GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **FOURTH** PROGRAM : **INDUSTRIAL ELECTRONICS**

COURSE CODE :- **IEG405**

COURSE NAME **POWER ELECTRONICS-I**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **05/ 06 / 2023**

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	SQN	**SECTION -I**	R/U/A	Co IEG 405	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Write need of semiconductor switches.	U	1	
	b)	Define holding and latching current.	R	1	
	c)	Write any two advantages of gate triggering.	U	2	
	d)	Enlist methods of SCR firing.	R	2	
	e)	Write advantages of PUT over UJT.	U	2	
	f)	Define commutation. Classify methods of commutation of SCR.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain SCR with its symbol and construction.	R	1	
	b)	With neat diagram explain DIAC.	U	1	
	c)	With diagram explain characteristics of TRIAC.	U	1	
	d)	Draw 'R' firing circuit and describe it.	R	2	
	e)	Explain operation of class 'F' commutation.	R	3	
	f)	What is the principle of self commutation? Explain auxiliary commutation with relevant waveform.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain characteristics of SCR.	R	1	
	b)	Explain the following terms of SCR. i) VBO ii) On state voltage iii) Turn ON time iv) Turn off time.	R	1	
	c)	Draw and explain two transistor analogy of SCR.	A	1	
	d)	Describe UJT as a relaxation oscillator.	A	2	
	e)	Explain with necessary waveform class D commutation.	U	3	
	f)	With waveform explain RC firing circuit.	R	2	

P.T.O.

IEG 405

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the necessity of parallel connection of SCR.	R	4	
	b)	State the meaning of controlled rectification.	R	5	
	c)	Define the terms i) firing angle ii) Conduction angle with waveform.	R	6	
	d)	State need of freewheeling diode in controlled rectifier with diagram.	R	6	
	e)	Draw half wave controlled rectifier with R load.	U	6	
	f)	Give the classification of controlled rectifier.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain dynamic Voltage equalization circuits for SCR series connection	U	4	
	b)	Explain Current equalization networks for SCR parallel connection.	U	4	
	c)	With the help of circuit diagram and waveform explain working of Three Phase half wave uncontrolled rectifier with RL load	U	5	
	d)	With the help of circuit diagram and waveform describe working of Three phase bridge wave uncontrolled rectifier with RL load	U	5	
	e)	Describe working of Single phase half wave controlled rectifier with RL load & freewheeling diode.	U	6	
	f)	Describe Single phase full wave bridge controlled rectifier with resistive load with the help of circuit diagram and waveform.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain static Voltage equalization circuits for SCR series connection.	U	4	
	b)	Explain Reasons of unequal distribution of current for SCR parallel connection.	U	4	
	c)	Define the terms i) Form factor ii) Ripple factor iii)PIV iv)TUF for Three Phase half wave uncontrolled rectifier.	R	5	
	d)	Describe Three Phase transformer star connection With the help of circuit diagram	U	5	
	e)	Describe Concept of two quadrant operation, power feedback, power factor for half wave controlled rectifier with RL load.	U	6	
	f)	Draw the circuit diagram and waveform of full wave bridge controlled rectifier with RL load.	U	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - FIFTH PROGRAM: **ENTC/IE**

COURSE CODE: - ETG511/IEG505/IEF502

COURSE NAME: - **PROGRAMMABLE LOGIC CONTROLLER**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 1/6/23

QN	SQN	SECTION –II	R/U/A	Co ETG511	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw ladder diagram for two input OR logic function.	4	R	
	b)	State different PLC programming languages.	4	R	
	c)	Enlist any two industrial applications of PLC.	5	R	
	d)	State with logical addresses the number of inputs and outputs required for car parking system.	5	R	
	e)	Write a ladder diagram for following conditions: When PB is ON, Lamp 1 will be ON after 10 sec. Stay ON for 10 second and then turn OFF	5	R	
	f)	State the role of Enclosure in PLC installation	6	R	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain any two logical instructions with suitable example used in PLC.	4	U	
	b)	Explain ladder programming for NAND and NOR logical function.	4	U	
	c)	System startup include three motors in a sequence with a delay of 5 sec. between each start up i.e. a motor number 2 starts after 5 sec. of motor 1 and motor 3 starts at delay of 5 sec. w.r.t. motor2.During shot down motor 3 shuts first and motor 2 after 5 sec. of motor 3 and motor 1 shuts after 5 sec of motor 2.Develop appropriate ladder diagram along with input and output addresses.	5	A	
	d)	Draw and explain the block diagram of speed of control of AC/DC motor using programmable drives.	5	U	
	e)	Draw the block diagram of SCADA and describe each block in detail.	6	U	
	f)	Explain PLC troubleshooting of ladder diagram.	6	U	
Q.6		Attempt any **FOUR:**			**16**
	a)	Create a 12 hour 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.	4	A	
	b)	Develop ladder diagram for 4:1 multiplexer. Also draw its truth table.	4	U	
	c)	Draw and explain ladder diagram for stepper motor control in clockwise direction.	5	A	
	d)	A coal handling plant has three coal conveyors C1, C2 and C3. C1 is fed from the output of the crusher, C2 is the mid-belt and C3 pushes coal to the bunker. The requirements of the plant are as follows: a) C1 and C2 will be ON only when C3 is ON. b) C1 will be ON only when C2 and C3 are ON. c) C1 and C2 trip when C3 trips. d) C1 trips when C2 trips but C3 is ON. e) C1 trips when C2 and C3 trip. Design a ladder diagram for the above.	5	A	
	e)	Explain the role of maintenance guidelines and Electrical noise in PLC installation.	6	U	
	f)	Explain the typical architecture of SCADA and along with its diagram.	6	U	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 05 PROGRAM : ET / IE

COURSE CODE :- ETG511 /IEG 505 / IEF/502

COURSE NAME :- Programmable Logic Controller

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 6 /6/23

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	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			08
	a)	Enlist the PLC characteristics.	R	ETG511-1	
	b)	State the role of PLC in automation.	R	ETG511-1	
	c)	Enlist the specifications of analog i/o module (any four).	R	ETG511-2	
	d)	List the Relay type instructions used in PLC with their logic symbol. (Any four)	R	ETG511-3	
	e)	Enlist the logical instructions used in PLC with their logic symbol.	R	ETG511-3	
	f)	Enlist two applications of timer and two applications of counter instruction used in PLC.	R	ETG511-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe different PLC operating modes.	U	ETG511-1	
	b)	Draw the basic block diagram of PLC and write the function of each block.	A	ETG511-1	
	c)	Enlist the specifications of AC input module and DC input module (Any four each).	R	ETG511-2	
	d)	Describe the sinking and sourcing concept in DC input module.	U	ETG511-2	
	e)	Consider Source A = B3:0 = 1100110011001100 and Source B= B3:1 = 1111111100000000 Draw a ladder diagram using above inputs and express the output for following instructions 1. AND logic function 2. OR logic function	U	ETG511-3	
	f)	Describe the functional description for Non retentive ON delay timer instruction. State the means to reset the Non retentive ON delay timer.	A	ETG511-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Describe the evolution of PLC in automation.	U	ETG511-1	
	b)	Describe in detail following systems used for industrial automation: PLC, SCADA, HMI and DCS.	A	ETG511-1	
	c)	Draw and explain the block diagram of analog input module.	A	ETG511-2	
	d)	Describe the discrete AC input module with wiring diagram.	U	ETG511-2	
	e)	Describe the functional description for SCP (scale with parameter) instruction used in PLC.	U	ETG511-3	
	f)	Describe the functional description for LIMIT TEST instruction used in PLC. Determine the circular nature of this instruction.	A	ETG511-3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : Industrial Electronics

COURSE CODE- IEG504 / IEF501

COURSE NAME :- Power Electronics- II

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 30 /5 /23

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	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**		IEG504	**08**
	a)	State the applications of GTO	R	1	
	b)	Give classification of Cycloconverter.	R	2	
	c)	Define Chopper, Give its two applications.	R	2	
	d)	What is need of AC voltage regulator?	R	3	
	e)	Enlist disadvantages of linear regulators.	R	3	
	f)	Draw basic block diagram of Chopper.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare between MOSFET & IGBT.	U	1	
	b)	Explain one-phase to one-phase mid point cycloconverter with its circuit diagram and waveforms.	U	2	
	c)	List applications of MOSFET and GTO.	A	1	
	d)	Draw and explain working of Parallel turn off Chopper.	U	2	
	e)	Draw Servo type and Resonant type regulator.	U	3	
	f)	Explain operating principle of step down chopper with its circuit and waveform.	A/U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain operating principle of GTO and state its applications.	A	1	
	b)	With neat circuit diagram explain working of three phase to three phase Cycloconverter.	A	2	
	c)	Explain terms related to SMPS i) Isolation ii) Multiple outputs.	A/U	3	
	d)	Define terms i) Power line disturbance and ii) Efficiency, related with SMPS.	U	3	
	e)	Draw and explain output characteristics of MOSFET.	U	1	
	f)	Explain two quadrant Choppers.	U	2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FIVE PROGRAM : INDUSTRIAL ELECTRONICS

COURSE CODE :-IEG 504 / IEF501

COURSE NAME :- POWER ELECTRONICS-II

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30/5/23

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	SQN	**SECTION -II**	R/U/A	Co IEG 504	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Specify the four important industrial application of inverter.	A	4	
	b)	Specify four advantages of induction heating.	A	5	
	c)	List the different types of inverter.	R	4	
	d)	State the need of protection circuits.	A	6	
	e)	Specify the need of UPS.	R	5	
	f)	What are the causes of over-voltages in thyristor circuits?	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw a circuit diagram of McMurray Bedford inverter, and explain them.	R	4	
	b)	What do you mean by Snubber circuit. Draw and explain the function of each components.	U	6	
	c)	Describe a circuit diagram of parallel inverter with the help of voltage and current waveform .	U	4	
	d)	Draw and explain the block diagram of on-line UPS.	U	5	
	e)	Draw a diagram of McMurray Half-bridge inverter. Explain the working of inverter with the help waveform .	R	4	
	f)	What are the causes of over-voltages and overcurrent in thyristor circuit?	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and describe a circuit diagram of McMurray Full-bridge inverter.	U	4	
	b)	Explain the principle of induction heating.	U	5	
	c)	Explain the simple SCR Series inverter circuit employing Class A type commutation. Draw the waveform. State the limitation of this series inverter.	U	4	
	d)	Explain the circuit diagram of SCR crowbar.	U	6	
	e)	With the help of block diagram explain the operation of off-line interactive UPS system.	U	5	
	f)	Explain the circuit diagram of DC circuit breaker.	U	6	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EIG303**/EIF303

COURSE NAME :- **ELECTRONICS MEASUING INSTRUMENTS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 3/6/23

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	SQN		R/U/A	Co EIG303	Marks
Q.1		**Attempt any FOUR:**			**08**
	a)	Define Calibration.	R	1	
	b)	State the types of DC Bridges.	R	2	
	c)	Draw the diagram of Inductance comparison bridge.	R	2	
	d)	Compare between ADC and DAC (any 2 points)	R	3	
	e)	Define Standard and name any 2 types of standards.	R	1	
	f)	Define Transducer and write 2 examples of transducer.	R	3	
Q.2		**Attempt any FOUR:**			**16**
	a)	**Explain any four static characteristics of instruments.**	**U**	1	
	b)	Derive the equation for bridge balance condition for Wheatstone's bridge.	U	2	
	c)	State where you can apply the principle of Guarded Wheatstone's bridge?Explain it in detail.	A	2	
	d)	Explain how unknown capacitor can be measured using Schering's bridge.	U	2	
	e)	Explain successive approximation type DVM. State its two applications.	U	3	
	f)	Draw & explain basic block diagram of digital frequency meter.	U	3	
Q.3		**Attempt any FOUR:**			**16**
	a)	Discuss various types of standards with their classification.	U	1	
	b)	Explain bridge balance condition for wien's bridge with suitable diagram.	U	2	
	c)	Compare between DC & AC bridges w.r.t. following points, 1)Types 2)Bridge balance condition 3)Advantage 4)Application	U	2	
	d)	Explain constructional diagram of PMMC in detail.	U	3	
	e)	Compare between average & RMS value (any four points).	U	3	
	f)	Explain the concept of inductive transducers.	U	3	

P.T.O.

QN	SQN	Question Text	R/U/A	Co EIG 303	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	What is the function and importance of delay line?	R	4	
	b)	What is the use of oscillator explain in brief?	R	5	
	c)	What is the function of probe? List different types of probes.	R	4	
	d)	Explain i) Time domain ii) Frequency domain instruments.	R	5	
	e)	State applications of Recorders.	R	6	
	f)	Draw neat and labeled block diagram of CRO.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write classification of recorders. Draw block diagram of pulse generator.	U/A	5& 6	
	b)	Explain the functions of following blocks of the block diagram of CRO. i) CRT ii) Horizontal deflection system.	R/U	4	
	c)	Explain the working of spectrum analyzer with neat block diagram.	U	5	
	d)	Draw neat and labeled block diagram of function generator.	U	5	
	e)	Explain working of CRT with neat diagram.	U	4	
	f)	Explain function of strip chart recorder with neat diagram.	U/A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain the component testing (CT) application of CRO in detail with example.	A	4	
	b)	List specifications of function generator (any four)	U	5	
	c)	Differentiate single beam CRO with dual beam CRO (any four points)	A	4	
	d)	Draw neat block diagram of Digital storage oscilloscope.	U	4	
	e)	State the role of Trigger circuit and time base generator in oscillator circuit.	A	4	
	f)	Write two features and two applications of recorders.	U/A	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/~~WINTER~~ 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - Fourth PROGRAM : Electronics and Telecommunication

COURSE CODE :- EIG 403 / EIF406

COURSE NAME :- Electronic Circuit Design

MAX. MARKS :80 TIME : 3 Hrs DATE :- 8/6/2023

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	SQN	SECTION -I	R/U/A	CO	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List any four specifications of Rectifier diode .	R	co-1	2
	b)	Explain any two specifications of Zener diode .	U	co-1	2
	c)	Draw functional block diagram of IC 723 .	R	co-2	2
	d)	Define Line Regulation and Load Regulation of a Voltage Regulator .	R	co-2	2
	e)	Compare RC coupling and Direct Coupling method to couple amplifier stages	U	co-3	2
	f)	Draw Bootstrapped Emitter Follower Circuit . State advantage of Bootsrapping .	U	co-3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe classification of Transformers	U	co-1	**4**
	b)	Tabulate voltage options available in 78XX and 79XX voltage regulators. List any four characteristic of 3 terminal voltage regulators .	R	co-2	4
	c)	Design a 6 V dc Voltage source to operate from a 16 V Supply (Use Zener)	A	co-2	4
	d)	Design a 15 V regulator using IC 723 at 50 mA output current . Input voltage is 20 V .	A	co-2	4
	e)	A multistage amplifier consists of three stages . The voltage gains of the stages are 30, 50, and 80. Calculate the overall gain in dB .	A	co-3	4
	f)	Design a single stage BJT amplifier for output voltage of 9 V(p-p) with load resistance of 5 Kohm . Use transistor BC147 B.	A	co-3	4
Q.3		Attempt any **FOUR:**			**16**
	a)	Define the following BJT quantities listed on a device data sheet : Ic , h_{FE} , h_{fe} , $V_{CE(sat)}$, V_{CBO} , I_{CBO} , P_D , NF .	U	co1	4
	b)	Design a voltage regulator using IC 723 to give output voltage of 5 V at 100 mA current . Input voltage is 10 V	A	co-2	4
	c)	Design a three terminal voltage regulator for Vo= 7.5 V using IC 7805 .	A	co-2	4
	d)	An RC coupled amplifier has voltage gain of 100 in the frequency range of 400 Hz to 25 KHz . On either side of these frequencies , gain falls by 3 dB at 80 Hz and 40 KHz . Calculate gain in dB at Cut-off frequencies.	A	co-3	4
	e)	Draw a single stage common source FET amplifier . Describe the necessity of Coupling and Source bypass Capacitors .	U	co-3	4
	f)	Draw a two stage RC coupled Common emitter amplifier with voltage series feedback . Explain effect of Cascading on Voltage gain and bandwidth of amplifier .	U	co-3	4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER~~WINTER~~ 2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EIG403 / EIF-406**

COURSE NAME :- **ELECTRONIC CIRCIUT DESIGN**

MAX. MARKS : TIME : ~~3~~ **Hrs** DATE :- 8/6/2023

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw circuit diagram of class B push pull power amplifier	R	4	
	b)	Define oscillator. Write formula for frequency of Colpitts's oscillator	U	5	
	c)	Write the conduction cycle for class A & class AB power amplifiers	U	4	
	d)	Draw circuit diagram of Hartley oscillator using op-amp	U	5	
	e)	Write any two advantages of complementary symmetry power amplifier	R	4	
	f)	Draw circuit diagram of bistable multivibrator using IC555	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Design class A amplifier with resistive load to give output power of 5W across 10Ω load resistance. Use Vcc=12V.	A	4	
	b)	Design wien bridge oscillator using opamp for output frequency of 1KHz.	A	5	
	c)	Draw colpitt's oscillator using BJT & describe its working	U	5	
	d)	Design RC phase shift oscillator using opamp for frequency of oscillation of 1KHz.Use supply voltage of 10V	A	5	
	e)	Design astable multivibrator of using IC555 for maximum output frequency of 10 KHz with duty cycle =0.6	A	6	
	f)	Design monostable multivibrator using IC741 for pulse duration of 150 msec with pulse amplitude of 5V.Use Vcc=15V	A	6	
Q.6		Attempt any **TWO:**			**16**
	a)	1. Describe design steps of bistable multivibrator using IC555. 2. Explain with diagram working of monostable multivibrator using opamp	U	6	
	b)	Design Colpitts oscillator using transistor for f_0=1MHz, V_0 =1Vrms, . Use transistor BC147B	A	5	
	c)	Draw complementary symmetry Power amplifier circuit . State its advantages . How drawbacks of Push pull amplifier are overcome in this circuit ?	A	4	

****

(2|2)

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

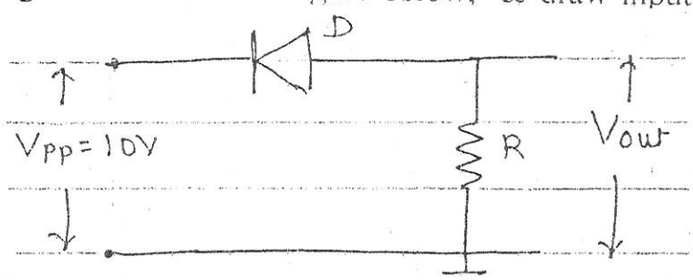
LEVEL: **THIRD** PROGRAM: **E. & T. C.**

COURSE CODE: **EIG 302** / EIF 302 COURSE NAME: **Applied Electronics**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **08/06 /2023**

Instruction :-

1) Answer must be written in 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	SQN	QUESTION TEXT.	RUA	CO EIG 302	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	State Barkhausen's criteria for sustained oscillations.	R	2	
	b)	List advantages of negative feedback.	R	1	
	c)	Sketch circuit diagram of positive clamper & negative clipper.	R	3	
	d)	Draw block diagram of voltage series feedback.	R	1	
	e)	Sketch detail classification of wave shaping circuit.	R	3	
	f)	Sketch equivalent circuit diagram for crystal.	R	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	For RC phase shift oscillator, to generate frequency of 100KHz, calculate value of R if C= 0.01 μF	A	2	
	b)	State effect of negative feed back on following parameter i) Bandwidth ii) Gain iii) Noise iv) Input impedance	U	1	
	c)	Explain working of colpitts oscillator with neat diagram.	U	2	
	d)	Compare performance of current series & current shunt feedback amplifier.	A	1	
	e)	Identify following circuit shown in figure below; & draw input & output waveforms 	A	3	
	f)	Explain operation of voltage doublers with neat circuit diagram.	U	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Differentiate clipper & clamper with following points i) Components used in circuit ii) Function iii) Application iv) Configuration.	A	3	
	b)	In Hartley oscillator, L_1 = 2mH, L_2 = 20mH, C= 1pF. Determine required gain for oscillator & frequency of oscillation.	A	2	
	c)	Explain operation of negative clamper with neat diagram and waveform.	U	3	
	d)	Explain operation of wien bridge oscillator with neat diagram.	U	2	
	e)	Explain principle of Boots traping with neat diagram.	U	1	
	f)	Compare positive feedback & negative feedback (Any 4 points)	A	4	

P.T.O.

QN	SQN	QUESTION TEXT	RUA	CO EIG 302	Marks
Q.4		**Attempt any FOUR**			**08**
	a)	Define the following parameters with reference to power amplifier. i) Efficiency ii) Power Dissipation.	R	4	
	b)	Classify the different types of power amplifiers.	R	4	
	c)	State the various factors contributing to time delays in transistor.	U	5	
	d)	Classify the different types of transistor multivibrators.	R	5	
	e)	State any two applications of sweep generators.	U	6	
	f)	Write any two characteristics of Class B amplifier.	R	4	
Q.5		**Attempt any FOUR**			**16**
	a)	Determine the time period & frequency of oscillations for an austable multivibrator with component values R1= 1KΩ, RZ = 10KΩ & $C_1 = 0.01\mu$ F, $C_2 = 0.05\ \mu$ F	A	5	
	b)	Draw the circuit diagram of Schmitt trigger using transistor along with its input- output waveforms.	R	5	
	c)	With the help of circuit diagram & waveform, explain the operation of class – A amplifier.	U	4	
	d)	Draw the circuit diagram of Class- B pull push amplifier & also draw its biasing condition on transconductance curve.	U	4	
	e)	Draw the circuit diagram of transistor based constant current sweep generator & explain its working.	U	6	
	f)	Explain how a sweep can be generated by charging a capacitor C through resistor R directly from voltage source V.	U	6	
Q.6		**Attempt any FOUR**			**16**
	a)	Draw the circuit diagram of sweep generator using transistor & explain its working.	U	6	
	b)	Describe the working of miller sweep generator and also draw its circuit diagram.	U		
	c)	With the help of circuit diagram & waveforms, explain the working of bistable multivibrator using transistor.	U	5	
	d)	With the help of circuit diagram, explain the operation of transistor as a switch.	U	5	
	e)	Draw a neat diagram labelled diagram of frequency response of single tuned and double tuned amplifier. Also define Bandwidth.	R	4	
	f)	Draw a circuit diagram of parallel connection tank circuit & explain its operation. Also state its equation for resonant frequency.	U	4	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/~~WINTER~~- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FOURTH PROGRAM : IE

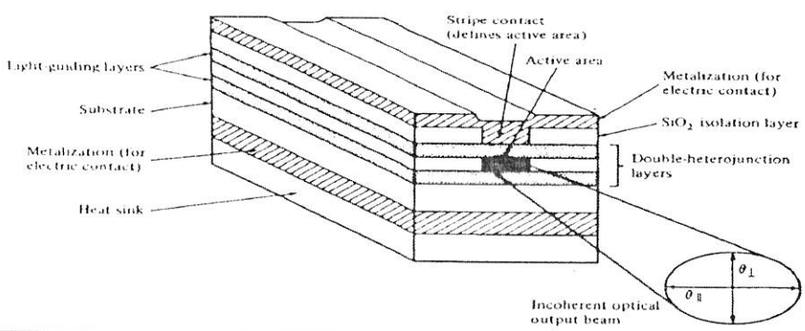
COURSE CODE :- IEG407

COURSE NAME :- **OPTOELECTRONICS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE : 07/06/2023

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	SQN	SECTION -I	R/U/A	Co IEG407	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define optical power & write its unit	R	1	
	b)	State Plank's law.	R	1	
	c)	Write any two requirements of light sources.	R	2	
	d)	Define: 1. Heterojunction LED 2. Indirect bandgap semiconductors	R	2	
	e)	List any two-material used for construction of LASER.	R	3	
	f)	Draw constructional diagram of index guided laser	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe polarization & diffraction with neat diagram	U	1	
	b)	Identify the type of LED shown in figure below and explain its construction in brief: 	A	2	
	c)	Compare Planar & dome LED with respect to following points, 1. Diagram 3. Radiance 2. Emission area 4. External power efficiency	A	2	
	d)	Explain following Injection laser characteristics • Frequency chirp • Noise	U	3	
	e)	Explain working principle of semiconductor Injection laser with neat diagram	U	3	
	f)	Draw and explain the working of quantum well laser.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw the spectrum of light. Define Luminescence.	U	1	
	b)	Explain with suitable diagram, working of Dome LED. Give any two advantages of LED over LASER.	U	2	
	c)	Explain the terms optical output spectrum and modulation bandwidth w.r.t LED.	U	2	
	d)	Name the LED which works on the principle of super-luminescence. Draw the construction diagram for same and explain its working principle.	A	2	
	e)	Draw & explain working of gain guided laser.	U	3	
	f)	Compare between LED & LASER with following points 1. Output spectrum 3.Efficiency 2. Lifetime 4.Distortion	U	3	

P-173

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/~~WINTER~~ – 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 4 PROGRAM : IE

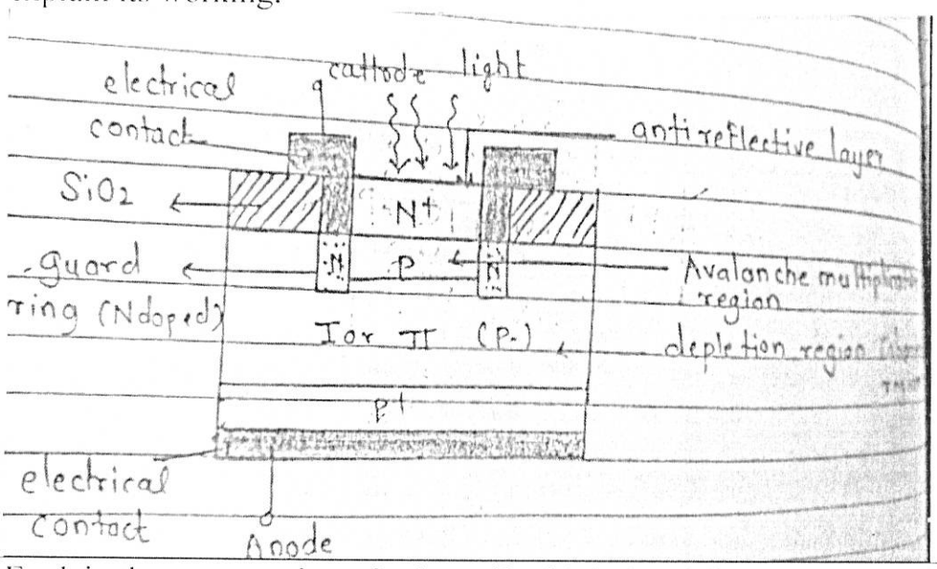
COURSE CODE :- IEG407

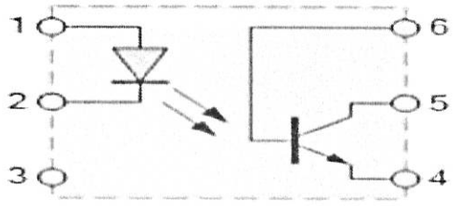
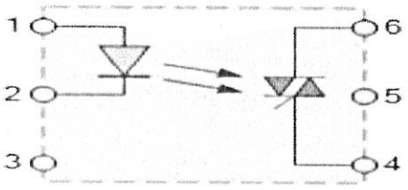
COURSE NAME :- Optoelectronics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :07/06/2023

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	SQN	SECTION –II	R/U/A	Co IEG 407	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the applications of LED display. (any four)	R	6	
	b)	Draw the diagram of OTDR.	R	4	
	c)	State the advantages of avalanche photodiode.	U	5	
	d)	Draw the diagram of 7X5 dot matrix display.	R	6	
	e)	State the requirements of optical photodetector. (any four)	U	4	
	f)	Draw the equivalent circuit of PIN Photodiode	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Define the following term with respect to photodetector (4M) (1) Quantum Efficiency (2) Detector Responsivity (3) Spectral Response Range (4) Response Time	U	4	
	b)	Identify the type of photodetector from given below diagram and explain its working. 	A	5	
	c)	Explain the construction of solar cell with help of diagram.	U	6	
	d)	Draw and explain working principles of CCD.	R	4	
	e)	Draw and explain the working of dynamic scattering type LCD display.	R	6	
	f)	Draw and explain the construction of PN photodiode.	U	5	

Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain construction of Photoresistor.	R	4	
	b)	Explain the working principle of phototransistor with help of diagram.	U	5	
	c)	Identify the following type of optocoupler with help of diagram and explain it.  Fig(1)  Fig(2)	A	6	
	d)	Explain the electrical characteristic of PIN photodiode.	U	5	
	e)	Explain common anode seven segment LED display with help of circuit diagram	U	6	
	f)	State the applications of PN photodetector. (Any six)	R	5	

****

P-3/3

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER / ~~WINTER~~ 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - 5th PROGRAM: ET

COURSE CODE: - ETG514

COURSE NAME: - Introduction to IOT

MAX. MARKS: **80** TIME: **03 Hrs.** DATE : 07/06/2023

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	SQN	SECTION -I	R/U/A	Co ETG 514	Marks
Q.1		Attempt any **FOUR:**	R		**08**
	a)	Define the term Internet of Things	R	1	
	b)	State the different layers of communication protocols used in IoT	R	1	
	c)	State the different IoT enabling technologies	R	1	
	d)	State the term NodeMCU	R	2	
	e)	List the any four library functions of Arduino IDE	R	2	
	f)	What is difference between active IR and Passive IR sensors? Explain	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	List various functional blocks of IoT and state the function of each block	U	1	
	b)	Compare between NodeMCU ESP8266, Arduino Uno and Raspberry PI board (any four points)	U	1	
	c)	Explain the following library function with proper syntax and example: 1.pinMode() 2.digitalRead() 3.digitalWrite() 4.analogRead()	U	2	
	d)	Write a program for NodeMCU to blink led connected to pin no D6 after every 5 seconds.	A	2	
	e)	List any 8 technical specifications of NodeMCU ESP8266.	U	2	
	f)	Explain the working principle of DHT11 sensors with necessary diagrams	R/U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw the architecture of IoT and explain its components.	U	1	
	b)	List any 8 technical specifications of NodeMCU ESP8266.	U	2	
	c)	Give the step wise procedure to setting Arduino IDE to program NodeMCU.	U	2	
	d)	Draw sensor to actuator flow diagram in IoT applications.	U	3	
	e)	Explain the principle of working of employing ultrasonic transmitter and detector for object detection	A	3	
	f)	Give the format of serial data received via Data pin of DHT11 and Explain	A	3	

P.T.O.

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List various components required in IoT implementation	U	CO4	
	b)	What is URL? List its parts	U	CO5	
	c)	List IoT communication protocols.	R	CO5	
	d)	What is AWS? Explain in brief	R	CO5	
	e)	Write the steps for object detection using sensor.	U	CO4	
	f)	Can we monitor temperature-humidity using sensor? If yes which sensor will be used?	U	CO4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw the interfacing diagram of Ultrasonic sensor HC SR04 with NodeMCU.	A	CO4	
	b)	Write a program for NodeMCU to connect to a Wi-Fi Network with id-"GPKP WiFi" and password-"gpkpgpkpgpkp".	A	CO4	
	c)	Write a program for LED controlling using Blynk app.	A	CO5	
	d)	Explain the following terminologies of MQTT protocol i) Client ii) Broker iii) Publish iv) Subscribe	A	CO5	
	e)	Explain LoRa wireless communication platform	U	CO5	
	f)	Interface DHT11 sensor to could server using open source IoT.	A	CO6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write a code to monitor smoke sensor data on blynk cloud server.	A	CO6	
	b)	Write a program for light intensity monitoring using LDR and outputting it to LED.	A	CO4	
	c)	Explain how to access of IP address assigned to NodeMCU.	U	CO5	
	d)	Explain the principle of working of MQTT protocol with suitable sketch	U	CO5	
	e)	Write the steps to design and develop application to control home devices using Google assistant.	A	CO6	
	f)	Describe the use of potentiometer connected to A0 pin of NodeMCU to control the speed of DC motor with suitable diagram.	A	CO4	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EIG512**

COURSE NAME : **ADVANCE MICROCONTROLLER**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 6 / 06 /2023

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	SQN	SECTION-I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw the block diagram of MSP430 Microcontroller	R	1	
	b)	State the instruction size of the following instructions: 1. MOVLW 0X25 2. CALL k , s	U	3	
	c)	State any two features of PIC18 Microcontroller	R	1	
	d)	Define Access Bank and Bank switching in PIC18 Microcontroller	U	2	
	e)	Write an assembly language program to add two 8 bit numbers , the numbers are 20h and 45h , store the result at 31H and carry at 30H	A	3	
	f)	Draw the format of PIC18 Status Register.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain PIC18 File Register with neat diagram.	U	2	
	b)	Define addressing mode. Explain any three addressing modes of PIC18 with an example	U	3	
	c)	Explain MSP430 Lunchbox Platform.	R	1	
	d)	Explain the following instructions with respect to Description, Number of bytes, Addressing mode, Effect on flag after execution. 1. XORWF F, d, a 2. RRNCF F, d, a 3. COMF F, d, a	U	3	
	e)	Draw the Architecture of PIC18 microcontroller.	R	2	
	f)	Develop an assembly language program to find smallest number amongst the 10 numbers stored at memory location 50H to 59H.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain the block diagram of Arduino UNO development board.	U	1	
	b)	Explain any four assembler directives of PIC18 microcontroller.	R	2	
	c)	Explain any two table processing instructions of PIC18 microcontroller.	U	3	
	d)	Develop an assembly language program to transfer block 10 bytes in file register starting from location 30H onwards to file register location starting from 40H.	A	3	
	e)	Explain the function of following pins of PIC18 microcontroller: 1. RA4/T0CKI 2. RB7/PGD 3. RC2/CCP1 4. RD2/PSP2/C2IN+	U	2	
	f)	Give the comparison between any two PIC18 family microcontrollers based on any two points.	U	1	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : Industrial Electronics/ Electronics & Telecomm

COURSE CODE :- EIG512

COURSE NAME :- Advance Microcontrollers

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 6/6/**23**

QN	SQN	SECTION –II	R/U/A	CO	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the SFRs associated with each port in PIC18 and give the function of each	R	EIG512-4	
	b)	State the formula for PIC18 Timer delay calculation using 16 bit mode with crystal frequency of 10MHz	U	EIG512-4	
	c)	State the significance of SPBRG SFR in PIC18 serial port	U	EIG512-5	
	d)	Describe the CCP features of PIC18	R	EIG512-5	
	e)	State any four features of on-chip ADC of PIC18	R	EIG512-6	
	f)	Draw the connection diagram between PIC18 and LCD	U	EIG512-6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Find the value for T0CON, if we want Timer 0 in 16 bit mode with a prescaler of 32, use internal clock source and negative source edge	A	EIG512-4	
	b)	Draw the block diagram of Timer 2 of PIC18	R	EIG512-4	
	c)	List the six SFRs associated with PIC18 Serial Port and State the function of each	R	EIG512-5	
	d)	State and Explain the steps involving in executing an interrupt	U	EIG512-5	
	e)	Write a program to initialize LCD in - 2 line, 5X7 matrix, cursor at line 2 and position 4, and to display "GPKP" using time delay method.	A	EIG512-6	
	f)	State the steps involving in programming on-chip ADC of PIC18 microcontroller	R	EIG512-6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write a program to toggle bit 2 of PORTA, bit 3 of PORTB, bit 4 of PORTC continuously after some delay in between.	A	EIG512-4	
	b)	Draw the block diagram of Timer 1 of PIC18 and explain its operation	U	EIG512-4	
	c)	Write a program to enable all the timer interrupts of PIC18	A	EIG512-5	
	d)	Write a program to transfer string "YES" serially at baud rate of 9600, 8 bit data continuously. Assume Crystal frequency=10 MHz	A	EIG512-5	
	e)	Draw the interfacing diagram between DAC0808 with PIC18. Also write a program to generate sawtooth wave at the output of DAC0808.	A	EIG512-6	
	f)	State the SFRs associated with on-chip ADC of PIC18F458. Explain any one with its format.		EIG512-6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **E. & T. C.**

COURSE CODE: **EIG 305/EIF305** COURSE NAME: **ANALOG COMMUNICATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **07/06 /2023**

Instruction :-

1) Answer must be written in 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	SQ N	QUESTION TEXT	R U A	CO EIG 305	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	State four advantages of SSB.	R	1	
	b)	Define Frequency Modulation.	R	2	
	c)	Classify the electronics communication system based on direction of communication.	U	1	
	d)	Calculate the Percentage Modulation Index, M when Emax = 140 Vpp and Emin = 40Vpp	A	2	
	e)	State the types of Angle Modulation.	R	3	
	f)	Compare FM & PM (2 points)	U	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw AM modulated waveform for modulation index m<1, m= 1 and m>1	U	2	
	b)	An audio signal 10 Sin 2π X 400t is used to amplitude modulate a carrier of 40 Sin 2π X 10^5 t. Determine i) Modulation Index m. ii) Sideband frequencies f_{LSB} and f_{USB} iii) Amplitude of each sideband frequency iv) Bandwidth required.	A	2	
	c)	Draw a neat block diagram of Electronic Communication system and state the functions of each block.	U	1	
	d)	A frequency modulated signal is represented by voltage equation as e_{FM} = 10 Sin (6 X 10^8 t + 5 Sin 1250 t) Find out i) Carrier frequency, f_c ii) Modulating frequency, f_m iii) Modulation index, m_f iv)Maximum deviation, δ	A	3	
	e)	Draw the representation of AM wave in Time domain and frequency domain, label it properly.	U	2	
	f)	Compare AM and FM with definition, modulation Index, number of sidebands and constant parameters.	U	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	State the types of Noise and explain (any 2)	U	1	
	b)	Draw the block diagram of a Low level AM Transmitter. State the functions of each block.	U	2	
	c)	Draw electromagnetic frequency spectrum. Show the ranges. Give application of each band.	U	1	
	d)	Explain mathematical representation of FM wave.	U	3	
	e)	Draw a circuit of transistorized reactance method. State the functions of each block.	U	2	
	f)	Draw a neat block diagram of FM transmitter (Armstrong method) and label it.	U	3	

P.T.O.

(1/2)

QN	SQN	QUESTION TEXT	RUA	CO EIG 305	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Sketch graph of pre-emphasis and de-emphasis.	R	4	
	b)	State disadvantages of TRF receiver.	R	4	
	c)	Draw sketch of Yagi-Vda antenna with its radiation pattern.	R	5	
	d)	Define antenna bandwidth and antenna bandwidth.	R	5	
	e)	Explain why ground waves must be vertically polarized.	R	6	
	f)	Define critical frequency and critical angle w.r.t. sky wave propagation.	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain need of AGC circuit list its types.	U	4	
	b)	Draw block diagram of FM detector using PLL and explain its working.	U	4	
	c)	Draw half wave dipole antenna and its radiation pattern write applications of this antenna.	U	5	
	d)	Draw helical antenna and its radiation pattern. Explain its two modes of operation.	U	5	
	e)	Compare sky wave and space wave propogation.	U	6	
	f)	Explain ground wave propogation with suitable diagram. Write range of frequencies used for ground wave propogations.	U	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	For a radio receiver with RF carrier of 27 MHz and IF frequency of 455 KHz. Determine i) Local oscillator frequency ii) Image frequency.	A	4	
	b)	Draw block diagram of a TRF receiver. Describe its working principle.	U	4	
	c)	Draw a sketch of parabolic dish antenna with cassegrain feed. Explain its working.	U	5	
	d)	Describe briefly the strata of ionosphere and their effects on sky wave propogation.	U	6	
	e)	Describe the difference between Am and FM receiver.	R	4	
	f)	Describe space wave propogation with neat sketch.	U	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **E. & T. C.**

COURSE CODE: **ETG306/ EIF306** COURSE NAME: **DIGITAL TECH. & APPLICATION**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **06/06 /2023**

Instruction -

1) Answer must be written in 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	SQN	QUESTION TEXT	RUA	CO ETG306	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Find 10's complement of following decimal number. i) 4069 ii) 1056.074	A	1	
	b)	Add following numbers using 2's complement arithmetic. i) -75 and 26 ii) -45.75 and 87.5	A	1	
	c)	Convert following Hexadecimal numbers to binary. i) 4BAC ii) 3A9E . BOD	A	1	
	d)	How EX.OR gate is different than OR gate?	U	2	
	e)	Write any four advantages of TTL family.	R	2	
	f)	Define noise margin in digital logic families.	R	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	i) 1101 ii) 100110 iii) 1101.101 iv) 01101100.1101	A	1	
	b)	Explain ASCII code.	U	1	
	c)	Prove that $\bar{A}\bar{B}\bar{C}\bar{D} = \bar{A}+\bar{B}+\bar{C}+\bar{D}$	A	2	
	d)	Explain what do you mean by associative and distributive laws.	U	2	
	e)	Define following characteristics of logic families i) fan in ii) fan out iii) Propogation delay iv) Power dissipation	R	3	
	f)	Compare TTL and CMOS logic families.	U	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Simplify the following Hexadecimal arithmetic operations. i) (2AB7) + (5C78) ii) 827F – 5C78 iii) 1ECD + A5 iv) 5CO457 + 7CA3	A	1	
	b)	Reduce the following Boolean expression. $Y= (A+B)(A+\bar{B})(\bar{A}+B)$	A	2	
	c)	Draw the following truth table and place on K map $Y= \bar{A}\bar{B} + AB + A\bar{B}$	A	2	
	d)	Obtain the SOP forms for $F= \sum 0,1,3,5,7,9,13,15$	A	2	
	e)	Draw circuit diagram of TTL NAND gate and explain.	A	3	
	f)	Draw and explain CMOS inverter.	A	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM :Electronics & Telecommunication

COURSE CODE :- ETG-306/EIF306

COURSE NAME :- Digital Techniques and Applicaitons

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 6/6/23

QN	SQN	Question Text	R/ U/ A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define adder	R	ETG306-4	02
	b)	Draw pin diagram of IC 7483	R	ETG306-4	02
	c)	Compare combinational and sequential logic circuits.(any 2 points)	R	ETG306-5	02
	d)	State the difference between latch and flip-flop	U	ETG306-5	02
	e)	List the types of data converter.	R	ETG306-6	02
	f)	State any 2 advantages of R/2R ladder DAC.	R	ETG306-6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Design half subtractor using logic gates.	A	ETG306-4	04
	b)	Draw truth table and logic diagram for 4:1 multiplexer.	U	ETG306-4	04
	c)	Compare synchronous and asynchronous counter. (any 4 points)	U	ETG306-5	04
	d)	Describe the working of 3-bit down counter.	U	ETG306-5	04
	e)	Explain the working of PISO shift register.	U	ETG306-5	04
	f)	Illustrate the working of Weighted resistor DAC.	A	ETG30-6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	Sketch the logic diagram and truth table of full adder.	A	ETG306-4	04
	b)	Compare Multiplexer and Demultiplexer(any 4 points).	U	ETG306-4	04
	c)	Sketch the logic diagram and truth table of priority encoder.	A	ETG306-4	04
	d)	Explain working of S-R flipflop.	U	ETG306-5	04
	e)	Sketch logic diagram and truth table of Master-slave JK ff.	A	ETG306-5	04
	f)	Describe the types of ROM	U	ETG306-6	04

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER 23

EXAM SEAT NO.

LEVEL : - 4th

PROGRAM : E&TC

COURSE CODE :- ETG407 / ETF407

COURSE NAME :-Signals and Systems

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-5/6/23

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	SN	**SECTION -I**	R/U/A	CO ETG 407	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State the Sampling Theorem with equation.	R	1	
	b)	Enlist the various operations performed on the signals.	R	1	
	c)	Define time reversal and amplitude scaling with input signal.	R	2	
	d)	Illustrate signal addition & signal multiplication.	R	2	
	e)	Define continuous & discrete time systems.	R	3	
	f)	Explain BIBO system.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare Energy and Power signals (any 4 points)	U	1	
	b)	Explain standard test signals with mathematical equation and represent it graphically.	U	1	
	c)	Identify linear system in the following : 1.$y(n)=ax(n)+b$ 2. $y(n)= x(n^2)$	U	2	
	d)	Sketch each of the following continuous-time signals. (a) $y[n] = u\,n + 3 - 0.5u\,n - 1$	A	2	
	e)	Sketch the even and odd components of the following signal i) $x(t) = \begin{cases} t & 0 < t < 1 \\ 2\text{-}t & 1 < t < 2 \end{cases}$	A	1	
	f)	Identify time variant system : 1.$y(n)=e^{x(n)}$ 2. $y(n)= x(n^2)$	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain Multichannel and Multidimensional signals with one example.	U	1	
	b)	Prove that folding and time delaying or advancing of a given signal by 3 samples are not commutative operations. $x(n) = \{ 1,1,1,1 \}$	A	2	
	c)	Sketch up scaling and down scaling of amplitude scaling operation on given signal by 2 sample. $x(n) = \{1, 2, 3, 4, 5 \}$	A	2	
	d)	Determine whether the following systems are Static or Dynamic 1. $y(n)= n\,x(n) + b\,x^2(n)$ 2. $y(n)= x(n) \cos \omega_0 n$	U	3	
	e)	Determine whether the following systems represented by input output relations are stable and causal : 1.$y(n)=$ sgn [x (n)] 2. $y(n)=$ Trunc [x (n)]	A	3	
	f)	Explain all symbols used to represent Discrete Time Systems	U	3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~ / SUMMER 23

EXAM SEAT NO. | | | | | | |

LEVEL : - 4th PROGRAM : E & TC

COURSE CODE :- ETG407 / ETF407

COURSE NAME :- Signals and Systems

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 5 /6 /23

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 QN	SECTION –II	R/ U/ A	Co ETG 407	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List any 2 application of correlation.	R	4	
	b)	Define Linear time invariant system.	R	4	
	c)	State and Prove Time reversal property of discrete Fourier series.	A	5	
	d)	State and Prove Time scaling property of discrete Fourier series.	A	5	
	e)	Define Z-transform with mathematical equation.	R	6	
	f)	Define ROC(Region of Convergence)	R	6	
Q. 5		Attempt any **FOUR:**			**16**
	a)	Compute the convolution $y(n) = x(n) * h(n)$ where $x(n) = \{ \underset{\uparrow}{1}, 2, -1, 3 \}$ and $h(n) = \{1,2,-1,\underset{\uparrow}{3}\}$ using tabulation method.	A	4	
	b)	Determine the auto-correlation of the following signal. $x(n) = \{ \underset{\uparrow}{1}, 1, 2, 1 \}$	A	4	
	c)	Determine the cross-correlation of the following signal. $x(n) = \{ 4, \underset{\uparrow}{2}, 3, 2 \}$ and $y(n) = \{ 3, \underset{\uparrow}{1}, 2, 2\}$	A	4	
	d)	State and Prove frequency shifting and time scaling properties of discrete Fourier transform with their meaning.	A	6	
	e)	Derive relationship between Z-transform and Fourier transform.	A	6	
	f)	State and Prove Linearity and time shifting properties of discrete Fourier transform with their meaning.	A	6	
Q. 6		Attempt any **TWO:**			**16**
	a)	Determine and sketch convolution y(n) using graphical method for the following signals $x(n) = \{ 1, 2, \underset{\uparrow}{1}, 2, 1, 2, 1 \}$ and $h(n) = \{ 1,1,\underset{\uparrow}{1},1,1\}$	A	4	
	b) i)	State and Prove Linearity and Time shifting properties of discrete Fourier series.	A	5	
	ii)	Explain development of Fourier Series derivation.	U	5	
	c) i)	Determine the Z-transform of the following finite-duration signals with ROC. i) $x(n) = \{1, 2, 5, \underset{\uparrow}{7}, 0, 1\}$ ii) $x(n) = \{1, 2, \underset{\uparrow}{5}, 7, 0, 1\}$	A	6	
	ii)	Determine the Pole-zero plot for the signal $x(n) = a^n u(n) \quad a > 0$	A	6	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EIF512**

COURSE NAME **PIC MICRCONTROLLER**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **06/ 06 / 2023**

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	SQN	SECTION -I	R/ U/ A	Co EIF 512	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State the difference between. Flash ROM, OTP ROM and Masked ROM.	R	1	
	b)	State any six features of PIC18 microcontroller.	R	1	
	c)	Find the content of the MYREG register after execution of the following program MYREG EQU OX20 MOVLW OX72 MOVWF MYREG NEGF MYREG, F	U	2	
	d)	List all the bit oriented instructions and give the working of anyone with an example.	R	2	
	e)	State the formula for delay calculation using 16 bit mode with crystal frequency of 20MHz.	U	3	
	f)	State the features of Timer 2 of PIC18.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	List all the PIC18 assembler directives and explain any two with an example.	U	1	
	b)	For PIC18 system of 12 MHz find how long it takes to execute each of the following instructions. i) ADDLW ii) BNZ iii) GOTO iv) RCALL	A	1	
	c)	List all the table processing instruction in PIC18. Explain the working of anyone with an example.	U	2	
	d)	Write a program to divide the numbers D'155' by D'20' and save the quotient in file register location 30H and remainder at 31H.	A	2	
	e)	Find the value of TOCON, if we want Timer 0 in 16 bit mode with prescaler 32, use internal clock source and of negative source edge.	U	3	
	f)	A switch SW is connected to pin RC1 and an LED to pin RC2. Write a program to get the status of SW and sent it to the LED.	A	3	
Q.3		Attempt any **TWO:**			**16**
	a)	i) Enlist any four differences between CISC and RISC CPU architectures. ii) Draw the structure of stack memory of PIC18 and explain.	U U	1 2	

	b)	i) Give the comparison in between PIC18 F458 and 8051 on any four points. ii) List the categories of brand instructions in PIC18 with 2 instructions from each category. Illustrate the use of any one instruction to implement looping.	U U	1 2	
	c)	Assume the crystal frequency = 10 MHz. Write a program to generate square-wave with 66.66% duty cycle with a period of 20 msec at port pin RBI. Use Timer 1 for the generation of the delay required. Draw the setup diagram for the above problem. Also give the time delay calculations performed.	A	3	
QN	SQN	**SECTION –II**	R/U/A	Co EIF 512	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the format of INTCON register.	R	4	
	b)	Draw the interrupt vector table for PIC18.	R	5	
	c)	Draw format of SSP CON1 register.	R	5	
	d)	Write any two ADC features of PIC18F458.	R	5	
	e)	Enlist any four applications of relays.	R	6	
	f)	What is advantage of placing an opto isolator between the motor and the microcontroller?	U	6	
Q.5		Attempt any **TWO:**			**16**
	a)	Consider a switch is connected to INTO (RBO) PIN and a LED is connected TO RB7 of PIC18 C. Write an ALP to toggle the LED every time INTO is activated and at the same time generate a square wave of frequency 3 KHz on RB4pin. Assume crystal frequency = 10KHz. Also write the necessary calculation.	A	4	
	b)	Draw interfacing diagram of keyboard with PIC18F. Also write the necessary program to detect the key pressed.	U/A	5	
	c)	Write a program for PIC18 to rotate the DC motor in clockwise direction or in counter clockwise direction depending on status of switch which is connected to the PORT D-7 and perform the following. i) If SW=0, DC motor moves in clockwise direction. ii) If SW = 1, DC motor moves in anticlockwise direction. Also draw the interfacing diagram of DC motor with PIC18 using 1293IC.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain ADCON1 format in detail.	R	4	
	b)	Draw the format of ECCPICON register. Also write significance of each bit.	R/U	4	
	c)	Write an ALP for PIC18 to initialize the date at 12/04/2004. Use single byte operation for writing into control register of DS 1306 and use multi byte burst mode for writing data, month, year.	A	5	
	d)	Write and explain all pins of DS1306 RTC chip in detail.	R	5	
	e)	Draw a neat diagram of interfacing PIC18 to stepper motor using opto isolator.	R	6	
	f)	Write a program for PIC18 to turn ON & OFF the relay and draw the interfacing of relay with PIC18 F485.	A	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRONICS & TELECOMMUNICATION**

COURSE CODE :- **ETG311**

COURSE NAME **BASICSOF POWER ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **05/ 06 / 2023**

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	SQN	Question Text	R/U/A	Co ETG 311	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State need of high power semiconductor switches.	R	1	
	b)	Draw the symbol of SCR & Triac.	R	1	
	c)	State the need of series connection of SCR.	R	4	
	d)	State use of freewheeling diode in controlled rectifiers.	U	5	
	e)	State the reason of unequal distribution of current in parallel connection of SCR.	R	4	
	f)	Construct a diagram for R triggering circuit.	A	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	List different triggering methods of SCR and explain any two methods.	U	2	
	b)	Explain with diagram and waveform single phase half wave controlled rectifier with freewheeling diode.	U	5	
	c)	Explain with diagram mode II and mode III of Triac Operation.	U	1	
	d)	Explain dynamic equalization circuit of SCR.	U	4	
	e)	Explain concept of two quadrant operations for full wave controlled rectifier.	U	5	
	f)	Draw and explain class C commutation method of SCR.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Derive the equation of anode current (IA) from transistorized equivalent circuit of SCR.	A	1	
	b)	Draw and explain Triac triggering using Diac.	U	2	
	c)	Draw and explain class E commutation circuit for SCR.	U	3	
	d)	What is controlled rectifier? How it differs from normal rectifier.	U	5	
	e)	Which semiconductor switch is bidirectional? Draw and explain VI characteristics of that device.	U	1	
	f)	Draw and explain operation of single phase bridge controlled rectifier with circuit diagram and waveform for RL load and with freewheeling diode.	U	5	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

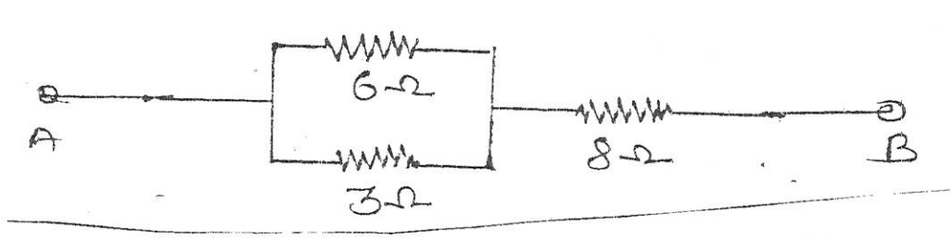
LEVEL: **FIRST** PROGRAM: **IE, E. & T.C.**

COURSE CODE: **EIG 107** COURSE NAME: **BASIC ELECTRICAL ENGINEERING**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **03/06 /2023**

Instruction -

1) Answer must be written in 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	SQN	QUESTION TEXT	RUA	CO EEG3 11	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Define the following terms: i) Resistivity ii) Conductivity	R	1	
	b)	Give the definition of following terms i) Reluctance ii) Permeance	U	2	
	c)	Define the electric current and potential difference.	R	1	
	d)	Define Eddy current loss and state its formula.	A	2	
	e)	Define the electrical power and also write down the formula for power in electrical circuit.	R	1	
	f)	What is the self induction.	R	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Explain the concept of DC & AC current .	U	1	
	b)	Compare between electric circuit and magnetic circuit. (on any four points)	U	2	
	c)	What is the B-H curve, Explain with neat sketch.	R	2	
	d)	State Faradays first law and explain Flemings left hand rule in detail and state its uses.	R	3	
	e)	Calculate the R_{AB} of given circuit. 	A	1	
	f)	List out the magnetic material and non magnetic material (Any 4 points)	R	2	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Write down Ohms law and Kirchoffs current law.	A	1	
	b)	Write the concept of Electromagnet.	A	2	
	c)	Explain statically induced EMF with neat diagram.	U	3	
	d)	Write down concept of self induction and Mutual induction.	A	3	
	e)	A conductor of 1.5 m length moves a right angle to a uniform magnetic field of flux density 1 Tesla with a velocity of 100 m/s. Calculate the emf induced in it. Find also the value of induced emf when the conductor moves at an angle of 30^0 to the direction of field.	A	3	
	f)	Explain the concept of leakage flux and leakage coefficient.	U	2	

~~P.T.O.~~

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER-23

EXAM SEAT NO. | | | | | | |

LEVEL : - FIRST PROGRAM : IE/ENTC

COURSE CODE :- EIG107

COURSE NAME :- BASIC ELECTRICAL ENGINEERING

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 3/6/23

QN	SQN	QUESTION TEXT	R/U/A	Co EIG107	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define:- 1. Frequency 2. Cycle.	R	4	
	b)	Define Form factor and state its formulae.	R	4	
	c)	Draw a neat diagram of Purely resistive AC circuit.	U	5	
	d)	State the relation of line voltage and phase voltage in balanced delta connection.	R	5	
	e)	State the types of transformers based on construction of core.	U	6	
	f)	State the types of earthing.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw sinusoidal alternating voltage quantity and write its equation.	U	4	
	b)	An alternating quantity of voltage is represented as V= 125sin(Wt+60); Calculate amplitude, time period, frequency and rms value.	A	4	
	c)	Draw a neat diagram of R-L series AC circuit and R-C series circuit diagram with its waveform.	U	5	
	d)	Compare star connected balanced load and delta connected balanced load with any four points.	A	5	
	e)	State and explain concept of active and reactive power in single phase circuit with its equation.	U	5	
	f)	Draw a neat diagram of DC series motor and DC shunt motor.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain working of single phase squirrel cage induction motor.	U	6	
	b)	State and explain concept of RMS value of alternating quantity.	U	4	
	c)	Two sinusoidal wave are represented by expression of V1= 120sin (Wt+30) and V2= 200sin (Wt +90) Find (V1- V2)	A	4	
	d)	Explain lagging and leading concept with waveform and equations.	U	4	
	e)	Draw a neat diagram of Star connected balanced load and label it.	U	5	
	f)	Draw a neat diagram of Purely inductive circuit with its equation, waveform and phasor diagram.	U	5	

****

2/2

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM : E&TC / IE

COURSE CODE :- ETG505/ETF501

COURSE NAME :- Mobile & wireless Communication

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 3/6/23

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	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define i) Base station, ii) Mobile station	R	ETG505-1	
	b)	Draw block diagram of cordless telephone system.	R	ETG505-1	
	c)	State any four features of 4G mobile handset.	R	ETG505-2	
	d)	State function of following sensors i) motion sensor, ii) touch sensor	R	ETG505-2	
	e)	Describe any two ways to improve capacity and coverage in cellular system.	U	ETG505-3	
	f)	List various wireless communication systems.	R	ETG505-1	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare GSM standard with AMPS standard.	U	ETG505-1	
	b)	Draw a timing diagram illustrating how a call initiated by a mobile is established .	U	ETG505-1	
	c)	Draw block diagram of transmitter unit of mobile handset and state its function.	U	ETG505-2	
	d)	Explain concept of frequency reuse. Draw frequency reuse pattern with cluster size 7.	U	ETG505-3	
	e)	Determine i) channel capacity for cellular telephone area comprised of 7 macrocells with 16 channel per cell ii) channel capacity if each macrocell is further split into 4 minicells.	A	ETG505-3	
	f)	Calculate system capacity if cluster size is 7 and per cell number of channels are 72. Calculate total system capacity if 14 such cluster are available.	A	ETG505-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Compare CDMA, TDMA and FDMA.	U	ETG505-1	
	b)	Draw block diagram of logic unit in mobile handset and explain it.	U	ETG505-2	
	c)	State working principle of receiver of mobile unit. State significance of RSSI signal.	A	ETG505-2	
	d)	Draw block diagram of basic cellular system. State advantages of it.	R	ETG505-3	
	e)	Explain two level handoff with suitable diagram.	U	ETG505-3	
	f)	Define Co-channel interference. How to reduce effect of co-channel interference.	U	ETG505-3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM : E&TC / IE

COURSE CODE :- ETA505 / ETF501

COURSE NAME :- Mobile & wireless communication

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 3/6/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State various services offered by GSM .	R	CO4	
	b)	List any four GSM air interface specifications .	R	CO4	
	c)	List any four features of IS 95 .	R	CO5	
	d)	Draw the diagram showing IS 95 channel bandwidth , guard band and frequency separation .	U	CO5	
	e)	State any four features of Bluetooth .	R	CO6	
	f)	Write any four features of 4 G mobile systems .	R	CO6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw the system architechture of GSM . State functions of OSS .	U	CO4	
	b)	Classify GSM channels and Describe GSM Traffic channels .	U	CO4	
	c)	Describe call processing stages in IS-95	U	CO5	
	d)	What type of Handoff is used in IS-95 ?Describe it with diagram .	U	CO5	
	e)	State advantages and disadvantages of Bluetooth .	R	CO6	
	f)	Draw SS7 protocol architecture . Write any two features of SS7.	R	CO6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Describe Authentication Process in GSM with proper diagram .	U	CO4	
	b)	Describe the process of Mobile originated call in GSM with diagram .	U	CO4	
	c)	Draw IS-95 system architecture and explain each block in brief .	U	CO5	
	d)	Draw forward channel structure of IS-95 . Write function of each channel in it .	U	CO5	
	e)	Compare 3G and 4G wireless systems wrt frequency used , Data rate , switching technique used , access technique .	U	CO6	
	f)	Describe various types of SS7 services .	U	CO6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM :Industrial Electronics

COURSE CODE :- EIG508

COURSE NAME :- Instrumentation

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 2/6/2023

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	SQN	SECTION -I	R/U/A	Co	Marks
Q1		Attempt any **FOUR:**			**08**
	a)	State Peltier effect	R	2	
	b)	Write formula for the working principal of capacitive transducer and List the material used for float in level measurement method	U	1/3	
	c)	What do you mean by PT-100 and list direct and indirect methods of level measurement.	U	2/3	
	d)	What is LVDT?Write 1 application of it	A	1	
	e)	List 4 applications of Temperature transducer.	U	2	
	f)	Define 1) Electrical transducer 2) Mechanical transducer	R	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	Write chart for types of thermocouple, their temperature ranges and material used.	R	2	
	b)	Draw block diagram of instrumentation system. State need of transducers in Instrumentation System.	U	1	
	c)	Draw and explain float type level measurement method.	A	3	
	d)	Describe Capacitance level measurement method with the application.	A	3	
	e)	Draw a neat labeled diagram of RTD.	U	2	
	f)	List selection criteria of transducers(any Eight)	R	1	
Q 3		Attempt any **FOUR:**			**16**
	a)	Suggest relevant level transducer for following applications 1)Level control of liquid, fine grained solids in mining 2)chemical processing and food industry 3)Tank level monitoring in chemical water treatment plant 4)water level in a tank for boilers in foundry.	A	3	
	b)	Compare NTC and PTC thermocouples.	U	2	
	c)	Draw and Explain Bounded type of strain gauge.	R	1	
	d)	Draw and name four types of thermistors. List any two applications of thermistors.	R, A	2	
	e)	State two advantages and two disadvantages of ultrasonic level measurement.	U	3	
	f)	Define transducer. Write classification of transducers in detail.	A	1	

P.T.O.

(An Autonomous Institute of Govt. of Maharashtra)

~~WINTER/~~SUMMER- 23

EXAM SEAT NO. | | | | | | |

LEVEL : - 5TH PROGRAM : ET/IE
COURSE CODE :- EIG508
COURSE NAME :- Instrumentation
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 2 / 6 / 23

QN	SQN	**SECTION –II**	R / U / A	Co EIG 508	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Pressure and its Unit.	R	4	
	b)	Compare Laminar and Turbulent Flow (any 2 points)	U	4	
	c)	State the Types of Telemetry system.	R	5	
	d)	List Wire line telemetering equipment hazards.(any 2)	R	5	
	e)	State the need of Wireless sensors.	R	6	
	f)	State basic principle of signal conditioning	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain construction of C type Bourdon Tube with 2 advantages.	U	4	
	b)	Draw and Explain Block diagram of General Telemetering System	U	5	
	c)	Describe Microwave Channels with band range.	A	5	
	d)	Draw and Explain block diagram of A.C.signal conditioning.	U	6	
	e)	Describe Block diagram of Single channel Data acquisition system.	U	6	
	f)	Draw and Explain working of Ultrasonic flow meter.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Describe working of Bellows with the help of diagram.	A	4	
	b)	Explain Metallic diaphragm gauge with diagram.	U	4	
	c)	Explain Power Line Carrier Channels in telemetry systems.	U	5	
	d)	Design Chopped & modulated amplifier with the help of circuit diagram.	A	6	
	e)	Explain block diagram of Multichannel Data acquisition system.	U	6	
	f)	Construct labeled Venturi meter for flow measurement.	A	4	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/~~WINTER~~-23

EXAM SEAT NO. | | | | | | |

LEVEL : - 4 PROGRAM : E&TC

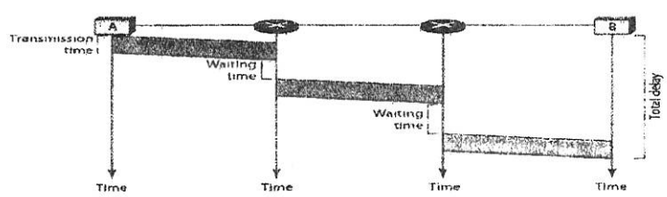
COURSE CODE :- ETG405 / ETF403

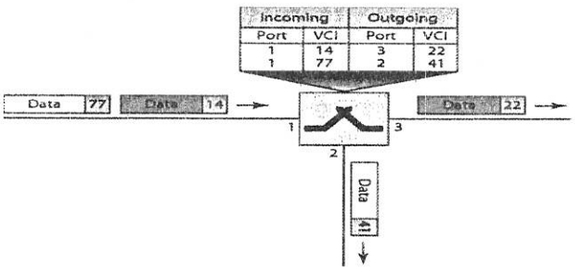
COURSE NAME :- **DATA COMMUNICATION AND NETWORKING**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 2/6/23

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	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw and describe the block diagram of data communication system.	R	ETG405 -1	
	b)	Define:- (a) Protocol (b) standards	R	ETG405 -1	
	c)	Draw diagram of star topology and write its advantages. (any two)	R	ETG405 -2	
	d)	Draw a hybrid topology with a star backbone and three ring networks	R	ETG405 -2	
	e)	Define Datagram. At which layer of OSI model does datagram switching take place?	R	ETG405-3	
	f)	Define: Frame relay and ATM	R	ETG405-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare simplex, half duplex, and full duplex data transmission modes on the basis of:- (a) definition (b) complexity (c) applications (d) diagram	U	ETG405 -1	
	b)	If a periodic signal is decomposed into five sine waves with frequencies of 100, 300, 500, 700, and 900 Hz, what is its bandwidth? Draw the spectrum, assuming all components have maximum amplitude of 10 V.	A	ETG405 -1	
	c)	Explain interaction between various layers of OSI model (peer to peer protocol) using layered structure of OSI model	U	ETG405 -2	
	d)	Describe the following diagram with reference to delay in datagram network and write the equation of total delay 	U	ETG405 -3	
	e)	Identify following addresses with justifications. 23:34:dc:4a:77:9f 192.168.100.23 753	A	ETG405 -2	

	f)	Compare a circuit switched network and a packet switched network (either datagram network or virtual circuit network), on the basis of : 1)OSI layer 2) communication phases 3) reservation of resources 4) format of data	A	ETG405 -3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Compare baseband transmission and broadband transmission of digital signal, on the basis of (a) Definition (b) Bandwidth (c) applications (d) diagram.	A	ETG405 -1	
	b)	Calculate the theoretical highest bit rate of a regular telephone line. A telephone line normally has a bandwidth of 3000 Hz (300 to 3300 Hz) assigned for data communications. The signal-to-noise ratio is usually 3162.	A	ETG405 -1	
	c)	Compare twisted pair cable with co-axial cable on the basis of (a) constructional details (b) strength (c) connectors (d) applications.	U	ETG405 -2	
	d)	Explain frame relay frame format.	U	ETG405 -3	
	e)	List different network devices and describe any two.	U	ETG405 -2	
	f)	Describe the following figure with reference to table entries and data routing 	R	ETG405 -3	

P.T.O.

P2/3

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/~~WINTER~~- 23

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **ETG405** / ETF403

COURSE NAME :- **DATA COMMUNICATION AND NETWORKING**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 2/6/23

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	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the diagram stop-N-wait protocol.	R	ETG405-4	
	b)	List error correction methods.	R	ETG405-4	
	c)	Define cryptography.	R	ETG405-5	
	d)	State any two advantages of wireless LAN.	R	ETG405-5	
	e)	Draw the block diagram of SNMP protocol.	R	ETG405-6	
	f)	Give any two examples of URL.	R	ETG405-6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain error control mechanism in data link layer with suitable diagram.	U	ETG405-4	
	b)	Draw and explain Go-Back-N ARQ protocol.	U	ETG405-4	
	c)	Explain the operation of PCF in MAC layer of IEEE 802.11 standard.	U	ETG405-5	
	d)	Draw and explain encryption model in cryptography.	U	ETG405-5	
	e)	Explain MIME protocol with suitable diagram.	U	ETG405-6	
	f)	Explain world wide web with one example.	U	ETG405-6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain CRC encoder and decoder with neat diagram.	U	ETG405-4	
	b)	Distinguish between error detection and correction methods.(any four points)	U	ETG405-4	
	c)	Explain fast ethernet w.r.t wireless LAN.	U	ETG405-5	
	d)	Explain the operation of DCF in MAC layer of IEEE 802.11 standard with neat diagram.	U	ETG405-5	
	e)	Explain the concept of Telnet.	U	ETG405-6	
	f)	Draw and explain request and response model of HTTP protocol.	U	ETG405-6	

****

P-3/3

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **INDUSTIRAL ELECTRONICS**

COURSE CODE: **IEG310** COURSE NAME: **Electrical Machines.**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **02/06/2023**

Instruction:-

1) Answer must be written in 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	SQN	QUESTION TEXT`	RUA	CO IEG 310	Marks
Q.1	A	Attempt any **FOUR**			**(08)**
	a)	Define D.C. motor.	R	01	
	b)	List out the applications of D.C. shunt motor.	R	01	
	c)	Write down the equation of voltage ratio and current ratio.	R	02	
	d)	What are the different types of losses occurs in transformer.	R	02	
	e)	List the types of transformer according to the voltage level & no. of phases.	U	02	
	f)	Classify the different types of 1-Ø induction motors.	R	03	
Q.2	A	Attempt any **FOUR**			**(16)**
	a)	Draw and explain characteristics of D.C. series motor.	U	01	
	b)	Derive the e.m.f. equation of 1-Ø transformer.	U	01	
	c)	State the concept of earthing for transformer and list out importance of the same.	U	02	
	d)	Explain the construction of single phase transformer.	U	02	
	e)	Explain the construction and working of capacitor start, capacitor run, induction motor.	U	03	
	f)	With neat diagram explain in brief the constriction of d.c. machines.	U	02	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Describe the significance of back emf. In D.C. motor.	U	01	
	b)	List out the applications of isolation transformer.	R	02	
	c)	Discuss the constructional features of pulse transformer.	U	02	
	d)	Classify the dc generator & dc motors with schematic diagram.	R/U	01	
	e)	List out the characteristic of A.C. series motor.	U	03	
	f)	Describe why single phase Im are not self starting?	U	03	

P.T.O.

QN	SQN	QUESTION TEXT`	RUA	CO IEG 310	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	State the base & 3 phase alternator on which types are made accordingly.	R	04	
	b)	State types of 3 phase induction motor with their starter.	R	05	
	c)	Discuss slip speed of 3 phase induction motor.	R	05	
	d)	Define synchronous speed of a 3 phase induction motor.	R	05	
	e)	State various types of stepper motor.	R	06	
	f)	State function of servomotor.	R	06	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain advantages of stationary armature in construction of 3 phase alternator.	U	04	
	b)	Explain constructional features of 3 phase alternator with suitable sketch.	A	04	
	c)	Explain with neat labeled sketch, working principle of 3 phase induction motor.	A	05	
	d)	State types of starters & explain with neat labeled sketch any one starter.	U	05	
	e)	Discuss 'step angle' & its phenomena in stepper motor.			
	f)	Sketch labeled diagram of any one type of stepper motor & state its applications.	U	06	
Q.6		Attempt any **FOUR**			**(16)**
	a)	State the winding factors & explain pitch factor with suitable expression.	A	04	
	b)	Explain voltage regulation of an 3 phase alternator with suitable expressions.	A	04	
	c)	Elaborate starting torque & Max torque with speed-torque characteristic of 3 phase induction motor.	U	05	
	d)	Explain with suitable sketch star – Delta starter used for staring of 3 phase induction motor.	A	05	
	e)	Explain with neat labeled sketch principle of working of DC servo motor.	U	06	
	f)	State various applications of stepper motor.	A	06	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRONICS AND TELECOMMUNICATION**

COURSE CODE :- **ETG310/ETF310**

COURSE NAME **DIGITAL COMMUNICATION**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **02/ 06 / 2023**

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	SQN	Question Text	R/U/A	Co ETG 310	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Explain how digital communication is different from analog communication.	U	1	
	b)	State the sampling theorem. Also define Nyquist rate.	R	2	
	c)	Draw the waveforms of ASK and FSK for the binary input of 101101110.	A	3	
	d)	Give two advantages of QPSK over BPSK.	R	3	
	e)	List the applications of PCM signals.	R	2	
	f)	State the role of channel decoder in digital communication system.	U	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	State and explain Shannon. Hartley theorem on channel capacity.	U	1	
	b)	Identify the name of communication system shown in Figure No. Q.2 (b). Also name and state function of missing blocks.	A	2	
	c)	With the help of neat diagram, explain slope overload distortion and granular noise with respect to delta modulation.	U	2	
	d)	Describe the generation of BFSK signal with block diagram.	U	3	
	e)	Draw the constellation diagram for 8-QAM modulator and 16-QAM MODULATOR.	A	3	
	f)	Differentiate between PCM and DM with respect to following points:- i) Number of bits per sample ii) Step size. iii) Distortion /errors. iv) Signalling rate and bandwidth.	A	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Identify the name of digital modulation technique represented in the Figure No. Q.3 (a). Draw its input and output waveforms and describe its operation.	A	3	
	b)	Describe natural sampling with neat sketch.	U	2	
	c)	Draw the block diagram of QAM generation system, and QAM receiver system.	U	3	
	d)	Explain the quantization process with waveform.	U	2	
	e)	Compare between QPSK and QAM systems with respect to following points. i) Information transmitted by change in ii) No. of bits per symbol iii) No. of possible symbols (M) iv) Bandwidth efficiency.	A	3	
	f)	Describe the concept of entropy in brief with mathematical expression.	U	1	

P.T.O

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : ENTC

COURSE CODE :- ETG310 / ETF310

COURSE NAME :- DIGITAL COMMUNICATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 2/6/23

QN	SQN	Question Text	R/U/A	Co ETG 310	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define hamming weight and hamming distance.	R	4	02
	b)	State the applications of FDM.(any 2)	R	5	02
	c)	List any 2 applications of spread spectrum modulation.	R	6	02
	d)	State the need of multiplexing.	U	5	02
	e)	Compare DSSS and FHSS (any 2 points).	R	6	02
	f)	Draw unipolar RZ, unipolar NRZ, polar RZ, polar NRZ formats for data 1011010.	R	4	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain stepwise procedure of CRC generator .	U	4	04
	b)	Compare TDM with FDM (any 4 points).	U	5	04
	c)	Explain PN sequences generation.	U	6	04
	d)	State the different types of errors in digital communication. Describe each with example.	A	4	04
	e)	Explain the concept of CDMA with diagram.	U	5	04
	f)	Generate CRC code for the data word of 110010101. The divisor is 10101	A	4	04
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain block diagram of TDMA.	U	5	04
	b)	Explain working of FHSS transmitter with block diagram.	U	6	04
	c)	Explain the T carrier hierarchy with neat diagram.	U	5	04
	d)	Construct the Hamming code for the data 1010 with odd parity.	A	4	04
	e)	Draw the block diagram of direct sequence spread spectrum and explain its working principle.	U	6	04
	f)	A discrete memoryless source has the letters A, B, C, D, E, F and G with corresponding probabilities {0.08, 0.2, 0.12, 0.15, 0.03, 0.02, 0.4}. Derive Huffman code for the above source and determine the average length of the code word.	A	4	04

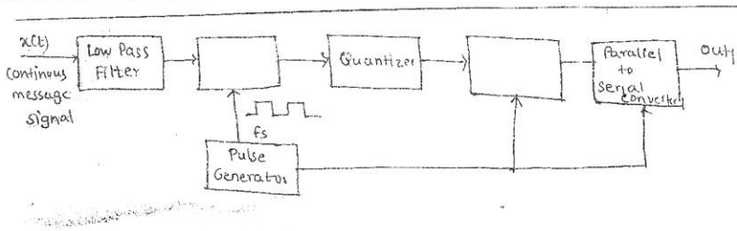


Fig:- Q.2. (b)

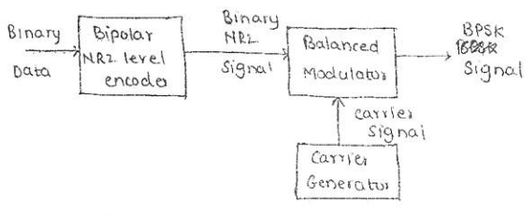


Fig. Q.8 (a)

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - THREE PROGRAM: IE & E & TC

COURSE CODE: - EIG 309 / EIf309

COURSE NAME: - MICROCONTROLLERS

MAX. MARKS: **80** TIME: **03 Hrs** DATE: - 31/5/23

Instructions:-

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	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw Von Neumann architecture.	R	1	
	b)	List the features of 8051 Microcontroller (any four).	R	2	
	c)	Explain the instruction - PUSH direct.	R	3	
	d)	State any two, individual instructions that make the contents of accumulator to zero.	A	3	
	e)	List SFRs related with serial communication.	U	2	
	f)	State the function of Stack pointer and Program counter.	U	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain block diagram of Microcomputer.	U	1	
	b)	Explain the alternate function of port 3 pins of 8051 Microcontroller.	R	2	
	c)	Write an assembly language program for 8051 microcontroller to find count of even numbers present in a given series. Assume the series of 10 numbers stored in internal memory with starting address at 40h.	A	3	
	d)	Differentiate between the Microprocessor and Microcontroller (any four points).	U	1	
	e)	Explain Power saving options available in 8051 Microcontroller.	R	2	
	f)	Write an assembly language program for 8051 microcontroller to exchange the contents of array of 10 bytes. The first array starts at 40H location of internal RAM and another at 50 H location onwards.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	State the comparison between Harvard and Von Neumann architecture (any four points).	U	1	
	b)	Draw the architecture of 8051 Microcontroller.	U	2	
	c)	Identify addressing modes of following instructions, a) MOV A, @ R1 b) ANL C, BIT c) MOV A, 70H d) SWAP A	A	3	
	d)	Explain the addressing modes of 8051 with examples.	U	3	
	e)	Write an assembly language program for 8051 microcontroller to find an average of an array of 10 byes stored from internal RAM address 50 H onwards. Store the result in external memory location 2000H and 2001H.	A	3	
	f)	Explain the following instructions with respect to their operation, size & addressing mode. a) RRC A d) XRL A, #data8	R	3	

QN	SQN	Question Text	R/U/A	Co EIG 309	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List various modes of timer in 8051 microcontroller.	R	4	
	b)	State the use of pull-up register connected to port-0.	R	4	
	c)	State the term Basic rate and list the various baud rate supports to 8051 microcontroller.	R	2	
	d)	Draw the Format of IE register and explain the function of EA bit.	U	5	
	e)	State the use of RS & E pin of LCD 16 X 2 configuration.	R	6	
	f)	Find the number of steps for revolution (360^0) of stepper motor with step angle of 7.5^0 and 1.5^0.	A	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write an ALP to send "GPKP" on serial port of 8051 microcontroller at 9600 buad rate. Assume crystal frequency of 11.0592 MHz.	A	5	
	b)	Draw interfacing diagram of 8 LED's are connected to port 1 or 8051. Write an ALP to toggle all LED's on port1. Assume suitable delay.	A	4	
	c)	State and explain the use of SCON and SBUF register of 8051 microcontroller.	U	5	
	d)	Draw interfacing diagram of relay with 8051 microcontroller. Write an ALP to turn ON and OFF relay after every sec.	A	4	
	e)	Explain the alternative functions of port '0' and port 2 of 8051 microcontroller.	U	4	
	f)	Draw the interfacing diagram of 4 X 4 matrix keyboard with 8051 micro controller.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write an ALP for 8051 microcontroller to generate a delay of 5ms by using timer 0 mode 1. Assume crystal frequency =11.0592MHZ.	A	4	
	b)	Write a ALP to display 0 to 9 number on common anode seven segment display.	A	4	
	c)	Draw the format of IE register of 8051 microcontroller and state the function of each bit in it.	U	5	
	d)	Write an ALP for 8051 microcontroller to receive the data at a baud rate of 4800 through serial port and send it to port 2 continuously. Assume XTAL= 11.0592 MHz.	A	5	
	e)	Develop a program to generate 50% duty cycle square wave on pin P1.2 using interrupt delay. Assume XTAL = 11.0592 MHz.	A	5	
	f)	Draw interfacing of steeper motor with 8051 and write an ALP to rotate it in clockwise direction.	A	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 20

EXAM SEAT NO. | | | | | | |

LEVEL : - VI PROGRAM : ENTC

COURSE CODE :- ETG504

COURSE NAME :- Optical Fiber Communication

MAX. MARKS : **40** TIME : ~~1~~5 **Hrs** DATE :30/5/23

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	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**		ETG504	**08**
	a)	Draw the diagram of electromagnetic spectrum	R	1	
	b)	State classification of various fiber types.	R	2	
	c)	In a fiber of length 10km, a mean optical power of 150mW is launched. The optical power received is 15mW. Calculate signal attenuation in dB.	A	3	
	d)	Define photon and state the equation of energy of photon.	U	1	
	e)	Define the optical connector and state the two requirements of it.	U	2	
	f)	Draw the block diagram of eye pattern technique.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Identify the technique to measure attenuation loss with use of connector and explain it.	A	3	
	b)	Compare between single mode and multimode fibers with following points (1) Definition (3) Optical source used (2) Effect of intermodal dispersion (4) application	U	2	
	c)	A silica optical fiber has a core refractive index of 1.50 and cladding refractive index of 1.48. Determine (1) Critical angle at core-cladding interface (2) NA for the fiber (3) Acceptance angle	A	1	
	d)	Explain the propagation of light in multimode graded index fiber with help of diagram.	U	2	
	e)	Define absorption loss and explain Extrinsic absorption and how to overcome it.	U	3	
	f)	Explain loose buffer cable with help of diagram and state the two applications of it.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Define the dispersion loss. Give the classification of it and explain the concept of Intersymbol interference	R/U	3	
	b)	Explain the concept of acceptance angle and total internal reflection with diagram with help of diagram.	U	1	

	c)	Compare linear and non-linear scattering with respect to (1) Definition (3) causes of it (2) Types (4) how to overcome loss	U	3	
	d)	Explain the Snug tube and V-groove splicing technique with help of diagram.	U	2	
	e)	Explain types of macro-bending loss and how to overcome it.	U	3	
	f)	Define the Active and passive coupler and explain T and star coupler.	U	2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 20

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **ETG504**

COURSE NAME :- **OPTICAL FIBER COMMUNICATION**

MAX. MARKS : **40** TIME : **1.5 Hrs** DATE :-30/5/23

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	SQN	**SECTION -II**	R/U/A	Co ETG 504	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define 1) Direct bandgap semiconductor 2)Homojunction LED	R	4	
	b)	List any four materials used for construction of optical sources.	R	4	
	c)	Draw the constructional diagram of avalanche photodiode	R	5	
	d)	Define 1) Quantum efficiency 2) Responsivity	R	5	
	e)	Define SONET and List any two applications of SONET.	R	6	
	f)	Draw block diagram of optical receiver circuit.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	List any four requirements of optical detectors and give the types of it.	R	5	
	b)	Explain the working of PIN photodiode with suitable diagram.	U	5	
	c)	Draw the diagram of Wave division multiplexing and explain it.	U	6	
	d)	Explain SONET architecture with suitable diagram.	U	6	
	e)	Explain indirect bandgap semiconductor with neat diagram.	U	4	
	f)	Compare between planar & dome LED (any four points).	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw gain guided laser & explain working of it.	U	4	
	b)	Explain working of surface emitting LED with neat diagram.	U	4	
	c)	Explain working principle of LASER diode.	U	4	
	d)	Explain spectral response of avalanche photodiode with suitable diagrams and state two application of it.	U	5	
	e)	Explain the construction of Phototransistor with help of diagram and state two application of it.	U	5	
	f)	Draw the block diagram of OTDR and define the two specifications of it.	U	6	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **EIG 307 / EIF 307** COURSE NAME: **Linear Integrated Circuits**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **29/05 /2023**

Instruction :-

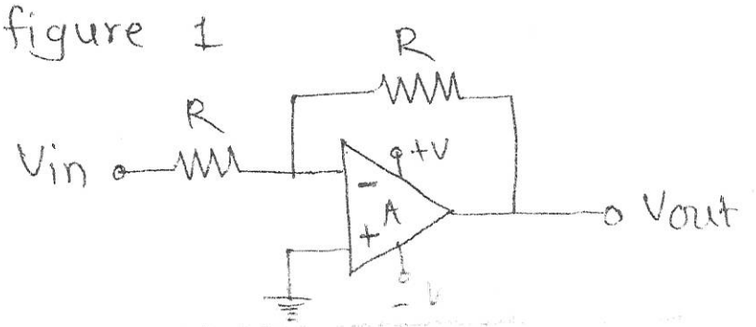
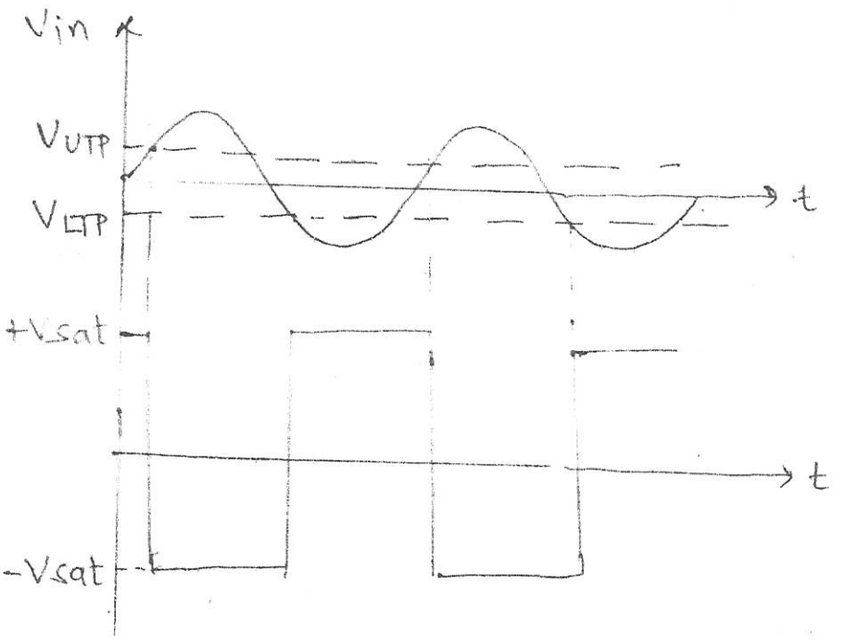
1) Answer must be written in main answer book provided. (and supplements if required)
2) Illustrate your answers with sketches where ever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables will be made available on request.
5) Assume and mention suitable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

---

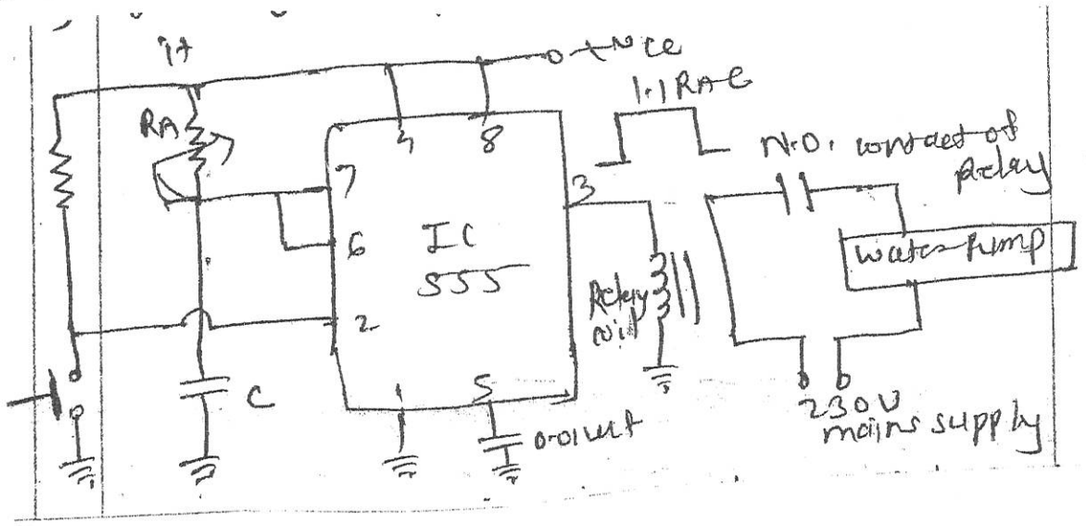
QN	SQN	QUESTION TEXT	RUA	CO EIG 307	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Define the operational amplifier parameters. i) CMRR ii) Input bias current	R	1	
	b)	Draw circuit diagram of op-amp based basic differentiator.	R	2	
	c)	State the advantages of instrumentation amplifier using 3 op-amps.	R	3	
	d)	Draw the block diagram of op-amp.	U	1	
	e)	Draw the output waveform for sine wave input of amplitude 2Vp-p Refer figure 1	A	2	
	f)	Compare comparator and Schmitt trigger (Any 4 Points)	U	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw the circuit diagram of dual input balanced output (DIBO) differential amplifier & explain in brief.	U	1	
	b)	Sketch the circuit diagram of closed loop non-inverting amplifier and derive the expression for its gain.	U	2	
	c)	Explain virtual ground concept of an op-amp.	U	2	
	d)	Explain the working of window detector with neat sketch.	U	3	
	e)	For the following equation, sketch the circuit diagram and output waveform for square wave input. $V_0 = -\frac{1}{RC}\int_0^t Vin\ dt + C$	A	2	
	f)	Draw the input output waveform of inverting zero crossing detector with sine wave input of 3Vp-p. Explain its operation in brief.	A	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	State the need of level shifter stage and Draw its circuit diagram.	U	1	
	b)	Draw the designed circuit for getting output voltage VO = - (Va + Vb + Vc) and suggest modifications for converting it into scaling amplifier.	A	2	
	c)	Explain the operation of instrumental amplifier using 3op-amps with neat sketch.	U	3	
	d)	Explain half wave precision rectifier with neat sketch.	U	3	
	e)	Derive the expression for closed loop non-inverting amplifier using op-amp.	U	2	
	f)	Identify the following waveforms Label the circuit, name & draw the circuit diagram for the same Refer figure No. 2 and explain its working in brief.	A	3	

QN	SQN	QUESTION TEXT	RUA	CO EIG 307	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Define multivibrator and classify it.	R	4	
	b)	State the function of filter. Give its classification.	R	5	
	c)	State any four feature of Timer IC555	R	6	
	d)	Draw ideal and practical frequency response of band reject filter with proper labeling.	U	5	
	e)	State the pin function of trigger pin and threshold pin of IC555.	R	6	
	f)	Draw the pin diagram of VCO IC566	R	4	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain RC phase shift oscillator with help of circuit diagram and State the equation of output frequency.	U	4	
	b)	Define the following form with respect to filter. i) Cut off frequency ii) Roll of rate ii) Iii) Q factor iv) Order of filter	U	5	
	c)	Explain operation of VCO (Voltage controlled oscillator) using IC 555 with help of circuit diagram.	U	6	
	d)	Calculate the lower cut off frequency of second order high pass filter if R = 1K Ω and C= 0.01 μf	A	5	
	e)	Identify the application of IC 555 from given diagram and explain it. Refer Figure no. 3	A	6	
	f)	Identify the given circuit diagram (Figure No 4) and explain it and state the output equation of frequency	A	4	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Describe the working of triangular waveform generator using IC741.	U	4	
	b)	Design the first order low pass Butterworth filter with higher cut off frequency of 1kHz and pass band gain of 2	A	5	
	c)	Explain the Monostable multivibrator using IC555 with help of circuit diagram and waveform.	U	6	
	d)	Identify the given circuit diagram (Figure No 5) and explain it and draw the waveform it.	A	4	
	e)	Draw and explain first order wide bandpass filter.	R	5	
	f)	State any two merits and demerits of active filter over passive filter.	R	5	

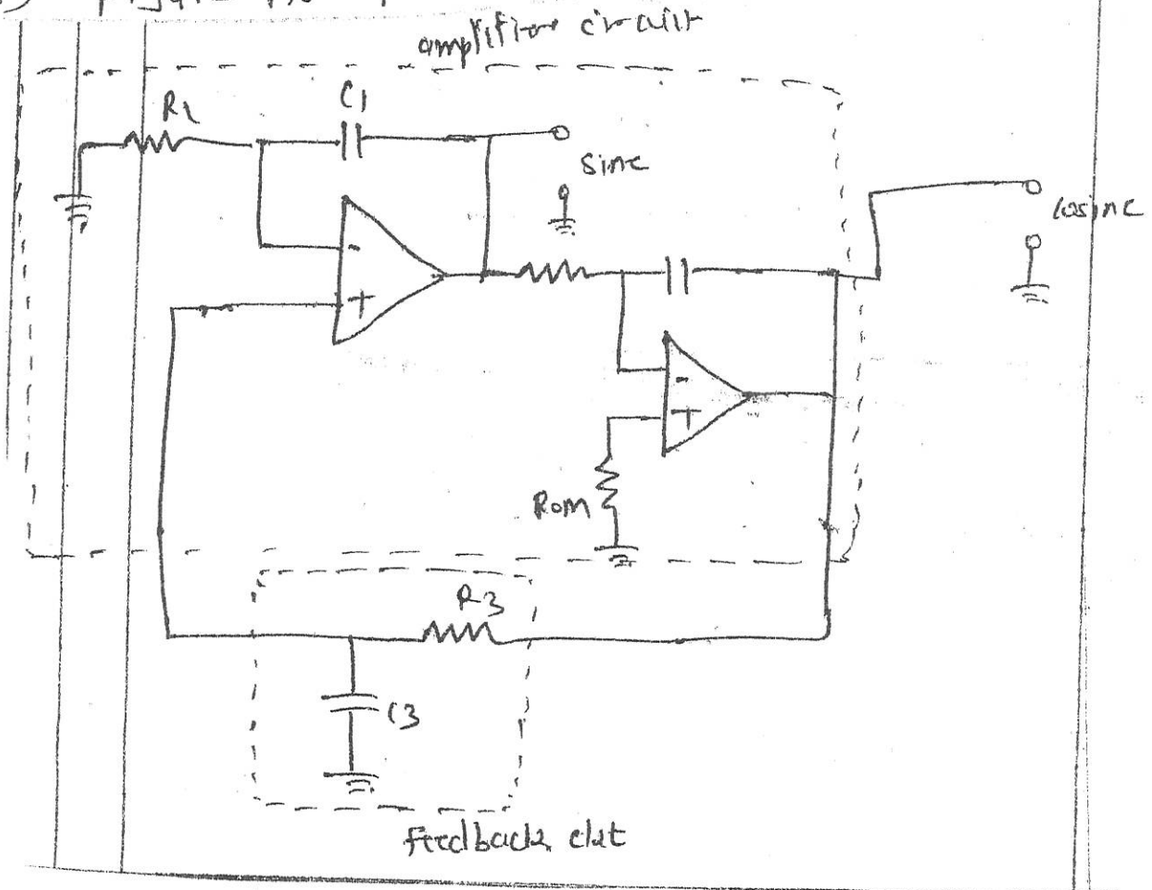
****

Q. N.	S.Q .N.	Question text	Cognition Level R/U/A	CO Code	Mark out of
1	e	figure 1 			
3	f	figure 2 			

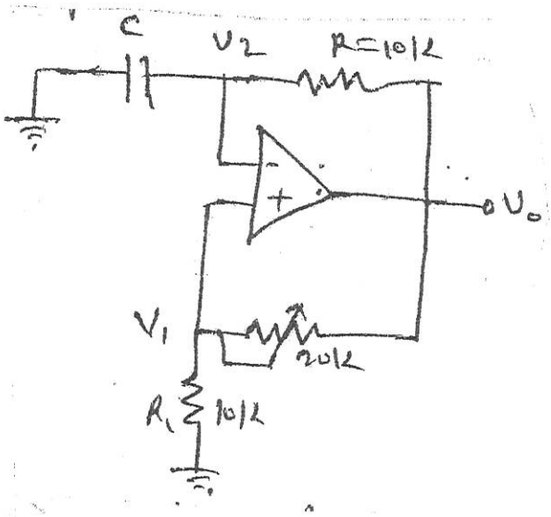
Q.5 e) Figure no. 3



Q.5 f) Figure no. 4



Q.6 d) Figure no. 5



GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **ELECTRONICS & TELECOMUNICATIONS**

COURSE CODE: **EIG103/EIF103** COURSE NAME: **Basic Electronics**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **27/05/2023**

Instruction :-

1) Answer must be written in 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	SQN	QUESTION TEXT`	RUA	CO EIG103	Marks
Q.1	A	Attempt any **FOUR**			**(08)**
	a)	Draw the symbol of PN junction diode & zener diode.	R	01	
	b)	Draw the V-I characteristics of an ideal P-N function diode.	U	01	
	c)	Define following parameter of rectifier. i) Ripple factor. ii) Peak Reverse Voltage	R	02	
	d)	State the specifications of Transistor.	U	03	
	e)	State any four applications of transistor.	R	03	
	f)	Differentiate between half wave & full wave rectifier (any two points)	U	02	
Q.2	A	Attempt any **FOUR**			**(16)**
	a)	Differentiate between zener diode & PN function diode (any four points)		01	
	b)	Draw & explain P type extrinsic semiconductor.		01	
	c)	Explain the working principle of center tapped full wave rectifier with suitable diagram.		02	
	d)	State the need filter and explain 'C' type filter with diagram and wave forms.		02	
	e)	Define α and β ? derive the relationship between α and β.		03	
	f)	Draw & explain switching action of transistor.		03	
Q.3		Attempt any **FOUR**			**(16)**
	a)	State the need of rectification also draw the LC filter with full wave rectifier.		02	
	b)	With the help of diagram describe the zener breakdown mechanism.		01	
	c)	Draw & explain the operating principles of PNP transistor.		03	
	d)	Explain the output characteristics of CB configuration with diagram.		03	
	e)	State the comparison between choke input filter, LC filter, π type filter. (any four points)		02	
	f)	Explain the mechanism of avalanche breakdown in PN junction diode.		01	

P.T.O.

Q.4		Attempt any **FOUR**			**(08)**
	a)	Define stability factor of transistor.	R	04	
	b)	State the types of MOSFET.	R	05	
	c)	Define line regulation and load regulation.	R	06	
	d)	State the need of biasing of BJT	U	04	
	e)	List the types of transistor biasing (any 2)	U	04	
	f)	Draw the symbol of P-channel and N – channel JFET.	U	05	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain the DC load line and Q point of a transistor.	U	04	
	b)	Define "Biasing of Transistor" explain in brief fixed bias circuit.	U	04	
	c)	Compare FET and BJT (any 4 points)	U	05	
	d)	Explain the working principle of N-channel depletion MOSFET with a neat and lebelled diagram.	U	05	
	e)	Draw the block diagram of DC regulated power supply and explain the function of each block.	U	06	
	f)	Draw circuit diagram of zener diode as a voltage regulator and explain its working.	U	06	
Q.6		Attempt any **FOUR**			**(16**
	a)	Sketch and explain frequency response curve of two stage RC coupled amplifier.	A	04	
	b)	Draw the single stage RC coupled CE amplifier circuit and explain its operation.	A	04	
	c)	State applications of MOSFET (any 4 points)	A	05	
	d)	Draw and explain drain characteristics (output characteristics) of JFET with neat and lebelled diagram.	A	05	
	e)	Sketch functional pin diagram of IC 79XX and explain the function of each pin.	A	06	
	f)	State the applications of voltage regulator ICs.	A	06	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : Mechanical

COURSE CODE :- MEG 503

COURSE NAME :- Industrial Engineering

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-27/5/**23**

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	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define productivity and write its relationship with production.	R	1	2
	b)	State the factors affecting site selection.	R	2	2
	c)	Define material handling.	R	2	2
	d)	Define Routing.	R	3	2
	e)	State the functions of dispatching.	R	3	2
	f)	Define Capacity and capacity planning.	R	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	State various techniques for improving productivity and explain any one of them.	U	1	4
	b)	Explain the characteristics of plant layout.	U	2	4
	c)	Explain the factors considered for selecting material handling systems.	U	2	4
	d)	Explain the concept of line balancing.	U/A	3	4
	e)	Draw operation sheet for manufacturing gear in workshop..	U	3	4
	f)	Explain the steps involved in deciding the sequence of operations	A	3	4
Q.3		Attempt any **FOUR:**			**16**
	a)	Compare fixed cost and variable cost of production system.	A	1	4
	b)	Explain the functional layout with simple sketch.	A	2	4
	c)	State the applications of the following material handling systems- i. Fork lift, ii. Jib crane, iii. Conveyors, iv. Automated Guided Vehicles (AGVs).	A	3	4
	d)	Five jobs are to be processed on two machines M1 and M2 in the order M1 M2. Processing time in hours are given below. Determine the sequence that minimises total elapsed time and also calculate idle time.	A	3	4
	e)	Explain Gantt chart used in production planning & control.	U	3	4
	f)	Explain the techniques of assembly planning.	U	3	4

Job	Processing time (hours)	
	M_1	M_2
1	5	2
2	1	6
3	9	7
4	3	8
5	10	4

PTO

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : Mechanical

COURSE CODE :- MEG 503

COURSE NAME :- Industrial Engineering

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 27/5/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Fixture	R	MEG503.4	
	b)	Define Ergonomics	R	MEG503.5	
	c)	Enlist the types of control used in the man-machine system	R	MEG503.5	
	d)	Define work measurement	R	MEG503.6	
	e)	Define JIT manufacturing	R	MEG503.6	
	f)	Enlist the steps involved in method study	R	MEG503.6	
Q.5		Attempt any **FOUR:**			**16**
	a)	List the elements of jig/fixture and draw neat sketch of jig/fixture showing all the elements	A	MEG503.4	
	b)	Explain 3-2-1 principle of pin location	U	MEG503.4	
	c)	Classify the displays used in the man-machine system	U	MEG503.5	
	d)	Draw and explain with suitable example the symbols used for following activities i) Operation ii) transportation iii) Delay iv) Storage	U	MEG503.6	
	e)	Explain Flow process chart with suitable block diagram	A	MEG503.6	
	f)	Explain the waste reduction using 5'S technique	A	MEG503.6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain ergonomics considerations in design of controls	A	MEG503.5	
	b)	Enlist the clamping device used in jig/fixture and explain any one with neat sketch	U	MEG503.4	
	c)	The observed times and the performance ratings for the five elements are given compute the standard time assuming rest and personal allowance as 15% and contingency allowance as 2% of the basic time.	A	MEG503.6	
	d)	Explain the basic procedure of time study	U	MEG503.6	
	e)	Explain the concept of Merit rating	U	MEG503.6	
	f)	Explain the concept of continuous improvement used in industry	A	MEG503.6	

Elements	1	2	3	4	5
Observed time (min)	0.2	0.08	0.5	0.12	0.10
Performance rating	0.85	0.80	0.90	0.85	0.80

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/~~WINTER~~- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FOUR — PROGRAM : IE & E&TC

COURSE CODE :- EIG402 / EIF402 — COURSE NAME :- Embedded Systems

MAX. MARKS : **80** — TIME : **03 Hrs** — DATE :-26/ 05/2023

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the interfacing diagram of keyboard with 8051 microcontroller.	U	4	
	b)	State the function of following pins of DS12887 RTC i. IRQ ii. SQW	R	4	
	c)	Define the terms : Scalability and Predictability related to RTOS.	R	5	
	d)	Calculate the output current (I_{out}) of DAC0808 for digital input FFH if, I_{ref} =2mA.	A	4	
	e)	Give the full step sequence for a unipolar stepper motor.	R	4	
	f)	List any 4 functions of RTOS.	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw an interfacing diagram of LCD with 8051 microcontroller.	U	4	
	b)	Draw the interfacing diagram of DC motor using L293D with 8051 microcontroller and write a C program to rotate motor in clockwise direction with 25% duty cycle.	A	4	
	c)	Compare between general OS & RTOS (any four points).	A	5	
	d)	Write an embedded C language program to generate a triangular waveform using DAC 0808.	A	4	
	e)	Write an embedded C program to set time 16:15:00 of RTC DS12887.	A	4	
	f)	Draw the interfacing of a key and LED to 8051 to pins P1.0 and P2.0 respectively. Write a C program to read the status of the Key and display it on LED.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw an interfacing diagram of serial ADC MAX1112 to 8051microcontroller. Write an embedded C program for sending a control byte to MAX 1112 ADC.	A	4	
	b)	Write an embedded C language program to for 8051 to display "HELLO" on LCD.	A	4	
	c)	Draw the interfacing diagram of stepper motor & write C program to rotate the motor continuously. (Use 4 step sequence)	A	4	
	d)	Explain the semaphore and watchdog timer feature of RTOS.	U	5	
	e)	Draw an interfacing diagram of temperature sensor LM35 with 8051microcontroller	U	4	
	f)	Explain the concept of Deadlock in RTOS & techniques to prevent it.	U	5	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/~~WINTER~~- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : -IV PROGRAM :Electronics & Telecommunication / I.E

COURSE CODE: - EIG 402 / EIF 402

COURSE NAME: Embedded System

MAX. MARKS: **80** TIME : **03 Hrs** DATE :-26/5/2023

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	SQN	SECTION -I	R/U/A	Co EIG 402	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Compare RISC and CISC Architecture.	R	1	
	b)	Write a C program to perform any two logical operation on data 0x35 and 0x0f.	U	2	
	c)	Enlist data types of embedded System.	R	2	
	d)	Write a C program To turn bit P1.5 ON and OFF 50,000 times.	A	2	
	e)	Explain CAN Bus.	R	3	
	f)	Enlist Applications of AVR and ARM microcontrollers in embedded systems.	R	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and Explain Block diagram of Embedded system.	U	1	
	b)	Explain i) Sophiscated, standalone Embedded system ii) Reactive/Real time (Soft and Hard) Embedded system.	A	1	
	c)	Write an 8051 C program to read the status of pin P1.0 and P1.1 and issue an ASCII character to P0 according to the following table. P1.1 P1.0 0 0 send '0' to P0 0 1 send '1' to P0 1 0 send '2' to P0 1 1 send '3' to P0	A	2	
	d)	Draw and Explain RS232 serial communication standard	A	3	
	e)	Write 8051 C programs to generate a square wave of 50% duty cycle on p1.2 pin using Timer0 Interrupt.	A	3	
	f)	Draw and Explain USB protocol.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and Explain each phase of Embedded system Life Cycle	A	1	
	b)	Write a C program to perform Checksum operation to ensure data integrity. If data is good, send ASCII character 'H' to port0, otherwise send ASCII character 'B' to port 0.Data given 0x25, 0x62, 0x3f, 0x52, 0xe8.	A	2	
	c)	Write a 8051 C program to transmit message 'Welcome 'using serial communication interrupt with baud rate 9600.	A	3	
	d)	Write a C program to toggle all pins of P1 continuously every 500 ms.Use timer1, mode 1.	A	3	
	e)	Enlist data types Of Programming in C in Embedded System. Explain any one.	A	2	
	f)	Assume 1 HZ external clock is being fed into T1 (P3.5).Write C program for counter1 in mode 2 to count up and display the state of TL1 count on P1 .Start the count at 0h.Use interrupt.	U	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **ELECTRONICS & TELECOMMUNICATION**

COURSE CODE: **EIG308 /EIF308** COURSE NAME: **CIRCUITS & NETWORKS**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **26/05 /2023**

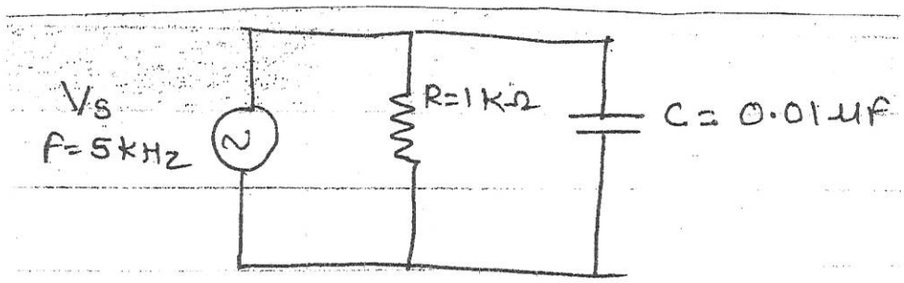
Instruction :-

1) Answer two sections must be written in separate section 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

---

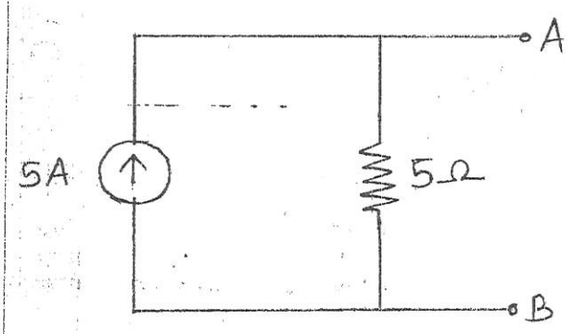
QN	SQN	QUESTION TEXT	RUA	CO EIG 308	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Define i) Resistance ii) Current	R	1	
	b)	State Kirchoff's Voltage law.	R	1	
	c)	Determine equivalent voltage source for the current source shown in following figure.	A	2	
	d)	State Thevenin's theorem.	R	3	
	e)	State Maximum power transfer theorem.	R	3	
	f)	What is the power in watts if 50 Joules of energy is used in 2.5 seconds.	U	1	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Calculate the voltage across resistor R_3 in figure (A) and calculate the value of current I_4 in figure (B)	A	1	
	b)	Give the difference between short circuit and open circuit.	U	1	
	c)	Find the value of current (I) by using Mesh analysis. For the circuit shown in following figure.	A	2	
	d)	Explain i) Ideal and practical voltage source (Any two points) ii) Ideal and practical current source (Any two points)	U	2	
	e)	Determine Norton's equivalent circuit for the circuit shown in (Refer diagram)	A	3	
	f)	Calculate current following through 3Ω resistor by using superposition theorem.	A	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Explain in detail Ohm's law with neat circuit diagram and equations.	U	1	
	b)	Determine the total amount of power in following circuit.	A	1	
	c)	Calculate the total resistance in the given network between points A & B. (Refer diagram)	A	2	
	d)	What is nodal analysis. Explain in detail with suitable example.	U	2	
	e)	For the given circuit, calculate maximum power to it. Also calculate the value of maximum power transfer in load resistor (R_L)	A	3	
	f)	Determine Thevenin's equivalent circuit between terminals a & b for the network shown in (Refer diagram)	A	3	

P.T.O. 1/4

QN	SQN	QUESTION TEXT	RUA	CO EIG 308	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	State concept of RC time constant.	R	4	
	b)	Define decibel measurement.	R	6	
	c)	List applications of resonance circuit.	R	5	
	d)	Sketch waveform to represent phase relationship between current & voltage in capacitor.	R	4	
	e)	Draw the circuit of parallel resonant band pass filter.	R	6	
	f)	State formula for quality factor in series resonance.	R	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain concept of impedance & admittance.	U	4	
	b)	A resistor of 10Ω & inductance of 0.1 H are connected in series across 230v, 50Hz supply. Find i) Reactance ii) Impedance iv) Current iv) Phase angle.	A	4	
	c)	Compare series & parallel resonance circuit (Any 4 points)	U	6	
	d)	Explain series resonance band stop filter with frequency response.	U	6	
	e)	Explain series resonance in R-L-C circuit. Derive formula for resonant frequency.	U	5	
	f)	Explain R-L high pass filter with circuit diagram & frequency response.	U	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Derive the equation for charging of capacitor with its curve.	U	4	
	b)	Determine admittance for circuit shown below. 	U	5	
	c)	Calculate resonance frequency for series R-L-C circuit, where R = 10 Ω , L = 25mH , C = 100 μf also find quality factor.	A	5	
	d)	Explain parallel band stop filter.	U	6	
	e)	Explain series resonant band pass filter with frequency response.	U	6	
	f)	Explain concept of Roll off rate.	U	6	

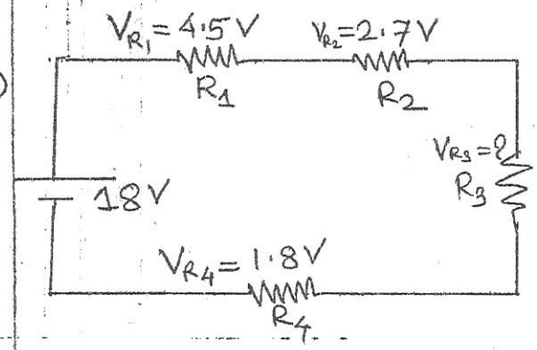
****

1 a)

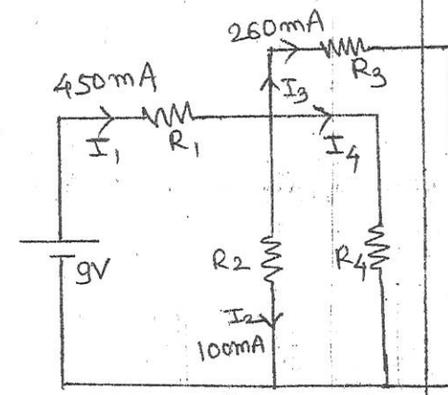


Q1 (a)

2 a)

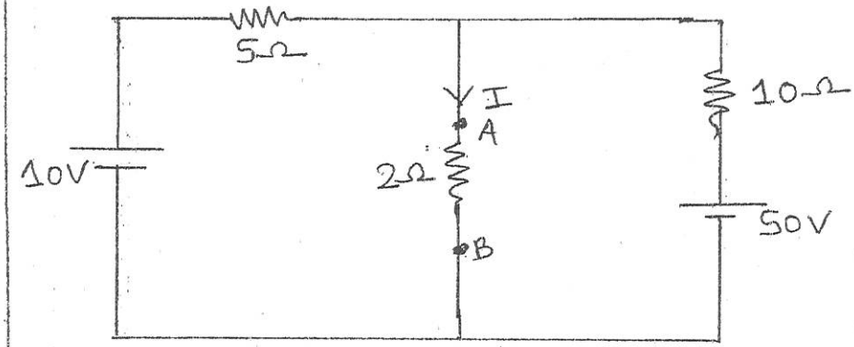


(a)

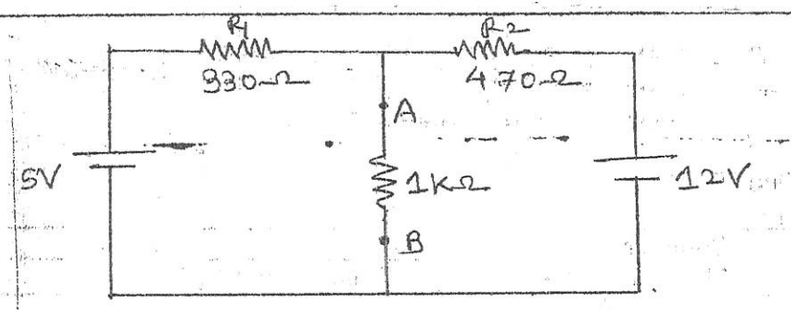


(b)

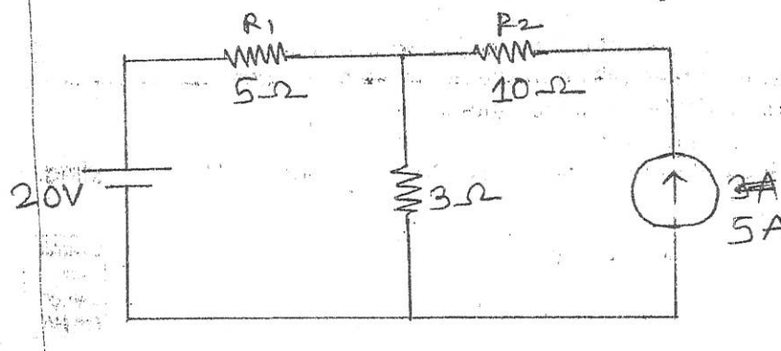
2 c)



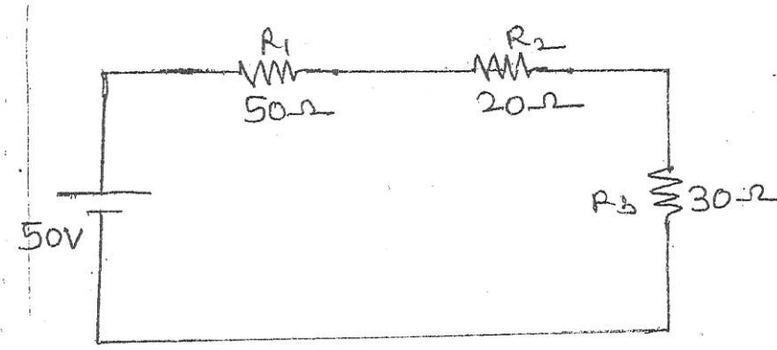
2 e)



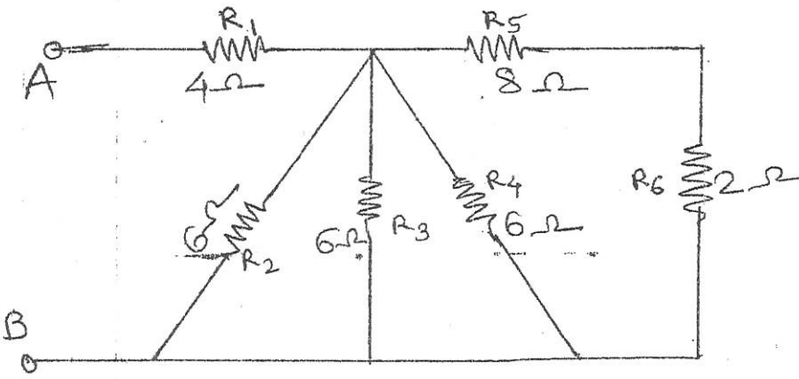
2 f)



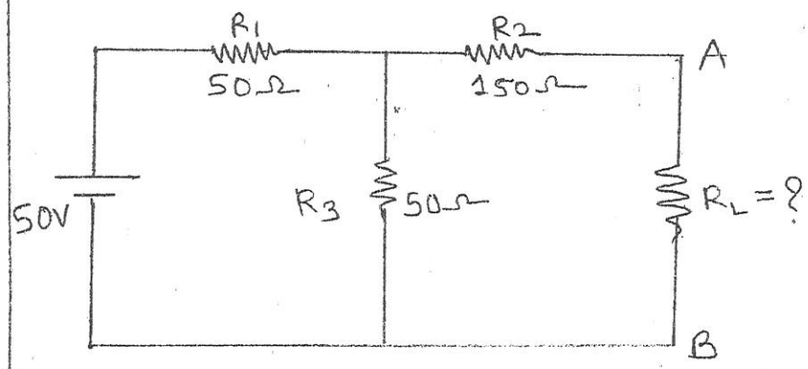
3 b)


R1
50Ω
R2
20Ω
50V
R3
30Ω

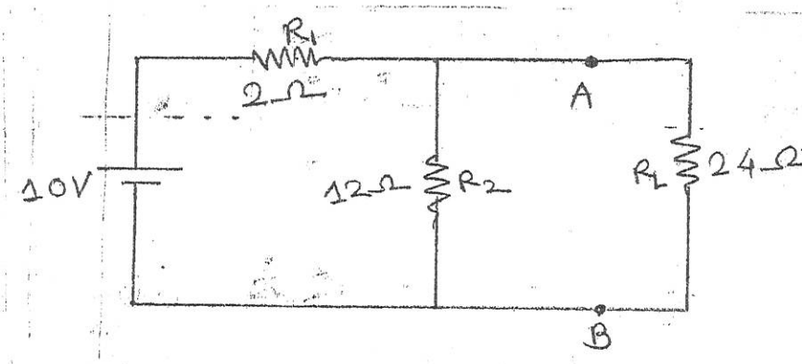
3 c)


A
R1
4Ω
R5
8Ω
R2
6Ω
R3
6Ω
R4
6Ω
R6
2Ω
B

3 e)


R1
50Ω
R2
150Ω
A
50V
R3
50Ω
RL = ?
B

3 f)


R1
2Ω
A
10V
12Ω
R2
RL
24Ω
B

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 04 PROGRAM : ET

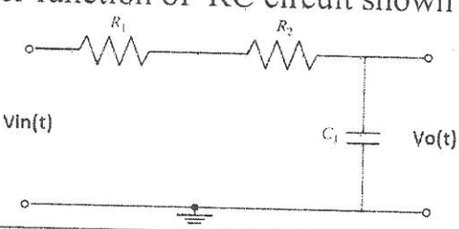
COURSE CODE :- EIG406 / EIF404

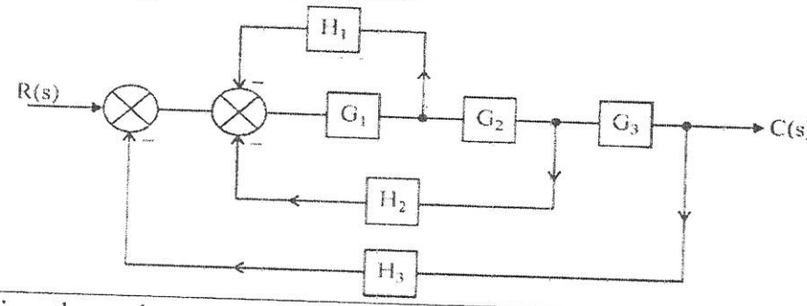
COURSE NAME :- Principles of Control System

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 27/5/23

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) 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	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define transfer function of closed loop system. Give equation for standard transfer function of closed loop control system.	R	EIG406-1	
	b)	Define control system. State any two examples for control system.	R	EIG406-1	
	c)	Find the Poles and Zeros of following control system if feedback gain is unity. $$G(s) = \frac{(S^2 - 4)}{S(S^2 + 5s + 6)}$$	A	EIG406-2	
	d)	Give two advantages and two disadvantages of frequency domain analysis.	U	EIG406-3	
	e)	Define gain crossover frequency and phase crossover frequency related to frequency domain analysis.	R	EIG406-3	
	f)	Give correlation between time and frequency domain specifications.	U	EIG406-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare open loop and closed loop control system based on block diagram, transfer function, stability and example.	U	EIG406-1	
	b)	Derive the transfer function of RC circuit shown in figure 	A	EIG406-1	
	c)	Enlist the different standard test signals. Draw them and give their Laplace representation.	R	EIG406-2	
	d)	Draw the time response specification of second order control system and define (i) rise time (ii) peak time (iii) peak overshoot (iv) settling time.	U	EIG406-2	
	e)	For the system having closed loop transfer function $$\frac{C(s)}{R(s)} = \frac{18}{S^2 + 4S + 18}$$ Determine: i) ω_d ii)Peak time iii) % Peak overshoot and iv) Settling time	A	EIG406-2	
	f)	Write down the steps for solving Bode Plots.	A	EIG406-3	

Q.3		Attempt any **Two:**			**16**
	a)	i)Find the order of the system with unity feedback: $$G(s) = \frac{100(s+5)(s+50)}{S^3(s+10)(S^2+3s+10)}$$	U	EIG406-1	
		ii) Find the transfer function of block diagram shown in figure using block diagram reduction rule 	A	EIG406-1	
	b)	i) Derive the unit step response of second order over damped control system. Draw the response curve.	U	EIG406-2	
		ii) For given transfer function T.F. = $$TF = \frac{(s+2)}{S(S^2+7s+12)(S^2+2s+2)}$$ Find: (i) Poles (ii) Zeros (iii) Characteristic equation and iv) plot the S-plane with poles, zeroes for the system.	A	EIG406-2	
	c)	For unity feedback control system $$G(s) = \frac{10}{S(s+1)(s+10)}$$ Determine the stability of the system by plotting Bode plot of the system.	A	EIG406-3	

P.T.O.

P-2/3

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - Fourth PROGRAM : Electronics and Telecommunication

COURSE CODE :- EIG 406/EIF404

COURSE NAME :- Principles of control system

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-27/5/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define stable systems with location of roots.	R	EIG 406-4	
	b)	Define critically stable and conditionally stable system?	R	EIG 406-4	
	c)	Classify the types of servo motor.	R	EIG 406-5	
	d)	Define offset in proportional control action.	R	EIG 406-6	
	e)	State any two advantages of PI mode.	R	EIG 406-6	
	f)	Sketch block of Process control system.	R	EIG 406-6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain the procedure of root locus technique.	U	EIG 406-4	
	b)	A system has G(S) H(S) = $\frac{K}{S(S2+S+1)(S+4)}$ Where K is positive. Determine the range of 'K' values for system stability.	A	EIG 406-4	
	c)	Explain servo system with block diagram,	U	EIG 406-5	
	d)	Compare between armatures controlled and field controlled Dc servo motor.(any 4)	U	EIG 406-5	
	e)	Compare P, I, D control action on the basis of i) Nature of output ii) Response of error iii) Equation iv) application.	U	EIG 406-6	
	f)	Write mathematical equation for derivative control action. Explain why derivative control action is not used alone.	U	EIG 406-6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Check the stability using Routh's stability criterion for $S^6+2S^5+8S^4+12S^3+20S^2+16S+16=0$	A	EIG 406-4	
	b)	Explain unstable system with necessary conditions and draw locations of roots in S-plane.	U	EIG 406-4	
	c)	Sketch neat diagram of rotary encoder and explain it.	U	EIG 406-5	
	d)	Explain the principle of operation of variable reluctance type stepper motor.	A	EIG 406-5	
	e)	Sketch and explain potentiometer as an error detector.	A	EIG 406-5	
	f)	Sketch and explain PID controller using op-amp. Write its equation.	A	EIG 406-6	

****

P-3/3

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **INFORMATION TECHNOLOGY**

COURSE CODE :- **ITG306**

COURSE NAME **COMPUTER NETWORK**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **26/ 05 / 2023**

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	SQN	Question Text	R/ U/ A	Co ITG 306	Marks
					08
Q.1		Attempt any **FOUR:**			
	a)	Define computer network.	R	1	
	b)	State any two advantages of star topology.	R	1	
	c)	Define guided media.	R	1	
	d)	State any two advantages of Co-axial cable.	R	1	
	e)	State different types of networking devices.	R	2	
	f)	Define ALOHA.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe the concept of centralized and distributed computing.	U	1	
	b)	A computer network lab containing 50 nodes having peer to peer relationship used for training purpose, the rest of network must keep on working even after either node fails. Which topology should be used? Explain in detail.	A	1	
	c)	Explain the concept of switches with neat labelled diagram.	U	2	
	d)	Explain the concept of fiber optic cable with neat diagram.	U	2	
	e)	Explain pure ALOHA with neat labelled diagram.	U	3	
	f)	Differentiate between CSMA/CD and CSMA/CA.	A	3	
Q.3		Attempt any **TWO:**			16
	a)	i) Describe the advantages and disadvantages of computer network. ii) Explain random access ALOHA.	U U	1 3	
	b)	Explain OSI reference model with neat labelled diagram.	U	2	
	c)	Explain the concept of LAN and WAN in detail.	U	1	

P.T.O

QN	SQN	Question Text	R/U/A	Co ITG 306	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Enlist application of Gigabit Ethernet.	R	4	
	b)	Write uses of Bluetooth.	R	4	
	c)	State classful addressing.	R	5	
	d)	What is CIDR?	R	5	
	e)	Define Telnet.		6	
	f)	Enlist MIME header format.		6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain Bluetooth architecture in detail.	U	4	
	b)	Illustrate the Ethernet implementation of 10 base 2 and 10 base 5.	U	4	
	c)	Describe UDP-TCP functionality.	U	5	
	d)	Explain TCP/IP protocol suite with diagram.	U	5	
	e)	Explain SMTP in detail.	U	5	
	f)	Explain user agent and MTA.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain Fast Ethernet in detail.	U	4	
	b)	Explain IEEE802.11 architecture with frame format.	U	4	
	c)	Describe IPV4 addresses.	U	5	
	d)	Define socket. Explain in brief UDP socket programming.	U	5	
	e)	Describe FTP in detail.	5	4	
	f)	Differentiate between POP& IMAP.	A	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **FIRST** PROGRAM: **ELECTRONICS & TELECOMMUNICATION**

COURSE CODE: **EIG101** COURSE NAME: **Electronics Components & Applications**

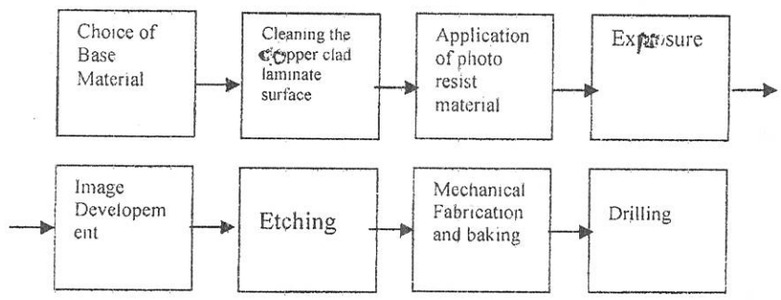
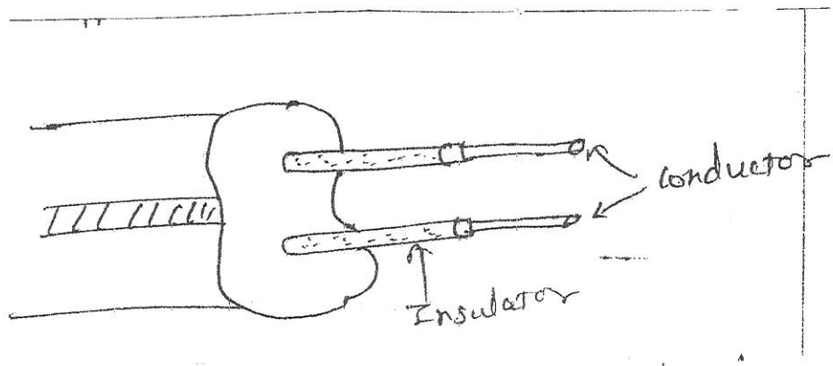
MAX. MARKS: **80** TIME: **3 HRS.** DATE: **25/05 /2023**

Instruction :-

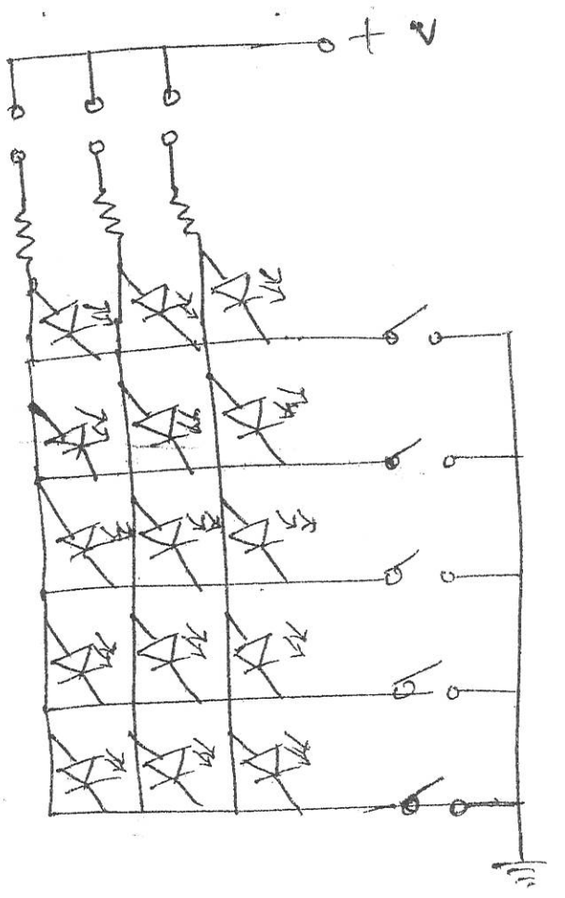
1) Answer two sections must be written in separate section answer book provided. (and supplements if required)
2) Illustrate your answers with sketches where ever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables will be made available on request.
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	SQN	QUESTION TEXT	RUA	CO EIG 101	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Draw the symbol of LDR and its characteristics.	R	1	
	b)	Give the classification of capacitors.	A	2	
	c)	Draw the symbol of Iron core and Ferrite core inductor.	R	3	
	d)	Define following terms related to capacitors. i) Capacitor working voltage. ii) C/V Ratio.	R	2	
	e)	State any four applications of inductors.	A	3	
	f)	Give color codes for following resistors. i) 33KΩ ±10% ii) 220 Ω ±05%	U	1	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw the construction diagram of air gang capacitor and describe the working of the same.	U	2	
	b)	Compare potentiometer & Trimmer Resistor. (Any four Points)	A	1	
	c)	Draw and explain working principle of Slug tunned Inductor.	U	3	
	d)	Describe the following parameters w.r.t. resistors. i) Maximum voltage rating. ii) Power rating. iii) Temperature coefficient. iv) Tolerance.	U	1	
	e)	List the applications of Aluminium electrolytic capacitors.	U	2	
	f)	Define : i) Self inductance ii) Mutual Inductance iii) Inductive Reactance iv) Q factor.	R	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Compare carbon film and wire wound resistors on the basis of construction, specifications and applications.	A	1	
	b)	List the types of frequency range inductors and describe Toroidal inductor.	U	3	
	c)	Differentiate between ironcore and ferrite core inductor. (Any four Points)	A	3	
	d)	Find the value of capacitor if following code is printed on body of capacitor i) 102 ii) 422 iii) 3K3 iv) 22K	A	2	
	e)	Draw and describe the constructional diagram of wire wound resistors.	U	1	
	f)	Draw the construction diagram of ceramic capacitor and describe the same.	U	2	

QN	SQN	QUESTION TEXT	RUA	CO EIG 101	Marks
Q.4		Attempt any **ONE**			**(08)**
	a)	Give the two advantages of PCB	R	6	
	b)	List types of cable.	R	4	
	c)	Define SMD.	U	6	
	d)	Define the following specification of Relay. i) Operating time ii) Ii) Electrical Life.	U	5	
	e)	Draw the constructional diagram of push to on switch.	R	5	
	f)	Give the classification of IC.	R	6	
Q.5		Attempt any **ONE**			**(16)**
	a)	Explain general purpose Relay with help of constructional diagram.	U	5	
	b)	Draw the diagram of BNC connector and give the two application of it.	R	4	
	c)	Explain the following type of printer connector with help of diagram i) Min Din – 8 ii) DB – 9	U	4	
	d)	Identify the given diagram and explain it. 	A	5	
	e)	Show the alphabetic character 'C' using common anode seven segment display and explain the common anode seven segment display.	A	4	
	f)	Draw and explain construction of optical fiber cable.	U	5	
Q.6		Attempt any **FOUR**			**(1(**
	a)	Explain process for preparation of IC with help of flowchart.	U	6	
	b)	Explain the slide switch with help of constructional diagram.	U	5	
	c)	Suggest the suitable cable and connector for the following applications. i) Input of CRO ii) Telephone handset.	A	4	
	d)	Define the following specification of switch. i) Characteristic impedance, ii) Current carrying capacity iii) Flexibility	U	5	
	e)	Identify type of cable from given diagram and state any two application of it. 	A	4	

P.T.O.

	f)	Identify the type of display and explain it. 	A	5	

****