any four units of measuring fundamental quantities.	R	1	
	c)	Enlist any two types of DC bridges.	R	2	
	d)	Identify how DC bridge is in balanced condition.	U	2	
	e)	Define the term i) Resolution ii) Sensitivity.	R	3	
	f)	Define the term i) Average value ii) RMS value.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Discuss various types of standards with their classification.	U	1	
	b)	Compare analog and digital instruments (any 4 points)	U	3	
	c)	Derive the balance equation for scherings bridge.	A	2	
	d)	Compare Maxwell's bridge with Hay bridge (any 4 points)	U	2	
	e)	Draw and explain operation of LCR meter.	U	3	
	f)	Explain the working principle of Ramp type DVM.	U	3	
Q.3		Attempt any FOUR :			16
	a)	State where you can apply the principle of Guarded whetstone's bridge? Explain it in detail.	A	2	
	b)	Explain successive approximation type DVM. State its two applications.	U	3	
	c)	State any 4 applications of inductance comparison bridge.	R	2	
	d)	Draw and explain basic block diagram of digital frequency meter.	U	3	
	e)	Explain how unknown capacitor can be measured using scherings bridge.	A	2	
	f)	Explain following terms i) Reproducibility ii) Drift	U	1	

P.T.O.

Q.4	Attempt any FOUR :			08
a)	Define single beam dual trace CRO.	R	4	
b)	List the names of types of recorders.	R	5	
c)	Write the names of blocks present in horizontal deflection subsystem of CRO.	R	4	
d)	Draw diagram of passive voltage probe.	R	4	
e)	Define pulse generator.	R	5	
f)	Write the function of event marker in strip chart recorder.	R	5	
Q.5	Attempt any FOUR :			16
a)	Draw and explain block diagram of vertical amplifier of CRO.	U	4	
b)	Compare between time domain and frequency domain on basis of following points, i) Definition ii) Waveform iii) Example iv) Cost.	U	5	
c)	Draw lissajous patterns for following phase angles. i) $\theta = 0^\circ$ ii) $\theta = 90^\circ$ iii) $\theta = 0^\circ$ $\theta = 90^\circ$ iv) $\theta = 180^\circ$	A	5	
d)	Draw and explain block diagram of X-Y recorder.	U	5	
e)	Explain electrostatic deflection in CRO.	U	4	
f)	Identify given diagram shown in the fig & explain its working.	A	5	
Q.6	Attempt any FOUR :			16
a)	Compare between active and passive voltage probes on basis of i) Block diagram ii) Definition iii) Components used iv) Application	U	4	
b)	Define signal generator. Classify it and draw any one type of it.	U	5	
c)	State the procedure for measurement of frequency using CRO with diagram.	A	4	
d)	Write any four applications of strip chart recorder.	A	5	
e)	Draw and explain the type of CRO probe used to measure current in the circuit.	A	4	
f)	Write any four specifications of function generator.	A	5	



Q.5 (8)

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH**PROGRAM : IE & E & TC****COURSE CODE :- EIF406/EJ308/ETE311/ETE406/IX308/IEE406****COURSE NAME ELECTRONIC CIRCUIT DESIGN****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 20/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section- I	R/ U/ A	Co ITF 409	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Draw symbol of UJT and write any two specifications of it.	R	1	
	b)	Draw circuit diagram of L-section filter with bridge rectifier.	R	2	
	c)	Write the need of cascading amplifier stages.	U	3	
	d)	Define i) Zener voltage ii) Pinch off voltage.	R	1	
	e)	Write the formula of ripple factor for capacitor and CLC filter.	R	<u>2</u>	
	f)	Draw a circuit diagram of source follower.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain any four specifications of zener diode.	U	1	
	b)	Design a regulator using IC 723 to give the output of 5V at 100mA current. The input voltage is given as 10V and $V_{sc} = 0.65V$.	A	2	
	c)	Design a full wave rectifier using a capacitor filter to provide 12Vdc at 80 mA with a maximum ripple of 1%.	A	2	
	d)	Design current source using 78XX series for the reference voltage of 5V, that will deliver 0.5A current to the 10Ω load.	A	2	
	e)	Discuss the need of bootstrapping. Also draw a circuit diagram of bootstrapped darlington emitter follower.	U	3	
	f)	Explain types of transformer in detail.	U	1	
Q.3		Attempt any TWO :			16
	a)	Design a shunt regulator using zener diode to provide 6V output from a 15V unregulated power supply. Also calculate line and load regulations.	A	2	
	b)	Design a single stage CE amplifier for voltage swing of $9V_{(p-p)}$ with load resistance of 5 K Ω , BW = 20Hz to 20 KHz. Use $V_{cc} = 12V$, $R_s = 600\Omega$	U	3	

	c)	Design a source follower circuit for $R_i > 20m\Omega$, $R_o \leq 500\Omega$, $R_L = 1K\Omega$. Lower 3dB frequency $F_1 = 30Hz$. Use $V_{cc} = 20V$.			A	3	
QN	S Q N	Section-II			R/ U/ A	Co EIF 406	Mar ks
Q.4		Attempt any FOUR :					08
	a)	Draw the circuit diagram of Bistable multivibrator using op-amp.			U	6	
	b)	Give the classification of power amplifier with its conduction cycle.			R	4	
	c)	State Barkhausen's criterion.			R	5	
	d)	List any four features of IC 555.			R	6	
	e)	Draw circuit diagram of Wien bridge oscillator using op-amp.			U	5	
	f)	Define collector efficiency of power amplifier.			R	4	
Q.5		Attempt any FOUR :					16
	a)	Design class-A amplifier with resistive load to give output power (Po) of 4W across 5Ω resistance. Use $V_{cc} = 12V$.			A	4	
	b)	Design Hartely oscillator using transistor for $V_o = 4 V_{rms}$, $F_o = 2 MHz$, $R_L = 2.2K\Omega$ DC analysis only.			A	5	
	c)	Design monostable multivibrator using IC 555 that operates with 12V supply and turns ON LED for duration of approximately 8msec every time, it receives a negative trigger pulse. The high output of multivibrator (Timer) is $V_o = (V_{CC} - 2 V_{BE} - V_{CEsat})$ Volts			A	6	
	d)	Design a Colpitt's oscillator for frequency of 30 KHz using op-amp. Use inductor of 200mH with the supply voltage of $\pm 10V$.			A	5	
	e)	Explain the design steps of op-amp based Wien bridge oscillator.			U	5	
	f)	Describe design steps of class AB power amplifier.			U	4	
Q.6		Attempt any TWO :					16
	a)	Design complementary symmetry power amplifier to deliver a power of 700 mW to a load of 4Ω . The lower 3dB cut-off frequency is 25Hz.			A	4	
	b)	Design an RC phase shift oscillator for the following specifications using transistor frequency of oscillation = 750Hz, $V_{cc} = 14V$, and $R_L = 5\Omega$.			A	5	
	c)	i) Design an astable multivibrator using op-amp to give output frequency $f_o = 2KHz$, peak to peak output voltage 7V and supply $= \pm 15V$. ii) Explain design steps of astable multivibrator using IC 555.			A	5	

Appendix - 1

ECD Datasheet

Appendix - 2

Table 1 : Standard Resistance Values $\pm 1\%$, $\pm 5\%$, $\pm 10\%$

Ohms (Ω)				Kilohms (K Ω)			Megohms (M Ω)	
0.10	1.0	10	100	1.0	10	100	1.0	10
0.11	1.1	11	110	1.1	11	110	1.1	11
0.12	1.2	12	120	1.2	12	120	1.2	12
0.13	1.3	13	130	1.3	13	130	1.3	13
0.15	1.5	15	150	1.5	15	150	1.5	15
0.16	1.6	16	160	1.6	16	160	1.6	16
0.18	1.8	18	180	1.8	18	180	1.8	18
0.20	2.0	20	200	2.0	20	200	2.0	20
0.22	2.2	22	220	2.2	22	220	2.2	22
0.24	2.4	24	240	2.4	24	240	2.4	
0.27	2.7	27	270	2.7	27	270	2.7	
0.30	3.0	30	300	3.0	30	300	3.0	
0.33	3.3	33	330	3.3	33	330	3.3	
0.36	3.6	36	360	3.6	36	360	3.6	
0.39	3.9	39	390	3.9	39	390	3.9	
0.43	4.3	43	430	4.3	43	430	4.3	
0.47	4.7	47	470	4.7	47	470	4.7	
0.51	5.1	51	510	5.1	51	510	5.1	
0.56	5.6	56	560	5.6	56	560	5.6	
0.62	6.2	62	620	6.2	62	620	6.2	
0.68	6.8	68	680	6.8	68	680	6.8	
0.75	7.5	75	750	7.5	75	750	7.5	
0.82	8.2	82	820	8.2	82	820	8.2	
0.91	9.1	91	910	9.1	91	910	9.1	

Table 2 : Standard Capacitor Values

Pico Farad (pF $\rightarrow 10^{-12}$)			Micro Farad (μ F $\rightarrow 10^{-6}$)					
10	100	1000	0.01	0.1	1.0	10	100	1000
12	120	1200	-	-	-	-	-	-
15	150	1500	0.015	0.15	1.5	18	180	1800
22	220	2200	0.022	0.22	2.2	22	220	2200
27	270	2700	-	-	-	-	-	-
33	330	3300	0.033	0.33	3.3	33	330	3300
39	390	3900	-	-	-	-	-	-
47	470	4700	0.047	0.47	4.7	47	470	4700
56	560	5600	-	-	-	-	-	-
68	680	6800	0.068	0.68	6.8	-	-	-
82	820	8200	-	-	-	-	-	-

Table 3 : Rectifier Diode Specification Sheet

Type No.	Material (S/G)	V_R (PIV) (V)	I_F (A)	V_F (V)	I_R (μ A)
1N4001	S	50	1.0	1.1	5
1N4002	S	100	1.0	1.1	5
1N4003	S	200	1.0	1.1	5
1N4004	S	400	1.0	1.1	5
1N4005	S	600	1.0	1.1	5
1N4006	S	800	1.0	1.1	5
1N4007	S	1000	1.0	1.1	10
1N4148	S	75	0.1	1.0	25 (nA)
1N5060	S	400	2.5	1.25	0.2
1N5061	S	600	2.5	1.25	0.2
1N5062	S	800	2.5	1.25	0.2
1N5391	S	50	1.5	1.4	250
1N5393	S	200	1.5	1.4	250
1N5397	S	600	1.5	1.4	250
1N5399	S	1000	1.5	1.4	250
1N5402	S	200	3.0	1.0	10
1N5408	S	1000	3.0	1.0	5
1N5409	S	200	2.5	1.25	0.2
OA 47	G	25	0.05	0.6	30
OA 85	G	115	0.05	0.1	4.5
OA 90	G	30	0.008	0.1	2.4
OA 95	G	115	0.05	0.1	4.5
BA 100	G	60	0.09	-	-
BA 102	G	20	0.09	-	-
BY 100	S	1250	1.0	1.5	70
BY 125	S	150	1.0	-	10
BY 126	S	650	1.0	1.5	10
BY 127	S	1250	1.0	1.5	10
DR 25	G	25	0.25	-	-
Switching and Detector Diodes :			(mA)		
1N914	S	75	10	-	5
1N915	S	50	10	-	5
OA 70	G	22.5	50	0.1	30
OA 72	G	45	10	0.2	0.3
OA 73	G	30	50	0.1 - 0.2	18
OA 79	G	45	35	0.15 - 0.3	0.1 - 2.8

Table 4 : Zener Diode Specification Sheet

Type No.	Zener Voltage (V_{ZT})	Zener Test Current (I_{ZT}) mA	Zener Impedance (Z_{ZT}) Ω	Max. Zener Current (I_{ZM}) mA
IN 4370	2.4	20	30	150
IN 4371	2.7	20	30	135
IN 746	3.0	20	29	120
IN 747	3.3	20	28	110
IN 748	3.6	20	24	100
IN 749	3.9	20	23	95
IN 750	4.3	20	22	85
IN 751	4.7	20	19	75
IN 752	5.1	20	17	70
IN 753	5.6	20	11	65
IN 754	6.2	20	7	60
IN 755	6.8	20	5	55
IN 756	7.5	20	6	50
IN 757	8.2	20	8	45
IN 758	9.1	20	10	40
IN 759	10	20	17	35
IN 957A	12	20	30	30
IN 960A	6.8	18.5	4.5	47
IN 962A	9.1	14	7.5	35
IN 964A	11	11.5	9.5	28
IN 965A	13	9.5	13	24
IN 966A	15	8.5	16	21
IN 968A	20	7.8	17	19
IN 972A	30	6.2	25	15
IN 980A	62	4.2	49	10
IN 983A	82	2.0	185	4.9
IN 985A	100	1.3	500	3.7
IN 3993	3.9	2	3.0	3.0
IN 3994	4.3	1.5	2360	2.360
IN 3995	4.7	1.5	2130	2.130
IN 3996	5.1	1.2	1940	1.940
IN 3397	5.6	1.1	1780	1.780
IN 3998	6.2	1.0	1620	1.620
IN 3999	6.8	1.1	1460	1.460
IN 4000	7.5	1.2	1330	1.330

IN 4370 series : $\pm 10\%$
 IN 746 series : $\pm 10\%$
 IN 795 series : $\pm 10\%$
 Suffix A for $\pm 5\%$ units, C for $\pm 2\%$, D for $\pm 1\%$
 Suffix A for $\pm 10\%$ units, C for $\pm 2\%$, D for $\pm 1\%$

Table 5 : Transistor Data Sheet

Transistor No.	Material and Type	V_{CE} (V)	V_{CE} (V)	V_{CE} (V)	V_{CE} (V)	$I_{C(max)}$ (mA)	PT (mW)	h_{FE}	f_T (MHz)
AC105	PG	40	18	10	10	1 A	400	15	0.5
AC126	PG	32	12	10	10	50	30	75	1
AC127	NG	32	12	10	10	100	500	100	1.5
AC128	PG	32	12	10	10	500	500	100	1
AC130	PG	20	16	10	10	1 A	340	50	1.5
AC131	PG	45	32	10	10	1 A	145	50	2
AC153	PG	52	32	10	10	2 A	1 W	50	1
AC163	PG	32	24	10	10	200	900	80	0.8
BC107	NS	50	45	20	20	100	300	110	150
BC108	NS	30	20	5	5	100	300	120	150
BC109	NS	40	30	5	5	100	300	180	150
BC115	NS	45	40	5	5	100	300	80	40
BC116	PS	45	40	5	5	100	300	80	40
BC119	NS	60	40	5	5	1 A	800	35	150
BC126	PS	35	30	5	5	600	800	40	40
BC138	NS	60	40	5	5	1 A	800	35	100
BC139	PS	40	40	5	5	500	700	40	40
BC142	NS	85	60	5	5	1 A	800	20	100
BC147A	NS	50	45	6	6	250	250	110	150
BC147B	NS	50	45	6	6	250	250	110	150
BC148	NS	30	20	5	5	200	250	110	150
BC151	PS	25	20	5	5	100	200	110	150
BC158	PS	30	25	5	5	100	200	110	150
BC161	PS	60	45	5	5	1 A	300	70	130
BC177	PS	45	45	5	5	300	300	70	130
BC178B	PS	45	45	5	5	300	300	70	130
BC179A	PS	30	25	5	5	300	300	120	100
BC180	NS	30	25	5	5	300	300	120	100
BC194	NS	40	35	5	5	100	100	100	150
2N109	PG	35	25	12	12	165	40/250	65	250
2N244	NS	60	60	15	15	750	750	50	0.15
2N271	PG	30	10	20	20	200	200	45	4
2N312	NG	15	15	15	15	200	200	50	2
2N329B	PS	50	30	20	20	400	400	50	5
2N334A	NS	45	45	4	4	500	500	18/86	300
2N914	NS	40	30	10	10	200	200	30/120	300

Transistor No	Material and Type	V _{CH} (V)	V _{CE} (V)	V _{EB} (V)	I _{C(max)} (A)	P _T (W)	h _{FE}	f _T (MHz)
TIP62	PS	40	40	5	2	40	15/100	3
TIP120	NS	60	60	5	5	60	1000	-
TIP125	PS	60	60	5	5	60	1000	-
TIS45	NS	40	15	5	0.2	250	30/120	300
2N1481	NS	60	40	12	1.5	5	35/100	1
2N1721	NS	150	100	-	1	15	40/120	16
2N1722	NS	120	80	10	7.5	50	20/90	10
2N2067	PG	40	25	20	3	10	20	-
2N2033	NS	80	60	-	3	5	20/60	1
2N2017	NS	60	60	8	1	1	50/200	80
2N3053A	NS	80	60	5	700 mA	5	50	100
2N3055	NS	100	60	7	15	115	20/70	0.2
2N3140	NS	140	140	1	2	25	10	10
2N3180	PS	60	60	-	5	85	10/30	1
2N3878	NS	120	50	7	4	35	20	40
ECN100	NS	-	60	-	0.7	5	50	-
ECN149	NS	50	40	6	4	30	10	-
ECPI49	PS	50	40	6	4	30	10	-

Table 6: Field Effect Transistors

Type	Channel	V _{DS} (V)	I _G (mA)	I _{SS} (mA)	V _{GS(on)} (V)	I _{DSS} (mA)	V _{IS} (V)	V _{CS} (V)	P _T (W)
2N3821	N, CH	50	10	0.1	4	2.5	1.5 - 4.5	10	0.8
2N3822	"	50	10	0.1	6	2.1	3 - 6.5	23	0.3
2N4091	"	40	10	0.2	5-10	30	-	-	0.3
2N4221	"	30	15	-0.1	-6	-	2.5	23	0.3
2N4422	"	30	15	-0.1	-8	-	2.5 - 6	40	0.3
2N4416	"	30	10	0.1	6	-	4.5 - 7.5	50	0.3
2N4856	"	40	-	-0.25	-4, -10	50	-	-	0.3
2N5457	"	25	10	-1.0	-6	3	3000	10 - 50	0.3
2N5458	"	25	10	-1	-7	6-9	4000	10 - 50	0.3
BFW10	"	15	-	0.1	8	820	3.2 mA/V	50	0.3
BFW11	"	15	-	0.1	6	810	3.2 mA/V	-	0.3

Table 7: Uni Junction Transistor

Type	I _A (A)	η	I _F (A)	I _V (mA)	V _{BE1} (V)	P _D (W)	R _{th} (K Ω)
2N2646	2	0.56 - 0.78	1.5	6	3.5	0.3	4.7 - 9.1
2N3980	1.5	0.68 - 0.82	2	1 - 10	3	0.36	4 - 8
2N4851	1.5	0.56 - 0.75	2	2	2.5	0.3	-
2N4948	1	0.55 - 0.82	0.6	4	2.5	0.36	4 - 12

78XX Voltage Regulator Datasheet: (8)

Device type with Input Voltage	output Voltage (V)	output Current	Quiescent Current (mA)	Line regulation (mv)	Load regulation (mv)	PSRR (dB)
78XXC (35)	5	1 A	8	25	50	80
	12	1 A	8	60	120	72
	15	1 A	8	75	150	70
78LXXAC (35)	5	100 mA	3 to 5	10	5	62
	12	100 mA	3 to 5	20	10	54
	15	100 mA	3 to 5	25	12	51
78LXXC (35)	5	100 mA	3 to 6	10	5	60
	12	100 mA	3 to 6.5	20	10	52
	15	100 mA	3 to 6.5	25	12	49
78MXX (35)	5	0.5 A	4 to 10	50	100	78
	12	0.5 A	4 to 10	120	240	71
	15	0.5 A	4 to 10	150	300	69

79XX Voltage Regulator sheet:

Device type	output Voltage (V)	Max. Input voltage
7902	-2	-35
7905	-5	-35
7905.2	-5.2	-35
7906	-6	-35
7908	-8	-35
7912	-12	-35
7915	-15	-35
7918	-18	-35
7924	-24	-40

Transistor No	Material and Type	V_{CE} (V)	V_{EB} (V)	$I_{C(max)}$ (mA)	PT	h_{FE}	f_T (MHz)
2N918	NS	30	15	3	50	200	600
2N930	NS	45	45	5	30	100	30
2N941	PS	25	8	25	50	10	16
2N1711	NS	75	50	7	100	20/60	70
2N1779	NG	25	15	15	200	800	50
2N1893	NS	120	80	7	500	800	250
2N2219	NS	60	30	5	800	100	40
2N2396	NS	60	40	5	300	40/120	250
2N2903	NS	60	30	7	50	125	60
2N2905	PS	60	40	5	600	100	200
2N2909	NS	60	40	-	400	40/120	50
2N2927	PS	25	25	4	500	30/130	100
2N2977	PG	30	15	0.3	50	75	400
2N2976	NS	45	45	60	30	60/240	60
2N3015	NS	60	30	5	500	30/120	30
2N3903	NS	60	40	6	200	50/150	250
2N5837	NS	10	5	3.5	200	25	1700
2N5843	PS	50	40	5	600	50/150	200
2N5855	PS	60	60	5	750	50/300	15
2N5856	NS	60	60	5	750	50/300	200

High Frequency Transistors	Material and Type	V_{CE} (V)	V_{EB} (V)	$I_{C(max)}$ (mA)	PT	h_{FE}	f_T (MHz)
AF115	PG	32	15	2	10	75	75
AF116	PG	32	15	2	10	50	75
AF121	PG	25	30	-	20	30	270
AF181	PG	30	30	-	20	155	105
AF187	PG	18	12	12	100	185	3
AF194	PG	20	0.5	0.5	10	80	60
AF200	PG	25	0.3	0.3	30	225	100
AF202	PG	25	0.3	0.3	10	60	100
AF239S	PG	15	15	0.3	100	60	450
BF137	NS	160	160	5	25	25	50
BF154	NS	30	20	2	300	200	200
BF160	NS	30	12	2	50	200	400
BF179B	NS	220	115	5	50	600	60
BF183	NS	25	20	3	30	150	400
BF194	NS	30	20	5	30	250	130
BF195	NS	30	20	5	30	36/125	100
SF104	PS	20	18	4	50	50/250	250
BF248	NS	30	25	3	600	30/300	180
BF249	PS	30	25	3	600	30/300	180
BF315	PS	20	25	4	600	30/300	300

Transistor No	Material and Type	V_{CE} (V)	V_{EB} (V)	$I_{C(max)}$ (A)	PT	h_{FE}	f_T (MHz)
AD136/4	PG	40	30	10	30	30	0.3
AD140	PG	55	55	3	35	30	0.2
AD143-5	PG	45	35	10	30	50/100	0.45
AD156V	PG	32	16	2	8	50/100	1
AD157V	NG	32	16	2	8	50/100	1
AD161	NG	32	20	1	6	80	1
AD162	PG	32	20	1	5	50	1
AD165	NG	25	20	1	60	60	0.5
AD262	PG	35	20	4	10	30	0.45
ADY12	PG	60	45	0.6	60/100	60/100	0.35
BD115	NS	245	180	0.15	6	22	80
BD124	NS	70	45	2	15	35	60
BD131	NS	70	45	3	11	40	60
BD132	PS	45	45	3	12	40/250	50
BD136	PS	45	45	1	12	40/250	50
BD137	NS	60	60	1	12	40/160	50
BD141	NS	140	120	8	117	20/70	50
BD145	NS	60	60	5	15	45	50
BD151	PS	35	30	3	25	30/150	50
BD152	NS	50	45	3	25	30/150	50
BD166	PS	45	45	1.5	20	40	3
BD181	NS	55	49	10	23	20/78	3
BD182	NS	70	60	15	117	20/70	3
BD187	NS	55	45	4	40	40	2
BD188	PS	55	45	4	40	40	2
BD232	NS	55	500	0.25	11	25/150	20
SL100	NS	60	50	0.5	4	40/300	20
SK100	PS	60	50	0.5	4	40/300	20
SL102	NS	30	30	1	3	50/280	3
SK102	PS	30	30	1	3	50/280	3
TIP29C	NS	100	100	1	30	40/200	3
TIP30C	PS	100	100	1	30	40/200	3
TIP31	NS	40	40	3	80	20/100	3
TIP32	PS	40	40	3	80	20/100	3
TIP33	NS	40	40	3	80	20	3
TIP34	PS	40	40	3	80	20	3
TIP41	NS	40	40	3	80	20	3
TIP42	PS	40	40	3	80	20	3

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM MAY -2019EXAM SEAT NO.

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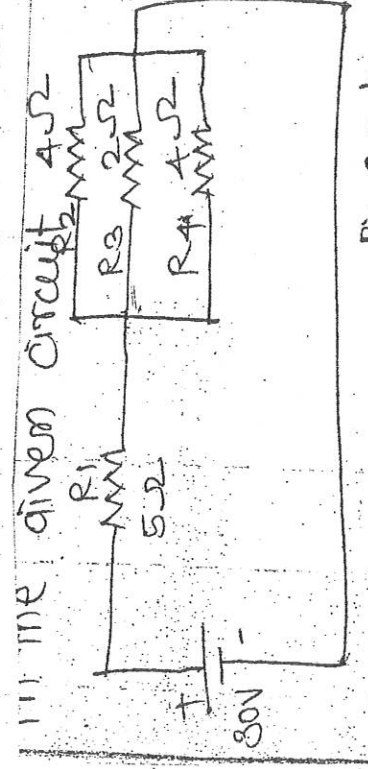
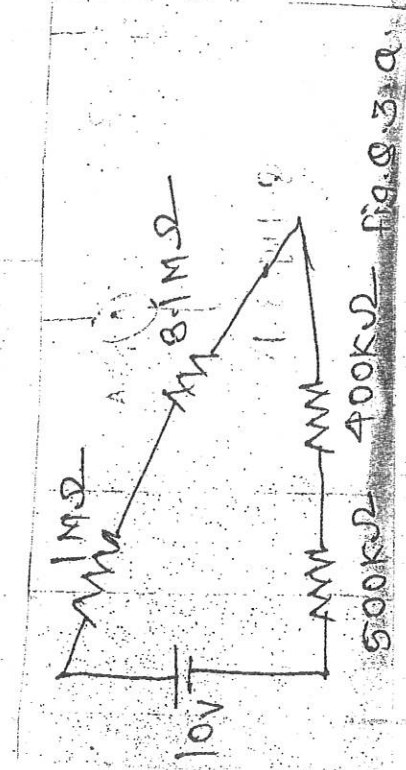
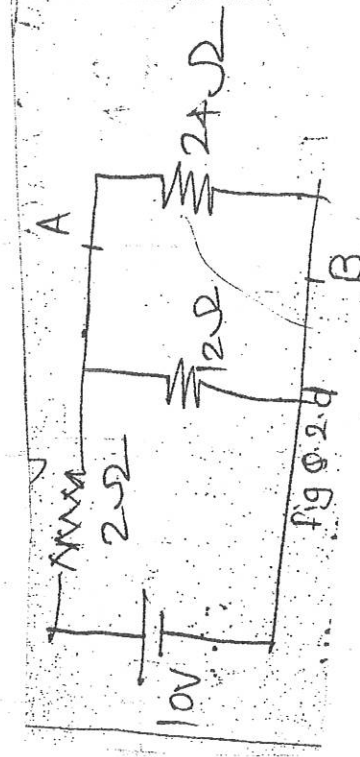
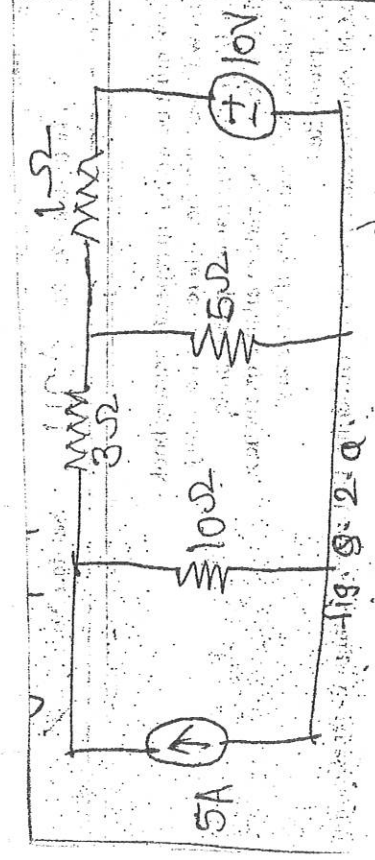
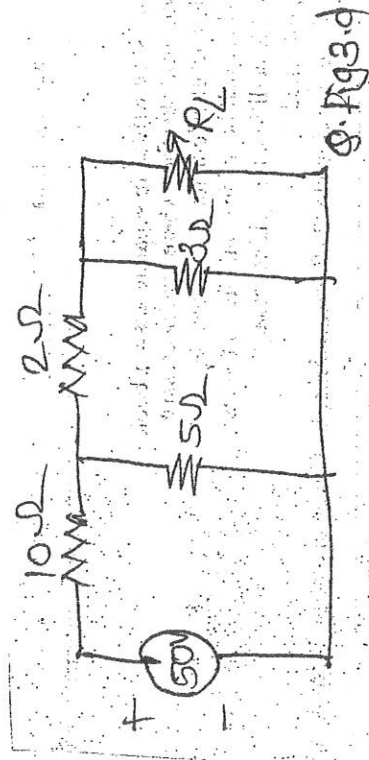
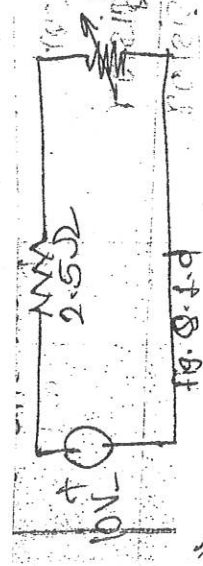
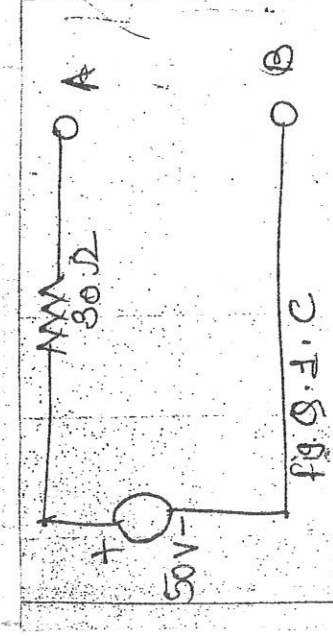
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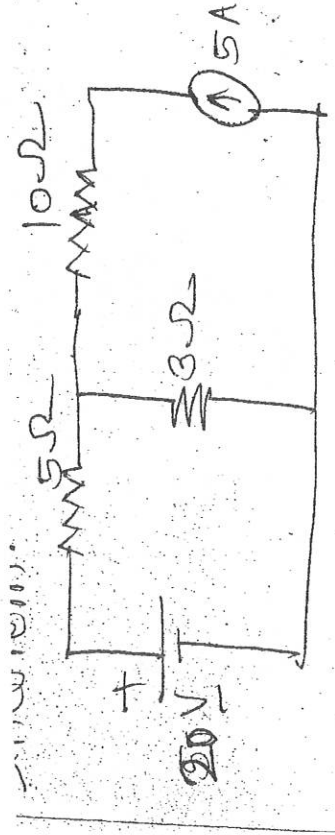
Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application

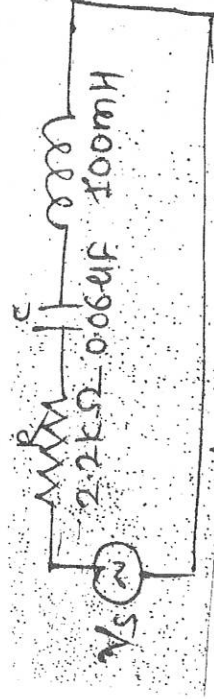
QN	SR. NO.	Question Text	Cognition Level R/U/A	Co Code	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define open circuit with diagram.	R	1	
	b)	Define AC circuit with diagram.	R	1	
	c)	Convert given circuit into equivalent current source. (Refer fig. page)	A	2	
	d)	State Thevenin's theorem.	R	3	
	e)	For given circuit estimate value of maximum power transferred to the load. (Refer fig. page)	U	3	
	f)	State superposition theorem.	R	3	
Q.2		Attempt any FOUR			(16)
	a)	Write the node voltage equations & determine the values of node voltage using following diagram. (Refer fig. page)	A	2	
	b)	Explain all steps for mesh analysis.	U	2	
	c)	State & Verify Norton's theorem with any one example.	U	3	
	d)	Determine Thevenin's equivalent circuit across 24Ω register in given diagram. (Refer fig. page)	A	3	
	e)	With diagram & equation explain voltage division & current division.	U	1	
	f)	Define 1) Ohm's law 2) Electric current 3) Energy in resistor 4) Power in resistor	R	1	
Q.3		Attempt any FOUR			(16)
	a)	Determine value of current & voltage across each resistor in given fig. (Refer fig. page)	U	1	
	b)	Calculate value of total current in the given circuit. (Refer fig. page)	A	1	
	c)	Explain concept of ground.	U	2	

	d)	Determine maximum power delivered to a load in given current. (Refer fig. page)	A	3	
	e)	Explain source transformation.	U	2	
	f)	Find the value of current through 3Ω resistor using superposition theorem. (Refer fig. page)	A	3	
Q.4		Attempt any FOUR			(08)
	a)	Define 1) roll of rate 2) decibel measurement	R	6	
	b)	Define quality factor and write its formula of resonant circuit.	R	5	
	c)	Define 1) admittance 2) impedance <i>Admittance 2) Impedance</i>	R	4	
	d)	Draw the frequency response of R-C & R-L low pass filter.	R	6	
	e)	List applications of resonance circuit (any four)	R	5	
	f)	Draw wave form to present phase relation between current and voltage in an inductor.	R	4	
Q.5		Attempt any FOUR			(16)
	a)	A $50\mu\text{F}$ capacitor is connected across a 230V , 50Hz supply calculate. 1) The reactance offered by the capacitor. 2) The maximum current.	A	4	
	b)	Explain series resonance in R-L-C circuit. Derive the formula for resonant frequency.	U	5	
	c)	With the neat circuit diagram explain series resonant band pass filters and also draw its frequency response.	U	6	
	d)	Derive the equation of charging of capacitor with its curves.	A	4	
	e)	What is the resonance frequency of a series RLC circuit where $R = 10\Omega$, $L = 25\text{mH}$, $C = 100\mu\text{F}$. Evaluate Q factor also.	A	4	
	f)	Explain RC high pass filter with circuit diagram and frequency response.	U	6	
Q.6		Attempt any FOUR			(16)
	a)	Explain parallel resonant band stop filter.	U	6	
	b)	A resistor of 10Ω and an inductance of 0.1H are connected in series across 230V , 50Hz , supply. Find 1) Inductive Reactance 2) Impedance 3) Current 4) Phase angle	A	4	
	c)	Compare series and parallel resonance circuit (Any four points).	U	5	
	d)	Explain the series resonant band stop filter with neat circuit diagram and frequency response.	U	6	
	e)	For each of the following input frequencies find the impedance in rectangle and polar form for the following fig. (Refer fig. page) 1) $f = 4\text{KHz}$ 2) $f = 2\text{KHz}$	A	4	
	f)	With neat circuit diagram and frequency response explain parallel resonant band pass filter.	U	6	





Q. fig 3. f.



Q. Fig 6 e

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM MAY-2019

EXAM SEAT NO.

LEVEL :- FOURTH

PROGRAM : E & TC

COURSE CODE :- ETE403/EJ409/ETE403

COURSE NAME DATA COMMUNICATION & NETWORKING

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 17/05 / 2019

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section- I	R/ U/ A	Co EFF A	Mar ks
Q.1		Attempt any FOUR :		4-03	08
	a)	Define i) Protocol ii) Standards	R	1	
	b)	Compare simplex, half duplex and full duplex communication on the basis of definition and applications.	U	1	
	c)	Draw network topology diagram of mesh topology. Write its advantage and disadvantage.	R/ U	2	
	d)	Write the function of session layer in OSI model.	R	2	
	e)	State the difference in connectionless services and connection oriented services. (any 2 points)	U	3	
	f)	State the necessity of switching. Write the classification of switching techniques.	U	3	
Q.2		Attempt any TWO :			16
	a)	Describe following transmission impairment in detail i) Noise ii) Attenuation iii) Distortion.	R/ U	1	
	b)	Draw the OSI model of network and describe function of physical data link layer, network layer in detail.	U	2	
	c)	With the help of diagram, describe circuit switching technique.	U	3	
Q.3		Attempt any TWO :			16
	a)	Draw the frame relay format and describe function of each bit.	U/ A	3	
	b)	Draw the block schematic of modem and describe it. Write names of standards used in modem.	U/ A	2	
	c)	List the parameters which are used to describe performance of network. Describe each of them.	R/ U	1	

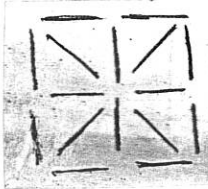
P.T.O.

QN	S Q N	Section- II	R/ U/ A	Co ETP 403	Mar ks
Q.4		Attempt any FOUR :			08
	a)	Define Redundancy.	R	4	
	b)	List error correction methods.	R	4	
	c)	State any two commands used in SMTP.	R	5	
	d)	State the need of cryptography. (any 2 points)	R	6	
	e)	Draw the frame format of standard ethernet.	R	6	
	f)	List the name of IEEE standards in project 802. (any 4)	R	6	
Q.5		Attempt any FOUR :			16
	a)	The original message 11100101 is transmitted to the receiver which has divisor 1010. Check whether there is error detected in the received message or not.	A	4	
	b)	Explain stop and wait ARQ protocol with suitable diagram.	U	4	
	c)	Explain the concept of Telnet.	U	5	
	d)	Explain uniform resource locator with one example.	U	5	
	e)	Explain Proxy firewall with neat diagram.	U	6	
	f)	Explain the operation of DCF in MAC layer of IEEE 802.11 standard with suitable diagram.	U	6	
Q.6		Attempt any FOUR :			16
	a)	Explain error control mechanism in data link layer.	U	4	
	b)	Explain Go-back -N ARQ protocol with suitable diagram.	U	4	
	c)	Explain the working of SMTP. With suitable diagram.	U	5	
	d)	Explain the concept of world wide web.	U	5	
	e)	Explain Post Office Protocol (POP) with suitable diagram.	U	5	
	f)	With neat diagram explain the architecture of 802.11 wireless LAN.	U	6	

P.T.O.

Q.3	Attempt any FOUR			(16)
a)	Solve by Cramer's Rule $\frac{2}{x-1} + \frac{3}{y-2} = 5, \frac{4}{x-1} - \frac{1}{y-2} = 3$	A	1	
b)	Resolve into partial fractions : $\frac{x^4 - x^5 + 1}{x^3(1-x)}$	A	2	
c)	By using Binomial theorem expand $\left(\frac{4}{3x} + \frac{y^2}{2}\right)^6$	A	4	
d)	If $A = \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix}, B = \begin{pmatrix} 4 & 2 & -5 \\ 1 & 0 & 3 \end{pmatrix}$ and $C = \begin{bmatrix} 6 & -7 & 0 \\ -1 & 2 & 5 \\ 1 & 0 & 3 \end{bmatrix}$ verify that $A(BC) = (AB)C$	U	3	
e)	If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ show that $adj A = 3A^T$	U	3	
f)	Solve by matrix method $x + y + z = 3$ $x + 2y + 3z = 4$ $x + 4y + 9z = 6$	A	3	
Q.4	Attempt any FOUR			(08)
a)	Prove that $\cos^2 \theta - \cos^2 \theta \operatorname{cosec}^2 \theta = 1$	U	5	
b)	Without using calculator, find the value of $\sec(3660^\circ)$	A	5	
c)	Prove that $\cos 2\theta = 1 - 2\sin^2 \theta$	U	5	
d)	Without using calculator find $\sin(15^\circ)$	A	5	
e)	If $2\sin 40^\circ \cos 10^\circ = \sin A + \sin B$ find A and B	U	5	
f)	Find principal value of $\cos\left[\frac{\pi}{2} - \sin^{-1}\left(\frac{1}{2}\right)\right]$	U	5	
Q.5	Attempt any FOUR			(16)
a)	Prove that $\frac{1 + 2\sin^2 \theta}{1 + 3\tan^2 \theta} = \cos^2 \theta$	U	5	
b)	Without using calculator, find the value of $\frac{\sec^2(135^\circ)}{\cos(-240^\circ) - 2\sin(930^\circ)}$	U	5	
c)	If $\tan(x+y) = \frac{3}{4}$, and $\tan(x-y) = \frac{8}{15}$ then show that $\tan 2x = \frac{77}{36}$	A	5	
d)	Prove that $\frac{1 - \tan 2\theta \tan \theta}{1 + \tan 2\theta \tan \theta} = \frac{\cos 3\theta}{\cos \theta}$	A	5	
e)	Prove that $\cos 10^\circ \cos 50^\circ \cos 70^\circ = \frac{\sqrt{3}}{8}$	A	5	
f)	Prove that $\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{3}{5}\right) = \tan^{-1}\left(\frac{27}{11}\right)$	A	5	
Q.6	Attempt any FOUR			(16)
a)	Without using calculator find the value of $\sin 150^\circ - \tan 315^\circ + \cos 300^\circ + \sec^2 3660^\circ$	U	5	
b)	If A and B are obtuse angle such that $\sin A = \frac{5}{13}, \cos B = \frac{-4}{5}$ find $\tan(A+B)$	U	5	
c)	prove that $\frac{\cos 3A - \cos 7A}{\sin 9A + \sin A} = \cos 2A \tan 4A - \sin 2A$	A	5	
d)	Prove that $\cos C + \cos D = 2 \cos\left(\frac{C+D}{2}\right) \cos\left(\frac{C-D}{2}\right)$	A	5	
e)	Prove that $\cos^{-1}\left(\frac{4}{5}\right) - \sin^{-1}\left(\frac{5}{13}\right) = \cos^{-1}\left(\frac{63}{65}\right)$	A	5	
f)	Prove that $2 \tan^{-1}\left(\frac{1}{3}\right) + \tan^{-1}\left(\frac{4}{3}\right) = \frac{\pi}{2}$	A	5	

QN	S Q N	Question Text	R U A	CO EIF 101	Marks
Q.1		Attempt any FOUR			(08)
	a)	State the types of capacitors.	R	2	
	b)	Enlist various types of components.	R	2,3	
	c)	Define power factor & give its unit.	R	2	
	d)	Define resistor and draw its symbol.	R	2	
	e)	List applications of inductor. (any two)	R	2	
	f)	State various applications of resistors. (any two)	R	2	
Q.2		Attempt any FOUR			(16)
	a)	State any four specifications of capacitors.	R	2	
	b)	Draw the construction of carbon film resistors and explain it.	U	2,3	
	c)	Explain iron core inductor with neat diagram.	U	2,3	
	d)	Identify the colour codes for following resistors: i) $560\text{ k} \pm 0.2\%$ ii) $23.4\text{ k} \pm 0.2\%$	A	3	
	e)	Explain following terms i) Q factor ii) Inductive Reactance.	U	2	
	f)	Identify the capacitors from colour code. i) Orange orange blue ii) Yellow violet yellow.	A	3	
Q.3		Attempt any FOUR			(16)
	a)	Draw and explain characteristics curves of TDR.	U	2, 3	
	b)	Identify the colour code for the following capacitors i) 0.034 F ii) 47 nF	A	3	
	c)	Draw and explain construction working of tapped inductor.	U	2	
	d)	Differentiate linear and logarithmic potentiometer. (any four)	U	2, 3	
	e)	Identify colour coding of inductor with colour band system.	A	3	
	f)	Explain Tantalum electrolytic capacitor.	U	2, 3	
					P.T.O

Q.4	Attempt any FOUR		(08)
a)	List the types of PCB.	R	6
b)	Identify the type of display shown in diagram below.		
		A	5
c)	Define the following specification of cable i) Characteristic impedance. ii) Current carrying capacity.	U	4
d)	State any four types of connector.	R	4
e)	State any two advantages of PCB.	R	6
f)	Define the following specification with respect to switch. i) Voltage rating ii) Mechanical life.	U	5
Q.5	Attempt any FOUR		(16)
a)	Draw and explain construction of co-axial cable.	U	4
b)	Show the numeric value three using common anode seven segment display and explain the common anode seven segment display.	A	5
c)	Draw and explain dip soldering technique of PCB.	U	6
d)	Draw and explain BNC connector. State any two applications of BNC connector.	U / R	4
e)	Compare relay and switch on the basis of following parameter. i) Cost ii) Specification iii) Applications iv) Types	R	5
f)	Explain the steps for preparation of PCB with the help of flowchart.	U	6
Q.6	Attempt any FOUR		(16)
a)	Draw Dry Reed relay and state any two applications of Dry reed relay.	R	5
b)	Suggest the suitable cable and connector for the following applications i) Input of CRO ii) Telephone handset	A	4
c)	Draw and explain general purpose Relay.	U	5
d)	Explain photo printing technique used in PCB manufacturing.	U	6
e)	Describe D-type connector with the help of diagram.	U	4
f)	Draw the diagram of 3 x 5 dot matrix display and explain dot matrix display.	U / R	5

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: **IE/E&TC**

COURSE CODE: **ETE309/IEE309/EJ209/IX209** COURSE NAME: **MICROPROCESSOR AND**

INTERFACING

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **16/05/2019**

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) Define i) Data bus ii) Address bus iii) control bus. State the bus size of address and data bus of 8085 processor.
- b) What is the role of latch and tristate buffer in microprocessor based system?
- c) What will be the contents of accumulator after execution of following instructions?

XRA A

DCR A

- d) Define i) Machine cycle ii) Instruction cycle.
- e) Describe following instruction i) SI ii) DI
- f) Enlist 8085 interrupts with their priorities and vector locations.

Q.2 Attempt any **FOUR**

(16)

- a) Draw the architectural diagram of 8085 processor and label it.
- b) Draw the diagram of demultiplexing of low order address-data bus of 8085 and describe the principle of demultiplexing it.
- c) Draw the instruction cycle of following instruction (assume necessary data) - MVI A, FFH
- d) Describe following instruction with reference to their function and flags affected.
 - i) MOV A, B
 - ii) ADI OFH
 - iii) ANA C
 - iv) JNZ 2000H
- e) Write a assembly language program to transfer a block of 16 data bytes stored at 4000H to 6000H.
- f) Define i) Stack ii) Subroutine. Write advantages of using subroutine.

P.T.O

Q.3**(16)**Attempt any **FOUR**

- Draw the format of flag register and describe each bit.
- What will be output of following program and status of flag register?
MVI A, OFH
ADI A, FOH
INR A,
HLT
- Define – addressing mode. Describe with example i) Immediate addressing mode ii) Indirect addressing mode.
- State the function of following instructions i) ADC ii) DAA iii) LHLD iv) SBI
- Write an assembly language program to add to BCD numbers 66 and 33 store result at 3000H.
- Describe CALL and RET instructions.

Section – II**Marks****Q.4****(08)**Attempt any **FOUR**

- Give the specifications of RS-232 standard.
- Give the format of I/O control word register of 8255.
- What do you mean by memory mapping mad memory interfacing?
- State function of $\overline{CS}$ and A_0-A_1 pin of 8259-PIC.
- State features of 2764 EPROM.
- What is meant by 1K x 8 memory?

Q.5**(16)**Attempt any **FOUR**

- Interface 4k x 8 memory to 8085 using 1k x 8 memory chips.
- Draw block diagram of 8255 PPI.
- Differentiate between I/O mapped IO and memory mapped I/O. (any 4 points)
- Draw & explain operational command words OCW_2 & OCW_3 8259 PIC.
- Interface two LED's using common anode & common cathode technique. Write a program to blink them alternately. Assume port address in I/O mapped I/O (using 8255)
- Explain operation of 'OUT' instruction with its timing diagram.

Q.6**(16)**Attempt any **FOUR**

- Interface 8259 PIC in cascade mode with microprocessor 8085. Explain in brief.
- Draw the interfacing diagram of 8255 with 8085 and explain.
- Interface input device (74LS244) with input address FFH. also interface output devices (74373- latch) with output address FEH to microprocessor 8085 (use decoder logic)
- Draw block diagram of 8259-PIC. Also draw format for ICW_1 , command word of 8259.
- Write a BSR control word subroutine to set bits PC_0 , PC_1 and PC_5 and reset them after some delay.
- Draw the multiplexed 7 segment display interfacing with 8085 diagram and explain.

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: First

COURSE CODE:CCF 102/CCE 102

MAX. MARKS: 80

PROGRAM: EE/IE/IT/ET

COURSE NAME: Engineering Physics

TIME: 3 HRS.

DATE: 09/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN**>Question No, **SQN**>Sub-Question No, **R**> Remembering, **U**>Understanding, **A**>Application

QN	S. Q. N	Question Text	Cognition Level	Co Code CCF	Marks
Q.1		Attempt any FOUR	R/U/A	102	
	a)	Define specific mass and give its SI unit.	R	01	(08)
	b)	Shape of a liquid drop is spherical. Explain.	U	01	
	c)	Define coefficient of viscosity & give its SI unit.	R	01	
	d)	State any two applications of nanotechnology in the field of automobile.	R	03	
	e)	Define surface tension. Give its SI unit.	R	01	
	f)	Define 1) Nanotechnology 2) Nanoparticle	R	03	
Q.2		Attempt any FOUR			
	a)	Explain the behavior of wire under continuously increasing load.	U	01	(16)
	b)	Derive an expression for coefficient of viscosity using Stoke's method.	A	01	
	c)	Define capillary action. Give any three examples of capillary action.	R	01	
	d)	State any four points of distinction between longitudinal and transverse waves.	U	02	
	e)	Mention any two applications each of nanotechnology in the field of textile and environment.	R	03	
	f)	A wire of diameter 2mm and length 2.5m extends by 1.5mm when a force of 15N is applied to it. Find the Young's modulus of the wire.	A	01	
Q.3		Attempt any FOUR			
	a)	Explain the molecular theory of surface tension.	U	01	(16)
	b)	Define 1) Amplitude 2) Period 3) Frequency 4) Wavelength of a wave.	R	02	
	c)	Derive expression $h\nu_1 = h\nu_2$ for capillary action.	A	01	
	d)	Define stress and explain the three types of stress.	R	01	
	e)	State any four applications of viscosity.	R	01	
	f)	Define resonance. Give any three examples of resonance.	R	02	

P.T.O.

Q.4	Attempt any FOUR			(08)
	a) Define refraction of light.	R	04	
	b) State Ohm's law for electricity.	R	04	
	c) Define photoelectric effect.	R	05	
	d) State two properties of laser.	R	05	
	e) State the principle of production of X-rays.	R	05	
	f) Define critical angle.	R	06	
Q.5	Attempt any FOUR			(16)
	a) Derive prism formula to calculate refractive index of given prism.	A	04	
	b) A 6 m long copper wire has diameter 0.45 mm. If its resistance is $18\ \Omega$, calculate its resistivity.	A	04	
	c) State any four characteristics of photoelectric effect.	R	05	
	d) Distinguish between spontaneous and stimulated emission. (any four points.)	U	05	
	e) State any four applications of X-rays.	R	05	
	f) State any four applications of optical fibre.	R	06	
Q.6	Attempt any FOUR			(16)
	a) How long will light take in travelling a distance 500 m in water ? R.I. of water is $\frac{4}{3}$ and velocity of light in vacuum is 3×10^8 m/s.	A	04	
	b) Derive equation of equivalent resistance for parallel combination of three resistors.	A	04	
	c) Explain construction and working of photoelectric cell.	U	05	
	d) Describe the term population inversion.	U	05	
	e) Explain the term total internal reflection.	U	06	
	f) Obtain balancing condition for Wheatstone's network.	A	04	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIFTH**PROGRAM: E & TC****COURSE CODE :- ETF502/ ETE502****COURSE NAME :- OPTICAL FIBER COMMUNICATION****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 09/05/2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I	R/ U/ A	Co ETF 502	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Define i) Optical power ii) Light intensity.	R	1	
	b)	State Snell's law and write the formula of critical angle	R	1	
	c)	List any four advantages of optical fiber cables.	R	2	
	d)	Define graded index fiber and draw index profile diagram of it.	R	2	
	e)	Draw a neat labelled diagram of eye pattern.	R	3	
	f)	Define attenuation and write any two causes of it.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Calculate Numerical aperture, acceptance angle and critical angle having core and cladding refractive indices are 1.48 & 1.42.	A	1	
	b)	Draw a labelled diagram of loose buffered optical fiber and explain it.	U	2	
	c)	Define optical coupler and explain its types.	U	2	
	d)	Draw constructional diagram of optical fiber and explain it.	U	2	
	e)	Explain with diagram attenuation measurement using cutback technique.	U	3	
	f)	Define non-linear scattering and explain mie scattering.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Derive an equation for numerical aperture of fiber with suitable diagram.	A	1	
	b)	Define mechanical splicing. Explain any one type of it with diagram.	U	2	
	c)	Compare between single mode and multimode fibers with following points. i) Definition ii) Optical source used iii) Core diameter iv) Application.	U	2	
	d)	Describe with diagram attenuation measurement using insertion loss method.	U	3	
	e)	Explain intrinsic and extrinsic absorption.	U	3	
	f)	Describe intramodal dispersion in detail.	U	3	

P.T.O.

QN		Section- II		R/ U/ A	Co ETF 502	Mar ks
Q.4	S Q N	Attempt any FOUR :				08
	a)	State any four requirements of optical sources.		R	4	
	b)	Draw the symbol and constructional diagram of photo-Darlington.		R	5	
	c)	State any four applications of OFC system		R	6	
	d)	Why do we prefer laser diode over LEDs for communication applications?		R	4	
	e)	Give classification of photodetector.		R	5	
	f)	Define the multiplexing and state the types of multiplexing.		R	6	
Q.5		Attempt any FOUR :				16
	a)	Draw construction of planar LED and dome LED.		U	4	
	b)	Compare p-i-n and avalanche photodiode for following parameters: i) Sensitivity ii) Wavelength range iii) Internal gain iv) Cost		U	5	
	c)	Draw the block diagram of optical fiber communication system and explain.		U	4	
	d)	Describe the population inversion and stimulated emission with the help of energy level diagram.		U	4	
	e)	With the help of neat diagram explain the working principle of PN photodiode.		R	5	
	f)	Explain the concept of optical power budgeting with neat diagram		U	4	
Q.6		Attempt any FOUR :				16
	a)	Draw constructional diagram of edge emitting LED and explain construction of it.		U	4	
	b)	Explain the following characteristics of avalanche photodiode i) Sensitivity ii) Operating speed iii) Noise.		U	4	
	c)	Compare between LED and LASER. (any four points)		U	4	
	d)	Draw the LED drive circuit for analog optical transmitter and explain.		U	6	
	e)	Explain construction and working of Fabry-perot cavity resonator.		U	4	
	f)	Compare between photodiode and phototransistor. (any four points)		U	5	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : CE/ME/SM/MT****COURSE CODE :- CCF103/X103/X109/CCE103****COURSE NAME :- CHEMISTRY OF ENGINEERING MATERIALS /
ENGINEERING CHEMISTRY****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 09/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 103	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Write electronic configuration of 20Ca^{40} , 7N^{14}	U	1	
	b)	State Aufbau principle.	R	1	
	c)	Define electroplating.	R	2	
	d)	State Faraday's first law of electrolysis.	R	2	
	e)	What is corrosion?	R	3	
	f)	Mention factors affecting Wet corrosion.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain Bohr's theory of atom.	U	1	
	b)	On the basis of electrovalency explain the formation of NaCl molecule.	A	1	
	c)	Distinguish between atom and ion.	U	2	
	d)	What is degree of ionization? Explain any three factors affecting on it	U	2	
	e)	With neat labelled diagram explain the process of galvanizing.	U	2	
	f)	Name and explain the process used to protect the large sized and irregular shaped articles.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Distinguish between i) Soft water and Hard water ii) Temporary Hardness and permanent hardness.	U	4	
	b)	Write any four reactions of hard water with soap.	A	4	
	c)	If hard water is used for drinking and cooking purpose then write its disadvantages.	U	4	
	d)	What is meant by scale formation in boilers? Explain its causes.	U	4	
	e)	How will you sterilize impure water by using bleaching powder? Explain with the help of chemical reactions.	U	4	
	f)	With the help of chemical reactions explain the regeneration of both the types of resins.	A	4	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) Distinguish between mineral and ore (any two points)	U	6	
	b) Define alloy and Gangue.	R	6	
	c) Select lubricants for sewing machine and state its properties.	A	7	
	d) State functions of Drying oil and pigment. (Each two functions)	R	7	
	e) Define Adhesive and composite materials.	R	7	
	f) Write preparation of Glass Wool.	R	7	
Q.5	Attempt any FOUR :			16
	a) With example state four purposes of making alloy.	R	6	
	b) With diagram explain extreme pressure lubrication.	U	7	
	c) Distinguish between paint and varnish (any four points)	U	7	
	d) State four engineering properties and their related applications of plastic	U	7	
	e) Explain with chemical reactions vulcanization of rubber.	U	7	
	f) Classify composite materials and state its applications.	U	7	
Q.6	Attempt any FOUR :			16
	a) Distinguish between calcination and roasting (any four points)	U	6	
	b) With diagram explain Electromagnetic separation method.	U	6	
	c) Define lubricant. Write functions of lubricants.	U	7	
	d) Write characteristics of oil paint. Write functions of plasticizer and Thinner (two each)	R	7	
	e) With example explain condensation polymerization.	U	7	
	f) Define i) Tack ii) Elasticity iii) Rebound iv) Abrasion resistance.	R	5	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCE106/0108/X110/CCE106/R108 COURSE NAME: ENGINEERING MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 13/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO CCE106	Marks
Q.1		Attempt any FOUR			(08)
	a)	Find centroid of a triangle whose vertices are (-1, 2), (3, 2), (4, 5)	R	1	
	b)	Find the distance between parallel lines $3x+2y-6=0$ and $3x+2y-12=0$	U	1	
	c)	Find equation of line passing through (-4, 6) and (8, -3)	R	1	
	d)	Find center and radius of circle $2x^2+2y^2+5x-6y+4=0$	U	1	
	e)	Find equation of circle having center (-1, -2) and radius $\sqrt{15}$	R	1	
	f)	Show that the root of equation $x^3 - 2x - 5 = 0$ lies between 2 and 3	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Find area of quadrilateral whose vertices are (4, 1), (-3, 0), (-2, 3) and (3, 4)	A	1	
	b)	Find the equation of straight line passing through (4, 5) and perpendicular to the line $7x - 5y = 420$	U / A	1	
	c)	Find the equation of circle whose center is at point of intersection of lines $2x+3y=13$, $5x-y=7$ and passing through the point (1, -1).	A	1	
	d)	Using Bisection method, find the approximate root of $x^2 + x - 3 = 0$ (Three iteration only)	A	2	
	e)	Using Regula falsi method find real root of the equation $xe^x = 3$ (Two iteration)	A	2	
	f)	Using Bisection method find value of $\sqrt{10}$ by performing three iteration	A	2	
Q.3		Attempt any FOUR			(16)
	a)	Find the angle between the lines $y = 5x + 6$, $y = x$	A	1	
	b)	Find the equation of circle whose center is at (-1, 3) and which touches the line $2x+y=4$	U / A	1	
	c)	Solve the following equation by Jacobi's method $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$	A	2	
	d)	Solve the equation by using Gauss-seidal method, $4x + y + 2z = 12$, $-x + 11y + 4z = 33$, $2x - 3y + 8z = 20$	A	2	

P.T.O

	e)	Solve the following equations by Gauss –seidal method $5x - y = 9$, $x - 5y + z = -4$, $y - 5z = 6$	A	2	
	f)	Solve the following equations by Jacobis method $10x + y + z = 12$, $x + 10y + z = 12$, $x + y + 10z = 12$	A	2	
Q.4		Attempt any FOUR			(08)
	a)	If $f(x) = \frac{x^2 + 2x + 5}{x^3 + 8}$ find $f(1) + f(-1)$	U	3	
	b)	Define odd and even functions	R	3	
	c)	Evaluate $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$	U / A	3	
	d)	Evaluate $\lim_{x \rightarrow 0} \frac{3 \sin x + 4x}{7x - 2 \tan x}$	U / A	3	
	e)	State the Quotient Rule of the Derivative.	U	4	
	f)	Find the slope of the tangent to the circle $x^2 + y^2 = 25$ at $(-3, 4)$	A	4	
Q.5		Attempt any FOUR			(16)
	a)	If $f(x) = \frac{1}{1-x}$ then show that $f(f(f(x))) = x$	U	3	
	b)	Evaluate $\lim_{x \rightarrow \infty} \left(\sqrt{x^2 + 3x + 2} - \sqrt{x^2 + x + 1} \right)$	A	3	
	c)	If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then show that $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$	U	4	
	d)	Find $\frac{dy}{dx}$ if $y = \tan^{-1} \sqrt{\frac{1-x}{1+x}}$	A	4	
	e)	Find $\frac{dy}{dx}$ if $y = (x)^{\sin x} + (\sin x)^x$	A	4	
	f)	Find the equations of the tangents to the curve $y = x^2 - 2x - 3$ where it meets the x-axis	A	4	
Q.6		Attempt any FOUR			(16)
	a)	Evaluate $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{\frac{\pi}{4} - x - \frac{\pi}{4}}$	A	3	
	b)	Find $\frac{dy}{dx}$ if $\sin y = \log(x + y)$	A	4	
	c)	If $y = \cos^{-1} \left(\frac{\cos x + \sqrt{3} \sin x}{2} \right)$ show that $\frac{dy}{dx} = -1$	U	4	
	d)	If $x = 3 \cos \theta - 2 \cos^3 \theta$ and $y = 3 \sin \theta - 2 \sin^3 \theta$ find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$	A	4	
	e)	If $y = (\sin^{-1} x)^2$ prove that $(1-x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - 2 = 0$	U	4	
	f)	A metal wire 36 cm long is bent to form a rectangle. Find its dimensions when its area is maximum.	A	4	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- SECOND**PROGRAM : COMMON****COURSE CODE :- CCF 202 /CCE202****COURSE NAME :- COMMUNICATION SKILLS****MAX. MARKS : 40 TIME : 2 HRS. DATE :- 10/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 202	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State importance of oral communication for engineers.	R	2	
	b)	Write examples of oral and written communication. (two each)	U	2	
	c)	State advantages and disadvantages of written communication. (each one)	R	3	
	d)	Define the term 'Haptics'.	R	4	
	e)	Define panel interview.	U	6	
	f)	Write two uses of L C D projector.	U	4	
Q.2		Attempt any FOUR :			16
	a)	State communication process with diagram.	U	1	
	b)	Elaborate physical and mechanical barriers.	U	1	
	c)	Discuss 'media plays an important role in the communication process'.	U	4	
	d)	Write strengths of media aided presentation.	A	4	
	e)	Write a brief note on mock interview.	U	6	
	f)	State advantages and disadvantages of oral communication.	U	2	
Q.3		Attempt any TWO :			16
	a)	Write four principles of effective communication.	U	1	
	b)	Write a letter of application for the post of Production Engineer in Mahindra Tech, Aundh, Pune- 420004, with your resume.	A	3	
	c)	Draw a pie chart indicating the given below quantities, in given percentage of five senses of perception Sight – 65% Audio – 18% Touch – 07% Smell – 05% Taste – 05%	A	4	

	c)	Find the area enclosed between the parabola $y^2 = 4x$ and the line $2x - y = 4$	A	1	
	d)	Evaluate $\int \cos(\sqrt{x}) dx$	U	1	
	e)	If $i_1 = 10 \sin wt$ & $i_2 = 20 \cos wt$ Find $i_1 + i_2$ in the form $r \sin(wt + \alpha)$ & calculate the R.M.S value over the range from $t = 0$ to $t = \frac{\pi}{w}$	A	1	
	f)	Evaluate $\int \frac{dx}{(x+1)(x^2+4)}$	A	1	
Q.4		Attempt any FOUR			(08)
	a)	Define order and degree of a differential equation.	R	2	
	b)	Find order and degree of the following differential equation $y - x \frac{dy}{dx} = \left(\frac{dy}{dx} \right)^2$	R	2	
	c)	Define i) Conjugate of a complex number ii) Modulus of a complex number.	R	3	
	d)	Find real and imaginary part of $\frac{1+i}{1-i}$	R	3	
	e)	Find the value of $i^{30} + i^{40} + i^{60}$	R	3	
	f)	Separate into real and imaginary parts: $\cosh(x+iy)$	R	3	
Q.5		Attempt any FOUR			(16)
	a)	Show that $y^2 = ax^2$ is a solution of $x \left(\frac{dy}{dx} \right)^2 - 2y \frac{dy}{dx} + ax = 0$	U	2	
	b)	Find the equation of the curve whose slope of the tangent at any point (x, y) is $3x-4$ and which passes through the point $(3, 2)$	A	2	
	c)	Prove that $(1+i)^8 + (1-i)^8 = 32$, by using De-Moivre's theorem.	U	3	
	d)	Solve by using variable separable method $x - y \frac{dx}{dy} = a \left(x^2 + \frac{dx}{dy} \right)$	A	2	
	e)	Use De Moivre's theorem to find $\frac{(\cos 2\theta + i \sin 2\theta)^{3/2} (\cos \theta - i \sin \theta)^3}{(\cos 3\theta - i \sin 3\theta)^2 (\cos 5\theta - i \sin 5\theta)^{2/5}}$	A	3	
	f)	Solve $x(y-x) \frac{dy}{dx} = y(x+y)$	A	2	
Q.6		Attempt any FOUR			(16)
	a)	Show that $\frac{2x}{y^3} dx + \frac{y^2 - 3x^2}{y^4} dy = 0$ is exact differential equation and hence solve it.	U	2	
	b)	The particle starts from rest, its acceleration at any time is $(t+3)m/s^2$. Find the distance travelled in 4 seconds.	A	2	
	c)	Using Euler's formula, prove that $\cos A - \cos B = -2 \sin \left(\frac{A+B}{2} \right) \sin \left(\frac{A-B}{2} \right)$	U	3	
	d)	Solve $x \log x \frac{dy}{dx} + y = 2 \log x$	A	2	
	e)	Find modulus and amplitude of $\frac{(1+i)(2+i)}{3-i}$	A	3	
	f)	Find cube root of unity.	A	3	

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EVEN TERM ENDE EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- **FOURTH** PROGRAM : **IE & E& TC**COURSE CODE :- **EIF402/IEE502**COURSE NAME **EMBEDDED SYSTEMS**MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **13/05 / 2019**

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN		S	Section-I			R/ U/ A	Co EIF 402	Mar ks
Q.1			Attempt any FOUR :					08
	a)		State the data types used for 8051 C programming.			R	1	
	b)		Write an 8051 C program to send the values -4 to +4 to port 1.			U	1	
	c)		State advantages of serial communication over parallel communication.			R	2	
	d)		Enlist the interrupts of 8051 priority wise with their vector addresses			R	3	
	e)		Find out the value to be loaded in TMOD SFR to configure Timer 0 in mode 1 and counter 1 in mode 0.			U	2	
	f)		Draw the format of IE SFR mentioning all the bits from D7 to D0.			R	3	
Q.2			Attempt any FOUR :					16
	a)		State DB-9 signals for RS232 standard and explain the function of any two signals.			R	2	
	b)		State why we use TCON register in 8051 interrupt programming. Draw its suitable format and explain in detail.			R	3	
	c)		Write an 8051 C program to toggle all bits of port 1 after 250ms delay. Use MSdelay () Function. Use logical operator to toggle the bits of port 1.			U	1	
	d)		Write a 8051 C program to perform following, i) To read a single bit of data from P1.7 and send it to P1.0 continuously. ii) Create a square wave of 200 ms period on pin P2.5. Use timer 0 to create the square wave. Assume XTAL= 11.0592 MHz.			A	3	
	e)		Write a C language program for 8051 to toggle bits of port 0 continuously using timer 0 in mode 1 at an interval of 10m Sec. Assume X TAL = 12 KHz.			A	2	
	f)		Write a C language program for 8051 microcontroller using interrupts to do the following. i) To use timer 0 as an event counter to count the external pulses fed to pin T0 (P 3.4) of 8051 and display it on P0. ii) Simultaneously create a square wave of 2 KHz frequency at P2.0 using T1 in 8 bit auto reload mode (mode 2)			A	3	

P.T.O.

Q.3	Attempt any FOUR :			16
a)	Assuming that a door sensor is connected to pin P2.0, write a 8051 C program to monitor the status of door sensor switch (SW) and transmit the two messages on serial port as following. i) If SW=0 (closed) : “ DOOR OPENED” ii) If SW=1 (open) : “ DOOR CLOSED” Set Band rate = 4800, 8 bit UART mode. Assume XTAL = 11.0592 KHz	A	2	
b)	Assume 4 bytes of hexadecimal data : 25H,62H, 3FH & 52H. write a 8051 C program to i) Calculate the checksum byte for above data ii) Checksum operation to ensure data integrity.	A	1	
c)	State the steps involved in programming 8051 timers in mode 1 and mode 2.	R	2	
d)	Give the interrupt priority upon Reset. Draw the format of IP register and explain the significance of each bit.	R	3	
e)	Write an 8051 C program to convert FDH to decimal and display on port P0, P1,P2. (P0 as LSB)	A	1	
f)	Two switches (SW 1 & SW 2) are connected to $\overline{INT0}$ & $\overline{INT1}$ of 8051 microcontroller. Write a 8051 c program to perform following. i) When SW 1 is pressed, turn ON all LEDs connected to port 0. ii) When SW2 is pressed, turn ON all LEDs connected to port 1.	A	3	
QN	S	R/ U/ A	Co EIF 402	Mar ks
	Q			
	N			
Q.4	Attempt any FOUR :			08
a)	State formula through which step voltage can be calculated in DAC.	R	4	
b)	Give functions of EOC and SOC pins in ADC 0808/0809.	R	4	
c)	True or Falls following i) IRQ is an input pin ii) SQW is output pin	R	5	
d)	How much NV-RAM present for DS 12887?	R	5	
e)	State the tips for writing efficient programs in C for embedded systems.	P	6	
f)	State selection criteria for ADC.	R	6	
Q.5	Attempt any FOUR :			16
a)	Write C program to generate staircase waveform using DAC 0808.	A	4	
b)	Write C program to generate Triangular waveform using DAC 0808.	A	5	
c)	Write ‘C’ program to display “WELCOME” on LCD.	A	6	
d)	Write ‘C’ program to rotate stepper motor in clockwise direction using angle 1.8° .	A	5	
e)	Draw an interfacing diagram of DC motor using L293 D with 8051 μ C.	R	5	
f)	Draw flow chart for sensor interfacing system for 8051 μ C.	U	6	

Attempt any FOUR :				16
Q.6		Attempt any FOUR :		
	a)	Write a flowchart and algorithm to read data from ADC 0808.	U	4
	b)	Draw an interfacing diagram of 4 X 4 matrix keypad with 8051 μ C.	U	4
	c)	Write 'C' program to rotate DC motor in clockwise direction.	U/ A	5
	d)	Write 'C' program to set time <u>9:15:00PM</u> of RTC 12887.	A	5
	e)	Write 'C' program to generate 512Hz square wave on SQW pin.	A	5
	f)	Design 8051 μ C based data acquisition system with its labels for parameters like temperature, pressure etc.	A	6

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EVEN TERM ENDE EXAM MAY-2019

EXAM SEAT NO.

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LEVEL :- FIRST

COURSE CODE :- CCF104/CCE104

COURSE NAME

PROGRAM : EE / IE / IT / E & TC

CHEMISTRY OF ENGINEERING MATERIALS /
ENGINEERING CHEMISTRY

MAX. MARKS : 80 TIME : 3 HRS. DATE :- 08/05/2019

Instruction :-

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 104	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Explain fundamental particles of atom.	U	1	
	b)	Define i) Atomic number ii) Mass number.	R	1	
	c)	State Faraday's second law of electrolysis.	R	2	
	d)	Define i) Electro plating ii) Electrode.	R	2	
	e)	Define i) Atmospheric corrosion. ii) Electrochemical corrosion.	R	3	
	f)	Explain why Porous oxide film is called as non-protective film.	U	3	
Q.2		Attempt any FOUR :			16
	a)	i) State Pauli's exclusion principle.	R	1	
		i) Write electronic configuration of $^{40}_{24}\text{Ca}$, $^{12}_{12}\text{Mg}$.			
	b)	Differentiate between metallic conduction and electrolytic conduction.	U	2	
	c)	Explain Tinning method of electroplating with diagram.	U	3	
	d)	Explain disadvantages of hard water in i) Textile industry ii) Dyeing industry	U	4	
	e)	Write any four reactions of hard water with soap.	U	4	
	f)	Explain causes of scale formation in boilers.	U	4	
Q.3		Attempt any FOUR :			16
	a)	Explain Lewis and Langmuir's concept of stable electronic configuration.	U	1	
	b)	An electric current is passed through a solution of ZnSO_4 and CuSO_4 connected in series. If in a given time 0.716 gm of Zn is deposited, what would be the weight of Cu that would deposit in the same time? (At. Wt. of Cu= 63.5 and Zn = 65)	A	2	
	c)	Explain with diagram the method which is used to coat the metal in form of sheet.	U	3	
	d)	Explain the method for sterilization of water by using Chloramine.	U	4	

P.T.O.

	e)	Define pH. Draw pH scale. Write impurities in water.	R	4
	f)	Differentiate between Hard water and Soft water. (any four points)	U	4
				08
Q.4		Attempt any FOUR :		
	a)	Draw a neat labelled diagram of gravity separation method.	U	5
	b)	Define i) E.M.F. ii) Discharge	R	5
	c)	Give important ores of copper with their molecular formula.	A	6
	d)	Distinguish between ferrous and non ferrous alloys (any 2 points)	U	6
	e)	Write two properties of graphite.	R	6
	f)	Classify the composite materials with example.	R	7
				16
Q.5		Attempt any FOUR :		
	a)	Give charging and discharging reactions of lead acid storage cell.	R	5
	b)	Draw a neat labelled diagram of dry cell. Explain its construction and working.	U	5
	c)	Name and explain method used for concentration of Sulphide ores.	A	6
	d)	State and explain purposes of making alloys (any four)	R	6
	e)	Write properties and applications of germanium as a semiconductor.	R	6
	f)	Distinguish between thermosoftening and thermosetting plastics.	U	7
				16
Q.6		Attempt any FOUR :	R	5
	a)	Draw a neat labelled diagram and explain working and advantages of hydrogen-oxygen fuel cell.		
	b)	Define i) Flux ii) Mineral iii) Ore iv) Gangue.	R	5
	c)	Distinguish between calcination and roasting. (any 4 points)	U	6
	d)	Explain with diagram electro refining of copper.	U	6
	e)	Give preparation, properties and applications of thermocole.	U	7
	f)	Write properties and applications of Teflon.	U	7

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH**PROGRAM : IE / E & TC****COURSE CODE :- EIF401/IX211/IEE401/ETE401****COURSE NAME :- POWER ELECTRONICS - I****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 08/05/2019**

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN		S	Section-I			R/ U/ A	Co EIF 401	Mar ks
Q.1			Attempt any FOUR :					08
	a)		Draw symbol of DIAC and TRIAC.			R	1	
	b)		Describe turn on specification of SCR.			U	1	
	c)		Draw V-I characteristic of DIAC.			R	1	
	d)		Explain voltage triggering of SCR.			U	2	
	e)		Define commutation.			R	3	
	f)		Construct a diagram and waveform of Class F commutation.			A	3	
Q.2			Attempt any FOUR :					16
	a)		Explain with diagram V-I characteristic of TRIAC.			U	1	
	b)		Give any four differences between PUT & UJT.			U	1	
	c)		Draw symbol, construction diagram and V-I characteristic of power transistor.			R	1	
	d)		Explain light triggering and $\frac{dv}{dt}$ triggering of SCR.			U	2	
	e)		Derive equation for time period of PUT relaxation oscillator.			A	2	
	f)		Explain with diagram class C commutation.			U	3	
Q.3			Attempt any TWO :					16
	a)		Explain with diagram Mode II & Mode III of TRIAC.			U	1	
	b)		i) Draw and explain TRIAC triggering using DIAC. ii) Identify advantages of PUT over UJT.			U	2	
						A	2	
	c)		Draw diagram and waveform of class B commutation and explain its working.			R	2	

P.T.O.

QN		Section- II		R/ U/ A	Co MEF 503	Mar ks
Q.4		Attempt any FOUR :				08
	a)	State the need of parallel connection of SCR.		U	4	
	b)	What is the reason of unequal distribution of current? (state any two)		U	4	
	c)	Define i) T.U.F. ii) Ripple factor with respect of uncontrolled rectifier.		R	5	
	d)	Draw the input/output waveforms of 3 ϕ uncontrolled bridge rectifier circuit for resistive load.		R	5	
	e)	State the need of controlled rectifier circuit.		U	6	
	f)	State the function of freewheeling diode in controlled rectifier circuits.		U	6	
Q.5		Attempt any FOUR :				16
	a)	Compare uncontrolled and controlled rectifier (any four points)		U	6	
	b)	Draw the circuit diagram and input/output waveforms of single phase half wave controlled rectifier with RL load and freewheeling diode.		R	6	
	c)	Explain the need of series and parallel connection of SCR.		U	4	
	d)	List any four advantages of 3 ϕ uncontrolled rectifier.		U	5	
	e)	Explain with neat circuit diagram operating principle of 3 ϕ half wave uncontrolled rectifier.		U	5	
	f)	Explain operation of current equalization network.		U	4	
Q.6		Attempt any FOUR :				16
	a)	With neat circuit diagram explain static voltage equalization circuit.		U	4	
	b)	Compare 1 ϕ & 3 ϕ uncontrolled rectifier. (any four points)		R	5	
	c)	State the operating principle of 3 ϕ uncontrolled bridge rectifier. Draw vector diagram for the same.		U/ R	5	
	d)	Describe with neat circuit diagram operating principle of 1 ϕ half wave controlled rectifier with R-load.		U	6	
	e)	Explain concept of two quadrant operation for fullwave controlled rectifier.		U	6	
	f)	Explain concept of inductive load for 1 ϕ fullwave controlled rectifier.		U	6	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.
(An Autonomous Institute of Govt. of Maharashtra)
EVEN TERM END EXAM MAY -2019
EXAM SEAT NO.

LEVEL: Third

PROGRAM: IE/E & TC

COURSE CODE: EIF 307/ETF 307/IEE 307 COURSE NAME: LINEAR INTEGRATED CIRCUITS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 09/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application

QN	S. Q. N	Question Text	Cognition Level R/U/A	Co Code EIF 307	Marks
Q.1		Attempt any FOUR			(08)
	a)	Draw Symbol of OP-amp.	R	01	
	b)	Define 1) Input offset current 2) Power Consumption	R	01	
	c)	Calculate output voltage of inverting op-amp with $R_1 = 20k\Omega$ and $R_f = 100k\Omega$ and input voltage $V_i = 20mv$.	A	02	
	d)	Explain Virtual ground Concept.	U	02	
	e)	Draw transfer characteristics of a comparator.	R	03	
	f)	Draw circuit diagram of Current to Voltage Converter using op-amp and give its output expression.	R	03	
Q.2		Attempt any FOUR			(16)
	a)	Draw the block diagram of an op-amp and Explain the purpose of each block.	U	01	
	b)	List Characteristics of an ideal op-amp (any four).	R	01	
	c)	Derive output expression for subtractor with diagram.	A	02	
	d)	Draw inverting summing amplifier and determine output voltage if $V_1 = 4V$, $V_2 = 5V$ and $V_3 = 6V$ with $R_1 = R_2 = R_3 = 2k\Omega$ and $R_f = 2k\Omega$	A	02	
	e)	Derive output expression for 3-op-amp instrumentation amplifier.	A	03	
	f)	Explain full-wave precision rectifier using op-amp with output waveform.	U	03	
Q.3		Attempt any FOUR			(16)
	a)	Define 1) Input offset voltage 2) SVRR 3) Slew rate 4) CMRR	R	01	
	b)	Explain need and circuit diagram of level shifting stage	U	01	
	c)	Derive output expression for non-inverting summing amplifier.	A	02	
	d)	Design a practical differentiator to differentiate an input signal that varies in frequency from 10 Hz to about 1 KHz	A	02	
	e)	Derive output expression for voltage to current converter with grounded load	A	03	
				P.T.O	

	f)	Explain window detector with the help of circuit diagram and waveform.	U	03	
Q.4		Attempt any FOUR			(08)
	a)	Draw pin diagram of IC 566.	R	04	
	b)	Give classification of Filters.	R	05	
	c)	Define the following parameter with respect to filter 1) cut-off Frequency 2) Q-Factor	R	05	
	d)	Draw Transfer characteristics of PLL.	R	06	
	e)	Define the following parameter with respect to PLL 1) Centre frequency 2) Lock range	R	06	
	f)	Draw a neat circuit diagram of Quadrature oscillator.	R/A	04	
Q.5		Attempt any FOUR			(16)
	a)	Define order of Filter. Explain with proper graph state one advantage of Higher order filters and one disadvantage of higher order filters.	U	05	
	b)	Describe with neat circuit diagram RC phase shift oscillator using op-amp.	U/A	04	
	c)	Explain with neat diagram how PLL can be used as frequency multiplier.	U/A	06	
	d)	Draw and explain monostable multi vibrator using IC555 with the help of wave forms.	V	06	
	e)	Describe the operation of Opamp as astable multi vibrator with the help of circuit diagram and a wave form.	V	06	
	f)	Design Define second order high pass filter for cut-off frequency of 20KHz & passband gain of 1.586.	A	04	
Q.6		Attempt any FOUR			(16)
	a)	Draw block diagram of PLL. State operating principle of it.	U	06	
	b)	Describe the operation of Frequency Synthesizer.	U	06	
	c)	With neat circuit diagram explain the operation of narrow band pass filter.	U	05	
	d)	Describe the operation of bistable multi vibrator using OPAMP.	U	04	
	e)	7th order Design a low pass Butterworth filter with a cut off frequency of 1.5KHz and passband gain of 2. Draw frequency response curve for the same.	A	05	
	f)	Describe the operation of triangular wave from generator circuit.	U	04	

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