GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : Electronics &Telecommunication

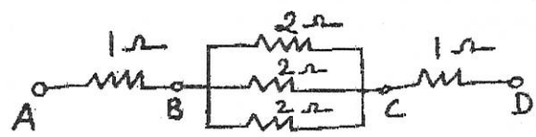
COURSE CODE :- ETH 104

COURSE NAME :- ELECTRICAL ENGINEERING

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 11/5/2024

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	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Define resistance and state its unit.	R	1	02
	b)	Define Magneto Motive Force.	R	2	02
	c)	Define Magnetic Hysteresis.	R	2	02
	d)	Define flux density and state its unit.	R	2	02
	e)	State the equation of dynamically induced emf and state unit of emf.	R	3	02
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Compare series and parallel connection of resistances. (any four points)	R	1	04
	b)	Calculate the equivalent resistance between points A and D in Fig No.1  **Fig. No. 1**	A	1	04
	c)	Draw and explain 'B-H Curve' of a magnetic and non magnetic material.	U	2	04
	d)	An iron ring of mean circumference 0.8m and area of cross section of $20cm^2$ is uniformly wound with 400 turns of wire. It carries 1.6 A and produces a flux of 11mWb. Find permeability of the material.	A	2	04
	e)	State and explain Faraday's laws of electromagnetic induction.	R	3	04
	f)	A coil consisting of 120 turns is placed in the magnetic field of 0.8 mWb. Calculate the average emf induced in the coil when it is moved in 0.08 seconds from the given field to 0.3 mWb. If the resistance of coil is 200Ω, find the induced current in the coil.	A	3	04
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Write any six differences between direct current and alternating current.	U	1	06
	b)	Give any three similarities and dissimilarities between electric and magnetic circuits.	U	2	06
	c)	Explain the generation of single phase ac supply by an elementary alternator with neat sketch.	U	3	06

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : ELECTRONICS &TELECOMMUNICATION

COURSE CODE :-ETH104

COURSE NAME :- ELECTRICAL ENGINEERING

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 11/5/2024

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Define RMS value.	R	4	
	b)	State peak factor with its formulae.	U	4	
	c)	Define reactive power with its unit.	R	5	
	d)	Draw RLC series circuit with neat label.	U	5	
	e)	Define transformer.	U	6	
	f)	Classify the transformer on the basis of transformer core.	R	6	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Explain generation of emf with suitable diagram.	U	4	
	b)	Define the following terms:- 1.Frequency 2.time period 3.Amplitude 4.cycle.	U	4	
	c)	Draw and explain purely inductive circuit with waveform, phasor diagram and voltage and current equation.	A	5	
	d)	Explain the basic principle of working of single phase induction motor.	U	6	
	e)	Define earthing and state necessity of it for consumer premises.	U	6	
	f)	State the function of instrument transformer and isolation transformer.	A	6	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Do multiplication and division of (10 - j4) and (15 + j8) and give answer in polar form.	A	4	
	b)	Draw R-C series circuit with waveform, phasor diagram, impedance triangle, voltage and current equation.	A	5	
	c)	Draw a constructional diagram of transformer and explain working of it.	U	6	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : ENTC

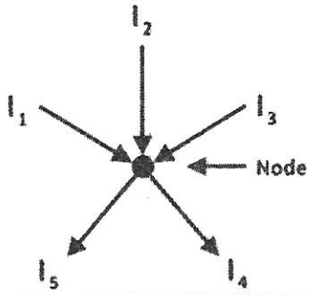
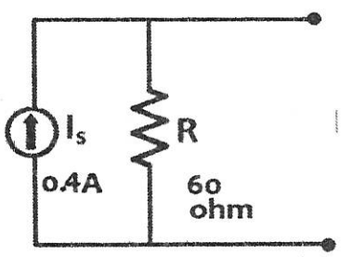
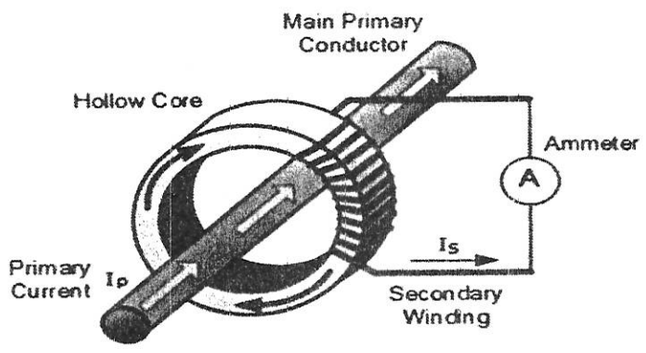
COURSE CODE :- ETH101

COURSE NAME :- Basic Electronics-1

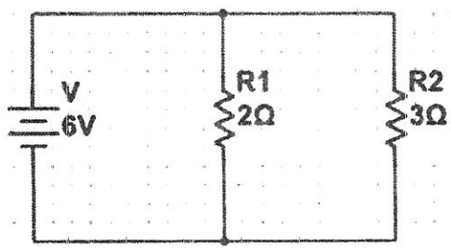
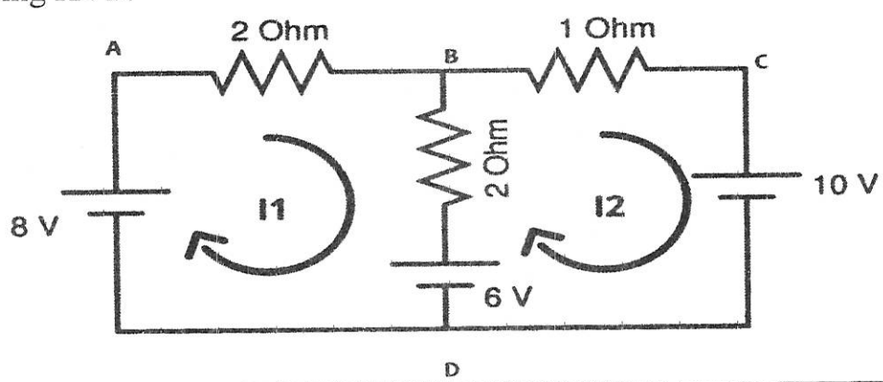
MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 18/5/2024

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	Question Text	R/U/A	Co ETH101	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Define the KCL and state its equation for following circuit. 	U/A	1	
	b)	Define the dynamically induced emf.	R	3	
	c)	Compare short circuit and open circuit based on (i) Definition (ii) Circuit Current	U	1	
	d)	Define phase difference between two sine wave and draw the waveform of it.	R	2	
	e)	Convert a current source into its an equivalent voltage source. 	A	1	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Identify the given diagram shown below. Explain the working of it and state two application. 	A	3	

P. T. O. 1/3

	b)	Calculate the currents through R_1 and R_2 in the parallel circuit using current division rule. 	A	1	
	c)	Explain Phase relationship between voltage and current through a resistor with neat circuit diagram and waveform	U	2	
	d)	Explain the use of Dot convention in the transformer with help of diagram.	U	3	
	e)	The equation for an alternating voltage is given by V(t) = 50 sin 314t. Find the (1) Peak value, (2) Frequency, (3) Time period and (4) Peak to peak value	A	2	
	f)	Define the Practical Current Source. Draw the symbol and Ideal and Practical Characteristics of it.	U	1	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Draw the constructional diagram of Step-down transformer. Explain working of Step-down transformer. Also draw symbol of Iron core and ferrite core transformer.	U	3	
	b)	Determine the current flowing through branch AB, BC and BD using KVL. 	A	1	
	c)	(1) Define the following terms of AC fundamentals (i) Peak Value (iii) RMS value (ii) Frequency of sine wave (iv) Instantaneous value	U	2	
		(2) The equation for an alternating current is given by i = 65 sin 314t. Find an instantaneous value at t = 2ms.	A	2	

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SUMMER – 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : Electronics and Telecommunication

COURSE CODE :- ETH101

COURSE NAME :- Basic Electronics

MAX. MARKS : 70 TIME : 3 Hrs DATE :- 18/5/2024

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Define the knee voltage. State the typical values of knee voltage of germanium diode.	R	4	2
	b)	Draw V-I characteristics of PN junction diode	R	4	2
	c)	State the need of filter.	U	5	2
	d)	State any two advantages of Full wave Bridge wave rectifier.	U	5	2
	e)	State the need of wave shaping circuits	U	6	2
	f)	Draw circuit diagram of positive and negative clipper	U	6	2
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Draw and explain VI characteristics of Zener diode.	U	4	4
	b)	Explain Avalanche breakdown in PN junction diode.	U	4	4
	c)	Explain working of Full Wave Bridge rectifier. Draw its input output waveforms.	U	5	4
	d)	An a.c supply of 230V is applied to half wave rectifier circuit through a transformer turns ratio 10:1. Find d.c. output voltage and PIV of a diode.	A	5	4
	e)	Differentiate between Clipper and Clamper.(any four points)	R	6	4
	f)	Explain the working of positive clamper with neat circuit diagram and draw the waveforms at input & output of clamper	U	6	4
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Explain Zener diode as voltage regulator with the help of circuit diagram.	R	4	6
	b)	Draw and explain the working of CLC filter with full wave rectifier with neat diagram and waveforms.	U	5	6
	c)	(i) Design a clamper circuit to limit -Ve peak output to -8V when the input is 20V square wave varying about 0V. (ii) What is output if $20V_{pp}$ Sine wave at 1 kHz is applied at the input of +Ve biased +Ve clipper with reference voltage of 5V . Draw input and output waveforms.	A	6	6

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : Electronics and Telecommunication

COURSE CODE :- EIG101/EIF101

COURSE NAME :-Electronics components and application

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-24/5/2024

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	Question Texts	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**		EIG101	**08**
	a)	Define Passive components with two examples.	R	1	
	b)	Draw Equivalent circuit of resistors.	R	1	
	c)	Classify Capacitors.	R	2	
	d)	Define Inductor and its inductance.	R	3	
	e)	List Fixed inductors.	R	3	
	f)	Define Mutual-inductance	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain constructional diagram of Standard wire wound resistors with two applications.	U	1	
	b)	Calculate the color code of following resistor values. i) 23.4KΩ±02% ii)560KΩ ±02% iii)8.2KΩ± 5% iv)1MΩ±10%	A	1	
	c)	Explain constructional diagram of Aluminum Electrolytic Capacitor with two applications	U	2	
	d)	Calculate the value of capacitors by means of characters i) 33k ii) 1k	A	2	
	e)	Compare Air core inductor with Ferrite core inductor (any 4)	U	3	
	f)	Explain constructional diagram of Slug-tuned inductor.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Calculate the value of fixed resistors using color code i) Red ,Orange, yellow, red ii) Green, blue, yellow, red	A	1	
	b)	Explain constructional diagram of Rheostat with two applications.	U	1	
	c)	Explain constructional diagram of Trimmer Capacitor with two applications	U	2	
	d)	Calculate the value of capacitors using numerals i) 225 ii) 124	A	2	
	e)	Calculate the value of capacitors using color code iii) Orange, Yellow ,White iv) Yellow,Violet,Orange	A	2	
	f)	Explain constructional diagram of Ferrite core inductor with two advantages.	U	3	
				P.T.O.	

QN	SQN	Question Text	R/U/A	Co EIG 101	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List the different types of switches.	R	5	
	b)	Define characteristics impedance with respect to cable.	R	4	
	c)	State the basic difference between switch and relay.	U	5	
	d)	State any two applications of Dry reed relay.	A	5	
	e)	State the basic concept of SMT.	R	6	
	f)	State the applications of BNC connectors.	A	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	State the different IC packages. Draw any two of them.	R	6	
	b)	Draw the constructional diagram of General purpose Relay. Describe its working principle.	U	5	
	c)	Draw the artwork layout of single stage common emitter Amplifier.	A	6	
	d)	Draw and explain the construction of cable connector used for CRO.	A	4	
	e)	Define the following characteristics of Relay: i) Release time ii) Bounce time. iii) Operating time iv) Electrical lite.	R	5	
	f)	State any two general applications of following connectors : i) RJ 45 ii) D-type connector.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Describe the construction and applications of FRC cable.	A	4	
	b)	State the working principle of LED and draw the neat diagram of common cathode 7 segment display.	R	5	
	c)	Compare LED and LCD display (any Four points)	A	5	
	d)	List different properties of copper clad laminate.	U	6	
	e)	Compare rotary switch and slide switch. (any four points)	A	5	
	f)	State general specifications of cable and describe any two.	U	4	

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EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EIG103 / EIF103**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **25 / 05 / 2024**

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.
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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 EIG 103	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State any two specifications of P-N junction diode.	R	1	
	b)	State any two pentavalent impurities added in extrinsic semiconductor.	R	1	
	c)	Draw input and output waveforms of halfwave rectifier.	R	2	
	d)	Draw the symbol of NPN and PNP transistor.	R	3	
	e)	List any two applications of transistor.	R	3	
	f)	In a common base connection, a certain transistor has an emitter current of 10mA and a collector current of 8.7mA. Calculate base current.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Differentiate between Intrinsic and Extrinsic Semiconductors.	A	1	
	b)	Define following terms:- i) Depletion layer. ii) Breakdown voltage iii) Reverse saturation current. iv) Barrier potential.	U	1	
	c)	Draw the diagram of CLC filter with respect to full wave bridge rectifier.	U	2	
	d)	Give the following parameter values corresponding to full wave center tap rectifier. i) Average dc output voltage ii) Ripple factor iii) Rectifier efficiency iv) Peak Inverse voltage (PIV)	A	2	
	e)	Derive the relation between α and β.	U	3	
	f)	A change of 8.0mA in the emitter current brings a change of 7.9mA in the current collector. Calculate the values of α and β.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain working principle of NPN transistor.	A	1	
	b)	For BJT, if $\alpha = 0.98$ and $I_E = 11mA$. Calculate β, I_C and I_B.	A	3	
	c)	Explain the operation of Zener diode in Zener breakdown mode.	A	1	

P.T.O

	d)	Define following terms with respect to transistor. i) Collector – base voltage (V_{CB}) ii) Collector – emitter voltage (V_{CEO}) iii) Maximum collector dissipation (P_C) iv)collector current (I_C)	U	3	
	e)	Compare halfwave and full wave bridge rectifier with respect to following parameters. i) Ripple factor ii) Rectifier efficiency. iii) TUF iv) Input and output waveforms.	A	2	
	f)	Explain the need of filter and state its types.	A	2	
Q.4		Attempt any **FOUR:**			**08**
	a)	List types of biasing circuits with respect to transistors.	R	4	
	b)	Define operating point of transistor.	R	4	
	c)	State function of 'Gate', 'Source' and 'Drain' terminals of FET.	R	5	
	d)	Draw symbols of i) N-channel D-MOSFET ii) N-channel E-MOSFET	R	5	
	e)	List specifications of Zener diode.	R	6	
	f)	Define line regulation. State formula for its regulation.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw the single stage RC coupled amplifier circuit and explain its operation.	U	4	
	b)	Explain in short: i) Drain resistance ii) Trans conductance iii) Amplification factor iv) Pinch-off voltage of FET.	U	5	
	c)	Explain voltage divider bias method of transistor with diagram.	U	4	
	d)	Explain operation of N-channel enhancement type MOSFET (E-MOSFET) with suitable diagram.	U	5	
	e)	Draw circuit of Zener diode as voltage regulator and explain its working.	U	6	
	f)	Draw block diagram of DC regulated power supply and explain function of each block.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw two stage RC coupled amplifier and sketch its frequency response.	U	4	
	b)	Explain thermal runway. How it can be avoided?	A	4	
	c)	Sketch drain characteristics of FET showing different operating regions and briefly explain each region.	U	5	
	d)	Compare BJT and FET on basis of i) Symbol ii) Input impedance iii) Thermal stability iv) Charge carrier polarity.	A	5	
	e)	Sketch functional pin diagram of IC 78xx and explain the function of each block.	A	6	
	f)	Sketch functional block diagram of IC723.	A	6	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : -V PROGRAM : Industrial Electronics

COURSE CODE- IEG504 / IEF501

COURSE NAME :- Power Electronics- II

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 22/5/2024

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 MOSFET.	R	1	
	b)	Give classification of Chopper.	R	2	
	c)	Define Cycloconverter, Give its two types.	R	2	
	d)	What is need of SMPS.	R	3	
	e)	Enlist different types of regulators.	R	3	
	f)	List applications of Chopper.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare MOSFET & GTO.	U	1	
	b)	Draw quadrant diagrams of chopper AND classify them.	U	2	
	c)	List applications of IGBT and GTO.	A	1	
	d)	Draw and explain working of Step down chopper with its waveform.	U	2	
	e)	Differentiate between SMPS and linear regulators.	U	3	
	f)	Explain operating principle of Jones chopper with its circuit.	A/U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain operating principle of IGBT and state its applications.	A	1	
	b)	With neat circuit diagram explain working of three phase to single phase Cycloconverter.	A	2	
	c)	Draw and explain working principle for relay type regulator.	A	3	
	d)	With neat block diagram explain operation of SMPS.	U	3	
	e)	Draw and explain construction of GTO.	U	1	
	f)	Explain working of Step up chopper with its circuit and waveforms.	U	2	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM : IE

COURSE CODE :- IEG 504/IEF501

COURSE NAME :- Power Electronics 2

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-22/5/2024

QN	SQN	**SECTION –II**	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Classify inverters.	R	4	
	b)	Give any four specifications of UPS.	R	5	
	c)	Draw crowbar protection circuit.	R	6	
	d)	Give basic principle of inverter.	R	4	
	e)	Explain need of protection circuit.	U	6	
	f)	Define over current protection.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw and explain simple bridge inverter with R load.	U	4	
	b)	With help of block diagram, explain UPS.	U	5	
	c)	Explain 1) current fold back 2) spike suppressor	U	6	
	d)	With circuit diagram and waveforms , explain PWM inverter.	U	4	
	e)	Explain operating principle of snubber circuit . Give its function.	U	6	
	f)	Explain Mc Murray Bed Ford commutation.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain Mc Murray commutator.	U	4	
	b)	Compare online UPS and offline UPS(4 points)	U	5	
	c)	Explain optoisolator.	U	6	
	d)	Explain voltage source parallel inverter with RL load.	U	4	
	e)	Draw and explain line interactive UPS.	U	5	
	f)	Explain zero voltage switching.	U	4	

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EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRONICS AND TELECOMMUNICATION/~~IE~~**

COURSE CODE :- **EIG303**

COURSE NAME **ELECTRONICS MEASURING INSTRUMENTS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **21/ 05 / 2024**

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 EIG 303	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	How many arms are there in the bridge circuit? What is bridge balance condition?	R	2	
	b)	List types of instruments with one example each.	R	1	
	c)	Name any four A.C. Bridges.	R	2	
	d)	Define i) Active transducer ii) Analog transducer.	R	3	
	e)	Define i) Lag ii) Speed of response.	R	1	
	f)	Define i) ADC and ii) DAC	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Which type of bridge is Wheatstone's bridge? Explain its working with a neat diagram.	R/U	2	
	b)	Explain with neat diagram successive approximation type DVM.	U	3	
	c)	Explain working of capacitance comparison bridge with neat diagram.	A	2	
	d)	Draw neat diagram of digital frequency meter and explain its working.	R/U	3	
	e)	Define Error. Write down different types of errors with appropriate example.	R/U	1	
	f)	Kelvin's bridge is derived from which bridge? Explain its working with neat circuit diagram.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain four selection criteria for transducer.	A	3	
	b)	Draw and explain Hay's bridge.	A	2	
	c)	Explain the working principle of RTD. State its types and applications.	A	3	
	d)	Define calibration. What is need of calibration?	U/A	1	
	e)	Explain the working of Maxwell bridge with neat circuit diagram.	A	2	
	f)	With neat block diagram explain the working of LCR-Q-METER.	A	3	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

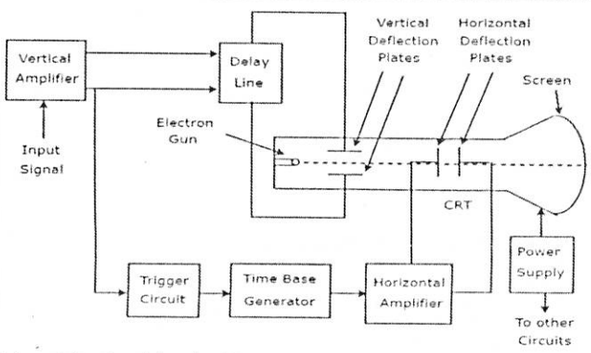
EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : IE / E&TC

COURSE CODE :-EIG303

COURSE NAME :- ELECTRONICS MEASURING INSTRUMENTS

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 21 / 5 / 2024

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State any two features of recorders.	A	5	2
	b)	State the necessity of recorders.	R	5	2
	c)	List the applications of CRO (any 2 points).	R	4	2
	d)	State the reason why delay line is provided in vertical deflection plates of CRO.	R	4	2
	e)	State the uses of function generator (any 2 points).	R	5	2
	f)	State the difference between AF signal generator and RF signal generator (any 2 points).	R	5	2
Q.5		Attempt any **FOUR:**			**16**
	a)	 Identify the block diagram of the figure shown above and state the function of trigger circuit, horizontal deflection plates and power supply.	A	4	4
	b)	Draw the diagram of active CRO probes and explain its operation.	U	4	4
	c)	With the help of neat block diagram explain the operation of X-Y recorder.	U	5	4
	d)	With the help of neat block diagram explain the operation of digital storage oscilloscope (DSO).	U	4	4
	e)	With the help of block diagram explain the operation of spectrum analyzer.	A	5	4
	f)	What are the advantages of digital recorders?	U	5	4
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw a neat labeled diagram of cathode ray tube (CRT).	R	4	4
	b)	With the help of neat block diagram explain the operation of function generator.	U	5	4
	c)	Differentiate between dual trace CRO and dual beam CRO (any 4 points).	U	4	4
	d)	With the help of neat block diagram explain the operation of logic analyzer.	U	5	4
	e)	Explain in brief the applications of strip chart recorder (any 4 points).	A	5	4
	f)	Draw a neat block diagram of pulse generator explain its operation.	U	5	4

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **ETG311**

COURSE NAME **BASIC OF POWER ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **20/ 05 / 2024**

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)	Draw symbol of DIAC. Draw its V-I characteristics.	R	1	
	b)	State the advantage of RC triggering over R-triggering.	R	2	
	c)	Define commutation and list different methods of commutation.	R	3	
	d)	State the necessity of parallel connection of SCR.	R	4	
	e)	State the meaning of controlled rectification.	R	5	
	f)	State the drawback of class A commutation over class B commutation.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain working of SCR with V-I characteristics.	U	1	
	b)	Draw the circuit of PUT relaxation oscillator with waveforms and explain it.	U	2	
	c)	Draw the circuit of class D commutation and explain it.	U	3	
	d)	State the necessity of dynamic equalizing circuit. Draw this circuit and explain it.	U	4	
	e)	Draw the circuit of half wave controlled rectifier with resistive load and explain with waveforms.	U	5	
	f)	Draw the circuit of full wave bridge controlled rectifier with freewheeling diode and explain with waveforms.	U	5	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain V-I characteristics of Triac.	U	1	
	b)	Draw the circuit of lamp dimmer using Triac and explain it.	U	2	
	c)	State the characteristics of Ideal switch. Explain class F commutation.	U	1 3	
	d)	Define holding current and latching current of SCR. State the necessity of parallel connection of SCR.	U	1 4	
	e)	Draw and explain circuit of full wave bridge controlled rectifier with resistive load and explain with waveforms.	U	5	
	f)	Define power factor. Why it decreases for inductive load? How it can be improved?	U	5	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : Electrical Engineering

COURSE CODE: - **EEH103**

COURSE NAME: - **BASIC ELECTRONICS**

MAX. MARKS: **35** TIME: **02 Hrs** DATE: -18/5/2024

Instruction :-

1) Preferably write questions in sequential order.
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.
5) Use of Mobile is strictly prohibited.
6) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/ U/ A	Co-EEH 103-	Marks
Q.1		Attempt any **FOUR: (2X4)**			**08**
	a)	Define the term 'knee voltage' of P-N junction diode.	R	1	02
	b)	Identify the following components: 	A	1	02
	c)	State necessity of filter.	R	2	02
	d)	Define Rectifier. State types of rectifiers.	R	2	02
	e)	State any two applications of BJT.	A	3	02
	f)	Sketch symbol of NPN and PNP transistor.	R	3	02
Q.2		Attempt any **THREE: (5X3)**			**15**
	a)	Explain forward and reverse biased VI characteristics of PN junction diode.	U	1	05
	b)	Define Trivalent and Pentavalent impurity atom with one example. Compare PN junction diode & zener diode with following points: (i) Doping concentration (ii) Direction of current flow and (iii) Application	R/U	1	05
	c)	Draw half wave rectifier with π filter. Also draw its input and output waveforms.	U	2	05
	d)	Explain the working of transistor as a switch. State the region in which transistor works as an amplifier.	U/R	3	05
	e)	Convert (i) $(230)_{10} = (?)_{16}$ (ii) $(230)_{10} = (?)_{8}$ (iii) $(23)_{10} = (?)_{2}$ (iv) $(43)_{10} = (?)_{2}$ (v) $(430)_{10} = (?)_{8}$	A	4	05
Q.3		Attempt any **TWO: (6 X2)**			**12**
	a)	Draw the reverse characteristics of Zener diode and describe the working of zener as a voltage regulator.	U	1	06
	b)	Define and state the values of the following parameters with reference to full wave rectifier (i) Ripple factor (ii) Efficiency (iii) Peak Inverse Voltage (iv) Transformer utilization factor (v) Average output voltage (vi) Average output current	R	2	06
	c)	Draw and explain the input and output characteristics of CE configuration with proper labelling of various regions.	U	3	06

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SUMMER 2024

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 :- 18/5/2024

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 **ETG405**	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define half duplex and full duplex mode.	R	ETG405-1	
	b)	State the types of performance of networks in data communication.	R	ETG405-1	
	c)	Define network and state the criteria of network.	R	ETG405-2	
	d)	Give any two disadvantages of mesh topology.	R	ETG405-2	
	e)	Define switching.	R	ETG405-3	
	f)	Give any two applications of Datagram approach packet switching.	R	ETG405-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Give the comparison between baseband and broadband transmission.(any 4 points)	U	ETG405-1	
	b)	Explain any one type of transmission impairement.	U	ETG405-1	
	c)	Draw neat diagram of OSI model and state the function of physical and data link layer.	U	ETG405-2	
	d)	Explain any one type of unguided media in data transmission.	U	ETG405-2	
	e)	Explain circuit switching with suitable diagram.	U	ETG405-3	
	f)	Explain the need for frame relay.	U	ETG405-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain any four standard organizations in data communication.	U	ETG405-1	
	b)	Explain throughput with respect to performance of network with suitable example.	U	ETG405-1	
	c)	Explain WAN with suitable example.	U	ETG405-2	
	d)	Draw and explain functional block diagram of MODEM.	U	ETG405-2	
	e)	Explain ATM with suitable diagram.	U	ETG405-3	
	f)	Explain virtual circuit approach in packet switching with suitable diagram.	U	ETG405-3	

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SUMMER/ 2024

EXAM SEAT NO.

LEVEL : - 4 PROGRAM : ENTC

COURSE CODE :- ETG405 / ETF403

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

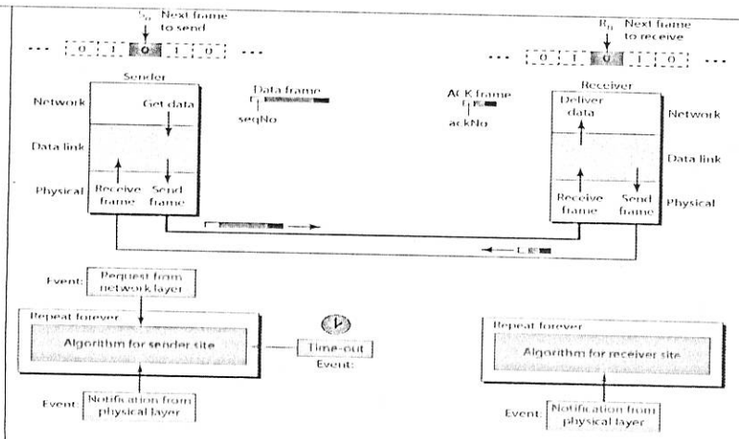
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 18/5/2024

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)	Enlist types of errors in data communication. Describe the concept of redundancy.	R	ETG405 -4	
	b)	Enlist different types of headers used in MIME.	R	ETG405 -6	
	c)	Describe gigabit Ethernet.	R	ETG405 -5	
	d)	Define: 1) Flow control 2) Error control	R	ETG405 -4	
	e)	State the difference between a primary server and a secondary server	R	ETG405 -6	
	f)	State any 2 differences between symmetric-key and asymmetric-key cryptography .	R	ETG405 -5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Justify the statement: "The size of send window must be less than 2^m-1, in Go-Back N ARQ protocol.	A	ETG405 -4	
	b)	Explain POP and IMAP with diagram.	A	ETG405 -6	
	c)	Explain physical layer in wireless LAN.	U	ETG405 -5	
	d)	Identify following protocol design diagram and describe its working.	A	ETG405 -4	

P.T.O. 2/3

					
	e)	Describe : (1) Basic service set (2) Extended service set. With diagram.	A	ETG405 -6	
	f)	Compare Gigabit Ethernet IEEE 802.3 implementations on the basis of 1. Media 2. Maximum Length 3. Number of wires 4. Block encoding	U	ETG405 -5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Define Piggybacking and state its necessity with diagram.	A	ETG405 -4	
	b)	Draw simple architecture of SNMP and describe the role of manager and agent.	U	ETG405 -6	
	c)	Describe the process for CSMA/CA as used in DCF sub-layer of MAC layer of wireless LANs .	U	ETG405 -5	
	d)	Draw the diagram of Stop-and-wait protocol and describe it with reference to the events.	U	ETG405 -4	
	e)	Define : a. cryptography b. plaintext and cipher-text c. ciphers d. key	U	ETG405 -5	
	f)	1. Define FQDN and PQDN. Determine which of the following is an FQDN and which is a PQDN. a. xxx b. xxx.yyy. c. xxx.yyy.net d. zzz.yyy.xxx.edu.	R	ETG405 -6	

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SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **Third** PROGRAM : **Electronics & Telecommunication / IE**

COURSE CODE : **ETG306/EIF306**

COURSE NAME : **Digital Technique & Applications**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **17 May 2024**

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	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Convert : i) $(501)_{10}$ to hexadecimal ii) $(37)_8$ to decimal	U	1	
	b)	Draw a symbol of Ex-OR gate with it's truth table.	A	2	
	c)	Convert the following Boolean equation in Pôs form into standard Pos form Y= (A+ B+C) (A+C)	U	2	
	d)	State the de-Morgan's Theorem.	R	2	
	e)	Define Minterm and maxterm	R	2	
	f)	Draw CMOS- NOR gate.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Find the BCD subtraction of given numbers using 9's complement method.$(984-599)_{10}$	A	1	
	b)	Perform the following operations using 2's complement method. i)48-(-23) ii) 23-48	A	1	
	c)	Simplify the following expressions using Boolean laws. i) $A+\overline{A}.B+A.\overline{B} = A+B$ ii) $\overline{A}BC + A\overline{B}C + AB\overline{C} + ABC = AB + BC + CA$	U	2	
	d)	Reduce the following Boolean expression by using K- map. $F(A,B,C,D) = \sum m\,(0,1,2,3,5,7,8,9,11,14)$	A	2	
	e)	Explain the working of CMOS NAND gate.	U	3	
	f)	Compare CMOS and ECL logic families with the help of following parameters. i) Fan-in ii) fan –out iii) Noise margin iv) Propagation delay	U	3	

Q.3		Attempt any **FOUR:**			**16**
	a)	Convert $(11011)_2$ to i) ~~Gray code~~ (delete) ii) $(\ )_{10}$ iii) ~~Excess -3 code~~ (delete) iv) $(\ )_{16}$	A	1	
	b)	Perform BCD subtraction using 10's complement method $(206.4)_{10}$- $(507.6)_{10}$	A	1	
	c)	Convert the following Boolean equations from standard SOP to standard POS form. i) $Y=ABC + \bar{A}BC+ \bar{A}\bar{B}C+ A\bar{B}C+ A\bar{B}C+ A\bar{B}\bar{C}$ ii) $Y= \bar{A}BC+ A\bar{B}C+ AB\bar{C}+ ABC$	A	2	
	d)	Using K-map reduce the following expression $f(A,B,C,D) = \sum M(1,3,7,11,15) + d(0,45)$	A	2	
	e)	Explain the interfacing of TTL logic family to CMOS	U	3	
	f)	Explain working of TTL NAND gate using diagram.	U	3	
Q.4		Attempt any **FOUR:**			**08**
	a)	Define binary parallel adder. Write the IC number of it.	R	4	
	b)	List any two applications of De- multiplexer.	R	4	
	c)	Draw logic symbol and truth table for D-flip flop.	R	5	
	d)	Differentiate between level triggered and edge triggered flip flop.	U	5	
	e)	Compare weighted register and R – 2R ladder DAC (Any 2 points)	U	6	
	f)	List any four specifications of ADC.	R	6	
Q.5		Attempt any **Four** :			**16**
	a)	Sketch full subtractor . Give its truth table.	A	4	
	b)	Sketch logic diagram and truth table of JK flip flop.	A	5	
	c)	Sketch logic diagram and truth table for 1:8 demultiplexer.	A	4	
	d)	Design 3 bit synchronous up counter. Draw logic diagram &output waveforms .	A	5	
	e)	Draw 4 bit SIPO shift register. Use D flip flop. Describe its working.	A	5	
	f)	Describe working of dual slope ADC with neat block diagram.	U	6	

Q.6		Attempt any **Four:**			**16**
	a)	Design four bit binary adder using IC 7483 and describe its working.	A	4	
	b)	Differentiate between multiplexer and de multiplexer. (Any 4 points)	U	4	
	c)	Draw pin diagram of IC 7447 and state function each pin.	U	4	
	d)	Draw the S-R flip flop using NOR gate. Write truth table of it.	U	5	
	e)	Sketch logic diagram of master slave JK flip flop & describe its operation.	A	5	
	f)	Compare SRAM and DRAM . (Any 4 points)	U	6	

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'SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - Five PROGRAM : ETC
COURSE CODE :- ETG 511/IEF502
COURSE NAME :- Programmable Logic Controller
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 17/5/2024

QN	SQN	SECTION –II	R/U/A	Co ETG 511	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Develop ladder diagram for 1:2 demultiplexer.	A	4	
	b)	Draw the ladder diagram for NAND gate.	U	4	
	c)	What do you mean by Rung in PLC?	U	5	
	d)	Draw a ladder program of starting a Induction motor.	U	5	
	e)	List different PLC programming languages	R	5	
	f)	List any four benefits of SCADA.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw the ladder diagram for following Boolean expression. (ABCD)+ (BCAF)=Q1 (A.C+E).G=Q2 Y=Q1+Q2	A	4	
	b)	Draw a ladder diagram for two lamps -Red and Yellow Having the following conditions. a) When start button is pressed then both the lamp will be ON. b) When stop button is pressed then red lamp will immediately OFF but yellow lamp will OFF after 5 seconds.	U	4	
	c)	Develop a ladder diagram for ON/OFF temperature control.	A	5	
	d)	Explain the ladder program of water level controller	A	5	
	e)	Draw block diagram of SCADA. Explain each block in brief.	R	6	
	f)	Differentiate between SCADA and PLC (any 4 points).	R	6	
Q.6		Attempt any **TWO:**			**16**
	a)	List and explain logical instructions.	A	4	
	b)	Draw a ladder diagram for a two motor system having the following conditions i) Starting push button start motor1 ii) After 20 seconds, motor 1 is OFF and motor 2 is ON iii) Stopping the switch stops motor 2. Time Base = 0.1 Sec.	U	5	
	c)	Explain testing of input and output using module LED status with trouble shooting of ladder diagram.	U	6	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - 05 PROGRAM : ET

COURSE CODE :- ETG511 / IEF502

COURSE NAME :- Programmable Logic Controller

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 17/5/2024

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 different systems used for industrial automation	R	ETG511-1	
	b)	Define Scanning cycle and Scan time of PLC.	R	ETG511-1	
	c)	Enlist the specifications of AC output module and DC output module (Any two each).	R	ETG511-2	
	d)	List the different timer instructions used in PLC.	R	ETG511-3	
	e)	Enlist any four arithmetic instructions used in PLC with their logical symbol.	R	ETG511-3	
	f)	List the sequencer instructions used in PLC.	R	ETG511-3	
Q.2		Attempt any **FOUR:**			16
	a)	Describe any two PLC characteristics.	U	ETG511-1	
	b)	Draw the basic block diagram of PLC and write the function of each block.	A	ETG511-1	
	c)	Give the selection criteria of I/O modules of PLC.	R	ETG511-2	
	d)	Describe the sinking and sourcing concept in DC output module.	U	ETG511-2	
	e)	Describe the functional descriptions for DOWN Counter Instructions. State means to reset the counter.	U	ETG511-3	
	f)	Give the functional description for Non retentive OFF delay timer instruction. State the step to reset the Non retentive OFF delay timer.	A	ETG511-3	
Q.3		Attempt any **FOUR:**			16
	a)	Give the advantages and disadvantages of PLC.	U	ETG511-1	
	b)	Draw the memory organization of ROM and RAM used in PLC.	A	ETG511-1	
	c)	Draw and explain the block diagram of AC output module of PLC.	A	ETG511-2	
	d)	Describe the discrete AC input module with wiring diagram.	U	ETG511-2	
	e)	Describe the functional description for sequencer instruction used in PLC.	U	ETG511-3	
	f)	Describe any two comparison instructions used in PLC ladder logic programming language with one example each.	A	ETG511-3	

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EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

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

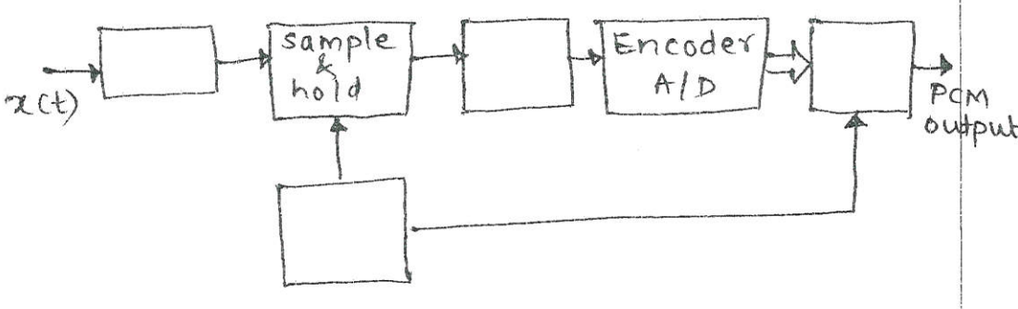
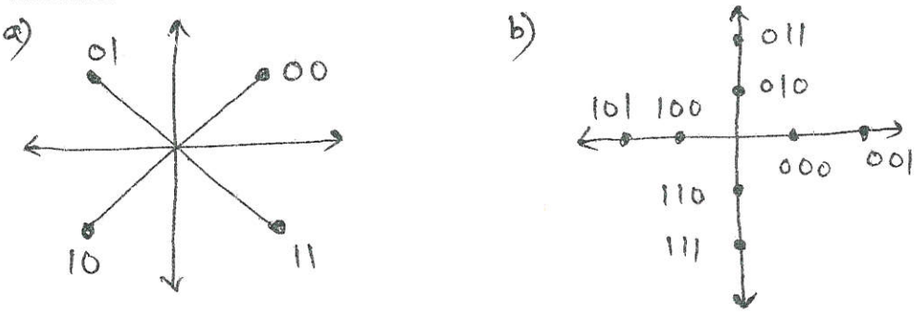
COURSE CODE :- **ETG310/ETF310**

COURSE NAME **DIGITAL COMMUNICATION**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **16/ 05 / 2024**

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)	Draw basic block diagram of communication system.	R	1	
	b)	Define pulse modulation. Give its classification.	R	2	
	c)	~~Enlist four factors affecting the repeater distance.~~	R	1	
	d)	Define i) Bit rate ii) Baud rate.	R	3	
	e)	Name the missing blocks of PCM transmitter. (Encoder) 	U	2	
	f)	If given the constellation diagrams, identify their respective circuits. 	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Define channel noise and enlist its two effects.	R	1	
	b)	With the help of simple circuit, explain flat top sampling.	U	2	
	c)	Explain ASK transmitter.	U	3	
	d)	State and explain sampling theorem.	U	2	
	e)	Compare between ASK and FSK with respect to following points. i) Definition ii) Bandwidth iii) Noise immunity iv) System complexity.	U	3	
	f)	Explain the quantization process with example.	U	2	

P.T.O

Q.3		Attempt any **FOUR:**			**16**
	a)	Enlist two advantages and two disadvantages of digital communication.	R	1	
	b)	Explain slope i) Overload distortion and ii) Granular noise in delta modulation.	U	2	
	c)	Draw Waveforms of ASK, FSK, PSK for binary input of 101101110.	A	3	
	d)	Compare PCM with DPCM with respect to following points i) Number of bits per sample ii) Defination iii) System complexity iv) Band width.	A	2	
	e)	Explain QPSK generator with waveform.	U	3	
	f)	With neat block diagram, explain generation of BPSK signal.	U	6	
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Line coding.	R	4	02
	b)	State the need of multiplexing.	R	5	02
	c)	State applications of spread spectrum modulation.	R	6	02
	d)	Define chip rate and PN sequence.	R	6	02
	e)	List the types of errors present in the digital communication system.	R	4	02
	f)	Enlist the various multiple access techniques.	R	5	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Give stepwise procedure in CRC generation.	U	4	04
	b)	Draw the block diagram of FDMA system and explain its working.	U	5	04
	c)	Compare slow and fast frequency hopping.(4 points)	U	6	04
	d)	The probabilities of five source messages are m1=0.2 , m2=0.3 , m3=0.2 , m4=0.15 , m5=0.15. Generate Huffman codes for the given source.	A	4	04
	e)	explain North American (T-carrier) digital multiplexing hierarchy with neat diagram.	U	5	04
	f)	Explain any one method of error detection with example.	U	4	04
Q.6		Attempt any **FOUR:**			**16**
	a)	Encode binary sequence 11010100 using Unipolar RZ, Unipolar NRZ, polar RZ , polar NRZ line coding techniques.	A	4	04
	b)	Explain synchronous TDM technique with relevant diagram.	U	5	04
	c)	Generate CRC code for data word 1101101001 by using divisor 1101.	A	4	04
	d)	Explain direct sequence spread spectrum (DSSS) transmitter with block diagram.	U	6	04
	e)	Compare TDMA and CDMA (any 4 points).	U	5	04
	f)	Draw the circuit diagram of PN sequence generator for generating PN sequences using 3 ~~ex-or gates.~~ D Flip Flop Assuming initial contents of the shift register, to be all ones, explain its working. Generate the output sequence.	A	6	04

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL :- FOURTH PROGRAM : IE & E&TC

COURSE CODE :- EIG403 / EIF406

COURSE NAME :- ELECTRONIC CIRCUIT DESIGN

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 16/5/2024

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 important specifications of Zener diode .	R	1	
	b)	List the specifications of UJT.	R	1	
	c)	Draw circuit diagram of bridge rectifier with CLC filter.	R	2	
	d)	Draw the pin diagram of IC 723.	R	2	
	e)	State any two advantages of RC coupled multistage amplifier.	R	3	
	f)	Draw circuit of two stage CE amplifier with feedback	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Design a single stage CE amplifier to give voltage gain of 80 and output voltage of 3 V rms using transistor BC 147 B . Use VCC=12 V ,	A	3	
	b)	Design a regulator using IC 723 to give the output of 5V at 100 mA Current. The input voltage is given as 10V & Vsc=0.65V.	A	2	
	c)	Design a common source amplifier to provide gain of 25 at peak output voltage of 3.5 V	A	3	
	d)	Explain any four specification of semiconductor diode.	U	1	
	e)	Discuss the need of bootstrapping, also draw a circuit diagram of bootstrapped emitter follower.	U	3	
	f)	Draw series voltage regulator circuit . Explain its regulatory action	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Design a power supply using pi filter to provide dc voltage of 20 V at 100 mA with ripple factor not exceeding 0.01 %.	A	2	
	b)	Design a shunt regulator using zener diode to provide 6V output from a 15V unregulated power supply.	A	2	
	c)	Compare between RC coupling & Direct coupling.(any 4 points)	U	3	
	d)	Draw a circuit of Emitter follower . Write expressions for Input and output resistance , voltage and current gain .	R	3	
	e)	Draw & Explain operation of FET common drain amplifier.	U	1	
	f)	Draw functional block diagram of IC 723 and Explain HIGH voltage regulator usin IC 723 using circuit connection .	A	2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - FOURTH

PROGRAM : ELECTRONICS AND TELECOMMUNICATION ; INDUSTRIAL ELECTRONICS

COURSE CODE :-EIG 403 /EIF 406

COURSE NAME :-ELECTRONICS CIRCUIT DESIGN

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-16/5/2024

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 EIG 403	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the circuit of basic complementary symmetry amplifier. State the advantage of it over Class-B Push- Pull amplifier.	R	4	
	b)	Draw block diagram of an oscillator and explain it.	R	5	
	c)	State the function of Pin of IC555: i) Control voltage , ii) Discharge	R	6	
	d)	Draw the circuit of Mono-stable multivibrator using IC 555.	R	6	
	e)	Draw the circuit diagram of Hartley Oscillator using Op-Amp.	R	5	
	f)	Define Duty cycle . Specify the formula of duty cycle of Astable multivibrator using IC555.	U	6	
Q.5		Attempt any **TWO:**			**16**
	a)	i) Design Astable multivibrator using IC555 for maximum output frequency of 4KHz with duty cycle of 60%. Give V_{cc} =14V. ii) Design the square wave oscillator using IC741 Op-Amp for output frequency fo =3 KHz and peak to peak voltage of 6V. Use supply voltage= +/- 15V.	A	6	4 4
	b)	i) Design a class- A power amplifier for the output power of 6W across 5Ω. ii) How conversion efficiency can be increases in transformer coupled class –A amplifier?	A U	4	6 2
	c)	Design a Hartly oscillator for frequency of 5MHz using transistor $V_{o(P)}$ =4Vrms, R_L=2.5K Ω.	A	5	8
Q.6		Attempt any **TWO:**			**16**
	a)	Design a transformer coupled class B audio power amplifier to give output power of 6 Watt to 8 Ω load. Consider the transformer efficiency to be 70% and available power supply is 30 Volts . Also calculate the power dissipated in each transistor and corresponding efficiency of amplifier	A	4	8
	b)	Design a Wien bridge oscillator to provide peak-to-peak output voltage of 4V at frequency of 15KHz. Use V_{cc}=10V.	A	5	8
	c)	i) Design a Monostable multivibrator using IC741 Op-Amp for pulse duration of 150msec with reference voltage of 6V. Use +/- Vcc = +/-14V ii) Design a Colpitt's oscillator for frequency of 30KHz using Op-Amp. Use inductor of 200mH with supply voltage of +/- 10V.	A	6 6	4 4

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EIG107/ EIF107**

COURSE NAME **BASIC ELECTRICAL ENGINEERING**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **15/ 05 / 2024**

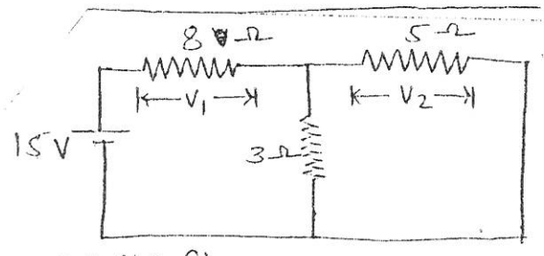
Instruction :-

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.

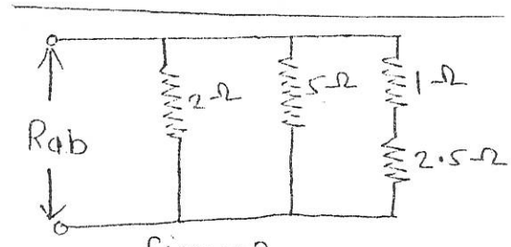
QN	SQN	Question Text	R/ U/ A	Co EIG 107	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define resistivity and conductivity. State units of resistivity and conductivity.	R	1	
	b)	State properties of series connection of resistances.	R	1	
	c)	Describe useful flux and leakage flux in magnetic circuit.	U	2	
	d)	Calculate the MMF when magnetic flux is 5 mWb and reluctance of magnetic circuit is 300 AT/Wb.	A	2	
	e)	Define the following terms i) Magnetic hysteresis ii) Hysteresis loop.	R	2	
	f)	Define eddy current loss and state its formula.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Find the voltages V_1 and V_2 shown in Figure 1 by using Kirchhoff's voltage law.	A	1	
	b)	Find the equivalent resistances (R_{ab} and R_{cd}), shown in Figure 2 and Figure 3.	U	1	
	c)	Consider a lamp having resistance of 880Ω is given power supply of 230V. Calculate current flowing through lamp and power consumed by lamp.	A	1	
	d)	Distinguish between direct current and alternating current.	U	1	
	e)	Explain the magnetization curve of magnetic material.	U	2	
	f)	Distinguish between electric and magnetic circuit.	A	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Distinguish between hard magnetic materials and soft magnetic materials.	A	2	
	b)	Describe electromagnet and state its applications.	U	2	
	c)	Conductor of length 10m moves at angle 45^0 to the direction of uniform magnetic field of strength 1 Tesla with velocity 80m/s. Calculate the emf induced. What will be the emf induced if conductor moves at 60^0 to the field.	A	3	

P.T.O

	d)	Explain the statically induced EMF.	U	3	
	e)	Explain self induced EMF.	U	3	
	f)	Explain the working principle of alternator.	U	3	
Q.4		Attempt any **FOUR:**			**08**
	a)	Define R.M.S. value of sinusoidal ~~e/n~~. waveform	R	4	
	b)	Write down equations of alternating voltage and current.	R	4	
	c)	Draw the Waveforms for current and voltage for pure inductive circuit.	U	5	
	d)	Define Active and Reactive Power.	R	5	
	e)	Classify different types of transformer based on construction.	R	6	
	f)	List out applications of isolation transformer.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain the Generation of alternating EMF.	U	4	
	b)	Define Peak factor and form factor with its formula.	R	4	
	c)	Draw and explain R-C series circuit.	U	5	
	d)	Compare star connection with delta connection.	R	5	
	e)	Draw a neat diagram of purely resistive circuit with waveforms, current & voltage equation.	U	5	
	f)	State the necessity of Earthing in detail also list out types of Earthing.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	The equation for an alternating current is $i = 77 \sin 314t$. Find the peak value, frequency and instantaneous value at $t = 2ms$.	A	4	
	b)	If $A = 10 + j15$ and $B = 20 + j16$ find i) A+B and ii) B-A.	A	4	
	c)	Find i) $A \times B \times C$ and ii) B/C. If $A = 10 < 20^0$, $B = 25 < 30^0$ & $C = 5 < 10^0$.	A	4	
	d)	Draw the waveforms of voltage and current for series R-L-C circuit.	U	5	
	e)	What is power factor? State the significance of the same.	U	5	
	f)	Draw a neat diagram of DC series motor and DC shunt motor.	U	6	



Q.2 (a) figure 1



Q.2 (b) figure 2

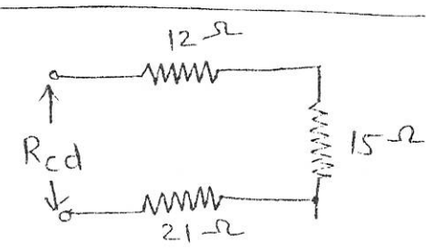


figure 3

Q.2 (c)

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SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : ENTC

COURSE CODE : EIG 302/EIF302

COURSE NAME : Applied Electronics

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- 14/5/2024

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	Question text	R/U/A	CO	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw High pass filter circuit.	R	3	
	b)	Define positive and negative feedback.	R	1	
	c)	Classify oscillators.	U	2	
	d)	Define clipper and clamper.	R	3	
	e)	Explain Barkhausen criteria.	U	2	
	f)	Draw response of integrator circuit when input is 1) square wave 2) rectangular wave.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Enlist advantages of negative feedback on amplifier. (any 4)	R	1	
	b)	Draw and explain Wein bridge oscillator	U	2	
	c)	Draw and explain combinational clipper.	U	3	
	d)	Compare voltage series feedback and current shunt feedback on the basis of 1) alternate name 2) input resistance 3) output resistance 4)voltage gain.	U	1	
	e)	2) In Colpitts oscillator, the values of inductors and capacitors in the tank circuit are L=40mH, C1=100pF , C2=500pF, Find the frequency of oscillation .	A	2	
	f)	With neat circuit diagram, explain voltage doubler.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Calculate the 1)voltage gain 2) input resistance of a voltage series feedback amplifier having Av=300,Ri=50K ohm and feedback fraction =1/15.	A	1	
	b)	Explain frequency stability consideration .(any 4 points)	U	2	
	c)	Draw circuit diagram and waveforms and explain positive clipper.	U	3	
	d)	An amplifier has a voltage gain of 1000.With negative feedback, the voltage gain reduces to10. Calculate the fraction of output that is feedback to the input.	A	1	
	e)	In Hartley oscillator, the value of capacitor in the tuned circuit is 500pF and 2 sections of coil have inductance 38 µH and 12 µH. Find the frequency of oscillaton and the feedback factor.	A	2	
	f)	With neat circuit diagram, explain voltage trippler.	U	3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER 2024

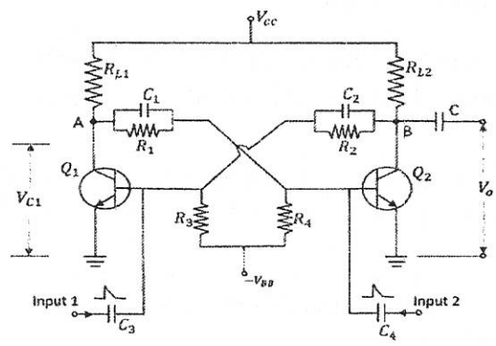
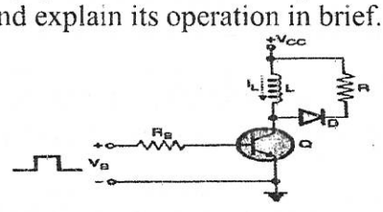
EXAM SEAT NO. | | | | | | |

LEVEL : - **03** PROGRAM : **I.E./E.T.C**

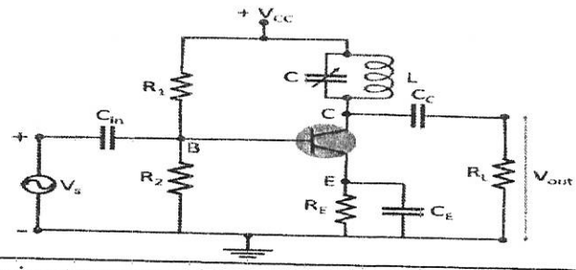
COURSE CODE : **EIG302/EIF302**

COURSE NAME : **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- 14/5/2024

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define: Power amplifier. List the applications of power amplifier.	R	302-4	
	b)	State the function of time base generators. Give its classification	R	302-6	
	c)	An astable multivibrator has component values R1=R2=20KΩ and C1=C2= 100pF.Calaculate the frequency of oscillation.	A	302-5	
	d)	State the reason why cross-over distortion occurs in class B push-pull amplifier.	U	302-4	
	e)	Draw the sweep voltage. Define sweep time "Ts" and retrace time "Tr".	R	302-6	
	f)	Define the term : Delay time and Rise time.	R	304-5	
Q.5		Attempt any **FOUR :**			**16**
	a)	Differentiate between Class A and Class B amplifier w.r.t following points:- (i) Position of Q-point on load line (ii)Distortion in output (iii) Efficiency (iv)Power dissipation in transistors	U	302-4	
	b)	With neat diagram explain the operation of exponential sweep generator.	U	302-6	
	c)	Name the type of multivibrator circuit shown below and draw output waveforms. Explain its operation in brief. 	A	302-5	
	d)	Draw diagram of complementary class B push-pull amplifier and explain its operation in brief.	U	302-4	
	e)	Determine the period and frequency of oscillations of an astable multivibrator with component values R1=2kΩ, R2=20kΩ,C1=0.01μF, C2=0.05μF. Draw the circuit diagram of above circuit with values.	A	302-5	
	f)	Identify the type of sweep generator shown in figure below . Draw the necessary waveforms and explain its operation in brief. 	A	302-6	

P.T.O. (2/3)

Q.6		Attempt any **FOUR:**			**16**
	a)	Identify the type of amplifier circuit shown below and describe its operation:  	A	302-4	
	b)	Define the following terms w.r.t BJT switching times: a) Turn-on time b) Storage time c) Turn-off time d) Pulse width	U	302-5	
	c)	Draw the circuit diagram of Miller Sweep Generator . Give its any two applications.	U	302-6	
	d)	Explain the concept of crossover distortion with suitable waveforms for any one type of push-pull amplifier.	U	302-4	
	e)	Explain the operation of sweep circuit using unijunction transistor switch with neat waveforms.	U	302-6	
	f)	Compare between single tuned and double tuned amplifier w.r.t following points: (i) Selectivity (ii) Bandwidth (iii) Frequency Response (iv) Applications	A	302-4	

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[3/3]

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : -Fourth PROGRAM : Electronics and Telecommunication

COURSE CODE :- EIG406/ EIF404

COURSE NAME :- Principle of control systems

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-14/5/2024

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:**		EIG 406	**08**
	a)	Define order of system and give the order of following systems. $G(S)=S(S+5)/S^4+S^3+9S^2+10S+6$	A	1	
	b)	List practical examples of open loop and closed loop systems .(2 each)	R	1	
	c)	Define Transfer function.	R	1	
	d)	Define Rise time of transient response specification.	R	2	
	e)	Define transient response and steady state response with mathematical formula.	U	2	
	f)	Define Gain margin and phase margin	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Derive the transfer function of block diagram shown in Fig.(a)	A	1	
	b)	Derive the transfer function of given electrical circuit shown in Fig. (b)	A	1	
	c)	For the given transfer function **T.F.**$=\frac{(S+2)}{S(S2+2S+2)(S^2+10S+25)}$ Find: i) Poles ii) Zeros iii) Characteristic equation iv) Pole- Zero plot.	A	2	
	d)	State the general procedure for constructing Bode plot.	U	3	
	e)	State advantages of frequency response analysis.(any 4)	U	3	
	f)	Derive analysis of second order control system for unit step input.	A	2	
Q.3		Attempt any **TWO:**			**16**
	a)	Compare Open loop and closed-loop control systems(any 8)	U	1	
	b)	A second order servo has a unity feedback $G(S)=500/s(s+15)$ Sketch the transient response for unit step input, and calculate peak overshoot, settling time, peak time.	A	2	
	c)	Determine the stability of the system by plotting the bode plot of the system having the open loop transfer function on semi log paper. $G(s)H(s)=5/s(s+1)(s+5)$	A	3	

P.T.O.

[1 | 3]

Q 2a)

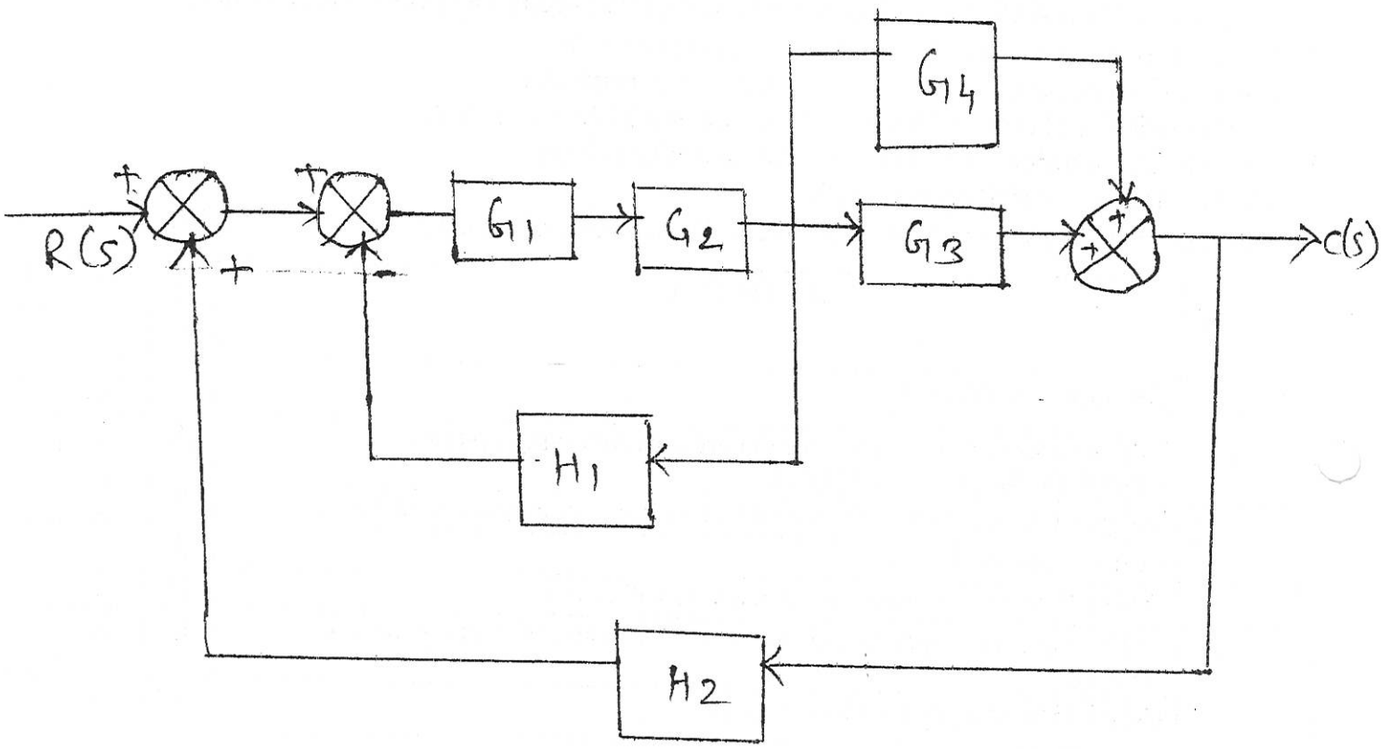

Fig (a)

Q 2 b)

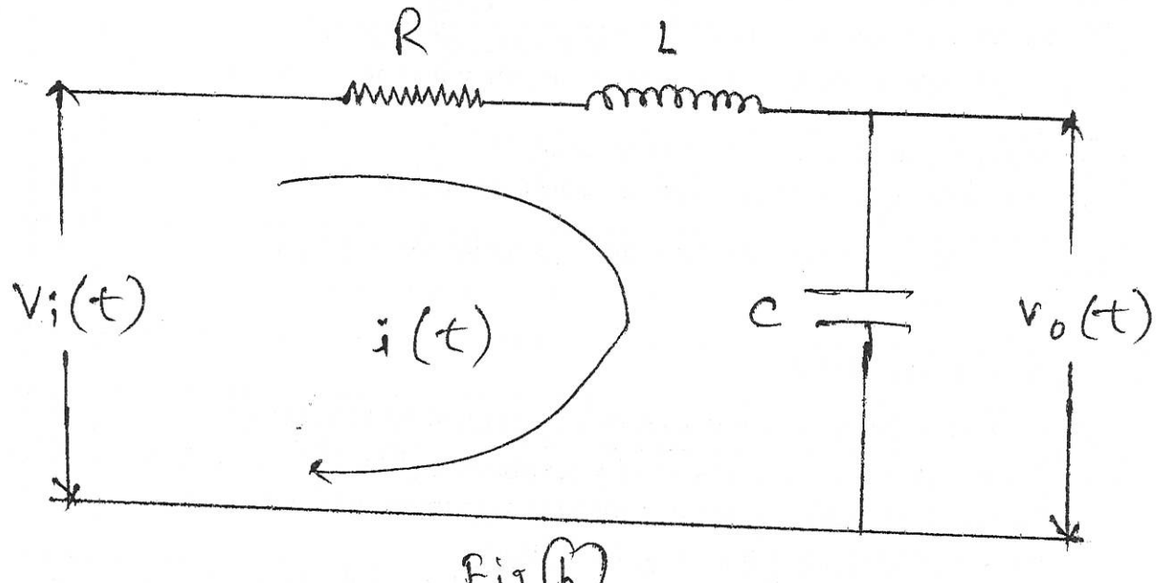

Fig (b)

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL :- Fourth PROGRAM : Electronics and Telecommunication

COURSE CODE :- EIG 406 / EIF406

COURSE NAME :- Principles of Control System

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 14/5/2024

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Stable systems.	R	EIG 406-4	
	b)	State Marginally stable systems with necessary condition for stability.	R	EIG 406-4	
	c)	Sketch electronic PI controller using op-amp.	R	EIG 406-6	
	d)	Define servo system.	R	EIG 406-5	
	e)	Sketch the block diagram of process control system.	R	EIG 406-6	
	f)	Define proportional band and offset.	R	EIG 406-6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain Routh's stability criterion for two different cases.	U	EIG 406-4	
	b)	For a control system, characteristics equation is given by $S^5+S^4+3S^3+9S^2+16S+10 = 0$. Determine stability using Routh's criteria.	A	EIG 406-4	
	c)	Differentiate between AC servo systems and DC servo systems.(any 4)	U	EIG 406-5	
	d)	Sketch and explain potentiometer as an error detector.	U	EIG 406-5	
	e)	Elaborate ON-OFF controller with suitable example. State significance of neutral zone.	A	EIG 406-6	
	f)	Describe PID controller with neat diagram, output equation and response.	A	EIG 406-6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Find range of k for the closed loop unity feedback system using Routh's criteria. S (S+ 2) (S+3) + 4 (S + K) = 0, Comment on stability.	A	EIG 406-4	
	b)	Explain the procedure of Root Locus technique.	U	EIG 406-4	
	c)	Compare P control action with PI control action.(any 4)	U	EIG 406-6	
	d)	Sketch and explain Rotary Encoders with digital output.	A	EIG 406-5	
	e)	Sketch and explain synchro as error detector.	U	EIG 406-5	
	f)	Differentiate between armature controlled and field controlled DC servo motors (any 4)	U	EIG 406-5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

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

COURSE CODE : **EIG309/EIF309**

COURSE NAME : **Microcontrollers**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **13 May 2024**

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	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State the advantages of microcontroller over microprocessor.(any four)	R	1	
	b)	Sketch the basic block diagram of microcomputer and label the each element in a microcomputer	U	1	
	c)	State the function of A and B registers of 8051 microcontroller.	R	2	
	d)	List the alternative functions of port 3 of 8051 microcontroller.	U	2	
	e)	List the various addressing modes of 8051 microcontroller.	R	3	
	f)	State the uses of swap A instruction of 8051 microcontroller.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare the 8051µc , PIC µc, AVR µc and ARM µc with following parameters i)Bits ii) Memory iii)instruction set architecture iv) memory architecture	A	1	
	b)	Draw neat labeled block diagram of von Neumann and Harvard architecture.	U	1	
	c)	Draw and explain the internal RAM memory organization of 8051 microcontrollers.	U	2	
	d)	Find the status of CY, AC OV & P flags after the addition of 9CH and 64H in following instructions MOV A , # 9CH ADD A, # 64H	A	3	
	e)	Explain the function of following instructions ; i) MUL AB ii) RRC A iii) JNB bit, target iv) SJMP target	U	3	
	f)	Write an ALP to transfer block of ten bytes is stored in the internal RAM from 20H onwards to another block starting from 50H location onwards.	A	3	

P. T. O.

Q.3		Attempt any **FOUR:**			**16**
	a)	Compare 8051 family members 8051,8052 & 8031 with respect to following points i) Memory capacity ii) No of I/O lines iii) Number of timer /counters iv) Interrupt sources.	A	1	
	b)	Draw the architectural block diagram of 8051 and Explain the function of program counter (PC) and stack pointer (SP).	U	2	
	c)	Sketch the reset circuit and clock circuit for 8051 microcontrollers.	A	2	
	d)	Identify the addressing modes of following instructions of 8051 microcontroller. i) CLRA ii) MOV DPTR , # 4000H iii)MOV @ Ro , A iv) MOV A , @ A+DPTR	A	3	
	e)	Write an ALP to multiply two 8 bit numbers 60H & 30H and store the final result at 55H & 56H.	A	3	
	f)	State the function of following instructions i) MOV A, @ A+DPTR ii) MOV @ Ro, A iii) MOV X A, @ DPTR iv) XCHD A , @R_i	U	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL: - THREE PROGRAM: IE & E & TC

COURSE CODE: - EIG 309/ EIF309

COURSE NAME: - MICROCONTROLLERS

MAX. MARKS: **80** TIME: **03 Hrs.** DATE: - 13 /5/2024

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the format for TCON register along with bit names.	R	4	
	b)	Draw the structure of port1 of 8051 microcontroller.	U	4	
	c)	What hex value should be loaded in TMOD SFR to configure timer/counter a) Timer1,mode 1 and counter 0, mode 2 b) Counter 1,mode 0 and timer 0, mode 1	A	4	
	d)	List the interrupt sources of 8051 microcontroller with their priority.	R	5	
	e)	State the advantages of LCD display over seven segment display (any two).	A	5	
	f)	Compare between Interrupt method and Polling method.	U	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw and explain the operation of timer in mode 2.	U	4	
	b)	Sketch interfacing diagram of 8 KB RAM and 8 KB EPROM with 8051 microcontroller. Draw the memory map.	A	5	
	c)	Write an assembly language program for 8051 microcontroller to transmit message 'SYET' serially through serial port at baud rate of 4800.	A	5	
	d)	Draw interfacing of 4*4 matrix keyboard to port 2 and port 1 of 8051 microcontroller, Explain process to detect pressed key.	U	5	
	e)	Draw interfacing of Seven segment display with 8051 microcontroller. Write an assembly language program to display numbers from 4 to 9 on it.	A	4	
	f)	Draw 8051 interfacing diagram to interface 4 LEDs and 4 Switches. Interface switches to port 0 and LEDs to port 1 upper nibble. Develop an assembly language program to read status of switches and operate LEDs as per switch status.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain the operation of mode 1 of Serial communication.	U	5	
	b)	Write an an assembly language program for 8051 microcontroller to toggle the LED's after every 500 m sec, connected to P5.0 and P5.1 after receiving the external interrupt on INT1.	A	5	
	c)	Draw an interfacing diagram of DAC with 8051 microcontroller. Write an assembly language program to generate Square waveform using DAC.	A	5	
	d)	Draw an interfacing diagram of stepper motor with 8051 microcontroller. Write an assembly language program to rotate motor in clock wise direction.	A	5	
	e)	Draw the interfacing diagram of Relay with 8051 microcontroller. Write an assembly language program to turn on and turn off Relay after certain delay.	U	4	
	f)	Write an assembly language program for 8051 microcontroller to generate square wave of 4 KHz on port pin P2.1. Generate delay using timer 0 in mode 1. Assume crystal frequency = 12 MHz	A	4	

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SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL: - 5th PROGRAM: ET

COURSE CODE: - ETG514

COURSE NAME: - Introduction to IOT

MAX. MARKS: **80** TIME: **03 Hrs.** DATE :- 13/5/2024

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)	List the different functions available in Wi-Fi header file.	R	4	
	b)	Draw and label the IR sensor module circuit diagram.	U	4	
	c)	Explain the principle of pulse width modulation technique (PWM).	U	4	
	d)	List any three features of HTTP protocol	R	5	
	e)	Differentiate in between the terms- Local Server and Cloud Server	U	5	
	f)	State the purpose of LoRa Alliance.	U	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain the working of servo motor using closed loop system diagram.	U	4	
	b)	Action of a 1000Watt AC Bulb is controlled by a Node MCU. To control the action, write a program with an interface diagram.	A	4	
	c)	With suitable sketches Explain How HTTP protocol works	U	5	
	d)	Write a program to scan all the available WiFi networks and list it on Serial monitor with its name and signal strength	A	5	
	e)	Write a program to turn ON/OFF the LED connected to D2 pin of NodeMCU by using Blynk Cloud server	A	5	
	f)	Write a code to monitor smoke sensor data on blynk cloud server.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write a program for NodeMCU to scan available Wi-Fi Network and connect to a wifi network with maximum signal strength.	A	4	
	b)	Draw the Interfacing diagram of DHT11 with NodeMCU and write a program to display temperature and humidity on serial monitor.(Assume suitable data)	A	4	
	c)	Write a program to connect NodeMCU with a WiFi network with following credentials: Name/id: "GPKOLHAPUR" Pwd: "gpkpgpkpgpkp"	A	5	
	d)	Write a program to turn ON/OFF the Home appliance connected to D2 pin via relay to NodeMCU by using Blynk Cloud server	A	5	
	e)	Explain steps to create template on blynk cloud for displaying humidity and temperature data.	A	6	
	f)	Write a code to display DHT11 sensor data on blynk cloud server.	A	6	

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SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : Electronics & Telecommunication

COURSE CODE :- **ETG514**

COURSE NAME :- **Introduction to Internet of Things**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-13 / 5/ 2024

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 the term IoT	R	CO1	
	b)	Write any four features of NodeMCU.	R	CO2	
	c)	State different types of IR sensors. Also give any two applications of IR sensor	R	CO3	
	d)	State the characteristics of IoT systems	U	CO1	
	e)	Justify the importance of ESP8266 used for IOT applications.	U	CO2	
	f)	What is HC-SR04? State any four specifications of it	U	CO3	
Q.2		Attempt any **FOUR:**			**16**
	a)	List the different components of IOT and Explain?	U	CO1	
	b)	List different layers of communication protocols used in IoT and Explain any one in brief	U	CO1	
	c)	Explain the use of Wi-Fi module in IoT? List the application of Wi-Fi module.	A	CO2	
	d)	Draw the constructional diagram of Relay.	U	CO3	
	e)	Define the term Actuator? List various actuators used in IoT.	U	CO3	
	f)	List any 8 technical specifications of NodeMCU ESP8266.	A	CO2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain the use of six buttons present on the toolbar of Arduino IDE.	U	CO2	
	b)	Explain the principle of working of LDR sensor in IoT	U	CO3	
	c)	Why NodeMCU ESP8266 is most suitable for IoT application?	A	CO2	
	d)	Write a program for NodeMCU to operate onboard LED according to status ofswitch connected to Node MCU pin no D5.	A	CO2	
	e)	What is Fresnel lens? What is it's usage in PIR sensor? Explain	U	CO3	
	f)	Compare Rasberry PI, Arduino Uno and NodeMCU ESP8266	U	CO1	

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(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **Third** PROGRAM : **I.E & ENTC**

COURSE CODE : **EIG305/EIF305**

COURSE NAME : **Analog Communication**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **11 May 2024**

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	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define Bandwidth .	R	1	
	b)	State the difference between FM and PM. (Any 2 points)	R	3	
	c)	Draw the representation of AM wave in time domain.	U	2	
	d)	Give classification of electronic communication system.	R	1	
	e)	A 500 watt carrier is modulated to depth of 80%. Calculate total power in AM wave.	A	2	
	f)	State the mathematical representation of FM.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	i) A 400watt carrier is modulated to a depth of 75%. Calculate the total power in modulated wave. ii) Calculate total power if same carrier is modulated to 50%.	A	2	
	b)	Derive Power relation in AM wave.	A	2	
	c)	Draw the circuit of varactor diode modulator and explain its operation.	U	3	
	d)	Explain the types of transmission media used in electronic communication system.	R	1	
	e)	Find out the carrier and modulating frequency , modulation index and maximum deviation of FM wave represented by the voltage equation $V = 12 \sin (6 \times 10^8 t + 5 \sin 1250 t)$	A	3	
	f)	Explain the concept of vestigial sideband with neat sketch.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	i) In FM , if the maximum deviation is 80 KHz and maximum modulating frequency is 10KHz. Calculate the deviation ratio. ii) Sketch the neat wave form of FM	A	3	
	b)	Explain the working of Phase shift method to suppress the unwanted side band.	U	2	
	c)	Draw the block diagram of a high level AM Transmitter. State the functions of each block.	U	2	

PTO

	d)	A receiver connected to an antenna whose resistance is 50Ω has an equivalent noise resistance of 30Ω. Calculate the receivers noise figure (F) in decibels and its equivalent noise temperature.	A	1	
	e)	i) Draw an electromagnetic spectrum ii) State the need of modulation & demodulation.	R	1	
	f)	Draw the circuit of transistorized Reactance method. State function of each component.	U	3	
Q.4		Attempt any **FOUR:**			**08**
	a)	State two disadvantages of TRF receiver over superheterodyne receiver .	R	4	
	b)	List two applications of loop antenna.	R	5	
	c)	Define electromagnetic polarization.	R	6	
	d)	State the need of AGC.	R	4	
	e)	Draw radiation pattern λ/2 dipole resonant antenna & non resonant antenna.	U	5	
	f)	State any two reasons of fading.	R	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Draw the block diagram of AM superheterodyne radio receiver & state the function of each block.	U	4	
	b)	Describe the working of Yagi-Uda antenna. Write its applications	U	5	
	c)	A superheterodyne AM receiver is tuned to station operating at 1200KHz. Find local oscillator frequency & image frequency.	A	4	
	d)	Describe the term virtual height with the help of diagram showing ionized layer & the path of wave.	U	6	
	e)	Describe the working of PLL using block diagram.	U	4	
	f)	Draw the structure & radiation pattern of parabolic reflector antenna.	U	5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain ground wave propagation along with sketch.	U	6	
	b)	Define pre-emphasis. State its need. Draw the circuit of pre-emphasis.	U	4	
	c)	Draw the structure of Loop antenna & its radiation pattern. List any two applications of it.	U	5	
	d)	Draw & explain FM receiver.	U	4	
	e)	Describe the transverse electromagnetic waves in wave propagation.	U	6	
	f)	Draw the block diagram of TRF AM receiver. Explain function of each block.	U	4	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **05** PROGRAM : **ETNTC**

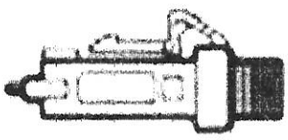
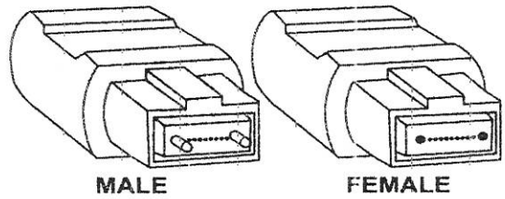
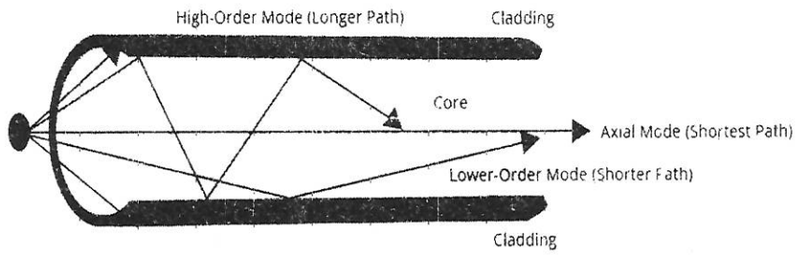
COURSE CODE :- **ETG504 / ETF502**

COURSE NAME :- **Optical Fiber Communication**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **10/5/2024**

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 neat labelled diagram showing spectrum of light	R	1	
	b)	Give the detailed classification of optical fiber cables.	R	2	
	c)	Define the term linear scattering and state its type.	R	3	
	d)	Explain in short concept of photon.	U	1	
	e)	Define the term attenuation and state its unit.	R	3	
	f)	Sate the function of optical couplers and list its types.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain the following terms in optical fiber communication with neat diagram: (i) Total internal reflection (ii) Critical Angle	U	1	
	b)	Identify the types of optical fiber connectors shown below and explain its function. (i) (ii)   MALE FEMALE	A	2	
	c)	Describe the phenomenon of Mie scattering in optical fibers.	U	3	
	d)	Explain fusion splicing technique with neat diagram.	U	2	
	e)	Identify the type of loss shown in figure below and describe its effect in brief.  	A	3	
	f)	With the help of neat diagram, explain tight buffered cable structure.	U	2	
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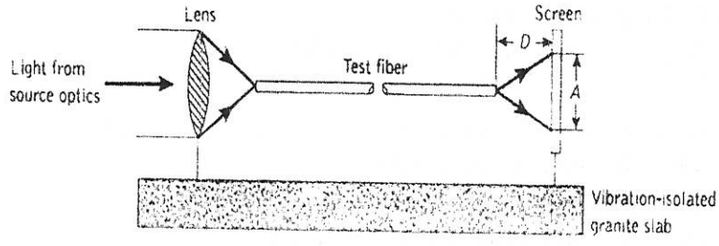
Q.3		Attempt any **FOUR:**			**16**
	a)	Name the type method used for measurement of numerical aperture in fig. shown below .Explain its process in brief. 	A	3	
	b)	Calculate the acceptance angle and critical angle for an optical fiber whose core refractive index is 1.48 and cladding refractive index is 1.39	A	1	
	c)	Differentiate between single mode and multimode fibers w.r.t. following points. (i)Number of propagating mode (ii) Core Diameter (iii) Modal Dispersion (iv) Optical Source	U	2	
	d)	Explain insertion loss method of attenuation measurement with diagram.	U	3	
	e)	With help of neat diagram explain the light propagation in step index single mode fibers,	U	2	
	f)	Describe the extrinsic absorption losses occurring in optical fiber cable in brief.	U	3	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ENTC

COURSE CODE :- ETG504 / ETF502

COURSE NAME :- Optical Fiber Communication

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 10/5/2024

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:**		ETG504	**08**
	a)	State four requirements of optical detectors	R	5	
	b)	Define following terms with respect to LASER (1) Directionality (2) Coherent	R	4	
	c)	Draw the block diagram of Optical receiver Circuit.	R	6	
	d)	Draw the symbol of PN photodiode and define optical detector.	R	5	
	e)	Compare Homojunction and Heterojunction LED with respect to (1) Definition (2) advantages/disadvantages	U	4	
	f)	Define the following terms of APD. (1) Sensitivity (2) operating speed	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare LED and LASER with respect to (1) Principle of Operation (3) Cost (2) Spectral width (4) Compatible fiber	U	4	
	b)	Draw and explain working of phototransistor.	U	5	
	c)	Draw the architecture of SONET and state the applications of it.	R	6	
	d)	Explain absorption and stimulated emission process of LASER diode.	U	4	
	e)	Identify the factor that limit the speed of response of photodetector and explain it.	A	5	
	f)	Explain construction of Gain guided laser diode with help of diagram.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain the construction of PIN photodiode.	U	5	
	b)	Explain working principle of OTDR with help of diagram and state two specification of it.	U	6	
	c)	Explain the optical output power of LED with help of graph.	U	4	
	d)	State two advantages, two disadvantages and four applications of avalanche photodiode.	R	5	
	e)	Explain the WDM and draw the diagram of it.	U	6	
	f)	Explain Planar LED with help of diagram and state two advantages of it.	U	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004

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SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **Third** PROGRAM : **I.E & ENTC**

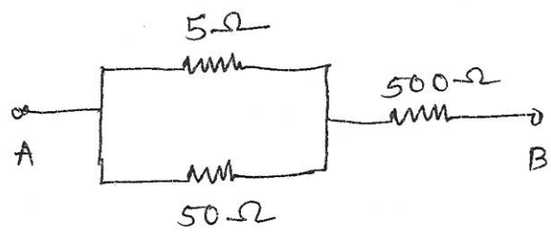
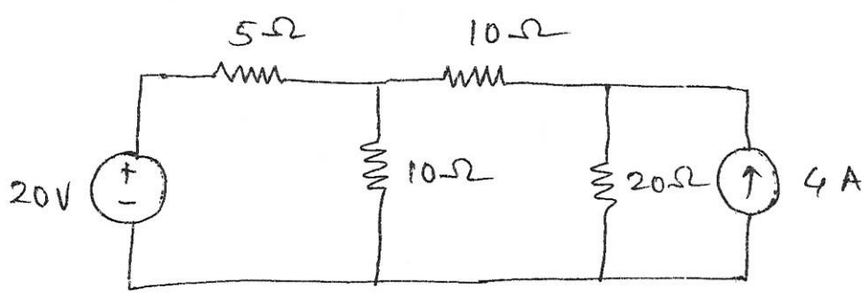
COURSE CODE : **EIG308/EIF308/IEE308**

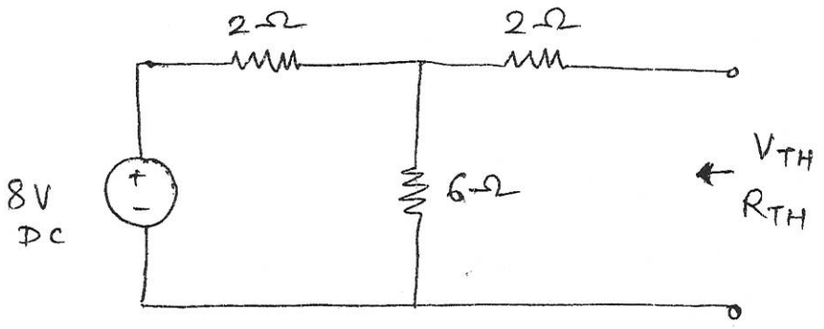
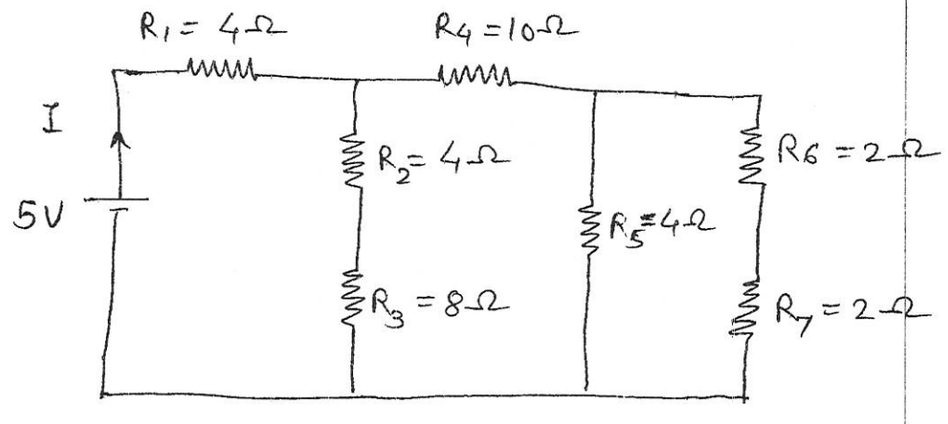
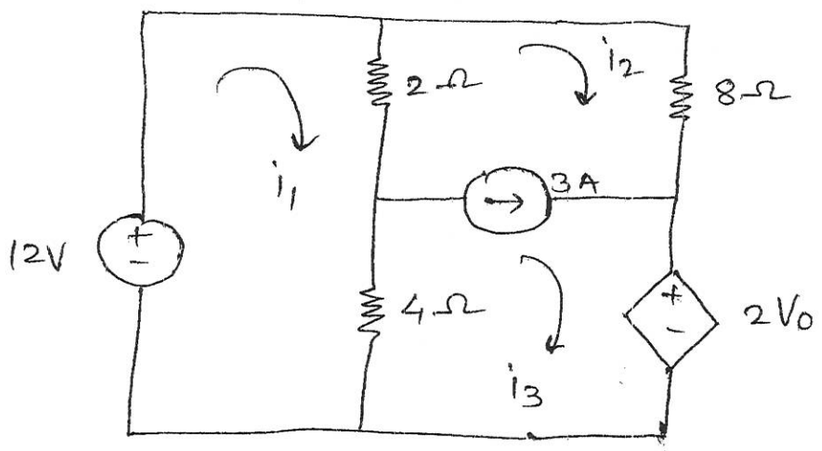
COURSE NAME : **CIRCUIT &NETWORKS**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **09 May 2024**

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	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State Ohm's law.	R	1	
	b)	State current divider rule.	R	1	
	c)	Define AC circuit with diagram.	R	1	
	d)	Find equivalent resistance across AB from following figure. 	U	2	
	e)	State Norton's theorem.	R	3	
	f)	State Maximum power transfer theorem.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain Voltage & current source.	U	2	
	b)	A 20Ω resistor is connected in parallel with 60Ω resistor. If the combination is connected across 30V battery supply ,find the current through each resistor and total current supplied by source.	A	1	
	c)	Find current flowing through 20Ω resistor in following circuit using superposition theorem . 	A	3	

	d)	Explain source transformation with example.	U	2	
	e)	State & explain Kirchhoff's voltage law.	U	1	
	f)	Find V_{th} & R_{th} value in the following circuit. 	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Calculate equivalent resistance for below circuit & find total current I through circuit. 	A	1	
	b)	Explain steps to solve example with nodal analysis.	U	2	
	c)	Use mesh analysis to find i_1 ,i_2 & i_3 in the figure. 	A	2	

	d)	State application of Kirchhoff's (current) law.	U	1	
	e)	Compare Thevenin's & Norton's theorem .	U	3	
	f)	State application of maximum power transfer theorem.	U	3	
Q.4		Attempt any **FOUR:**			**08**
	a)	Define inductor & capacitor. Mention their units.	R	4	
	b)	State the concept of decibel.	R	6	
	c)	State the condition for resonance in R-L-C series circuit.	R	5	
	d)	Draw the resonance curve for series resonance.	U	5	
	e)	State Q factor for parallel R-L-C circuit.	U	5	
	f)	Output voltage for certain filters is 400mv and input voltage is 1.2V. Express the ratio in decibel.	R	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Describe the phase relation of voltage and current in pure capacitor in single phase ac circuit.	U	4	
	b)	Express impedance in both rectangular & polar form for given Circuit shown in figure 1.			
	c)	Describe the charging and discharging of inductor with equation and neat diagram.	A	4	
	d)	Compare series resonance and parallel resonance on the basis of i) Resonant frequency ii) Impedance ii) Current iv) Magnification	U	5	
	e)	Define R-L low pass filter with its frequency resonance curve.	U	6	
	f)	Explain R-C high pass filter with its frequency resonance curve..	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	For the series R-C circuit shown in figure 2, determine the magnitude of the total impedance and phase angle for each of the following values of input frequency 20KHz, and 30KHz.	A	4	
	b)	If the current in the circuit shown in Fig. 3 is expressed in polar form as $I = 0.2 < 0^0$ mA ,determine the source voltage and express it in polar form.	A	4	
	c)	A coil of resistance 20Ω and inductance 200μH is in parallel with a variable capacitor . The voltage of the supply is 20V at a frequency of 100Hz. Calculate i) The value of 'C' to give resonance. ii) The Q factor of coil.	A	5	
	d)	Determine the voltage magnitude at resonance frequency and the bandwidth for the circuit shown in fig. 4	A	6	
	e)	Draw response curve and explain series resonant band stop filter	A	6	
	f)	Draw response curve and explain parallel resonant band pass filter	A	6	

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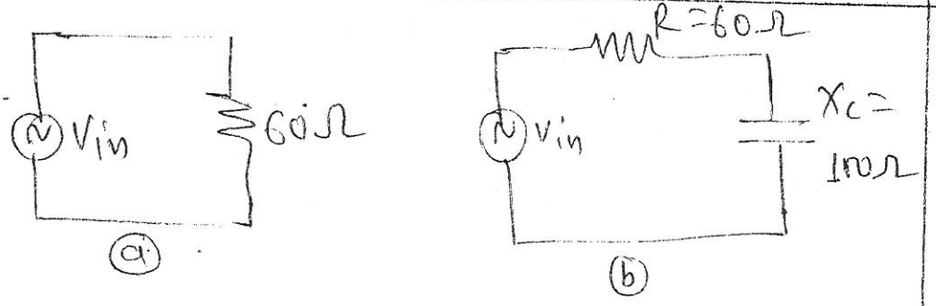
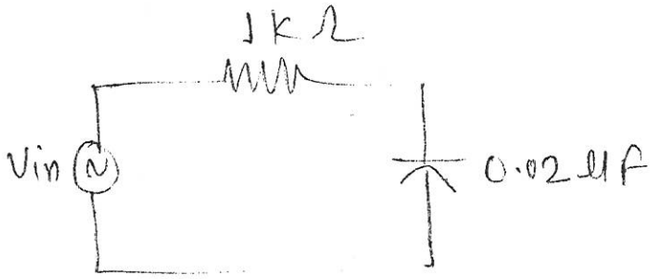
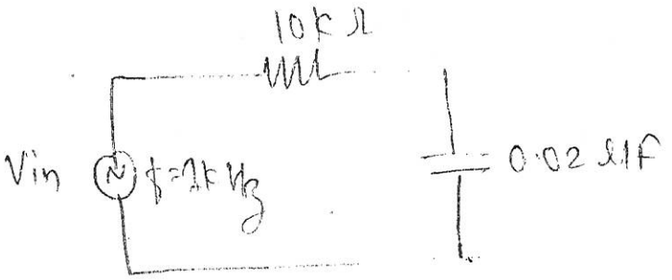
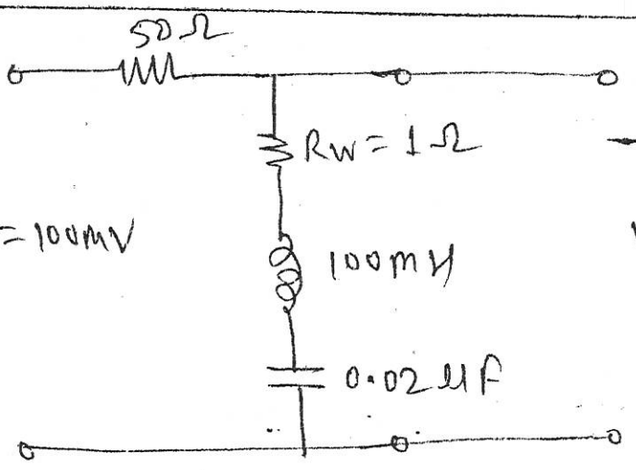
N.	N.	Question text	Cognition Level R/U/A	CO Code
5	b	 figure 1		
6	a	 figure 2		
6	b	 figure 3		
6	d	 figure 4		0

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - FOUR PROGRAM : IE&E&TC

COURSE CODE :-EIG402 / EIF402

COURSE NAME :-EMBEDDED SYSTEMS

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 9/5/2024

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)	State the advantages of embedded C over assembly language (any two).	R	2	2
	b)	Enlist the interrupts of 8051 priority wise with their vector locations.	R	3	2
	c)	State any 4 characteristics of embedded system.	R	1	2
	d)	List any 4 applications of ARM.	U	1	2
	e)	List various data types in embedded C with their data range (any 2).	U	2	2
	f)	Find out the value to be loaded into TMOD register to configure timer 0 in mode 1 and counter 1 in mode 0.	A	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare RISC and CISC architecture.	U	1	4
	b)	Draw the format of TCON register and explain each bit.	U	3	4
	c)	Write an embedded C program to send the values 0 to 255 to Port 1 continuously with some delay.	A	2	4
	d)	Classify embedded system and explain any one in detail.	R	1	4
	e)	If content of Acc=0x04 and P1=0xF7, state the result after execution of i. Result=Acc & P1 iii. Result=Acc ^ P1 ii. Result=Acc | P1 iv. Result=~P1	A	2	4
	f)	Write an embedded C program to generate square wave of 2KHz on P2.1. Assume crystal frequency of 11.0592MHz.	A	3	4
Q.3		Attempt any **FOUR:**			**16**
	a)	Write an embedded C program to convert the ASCII code of '4' and '7' to packed BCD and send its value to port1 continuously.	A	2	4
	b)	With the help of neat diagram explain the life cycle of an embedded system.	R	1	4
	c)	Explain the frame format of I2C with suitable diagram.	U	3	4
	d)	Write an embedded C program to send message 'WELCOME' serially through serial port at 9600 baud rate continuously. Assume crystal frequency= 11.0592MHz.	A	3	4
	e)	Write an embedded C program to read the data from port 1 and mask the upper 4 bits of the data and send its value to port 2.	A	2	4
	f)	Two switches SW1 and SW2 are connected to INT0 and INT1 of 8051 microcontroller. Write an embedded C program to perform the following. Use interrupt. i) When SW1 is pressed, turn on all LEDs connected to port 1 ii) When SW2 is pressed, turn on all LEDs connected to port 2	A	3	4

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - FOUR PROGRAM : IE & E&TC

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

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 9/05/2024

QN	SQN	**SECTION –II**	R/U/A	CoEIG402	Marks
Q.4		Attempt any **FOUR** of the following.			**08**
	a)	Compare between general OS and RTOS (any 2 points).	R	5	
	b)	State the function of following pins of DS12887 RTC. i. SQW ii. MOT	R	4	
	c)	Define reliability and scalability related to RTOS.	R	5	
	d)	Calculate the output current (I_{out}) for DAC0808, if the digital input applied is 7FH.Assume value of I_{ref}= 2mA	A	4	
	e)	Draw the interfacing diagram of relay with 8051 microcontroller.	R	4	
	f)	List any four functions of RTOS.	R	5	
Q.5		Attempt any **FOUR** of the following.			**16**
	a)	Write an embedded C program to generate a sawtoth waveform using DAC 0808.	A	4	
	b)	Explain the concept of Deadlock in RTOS & techniques to prevent it.	U	5	
	c)	Explain watchdog timer and semaphore feature of RTOS in detail.	R	5	
	d)	Write an embedded 'C' language program to rotate the stepper motor through 180^0. Assume step angle as 1.8^0.	A	4	
	e)	Give a memory map (RAM) of DS12887 and write an embedded C program to set time 13:18:30 of RTC.	A	4	
	f)	Draw a neat labeled interfacing diagram of serial ADC MAX1112 with 8051 microcontroller.	U	4	
Q.6		Attempt any **TWO** of the following.			**16**
	a)	Draw interfacing diagram for temperature measurement using LM 35 with 8051. Write an embedded 'C' language program to read the data from LM35 and send it to port.	A	4	
	b)	Draw an interfacing diagram of DC motor for with 8051microcontroller. Write an embedded C program to monitor the status of switch connected at P1.0 and perform the following. i) If switch=0, turn DC motor with 25% duty cycle. ii) If switch=1, turn DC motor with 75% duty cycle. .	A	4	
	c)	Draw the interfacing diagram of LCD with 8051microcontroller and write C program to display "GPKP" on LCD.	A	4	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- EIG512 / EIF512

COURSE NAME :- Advance Microcontrollers / PIC Microcontroller

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 4/5/2024

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 salient features of PIC18 family of microcontrollers.	U	EIG512-1	
	b)	Draw the logical pin diagram of PIC18F458 microcontroller.	R	EIG512-2	
	c)	State the significance Working Register (WREG) of PIC18 microcontroller	U	EIG512-2	
	d)	List any four bit oriented instructions of PIC18 microcontroller.	R	EIG512-3	
	e)	State all the conditional branching instructions of PIC18 and Explain any one in brief.	U	EIG512-3	
	f)	Write the steps involved in execution of the following instructions- MOVLW 0x23 MULW 0x3F	U	EIG512-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	State and Explain the important features of MSP430 lunchbox platform	R	EIG512-1	
	b)	Find the ROM address range of each of the following PIC18 microcontrollers- i) PIC18F2220 with 4Kbytes of program ROM ii) PIC18F2410 with 16Kbytes of program ROM	A	EIG512-1	
	c)	State the important features of Atmega328P Microcontroller	R/U	EIG512-2	
	d)	Draw the format of STATUS register of PIC18 microcontroller and Explain the significance of each bit.	U	EIG512-2	
	e)	Explain the- Immediate addressing mode of PIC18 microcontroller with a suitable example	U	EIG512-3	
	f)	List all the compare instructions in PIC18. Illustrate use of any one instruction to implement looping.	U	EIG512-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw the generic block diagram of PIC microcontroller and Explain.	U	EIG512-1	
	b)	Draw the Von-Neuman/Princeton bus architecture and State its advantages and disadvantages.	U	EIG512-2	
	c)	What is Instruction cycle in PIC18 microcontroller? Explain with a suitable example.	U	EIG512-2	
	d)	Write a program to perform subtraction of 16 bit numbers and store the result in file register locations starting at 40H.	A	EIG512-3	
	e)	Assume that five hexadecimal numbers are stored in RAM location starting at 50H. Write a program to find the sum of all these numbers. Store the result at the locations 60H and 61H.	A	EIG512-3	
	f)	Draw the Stack memory map of PIC18 microcontroller and Explain.	U	EIG512-3	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EIG512 / EIF 512**

COURSE NAME : **ADVANCE MICROCONTROLLER / PIC microcontroller**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **4/ 05 /2024**

QN	SQN	SECTION–II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the format of T2CON (Timer 2 Control) register.	R	4	
	b)	State the difference between CCP module and ECCP module (any two points	R	5	
	c)	State the different types of interrupts available in PIC18F microcontroller.	U	5	
	d)	Find the timer's clock frequency and its period for various PIC18 based system , with the following crystal frequencies. 1. 10 Mhz 2. 16 Mhz	A	4	
	e)	Define the function of RS and R/W pins of LCD	U	6	
	f)	Draw the interfacing of PIC18 Microcontroller with DS1306 RTC.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Assume that XTAL= 10Mhz , Write a program to generate a square wave with a period of 10ms on pin PORTB.3	A	4	
	b)	Draw and explain the block diagram of Timer 1.	R	4	
	c)	State the Importance of RCIF and TXIF flag bits in PIR1.	U	5	
	d)	Write a program to enable all the timer interrupts of PIC18	U	5	
	e)	Interface LCD with PIC18 microcontroller, and develop an assembly language program to display messages "GPKP" on LCD.	A	6	
	f)	Draw and Explain the connection diagram between DS1306 with PIC18.	R	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Assuming that clock pulses are being fed in to pin T0CKI, write a program for counter 0 in 8 bit mode to count the pulses and display the state of the TMR0L count on PORT B.	U	4	
	b)	Write an assembly language program to transmit message "WELCOME" serially at baud rate 9600 bps continuously. Assume XTAL = 10 MHz.	A	5	
	c)	Interface DAC0808 with PIC 18 Microcontroller and Write an assembly language program to generate the Stair-step Ramp waveform at the output of DAC 0808.	U	6	
	d)	A switch is connected to pin RB2, write a program to check the status of SW and perform the following: i. If SW = 0, send the letter 'S' to PORTD ii. If SW = 1, send the letter 'N' to PORTD	A	4	
	e)	Explain the Compare mode operation of CCP module of PIC18 with a suitable diagram.	U	5	
	f)	State the SFRs associated with on-chip ADC of PIC18F458. Explain any one SFR with its format.	R	6	

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SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - One PROGRAM : ENTC

COURSE CODE :- ETH 103

COURSE NAME :- Basic electronics 2

MAX. MARKS : **70** TIME : **03 Hrs** DATE :- 4/5/2024

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 **THREE: (2 X 3)**			**06**
	a)	Draw construction of PNP and NPN transistors, also draw the symbols.	R	1	
	b)	Define amplification.	R	2	
	c)	Enlist types of feedback connections.	R	3	
	d)	Draw input characteristics of BJT.	R	1	
	e)	Enlist types of biasing circuits.	R	1	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Derive the relation between alpha and beta .	A	1	
	b)	Draw and explain frequency response of single stage amplifier in CE mode.	U	2	
	c)	An amplifier has a voltage gain of 1000.With negative feedback, the voltage gain reduces to10. Calculate the fraction of output that is feedback to the input.	A	3	
	d)	Explain the concept of DC load line and operating point.	U	1	
	e)	Explain the concept, Transistor as a switch.	U	2	
	f)	Compare voltage series feedback and current shunt feedback on the basis of 1) alternate name 2) input resistance 3) output resistance 4)voltage gain.	U	3	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Compare common emitter and common base on the basis of 1)input current 2) output current 3)current gain 4)common terminal 5)input voltage 6) output voltage	U	1	
	b)	Enlist amplifier characteristics(any 6)	R	2	
	c)	Calculate the 1)voltage gain 2) input resistance 3) output resistance of a voltage series feedback amplifier having R_o=1.5KΩ Av=300,Ri=50K ohm and feedback fraction =1/15.	A	3	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER-2024

EXAM SEAT NO. | | | | | | |

LEVEL: - First PROGRAM: Electronics & Telecommunication

COURSE CODE: - ETH103

COURSE NAME: - Basic Electronics II

MAX. MARKS: 70 TIME: **03 Hrs** DATE: - 4/5/2024

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	List 2 applications of Oscillators.	R	ETH103-4	02
	b)	Define Multivibrator. Give classification of it.	R	ETH103-5	02
	c)	Compare Astable and Bistable multivibrator (any two points)	U	ETH103-5	02
	d)	State types of JFET and draw its symbol with terminal names.	R	ETH103-6	02
	e)	State 2 application of FET.	R	ETH103-6	02
	f)	State 2 advantages of MOSFET over JFET.	R	ETH103-6	02
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Sketch circuit diagram of Hartley oscillator and explain its working.	U	ETH103-4	04
	b)	Compare RC and LC oscillators. (FOUR points)	U	ETH103-4	04
	c)	Explain the working of transistor as a switch.	U	ETH103-5	04
	d)	Draw and explain working of Astable multivibrators.	U	ETH103-5	04
	e)	Sketch construction of N-channel JFET and explain its operating principle.	U	ETH103-6	04
	f)	Derive the relation between μ, r_d and g_m.	A	ETH103-6	04
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	List two applications of oscillator. Calculate the frequency of oscillation for RC phase shift oscillator for the component's values R = 8·2KΩ, C = 0·01μF, R_I = 1·2KΩ, R_F = 39KΩ.	A	ETH103-4	06
	b)	Explain monostable multivibrator with neat circuit diagram and waveforms.	U	ETH103-5	06
	c)	Describe the working of N-channel E-MOSFET with neat constructional diagram and also draw the drain characteristics of EMOSFET.	U	ETH103-6	06

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : Electronics and Telecommunication

COURSE CODE :- ETG505/ETF501

COURSE NAME :- Mobile and Wireless Communication

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 03/5/2024

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 1) Cell 2) Cluster 3) Base Station 4) Control channel	R	CO1	
	b)	State functions of MSC or MTSO in Cellular Radio System .	R	CO1	
	c)	Compare Simplex , Half Duplex and Full Duplex Communication	U	CO1	
	d)	Write functions of Light and touchscreen sensors in 4G phones	R	CO2	
	e)	State the difference between Macrocells , Minicells and Microcells	R	CO3	
	f)	Define Cochannel Cells. Determine distance from nearest co-channel cell having radius 0.64 km and co-channel reuse factor 12	A	CO3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw the block diagram Cordless Telephone system & describe it	U	CO1	
	b)	Draw and Explain transmitter system in 2G Cellular phone .State function of APC (Automatic Power Control) Unit in it .	U	CO2	
	c)	Draw block diagram of Receiver unit of 2G mobile handset .State function of RSSI (Received Signal Strength Indicator) signal in it	U	CO2	
	d)	Draw block diagram of Basic Cellular System .State its advantages	U	CO3	
	e)	Determine number of channels per cluster and total channel capacity for a cellular telephone area comprised of 10 clusters with 7 cells in each cluster and 10 channels in each cell .	A	CO3	
	f)	Describe Cochannel interference with suitable diagram . How to reduce it ?	U	CO3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Describe the procedure of making a call from landline to a mobile user	U	CO1	
	b)	Describe the operation of Pager system with block diagram .	U	CO1	
	c)	Draw and describe Logic unit in 2G mobile handset	U	CO2	
	d)	What is Handoff in cellular system ? List different types of Handoff . Describe Improper and Proper Handoff with diagram .	U	CO3	
	e)	Determine a) The channel capacity of a cellular telephone area comprised of 7 macrocells with 10 channels per cell . b) Channel capacity if each microcell is split into 4 minicells .	A	CO3	
	f)	Describe concept of frequency reuse . Draw frequency reuse pattern for cluster size 7 . State formula for capacity of a cellular system .	U	CO3	

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WINTER/SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL :- Fifth PROGRAM : ENTC

COURSE CODE :- ETG505/ETF501

COURSE NAME :- MOBILE AND WIRELESS COMMUNICATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-03/5/2024

QN	SQN	**SECTION –II**	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List any four features of GSM system.	U	4	02
	b)	Describe various services offered by GSM .	R	4	02
	c)	Describe handoff types in IS 95	R	5	02
	d)	State any four features IS 95	U	5	02
	e)	List the various channel types in GSM.	R	4	02
	f)	State any four features of Bluetooth .	U	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain GSM radio subsystem and list GSM air interface specification.	U	4	04
	b)	Describe any four advantages and disadvantages of Bluetooth .	U	6	04
	c)	Draw system architecture of IS-95 and explain functions of each block in brief .	R	5	04
	d)	Describe operation of WLL with suitable diagram.	U	6	04
	e)	Explain Authentication and security process in GSM.	R	4	04
	f)	Draw and explain reverse link channel structure IS-95.	U	5	04
Q.6		Attempt any **FOUR:**			**16**
	a)	Describe the GSM system architecture with a neat block diagram.	U	4	04
	b)	Describe the call processing in IS-95 CDMA.	U	5	04
	c)	Explain Traffic channels in GSM in details .	R	4	04
	d)	Draw SS7 protocall architecture and describe .	U	6	04
	e)	Describe the call processing in GSM (Mobile originated call)	U	4	04
	f)	Compare GSM system with IS 95 with respect to following points: 1)Handoff used 2)Modulation used 3)Number of user 4)Channel bandwidth	R	5	04

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **Third** PROGRAM : **Electronics &Telecommunication**

COURSE CODE : **EIG307 / EIF 307**

COURSE NAME : **Linear Integrated Circuits**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **02 May 2024**

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	Question Text	R/U/A	CO	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Write the pin functions of the following pins of IC 741 i) -IN (Pin no. 2) ii) + IN pin no. 3	R	1	
	b)	List the different open -loop configurations of on op-amp.	R	1	
	c)	What are the types of feedback configurations? State the types of feedback to which inverting amplifier belongs.	U	2	
	d)	State the difference between positive feedback and negative feedback. (Two points)	U	2	
	e)	Which feedback is used in Schmitt trigger? State any two applications of Schmitt trigger.	U	3	
	f)	State the limitations of op-amps as comparators.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw the circuit diagram of dual input balanced output differential amplifier and explain its operation.	U	1	
	b)	Draw an equivalent circuit of an op-amp and explain it.	U	1	
	c)	The op-amp (741C) is connected as an inverting amplifier with R1 = 1KΩ and R_F = 4.7KΩ , Vin = 1Vp-p sine wave at 100Hz.i) Compute the output voltage Vo ii) Draw the output voltage waveform ,assuming that the output is initially nulled ,	A	2	
	d)	With the help of neat circuit diagram and output waveforms, explain the operation of invertor using op-amp.	R	2	
	e)	Draw the circuit diagram of window detector and explain its operation.	R	3	
	f)	With the help of neat circuit diagram, explain the operation of current voltage (I to V) convertor.	R	3	

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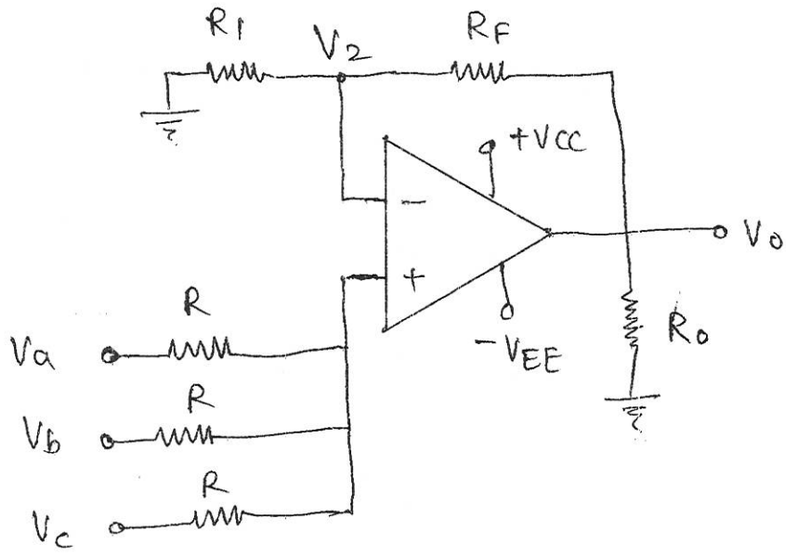
Q.3		Attempt any **FOUR:**			16
	a)	Define the following electrical parameters of an op-amp and state its typical and ideal values i) Large signal voltage gain (A) ii) CMRR iii) Input resistance iv) output voltage swing	U	1	
	b)	Determine the output voltage in each of the following cases for the open loop differential amplifier configuration. i) Vin 1 = - 25μv ,Vin 2 = 20μv ii) Vin 1 = - 2.1 V ,Vin 2 = 2.0 V Assume that the op-amp is 741 with specifications A= 200000, supply voltage = ± 15 V output voltage swing = ± 14 V	A	1	
	c)	For the circuit shown below, supply voltages (V_{CC}& V_{EE}) = ± 15 V Va = + 2V , Vb = - 3V, Vc = +4 V , R=R_1 = 1KΩ and R_F = 2KΩ. Determine the voltage V1 at non- inverting terminal and output voltage V0. Assume that the Op-amp is initially nulled.  	A	2	
	d)	With the help of neat circuit diagram and input output waveforms, explain in detail the operation of basic differentiator circuit using Op-amp.	U	2	
	e)	Draw the circuit and input output voltage waveforms of non-inverting comparator.	R	3	
	f)	Draw the circuit and input output voltage waveforms of Schmitt trigger.	R	3	

QN	SQN	Question Text	R/U/A	Co MEF 503	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the block diagram of IC 566	U	4	
	b)	State the classification of filters based on frequency response.	U	5	
	c)	Draw the circuit diagram of Quadrature Oscillator using Op-amp.	R	4	
	d)	Define order of filter & state the need of higher order filter.	U	5	
	e)	Draw labeled pin diagram of IC555	U	6	
	f)	State any four applications of IC555	R	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Draw the internal function block diagram of IC555. State any two specification of it.	U	6	
	b)	Draw the circuit diagram of 1st order high pass filter & explain its operation. . State the formula for cut- off frequency.	U	5	
	c)	Explain with neat sketch operation of astable multivibrator using op-amp.	U	4	
	d)	Sketch the circuit diagram of active wide band reject filter using op-amp . Draw its frequency response and state its formula for cut off frequency.	U	5	
	e)	Design 1st order low pass filter at a cut off frequency of 10KHz with pass band gain '2' . Draw the designed circuit.	A	5	
	f)	Explain the working of monostable multivibrator using IC555 with neat sketch. Also draw the waveforms	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	With neat circuit diagram explain operation of triangular waveform generator using op-amp.	U	4	
	b)	Draw and explain narrow band reject filter using op-amp.	U	5	
	c)	Define following terms related to filter 1) Roll off rate 2) Cut- off frequency 3) band width 4)Q factor	U	5	
	d)	Design 2nd order Butterworth high pass filter using op-amp.	A	5	
	e)	Explain the circuit diagram of RC-phase shift oscillator using op-amp.	U	4	
	f)	Explain the water level controller using IC555	A	6	

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SUMMER/WINTER-

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : Electronics and Telecommunication Engineering

COURSE CODE :- ETG407/ETF407

COURSE NAME :- Signals and Systems

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/05/2024.

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
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QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define discrete time signals and classify them.	R	ETG407-1	
	b)	Define and sketch the following continuous time signals i) Unit Step signal ii) Unit impulse signal	R	ETG407-1	
	c)	Sketch x[2n], for Discrete time signal $x[n]=n^2 \cdots$ for $-2 \le n \le 2$	A	ETG407-2	
	d)	Explain time shifting operation for continuous time unit step signal u(t).	U	ETG407-2	
	e)	Compare between Continuous time and discrete time systems (any 2 points)	U	ETG407-3	
	f)	Determine whether the following discrete time systems are causal or not causal. i) y[n]=x[n]+n x[n+1] ii) y[n]=x[3n]	A	ETG407-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Sketch and label following operations on Discrete time signals x[n]= { 2,1,1, 1, 2} (a) x[n]*u[n-1] (b) x[3-n]	A	ETG407-2	
	b)	Determine whether the following systems are stable or not i) y[n]= cos (x[n]) ii) y[n]= x[n]+x[n-1]+y[n-1]	A	ETG407-3	
	c)	Solve for Signal addition : x1(t) + x2(t) and signal multiplication: x1(t) * x2(t) for the given continuous time signals, where u(t) is unit step response and r(t) is ramp signal x1(t)=u(t-2) x2(t)= r(t-1)	A	ETG407-2	
	d)	Enlist and sketch symbols used in block diagram representation of discrete time system. (any 4)	R	ETG407-3	
	e)	Sketch and label following operations i) y1[n]= 2u(n+3) ii) y2[n]= 2r(-n-2) where u(n), r(n) represents discrete time unit step, unit ramp signals	A	ETG407-2	
	f)	Compare between the following systems i) Static system and dynamic system ii) Causal system and non causal system	U	ETG407-3	

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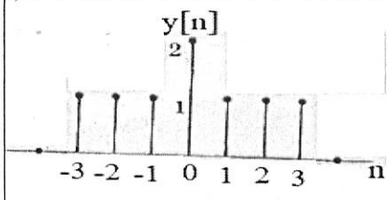
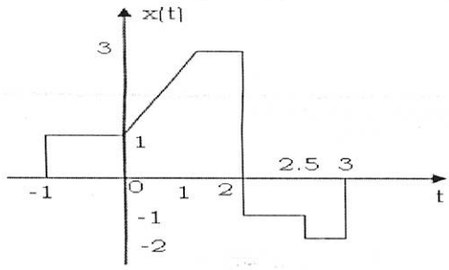
Q.3		Attempt any **TWO:**			**16**
	a)	i)Determine & sketch even & odd part of discrete signal given below  ii) Compare energy and power signals.	A U	ETG407-1	
	b)	A Continuous-time signal x(t) is shown in figure below.  Develop the sketch for the following signals. i) x (t – 4) ii) x(3t+7) iii) x (-(t+2)) iv) x(-t+2)	A	ETG407-2	
	c)	Determine whether the following systems are time variant or time invariant i) y[n]= x[n]-x[n-1] ii) y[n]= n*x[n] Determine whether the following systems are stable or unstable i) y[n]= x[n]+n*x[n-1] ii) y[n]= x[2n]	A	ETG407-3	

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QN	SQN	SECTION –II	R/U/A	CO (ETG407)	Marks
Q.4		Attempt any **FOUR** :			**08**
	a)	Define Linear convolution and state its applications (any2)	R	ETG407-4	
	b)	Enlist any two applications of correlation	R	ETG407-4	
	c)	Explain following properties of fourier series with mathematical expression i) Linearity ii) Time shifting	U	ETG407-5	
	d)	Explain following properties of fourier series with mathematical expression i) Convolution ii) Time reversal	U	ETG407-5	
	e)	Define Region of convergence and state its significance	R	ETG407-6	
	f)	State types of Z transform and write its equations.	R	ETG407-6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Compare Linear convolution and Correlation (any 4 points)	U	ETG407-4	
	b)	Determine the Cross Correlation of the following sequences x[n] and h[n] using tabular method x[n]= { 1, 2, 1, 2 } h[n]= {2, 2, -1, 1}	A	ETG407-4	
	c)	Explain any four properties of fourier transform with its mathematical expressions	U	ETG407-6	
	d)	Explain any four properties of 'Discrete time Convolution' with its mathematical expressions.	U	ETG407-4	
	e)	Obtain the Z transform of following finite duration sequence and plot its region of convergence (ROC) x[n]={1,2,4,5,0,7}	A	ETG407-6	
	f)	Explain the relation between Fourier Transform and Z Transform with its mathematical expression.	U	ETG407-6	

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Q.6		Attempt any **TWO**			**16**
	a)	Determine the Linear Convolution of following sequences x[n] and h[n] using graphical method. x[n]= {1, 1, 1, 1} ↑ h[n]= {2, 2} ↑	A	ETG407-4	
	b)	Develop Fourier series derivation with its mathematical expression	A	ETG407-5	
	c)	Determine Z transform and plot the ROC of the signal x[n], $\boldsymbol{x[n] = [3(4^n) - 5(3^n)]u[n]}$	A	ETG407-6	

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