GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO.

LEVEL : - First PROGRAM : EE

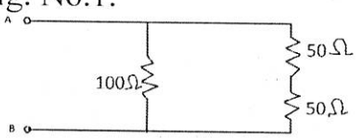
COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTALS OF 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 electric current and state its unit.	R	1	
	b)	State Krichhoff's current law and Krichhoff's voltage law.	R	2	
	c)	Define capacitance and state its unit.	R	3	
	d)	State Ohm's law and its equation.	R	2	
	e)	Define work and state its unit.	R	1	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Distinguish between Direct current and Alternating current. (Any four points)	U	1	
	b)	Define ideal voltage source and practical voltage source. Draw the symbol for each.	U	1	
	c)	Compare series circuit and parallel circuit.	U	2	
	d)	Calculate the equivalent resistance between points A and B in the Fig. No.1.  Fig. No. 1	U	2	
	e)	List any three types of capacitor. Give one application of each type.	U	3	
	f)	Distinguish between series combination of capacitor and parallel combination of capacitor. (Any four points)	U	3	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Three capacitors 15μf, 18μf and 12μf are connected in a circuit. Find equivalent capacitance when they are connected in - (i) series (ii) parallel	A	3	
	b)	Define three effects of electric current. Give one application of each.	A	1	
	c)	Explain star-to-delta conversion and delta-to-star conversion of resistive circuit.	A	2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER-2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTAL OF 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)	Explain the concept of Mutually Induced EMF.	R	6	
	b)	What are the different types of Magnet & give their examples	U	5	
	c)	Define & Explain Magnetic Field Strength.	U	4	
	d)	State & Explain Lenz's Law for induced EMF	R	6	
	e)	Define & state its unit i) Reluctivity ii) Permeability	U	5	
	f)	When a current of 2mA is supplied to a coil with 100 turns, a magnetic flux of magnitude 0.2Wb is linked with it. Find the self-inductance of this coil.	A	6	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Compare Electric Circuit & Magnetic Circuit.(Any 4 Points)	R	5	
	b)	Define following terms related to AC Circuit i) Frequency ii) Time Period iii) Cycle iv) Amplitude	U	6	
	c)	Explain the generation of Magnetic field due to current carrying conductor.	R	4	
	d)	State Faradays First & Second Law of electromagnetic induction.	R	6	
	e)	Explain the concept of Toroid & give their application.	R	4	
	f)	State the application of Permanent Magnet & Electromagnet.(4 Application each)	R	5	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Draw neat labeled circuit & diagram for B-H curve & discuss on Hysteresis Loop.	U	5	
	b)	A non-magnetic ring having 5cm mean length & cross section is $3cm^2$ it is uniformly wound having 200 turns. Calculate, i) Magnetic field strength having current 2 Amp ii) Magnetic flux density ($\mu_r = 300$)	A	4	
	c)	Draw & Explain the phenomenon of Mutual Induction & Self induction.	U	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. of Maharashtra)

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

* * * * * *

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEG102**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **22/ 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 EEG 102	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define Intrinsic and Extrinsic material.	R	1	
	b)	What is the need of Rectification? Specify the type of Rectifier.	R	2	
	c)	What are the PIV of full wave center tapped rectifier and why?	R	2	
	d)	Draw the structure of PNP & NPN transistor.	U	3	
	e)	Define cutoff and saturation region of transistor.	R	3	
	f)	Draw the symbol of basic gates.	U	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw the characteristic of P-N junction diode and explain it.	U	1	
	b)	Describe the circuit of full wave bridge rectifier with its circuit diagram and waveform.	U	2	
	c)	Explain the characteristics of CB-configuration of BJT with its circuit diagram and characteristics.	U	3	
	d)	Draw the symbol of NAND, NOR, XNOR & AND Gate. Write down its truth table also.	A	4	
	e)	Draw the circuit of Zener as a voltage regulator and explain it.	A	1	
	f)	Compare i) Shunt capacitor filter. ii) Series inductor filter. iii) LC filter iv) CLC filter.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw & explain the characteristics of Zener diode.	R	1	
	b)	Explain the energy band diagram of Conductor, Insulator and Semiconductor.	U	1	
	c)	Convert : i) $(84)_{10} = (\ ?\ )_2$ ii) $(9ACB)_{16} = (\ ?\ )_2$ iii) $(76)_8 = (\ ?\ )_2$ iv) $(44)_{10} = (\ ?\ )_2$.	A	4	
	d)	Draw the circuit of center tapped full wave rectifier with LC filter. Explain them with output waveform.	U	2	
	e)	Define α & β of transistor. State the relation between them. Specify its values of CE-configuration.	A	3	
	f)	Draw the block diagram of regulated power supply and describe them.	R	2	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Government of Maharashtra)

TERM END EXAM SUMMER2024

EXAM SEAT NO. | | | | | | |

LEVEL :- THIRD PROGRAM :- DIPLOMA IN ELECTRICAL ENGINEERING (EE)

COURSE CODE :- EEG301

COURSE NAME :- MECHANICAL AND CIVIL ENGINEERING

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 25/5 / 2024

Instructions :-

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

QN	SQN	QUESTION TEXT	R/ U/ A	CO	MARKS
Q.1		Attempt any **FOUR**			**08**
	a)	Enlist the types of couplings.	R	EEG301-1	02
	b)	Write classification of the keys.	R	EEG301-1	02
	c)	Explain in brief selection procedure of bearing.	U	EEG301-1	02
	d)	State functions of steam turbine.	R	EEG301-2	02
	e)	List various power transmission devices.	R	EEG301-2	02
	f)	Explain in brief working principle of compressor	R	EEG301-3	02
Q.2		Attempt any **FOUR**			**16**
	a)	Explain different types of thread profiles for nut and bolts with a neat sketch.	U	EEG301-1	04
	b)	Describe construction and working of universal joint with neat sketch.	U & A	EEG301-1	04
	c)	Write functions of following energy conversion devices. i) Gas Turbine ii) I C Engine iii) Hydraulic Turbine iv) Boiler	A	EEG301-2	04
	d)	Explain belt drives with suitable diagrams.	U	EEG301-2	04
	e)	Explain construction and working of condenser and cooling towers in thermal power plant with diagram.	U & A	EEG301-2	04
	f)	Differentiate between reciprocating and centrifugal compressor.	A	EEG301-3	04
Q.3		Attempt any **FOUR**			**16**
	a)	Describe applications of the keys.	A	EEG301-1	04
	b)	Explain mounting of bearing with a neat sketch.	U & A	EEG301-1	04
	c)	Classify various types of gear and draw tooth profile of spur gear indicating gear terminology.	U	EEG301-2	04
	d)	Explain construction and working of hydraulic turbine with a neat sketch.	U & A	EEG301-2	04
	e)	Describe construction and working of IC Engine with a neat sketch.	U & A	EEG301-2	04
	f)	Describe with neat sketch reciprocating pump.	U & A	EEG301-3	04

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - THREE PROGRAM :ELECTRICAL ENGINEERING

COURSE CODE :- EEG 301

COURSE NAME :- Mechanical and Civil engineering

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-25/5/2024

QN	S QN	Question Text	R/ U/ A	Co EEG 301	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define surveying and levelling.	R	5	
	b)	Give two functions of door.	U	4	
	c)	Define FSI and built-up area.	R	4	
	d)	State necessity of plastering	R	4	
	e)	Define substructure	R	5	
	f)	State two uses of tunnel.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Enlist the types of bonds in brick masonry and explain any one.	U	4	
	b)	Explain pile foundation with neat sketch.	U	4	
	c)	State two uses of Total station, theodolite, dumpy level, prismatic compass	R	5	
	d)	State the types of irrigation projects.	R	6	
	e)	Explain various types of flooring.	U	4	
	f)	What is roofing? Give the types of roofs.	R	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw a schematic diagram showing water treatment plant. State the function of the components.	A	6	
	b)	State the purpose of road , railway, bridge and Tunnel.	U	6	
	c)	Explain isolated footing with a neat sketch.	U	4	
	d)	What are the types of stone mosnary? Explain any one with diagram.	U	4	
	e)	Enlist the different types of vertical circulation and explain any one.	U	4	
	f)	Define Irrigation. State any two advantages of irrigation	R	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : -V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG510 / EEF508

COURSE NAME :- NON CONVENTIONAL POWER GENERATION

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 EEG510	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List out energy sources of power generation.	R	CO1	
	b)	Define Altitude angle and Zenith angle	R	CO1	
	c)	Define drag force and lift of force.	U	CO2	
	d)	State basic components of WECS	U	CO2	
	e)	Draw a neat diagram of Vertical Axis Wind Plant.	A	CO2	
	f)	State working principle of wind energy conversion.	U	CO2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare flat plate collector and concentrating collector with four points.	A	CO1	
	b)	Explain different zones of solar pond with neat labelled diagram.	A	CO1	
	c)	State and explain selection factors for installing wind mill.	U	CO2	
	d)	Draw a neat block diagram of Wind Energy Conversion system and state function of each component.	U	CO2	
	e)	State measuring instrument of solar radiation and explain one in detail.	U	CO1	
	f)	Explain safely system and environmental aspects of wind mill.	A	CO2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Define Renewable energy sources and state its need.	U	CO1	
	b)	Compare HAWT and VAWT with any four points.	A	CO2	
	c)	Explain solar distillation with neat diagram.	U	CO1	
	d)	Explain basic principle of wind energy conversion on following points: - 1. Nature of the wind energy 2. Power in wind	U	CO2	
	e)	Draw neat diagram of solar pumping and explain its working.	U	CO1	
	f)	State advantages and limitation of solar energy.	A	CO1	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : -V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG510 /EEF508

COURSE NAME :- NON CONVENTIONAL POWER GENERATION

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

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**8**
	a)	Draw a neat diagram of fixed dome digester.	R	CO3	
	b)	State basic principle of ocean thermal energy conversion.	U	CO4	
	c)	State types of OTEC power plant.	R	CO4	
	d)	Classify Small Hydro power station.	U	CO5	
	e)	State the methods used for energy conversion from biomass.	U	CO3	
	f)	State any two energy sources of geothermal.	R	CO5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw a neat labelled diagram of fuel cell and State its types.	U	CO5	
	b)	Draw and explain Deenbandhu Digestor biogas plant.	A	CO3	
	c)	State principle of Magneto-Hydro Dynamic (MHD) and draw any one type of MHD power generation plant.	U	CO5	
	d)	State advantages and limitation of tidal power generation.	A	CO4	
	e)	Explain single basin effects of tidal plant with neat diagram.	U	CO4	
	f)	Explain the four site requirement for biogas power generation.	U	CO3	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw SHP Power plant explain function of each part.	A	CO5	
	b)	State advantages and limitations of MHD power generation	A	CO5	
	c)	Explain KVIC digester biogas plant with neat labelled diagram.	U	CO3	
	d)	Explain open cycle OTEC plant with neat diagram.	U	CO4	
	e)	Draw neat labelled diagram of dry steam plant and explain its working.	A	CO5	
	f)	Draw a neat diagram of Pragati biomass plant and state its features.	A	CO3	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEG102**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **22/ 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 EEG 102	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define Intrinsic and Extrinsic material.	R	1	
	b)	What is the need of Rectification? Specify the type of Rectifier.	R	2	
	c)	What are the PIV of full wave center tapped rectifier and why?	R	2	
	d)	Draw the structure of PNP & NPN transistor.	U	3	
	e)	Define cutoff and saturation region of transistor.	R	3	
	f)	Draw the symbol of basic gates.	U	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw the characteristic of P-N junction diode and explain it.	U	1	
	b)	Describe the circuit of full wave bridge rectifier with its circuit diagram and waveform.	U	2	
	c)	Explain the characteristics of CB-configuration of BJT with its circuit diagram and characteristics.	U	3	
	d)	Draw the symbol of NAND, NOR, XNOR & AND Gate. Write down its truth table also.	A	4	
	e)	Draw the circuit of Zener as a voltage regulator and explain it.	A	1	
	f)	Compare i) Shunt capacitor filter. ii) Series inductor filter. iii) LC filter iv) CLC filter.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw & explain the characteristics of Zener diode.	R	1	
	b)	Explain the energy band diagram of Conductor, Insulator and Semiconductor.	U	1	
	c)	Convert : i) $(84)_{10} = (\ ?\ )_2$ ii) $(\mathrm{JJCB})_{16} = (\ ?\ )_2$ iii) $(76)_8 = (\ ?\ )_2$ iv) $(44)_{10} = (\ ?\ )_2$.	A	4	
	d)	Draw the circuit of center tapped full wave rectifier with LC filter. Explain them with output waveform.	U	2	
	e)	Define α & β of transistor. State the relation between them. Specify its values of CE-configuration.	A	3	
	f)	Draw the block diagram of regulated power supply and describe them.	R	2	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - THIRD PROGRAM : ELECTRICAL ENGG.

COURSE CODE :- EEG-303

COURSE NAME :- ELECTRIC CIRCUITS

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

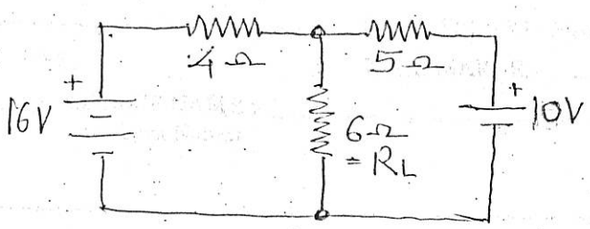
QN	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Using suitable circuit diagram state Kirchhoff's current law.	R	CO1	02
	b)	Define maximum power transfer theorem with simple example & circuit.	R	CO1	02
	c)	Define sinusoidal current quantity stating with equation & waveform.	R	CO2	02
	d)	Elaborate the term phase difference using phasor diagram & equations.	A	CO3	02
	e)	Solve $V_{Total} = V1+V2$; if $V1 = 2.5+j5$ volts & $V2 = 1.5+j3$ volts	A	CO3	02
	f)	Comment on power consumed by purely inductive circuit connected to AC supply.	R	CO3	02
Q.2		Attempt any **FOUR:**			**16**
	a)	Solve the given network using superposition theorem to find the current flowing through 06 ohms resistor as shown in fig. No-01.	A	CO1	04
	b)	State the following using waveform & equations i) Instantaneous value ii) Root mean square value iii) Average value iv) Peak factor.	U	CO2	04
	c)	If A= 4+j6 & B= 3+j5 calculate A+B, A-B, A*B & A/B in rectangular form.	A	CO2	04
	d)	Describe response of AC supply analytically in pure capacitive circuit with circuit diagrams and waveforms.	U	CO3	04
	e)	Solve the given R-C series AC circuit shown in fig no-02 to find impedance of the circuit.	A	CO3	04
	f)	Solve given the R-L-C series AC circuit in Fig. no-03. to find i) Resonant. frequency (Fr). ii) Current. ii) iii) Impedance Z. iv) Power factor.	A	CO3	04
Q.3		Attempt any **FOUR:**			**16**
	a)	Write analytical formulae for Star to Delta transformation with suitable labeled circuit diagrams.	A	CO1	04
	b)	Explain significance of 'Form factor & Peak factor'.	A	CO1	04
	c)	Draw Phasor diagram for subtractions of two AC voltage vectors $v1 = 100\angle 0^\circ$ volts & $v2 = 150\angle 45^\circ$ volts.	A	CO2	04

(P.T.O.)

	d)	Derive expression for finding out current flow & power consumed in R-L series circuit also draws Phasor diagram & waveform of voltage & current.	U	CO2	04
	e)	In series RLC circuit resistance of 40 ohms inductance of 0.45 H & capacitance of 220 Microfarads connected across 1 phase 230 volts, 50 Hz AC supply calculate i) Voltage across R, L & C ii) Current iii) Power & Power factor.	A	CO2	04
	f)	An inductance of 0.02 H, Resistance of 6 ohms & Capacitance of 50Microfarads connected in series across supply of AC 120 volt 50 Hz supply, Calculate Resonant frequency and Q factor of the circuit along with voltage across resistance & Capacitance.	A	CO3	04

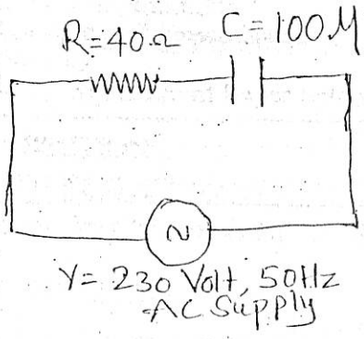
— Figures —

Fig No-01
Que-2-a)



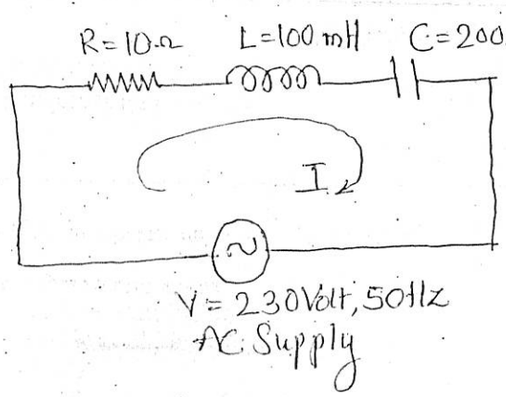
Using Superposition theorem find current flowing through 6Ω Load resistor.

Fig No-02
Que-2-e)

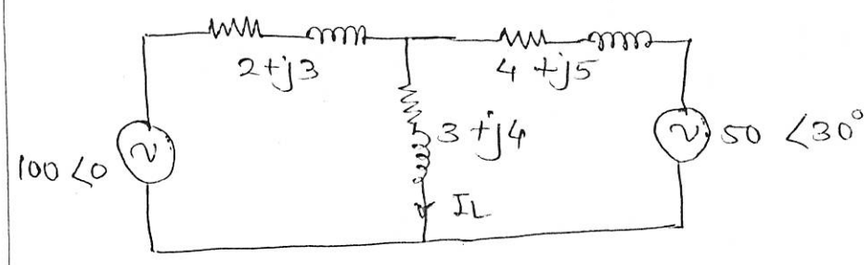
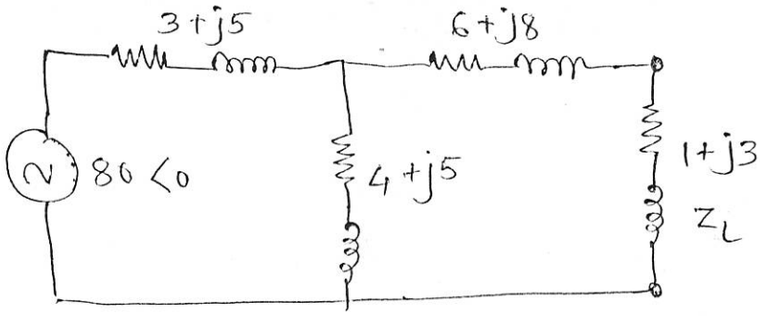


Find Z of circuit

Fig No-03
Que-2-f)



Find i) Fresonance
ii) I
iii) Impedance Z
iv) P.F. = cosϕ

QN	SQN	Question Text	R/U/A	Co EEG 303	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define conductance and susceptance related to parallel circuit.	U	4	
	b)	Define admittance.	U	4	
	c)	State maximum power transfer theorem for A.C. circuits.	U	5	
	d)	State Kirchhoff's laws for ac circuit.	U	5	
	e)	Define unbalanced three phase load.	R	6	
	f)	Define line voltage and phase voltage in case of 3 phase delta connected system.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Derive an expression for the resonance, frequency for an R-L-C parallel circuit.	A	4	
	b)	If $Z_1 = 3 + j7$ & $Z_2 = 12 - j16$ are connected in parallel, find the equivalent impedance of the combination.	A	4	
	c)	State Thevenins Theorem and write its procedural steps to find current in a branch.	U	5	
	d)	Explain with diagram superposition theorem (for A.C. circuits)	U	5	
	e)	State any four advantages of polyphase circuits over single phase circuits.	U	6	
	f)	Derive the relationship between the line voltage and phase voltage in star connection, With phasor diagram.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Two impedances $Z_1 = (8 + j6)\Omega$ & $Z_2 = (4 + j4)\ \Omega$ are connected in parallel across a 200V, 50 Hz ac. Supply calculate i) Branch current I_1 ii) Branch current I_2 iii) Total current I_T iv) Draw phasor diagram.	A	4	
	b)	Find I_L for the circuit shown in fig using superposition theorem. 	A	5	
	c)	Find the current through Z_L using Thevenins theorem inn Fig. 	A	5	

	d)	Draw the power trangle. State formulas for active power, reactive power and apparent power.	U	6	
	e)	Derive relation between i) Line current and phase current ii) Line voltage and phase voltage. For balanced delta connected load.	A	6	
	f)	Three resistance of 15Ω each are connected in star across 3 phase, 440v ac supply find. i) Phase current ii) Line current iii) Line voltage iv) Phase voltage.		6	

* * * * *

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : Electrical Engineering

COURSE CODE :- EEG311

COURSE NAME :- Electrical Estimation and contracting.

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-20/5/2024

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State General guidelines for selection of size of cables used in small scale industry.	R	4	02
	b)	Distinguish non industrial and industrial loads in industrial loads in industrial Electrical installations.	U	4	02
	c)	Write the aim of public lighting installation.	R	5	02
	d)	Name any two lamps with their ratings used in street lighting.	U	5	02
	e)	State the different types of tender.	R	6	02
	f)	State any two requirements of valid contact.	U	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw wiring diagram and single line diagram of 3 phase, 415 V, 5 HP induction motor installation.	R	4	04
	b)	Explain criteria for selection of starter for motor.	U	4	04
	c)	Decide the rating of main switch, motor switch, distribution board and cable for a industrial installation of having 2 motors of 3 HP and 5 HP.	A	4	04
	d)	Describe design consideration for the street light estimation; prepare the list of material required.	A	5	04
	e)	State the various types of contracts. Explain any one in detail.	R	6	04
	f)	Explain two envelop method for tender..	U	6	04
Q.6		Attempt any **TWO:**			**16**
	a)	i. Suggest the type of starter required for the following 1. IM of rating 5 HP 2. IM of rating upto 15 HP 3. IM with high rating 4. Slip ring IM of high rating ii. Explain the procedure to perform insulation resistance test between conductors.	U A	4 5	04 04
	b)	Design electrical installation scheme (Layout and wiring diagram) of industrial unit having three phase load of 50 KW floor mill. Also prepare the list of materials required.	A	4	08
	c)	Explain with suitable example quotation format, tender, comparative statement format and order format.	A	6	08

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL: -3 PROGRAM: Electrical Engineering

COURSE CODE: - EEG 311

COURSE NAME: - ELECTRICAL ESTIMATION AND CONTRACTING

MAX. MARKS: **80** TIME: **03 Hrs** DATE: - 20/5/2024

Instruction:-Answers of two sections must be written in separate section answer book provided.

1) Illustrate your answers with sketches wherever necessary.
2) Use of non-programmable pocket calculator is permissible.
3) Mathematical and other tables shall be made available on request.
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	Marks
Q.1		Attempt any FOUR of following:			**08**
	a)	State any two factors for selection of layout of commercial installation.	U	3	2
	b)	Draw a symbols of 2 pole switch and buzzer.	R	1	2
	c)	State any two IE rule related to electrical wiring installation.	R	1	2
	d)	State the principle of circuit design in lighting circuit.	U	2	2
	e)	Draw wiring arrangement for Meter-board.	A	2	2
	f)	State any four example of commercial installation	U	3	2
Q.2		Attempt any FOUR of following:			**16**
	a)	Explain the purpose of estimation and costing in electrical installation.	U	1	4
	b)	Prepare wiring and single line diagram for two lamps, two fans, and 5 Amp socket connected to single phase supply.	U	2	4
	c)	State the procedure for selection of rating of main switch and distribution board in residential building electrification.	U	2	4
	d)	Prepare an estimate for the earthing provided to residential multi-stored building electrical installation system.(building has 7 flats)	A	2	4
	e)	State the sequence to be followed to prepare estimate for a commercial building.	U	3	4
	f)	Prepare and design estimation with costing for main meter board for 24 kW, 1 phase 230 V load 8 kw, 3 phase 415v electrical motor load in an auditorium building Estimate the schedule of material with cost.	A	3	4
Q.3		Attempt any FOUR of following:			**16**
	a)	Describe basic elements of electrical estimation.	R	1	4
	b)	Draw single line diagram residential house for given data:- Light circuit: 3 tube set, 3 lamps, 1NL,2 ceiling fans, 2 sockets (5A), 1 socket (5A) on switch board.	A	2	4
	c)	State and explain guidelines of residential wiring work related to positioning of wiring elements and equipment's.	U	2	4
	d)	Prepare estimate and cost for 3 phase main MCB DB for the given data of connected load circuits(3 phase) i. SMDB -3 nos. each. 1 phase 9 kw load ii. 3 phase 3 kw electric motors load iii. Spare – 2 nos. each 3 kw, 3 phase capacity for the hospital building (supply 3 phase 415V)	A	3	4
	e)	Explain design consideration of commercial electrical installation.	U	3	4
	f)	State various clearance of switch and sockets of (5A,15A) boards in School, Library hall, Auditorium, Shopping mall.	U	3	4

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : Diploma in Electrical Engineering

COURSE CODE :- EEG306 / EEF306

COURSE NAME :- Electrical Power Generation

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	Question Text	R/U/A	Co EEG 306	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List any four sources of Energy.	R	1	2
	b)	List any four Environmental issues related to Electrical Power Generation from thermal power plant.	R	1	2
	c)	Define the term: i)Connected Load, ii)Firm power	R	2	2
	d)	Define the term: i) Average Demand ii) maximum Demand	R	2	2
	e)	List the four major auxiliaries of Thermal Power Station.	R	3	2
	f)	Classify Hydro power Plants based on water head.	R	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare Hydro and thermal power sources of power generation.	U	1	**4**
	b)	Draw and explain i) load curve and ii) load duration curve.	U	2	4
	c)	State the types of grids, state the impact of blackout on grid operation.	U	2	4
	d)	Draw layout of Thermal power station.	R	3	4
	e)	State and explain the four factors on which site selection of HPS depends.	U	3	4
	f)	Enlist the nuclear fuels, Explain energy conversion process in Nuclear power plant.	U	3	4
Q.3		Attempt any **FOUR:**			**16**
	a)	A generating station has the following data : Installed capacity = 300 MW ; Capacity factor = 50% ; Annual load factor = 60% Annual cost of fuel, oil etc. = Rs 9 × 107 ; capital cost = Rs 109 ; annual interest and depreciation = 10%. Calculate (i) the minimum reserve capacity of the station and (ii) the cost per kWh generated.	A	2	4
	b)	Enlist any two i) NPS and ii) HPS in India with their capacity.	R	3	4
	c)	Explain use of control rods and moderator in Nuclear Power Station.	A	3	4
	d)	Explain procedure of disposal of nuclear waste.	A	3	4
	e)	State safe practices adopted in HPS.	A	3	4
	f)	Define co-generation and enlist types of co-generation.	A	3	4

P.T.O.

QN	SQN	Question Text	R/U/A	Co MEF 503	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List out major wind forms in India.	R	4	
	b)	Define maximum power point tracking.	U	4	
	c)	List the various processes used for conversion of biomass	U	5	
	d)	List the working fluids used in closed cycle ocean thermal energy conversion system.	R	5	
	e)	State four applications of geo-thermal energy.	R	6	
	f)	Define the term fuel cell.	U	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	List the main components of a tidal power plant & explain the single basin tidal power generation system.	A	5	
	b)	Discuss the basic working principle of MHD power generation system with suitable diagram.	U	6	
	c)	Discuss the series & parallel connections used in solar power plant.	U	4	
	d)	State the advantages & limitations of geothermal energy power plant	U	6	
	e)	With neat labeled diagram explain pragati Biogas plant.	U	5	
	f)	Draw the block diagram of basic components of wind energy conversion system & explain in brief.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Discuss the term lift & drag for wind energy conversion.	U	4	
	b)	Discuss the I-V & P-V charteristics of performance influencing factors in solar power plant.	U	4	
	c)	With neat diagram explain closed cycle system of ocean thermal electric conversion.	A	5	
	d)	Discuss the construction & working of fuel cell.	U	6	
	e)	State the advantages & applications of magneto hydro dynamic power generation plant.(MHD)	A	6	
	f)	Discuss the bio –mass based power generation plant with different stages	U	5	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL: - FOUR PROGRAM: Electrical Engineering

COURSE CODE: - EEG 403

COURSE NAME: - Electrical Power Utilization and Traction

MAX. MARKS: **40** TIME: **1.5 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)	State the function of following: (i) Sub sectioning post and (ii) Elementary section.	R	EEG 403-1	
	b)	State the role of traction substations (Two points).	U	EEG 403-1	
	c)	State four limitations of third rail system.	R	EEG 403-2	
	d)	State four disadvantages of improper maintenance of OHE.	R	EEG 403-2	
	e)	List four requirements of train lighting.	R	EEG 403-3	
	f)	State the function of relay in electric locomotive and list its any two names.	R	EEG 403-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	With neat diagram explain the protection system used for AC traction Transformer.	U	EEG 403-1	
	b)	Compare AC traction system with DC traction system.	A	EEG 403-1	
	c)	Draw a neat labeled diagram of Faiveley type pantograph collector.	U	EEG 403-2	
	d)	State four factors to be considered for deciding: (i) Span length for OHE system and (ii) Height of contact wire for OHE system.	A	EEG 403-2	
	e)	State six desirable characteristics of ideal traction motor and names of two traction motors used.	U	EEG 403-3	
	f)	Explain the purpose of following equipment in AC locomotive: (i) Head light, (ii) Horn, (iii) Arno Converter and (iv) Blowers.	A	EEG 403-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain with neat diagram the trolley collector for overhead system.	U	EEG 403-2	
	b)	Compare uninsulated overlap with insulated overlap on four points.	A	EEG 403-2	
	c)	With neat diagram explain compound catenary construction system of polygonal OHE.	U	EEG 403-2	
	d)	Explain with neat diagram the working of double battery parallel block system in train lighting.	U	EEG 403-3	
	e)	Explain in brief four types of electrical faults occurring in locomotive with their causes.	A	EEG 403-3	
	f)	Draw a neat labeled diagram of 1-phase AC locomotive showing its various equipment of power circuit.	U	EEG 403-3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : ELECTRICAL ENGINEEING

COURSE CODE :- EEG403

COURSE NAME :- Electrical Power Utilization and Traction.

MAX. MARKS : 80 TIME : 1.5 hrs DATE :-17/5/2024

QN	SQN	SECTION –II	R/U/A	Co EEG403	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State any two welding equipment's used for resistance welding.	R	CO4	
	b)	State basic principle of resistance welding.	U	CO4	
	c)	Define Electric drive.	R	CO5	
	d)	Compare Individual drive and group drive with any two points.	A	CO5	
	e)	State methods of electric heating.	U	CO6	
	f)	State any two applications of induction heating.	A	CO6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain resistance welding with its neat diagram.	U	CO4	
	b)	Draw and explain indirect induction furnace.	U	CO6	
	c)	State the factors governing the selection of electric drives.	A	CO5	
	d)	Explain eddy current induction heating with neat diagram.	U	CO6	
	e)	State and explain advantages of electric drive.	A	CO5	
	f)	State any four motors used in electric drive with their applications.	A	CO5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain short and continuous duty cycle of motor briefly.	U	CO5	
	b)	Compare AC and DC welding with any four points.	A	CO4	
	c)	Draw and explain Ajax-Wyatt vertical core type furnace.	U	CO6	
	d)	State any four application of dielectric heating.	A	CO6	
	e)	State and explain electrical characteristics of motors used in electric drives.	U	CO5	
	f)	With neat diagram explain electric arc furnace.	U	CO6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEF504/EEE502**

COURSE NAME **MICROCONTROLLER**

MAX. MARKS : **80** TIME : **03 Hrs.** DATE :- **17/ 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.
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 EEF 504	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw lebelled block diagram of Micro computer.	R	1	
	b)	State Features of 8051 microcontroller (any four)	R	2	
	c)	Enlist Data transfer instructions.	R	3	
	d)	Enlist 8051 Family members and compare.	U	1	
	e)	Draw the format of PSW register and explain each bit.	U	2	
	f)	Enlist Jump instructions. (Conditional and unconditional)	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Enlist addressing modes of 8051. Explain any two with example.	R	3	
	b)	Compare Harvard and Von-Neumann architecture. (any four points)	R	1	
	c)	Explain power saving options of 8051.	R	2	
	d)	Enlist logical Instruction and explain any two with example.	U	3	
	e)	Draw pin diagram of 8051 chip. Enlist function of i) PSEN ii) INT0	U	2	
	f)	Develop an ASM program to find out largest number from a block of 10 numbers. Block is stored in internal RAM location from 604 to 694.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Compare Microprocessor and microcontroller. (any four points)	R	1	
	b)	Draw the format of IE register and explain each bit.	U	2	
	c)	Develop an ASM program to addition of two 16 bit numbers.	A	3	
	d)	Draw architectural block diagram of 8051. Enlist its features.	A	2	
	e)	Develop ASM program to exchange block of five numbers.	U	3	
	f)	Draw memory organization of internal RAM. Enlist SFR's with their addresses.	A	2	

P.T.O.

QN	SQN	SECTION –II	R/U/A	Co EEF 504	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Indicate which mode and which timer are selected for each of the following. I) MOV TMOD, #02H II) MOV TMOD, #10H.	A	4	
	b)	Draw format of IE register.	R	4	
	c)	How many address lines are required to interface 2k byte and 8 k bytes memories with 8051?	A	5	
	d)	Draw the pin diagram of 16 x 2 LCD display.	R	6	
	e)	List applications of seven segment display.	R	5	
	f)	State any four commands used to initialize 16 x 2 LCD.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write a program to generate square wave of 1KHz on P2.0 using timer 2. XTAL=12MHz.	A	4	
	b)	Explain the concept of interrupt and polling in 8051.	U	4	
	c)	Write assembly language program to send message "WELCOME" serially at 9600 baud rate continuously. Assume XTAL = 11.0592MHz.	A	4	
	d)	Draw interfacing diagram of 7. Segment LED display with microcontroller 8051.	U	5	
	e)	Draw labelled interfacing diagram of ADC 0808 with 8051 μc.	U	5	
	f)	Write 8051 assembly language program to rotate stepper motor by clockwise direction.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write a assembly language program to receive data serially at a baud rate of 4800 bps and send it to port 0.	A	4	
	b)	A switch is connected at P3.2 and 8 LED's are connected to P1. of 8051.Write a program to toggle LEDS with 1 msec delay when switch is pressed.	A	5	
	c)	Explain any two modes of timer.	U	4	
	d)	Draw interfacing diagram of 4 x 4 keyboard with 8051.	U	6	
	e)	Draw interfacing of 1k bytes of external RAM and 8k bytes of ROM with 8051 μc.	U	5	
	f)	Compare Linear and absolute decoding techniques.	U	5	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : Electrical Engineering

COURSE CODE :- EEG 310 / EEF310

COURSE NAME :- Transmission & Distribution of Electrical Power

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

QN	SQN	Question Text	R/U/A	EEG 310	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the functios of i) Isolator ii) Circuit Breaker.	R	CO4	
	b)	Enlist the desirable characteristics of Good Tariff (any Four)	U	CO6	
	c)	List the causes causing Low Power Factor.	R	CO5	
	d)	Name the type of Consumers for whom the Power factor tariff is employed.	U	CO6	
	e)	Explain the significance of employing Tariff.	U	CO6	
	f)	List different types of Distribution Schemes.	R	CO5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Differenciate between the Feeder and Distributor in Distribution System on the basis of Design and Use.	A	CO5	
	b)	Draw and explain the working of 3 wire Distribution System.	U	CO5	
	c)	~~List and Explain different methods generally employed for improvement of Power Factor.~~ Explain drawbacks of low power factor	A	CO6	
	d)	List the required design considerations of Distribution System.	U	CO5	
	e)	List and explain different types of Tariffs employed.	R	CO6	
	f)	List and Explain the Neccessity and Advantage of EHVT (Extra High Voltage Transmission Lines.	A	CO4	
Q.6		Attempt any **Two:**			**16**
	a)	List and explain the functions of Equipments used in Transmission and Distribution Systems.	U	CO5	
	b)	Draw and Explain Single line diagram of 33 KV/11 KV Substation with properly labeled substation Equipments.	A	CO5	
	c)	Draw and Explain Single line diagram of 3 phase 4 wire AC Distribution System.	A	CO5	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **Third** PROGRAM : **Electrical Engineering**

COURSE CODE :- EEG310 / EEF310

COURSE NAME : **Transmission & Distribution of Electrical Power**

MAX. MARKS : **80** TIME : **3 HRS.** DATE :- **16 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 desirable properties of insulators. (Any two)	R	1	
	b)	State any four advantages of bundled conductors.	R	1	
	c)	Define visual critical voltage.	R	2	
	d)	State any four factors on which skin effect depends.	U	2	
	e)	Define Ferranti effect.	U	2	
	f)	Define voltage regulation of transmission line & transmission efficiency.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	State and explain ACSR conductors and why are they preferred over copper conductors for overhead lines.	U	1	
	b)	A three phase transmission line is being supported by three disc insulators. The potential across top unit (i.e near to tower & middle unit are 8KV & 11KV respectively) Calculate 1) The ratio of capacitance between pin & earth to self capacitance of each unit. 2) The line voltage 3) String efficiency	A	1	
	c)	State advantages & disadvantages of corona.	U	2	
	d)	Explain nominal II method with vector diagram.	U	3	
	e)	Compare nominal T method & nominal π method on any four points.	A	3	
	f)	Draw a neat labeled diagram of monopolar HVDC link.	U	4	
Q.3		Attempt any **FOUR:**			**16**
	a)	Define sag. Derive sag when the supports are at equal level.	U	1	
	b)	State and explain methods of reducing corona effect.	U	2	
	c)	What is proximity & Ferranti effect in transmission system. Explain in detail.	U	2	
	d)	State and explain working principle of wireless power transmission.	U	3	
	e)	Draw a phasor diagram for nominal T & nominal π method of transmission line.	A	3	
	f)	Compare HVDC & AC transmission with any four points.	A	4	

PTO

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/ 2024

EXAM SEAT NO. | | | | | | |

LEVEL: IV PROGRAM: ELECTRICAL ENGINEERING

COURSE CODE: - EEG401

COURSE NAME: - INDUSTRIAL MACHINES

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-EEG 401	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define synchronous speed & slip only	R	1	
	b)	Give only the statement for condition for maximum torque under starting & running condition.	R+U	1	
	c)	State why rotor 'cu' losses are negligible.	U	1	
	d)	State the importance of circle diagram.	A	2	
	e)	State the necessity of starter for three phase induction motor.	U	3	
	f)	List the speed control methods of three phase induction motor from stator side & rotor side.	A	3	
Q.2		Attempt any **two.**			**16**
	A)	i) Explain the construction and working principle of three phase induction motor with neat diagram.	R+U	1	
		ii) A 3 phase, 6 poles, 50 Hz, induction motor develops 3.73KW at 960 rpm what will be the stator input, if the stator loss is 280 watts?	A	1	
	B)	Draw the circle diagram for a 3.73KW, 200V, 50 Hz, 4 pole , 3 phase star connected induction motor from the following test data No load test: Line voltage 200 V, Line current 5Amp, total input 350 watt Blocked rotor test : Line voltage 100 V, Line current 26 Amp, total input 1700 watt Estimate from the diagram for full load condition ,the line current, power factor & also the maximum torque in terms of the full load torque. The rotor 'cu' loss at standstill is half the total 'cu' loss.	A	2	
	C)	i) Explain stator resistance starter with neat diagram.	R+U	3	
		ii) Explain the speed control method of 3 phase induction motor by effect of injection of emf in rotor circuit.	R+U	3	
Q.3		Attempt any two.			**16**
	A)	i) The power input to a 6 poles, 3 phase, 50 Hz induction motor is 42 KW, The speed is 970 rpm. The stator losses are 1.2 KW & the friction and windage losses are 1.8 KW , find i) the slip , ii) the rotor 'cu' loss, iii) BHP, iv) the efficiency.	A	1	
		ii) A 3 phase , 400/200V, star- star connected wound rotor induction motor has 0.06 ohm rotor resistance & 0.3ohm standstill reactance per phase. Find the additional resistance required in the rotor circuit to make the starting torque equal to the maximum torque of the motor.	A	1	

P.T.O.

P.T.O.

	B)	Draw the circle diagram from no load and short circuit test of a three phase 14.92 KW, 400 V, 6pole induction motor from the following test results (line values). No load test: 400 V, 11Amp, p.f = 0.2 Short circuit test: 100 V, 25 Amp, p.f =0.4 Rotor cu loss at standstill is half the total cu loss. From the diagram, find a) line current, slip, efficiency and p.f at full load, b) the maximum torque.	A	2	
	C)	i) Discuss the production of rotating magnetic field by 3 phase supply in 3 phase winding.	U+R	1	
		ii) Give the applications of 3 phase squirrel cage induction motor & slip ring induction motor.	A	1	

QN	SQN	SECTION –II	R/U/A	Co EEG 401	Mark
Q.4		Attempt any **four of the following.**			**08**
	a)	Write down equation of emf's generated by three phase alternator.	R	4	2
	b)	What is the speed of synchronous motor? What happen if the motor try to run with speed lower than synchronous speed?	R	5	2
	c)	What is the function of centrifugal switch in a single phase induction motor?	U	6	2
	d)	Write down any two advantages of having stationary armature in case of an alternator.	U	4	2
	e)	Define load angle.	R	5	2
	f)	Write down any two applications of synchronous motor.	U	5	2
Q.5		Attempt any **four of the following.**			**16**
	a)	Compare salient pole and smooth cylindrical type alternator on any four points.	A	4	4
	b)	Compare three phase induction motor and 3 phase synchronous motor on following point i) Construction ii) Excitation iii) Speed iv)Power factor	R	5	4
	c)	Draw neat diagram of capacitor start Induction run motor and label different parts.	R	6	4
	d)	Explain single layer armature winding of a three phase alternator with neat diagram.	A	4	4
	e)	With the help of a neat labelled diagram, explain construction and working of Hysteresis motor.	U	6	4
	f)	Explain the factors affecting on the terminal voltage of an Alternator with vector diagram.	R	4	4
Q.6		Attempt any **four of the following.**			**16**
	a)	Explain the construction and operation of single phase AC series motor.	A	6	4
	b)	Derive EMF equation of an alternator considering short pitch factor.	R	4	4
	c)	Explain working of synchronous motor with suitable diagram.	A	5	4
	d)	Explain double revolving field theory for single phase induction motor.	U	6	4
	e)	What is the difference between capacitor start and capacitor start capacitor run induction motor?	U	5	4
	f)	The stator winding of an alternator has 48 slots .A 4 pole ,three phase winding is made on the stator .Each coil span is 11 slots.Calculate the pitch factor.	A	4	4

*****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIRST** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEG101**

COURSE NAME **FUNDAMENTALS OF ELECTRICITY AND MAGNETISM**

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

Instruction :-

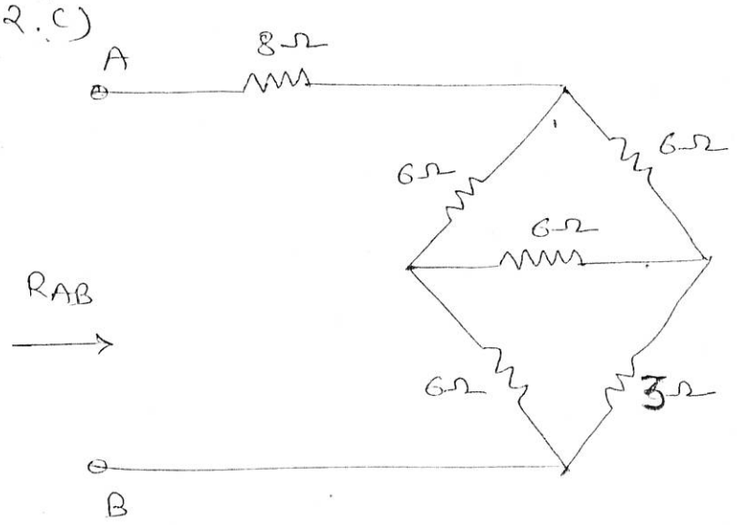
1) Answers must be written in the main answer book provided.(and supplements if required)
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention 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 EEG 101	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define power and energy.	R	1	
	b)	State the concept of internal voltage drop.	U	2	
	c)	Define dielectric strength and state its unit.	R	3	
	d)	State any two application of the chemical effect of electric current.	A	1	
	e)	Explain in detail why practical current source has more internal resistance and how it is connected with source?	U	1	
	f)	Calculate the energy stored in the capacitor if the capacitance of the capacitor is 10μF and voltage of 100V is applied across it.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Derive an expression for total or equivalent capacitor for 3 capacitors say C_1, C_2 and C_3 farad are connected in parallel.	A	3	
	b)	Explain ~~Joules Law of electric heating along with suitable expression.~~ heating effect of electric current with suitable example	U	1	
	c)	Find the equivalent resistance across terminal AB for the given resistive network as shown in (Fig. No.1)	A	1	
	d)	Derive the expression for division of current in parallel connected resistors (2 resistors only)	U	2	
	e)	Convert the given star connected resistive network in an equivalent delta connected network (See Fig. No.2)	A	2	
	f)	A parallel plate capacitor consists of two parallel plate of area 24cm^2. The plates are placed at 5cm apart from each other. There are three sheets of dielectric medium between plates of thickness 2cm, 1.5cm and 1.5cm with relative permittivity of 2, 3 and 4 respectively. Calculate the capacitance of these composite capacitor. Also calculate the new capacitance if these sheets are removed with air as dielectric medium.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Derive the expression for the development of capacitance in between two parallel plate capacitor.	U	3	
	b)	Explain in detail law of the resistance of the conductor.	U	1	
	c)	Calculate the value of equivalent capacitance of the given combination (See fig. No.3)	A	3	

	d)	A coil having a cross sectional area of $0.8mm^2$. The mean length of the coil is 40cm and resistivity of copper wire is 0.04 micro-ohm-meter. Find the resistance of the coil and power absorbed by coil when connected across the 100V DC supply.	A	1	
	e)	Calculate the equivalent resistance across the terminal AB (See Fig. No.4)	A	2	
	f)	State the Ohm's Law. Explain why voltage drop for given circuit affect the source voltage and Terminal voltage i.e. why Terminal voltage across load is always Less than source voltage.	A	2	
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Magnetic flux. State its unit..	R	4	
	b)	Define permeability of magnetic material.	R	4	
	c)	Define Reluctance. State its unit.	R	5	
	d)	Draw Hysterisis loops for Hard and Soft Magnetic Material.	U	5	
	e)	Write Lenz's Law.	R	6	
	f)	Define self-Inductance. State its unit.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write Right hand rule and Corcks screw rule.	R	4	
	b)	Describe concept of Toroid and write its application.	A	4	
	c)	Iron ring of mean circumference 80cm is uniformly wound. With 550 turns of wire. Calculate value of flux density when a current of 1.1A would produce in the ring. Assume $\mu r = 1400$.	A	5	
	d)	Compare electric circuit and magnetic circuit on basis of any four points.	U	5	
	e)	With neat sketch describe useful flux and Leakage flux.	U	5	
	f)	Describe steps to plot Hysterisis loop.	U	5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Give the properties of ~~magnetic flux~~ a magnetic field line.	U	6	
	b)	State Faraday's laws of Electromagnetic Induction.	R	6	
	c)	Explain Statically Induced EMF.	R	6	
	d)	Compare dynamically Inducted EMF and statically Induced EMF.	U	6	
	e)	Calculate Inductance of a Solenoid of 2000 turns wound uniformly over a length of 50cm on a cylindrical paper tube of area $20cm^2$. The medium is air.	A	6	
	f)	State Flemings Right hand rule. Give its application.	U	6	

****

Q.2.C)



(Fig No.1)

Q.2e)

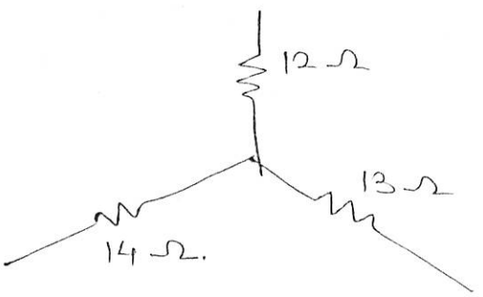


Fig No.2

Q.3C)

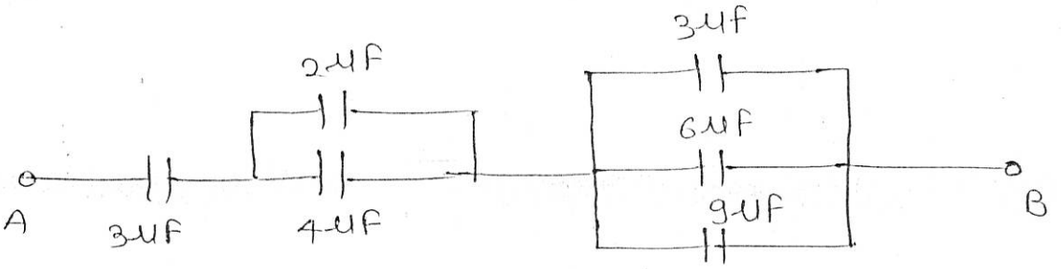


Fig No.3

Q.3e) $R_{AB} = ?$

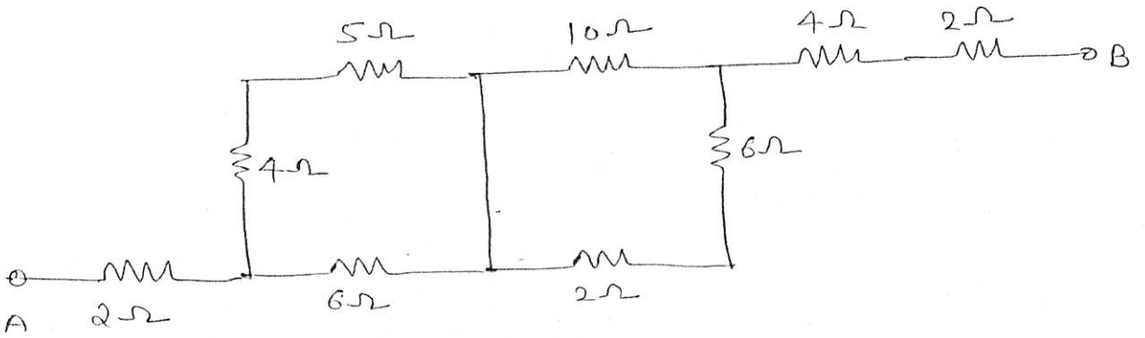


Fig No.4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - THIRD PROGRAM : Electrical

COURSE CODE :- EEG305

COURSE NAME :- ELECTRICAL ENGINEERING MATERIAL

MAX. MARKS : **40** TIME : **02 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 EEG305	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give classification of magnetic material	U	CO-2	
	b)	Define positive temperature coefficient and negative temperature coefficient of resistance.	R	CO-1	
	c)	State any two characteristics of mercury as conducting material.	R	CO-1	
	d)	State any four application of Conducting material in Electrical Engineering.	A	CO-1	
	e)	Define Specific resistance of material and state its unit.	U	CO-1	
	f)	State any two types of liquid insulator and state their one application.	U	CO-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain the phenomenon of loss of magnetism	R	CO-2	
	b)	Explain the effect of temperature rise on the properties of Conducting material.	U	CO-1	
	c)	Explain the importance of hysteresis loop in magnetic material.	A	CO-2	
	d)	Sate one application of Lead, Nickel , Tin and Brass related to electric material	A	CO-3	
	e)	Enlist any eight properties of aluminum conducting material.	A	CO-1	
	f)	State any four desired characteristics of Insulating material and explain any two of them in detail	A	CO-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	State the difference in characteristics of CRGO and HRGO silicon steel and write application of these material.	A	CO-2	
	b)	Draw magnetisation curve of a ferromagnetic material and label its main region with its meaning.	U	CO-2	
	c)	Explain why copper is preferred in electrical machine wiring.	A	CO-1	
	d)	Explain the electrical and thermal properties of transformer oil those make it suitable as an electrical insulating medium.	U	CO-3	
	e)	Explain the Breakdown in insulating material.	A	CO-3	
	f)	Explain suitability of tungsten as an electrical conducting material for heating applications with respect to its electrical and mechanical properties	A	CO-1	

* * * * * *

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/ 2024

EXAM SEAT NO. | | | | | | |

LEVEL: - V **PROGRAM: ELECTRICAL ENGINEERING**

COURSE CODE: - **EEG501**

COURSE NAME: - **Electrical Testing & Commissioning**

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-EEG501	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List the only methods of providing artificial respiration to the person who receive electrical shock.	R/U	1	
	b)	Define Electrical accidents.	R	1	
	c)	List the name of special test carried out on electrical machines/ equipment.	A/U	2	
	d)	List the methods of testing.	A	2	
	e)	List any four type test carried out on three phase induction motor.	A/U	3	
	f)	Give routine maintenance on 3 phase and single phase induction motor.(List any 04)	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Give the activities to be carried out for the person who received electrical shocks	A/U	1	
	b)	Discuss the factors involved in designing the machine foundation.	U	1	
	c)	Compare direct, indirect & regenerative type of testing	A/U	2	
	d)	Explain routine maintenance and breakdown maintenance.	R/U	2	
	e)	Discuss the reduced voltage running up test carried out on three phase and single induction motor	A/U	3	
	f)	State any four activities that are done during preventive maintenance of induction motor.	A/U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	State the precautions to be taken to avoid fire due to electrical reasons?	U	1	
	b)	Discuss mouth to mouth artificial respiration method to the person who receives electrical shock	A/U	1	
	c)	With neat a diagram discuss open circuit test and short circuit test conducted on three phase induction motor.	A	3	
	d)	Discuss momentary overload test conducted on rotating electrical machines	A/U	3	
	e)	Discuss the factors affecting preventive maintenance Schedule	U/R	2	
	f)	Explain the total productive maintenance.	A/U	2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

/SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG501

COURSE NAME :- ELECTRICAL TESTING & COMMISSIONING

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)	Give the name of tests are carried out on transformers as per IS 2026-1981	U/R	4	
	b)	Name any four contaminating agents of transformer oil.	R	4	
	c)	List out factors affecting life of insulation. (Any four)	R	5	
	d)	List the different methods of drying of insulation.	R	5	
	e)	List any four electrical and magnetic fault that occur in electrical equipment	R	6	
	f)	List any four External causes for abnormal operation of electrical equipment.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	List out the Routine, Type and special test to be carried out on transformer as per IS-2026.	R	4	
	b)	State the use of following tools – i) Filler gauge ii) Bearing puller iii) Growler iv) Dial Indicator	A	6	
	c)	Prepare trouble shooting chart of three phase induction motor for any four faults.	A	6	
	d)	Explain with neat circuit diagram back to back test on single phase transformer to determine efficiency and regulation.	A	4	
	e)	Explain with neat diagram steps to determine temperature rise test on power transformer by open delta method.	A	4	
	f)	Explain dielectric strength test and flash point test on transformer oil with neat diagram.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	List the special test to be carried on transformer as per IS 2026-1981	A	4	
	b)	State need of drying of electrical equipment. Explain any one method of drying of electrical equipment with neat diagram.	A	5	
	c)	Draw and explain vacuum impregnation method of varnishing.	A	5	
	d)	Describe desirable properties of transformer oil (any eight).	U	5	
	e)	Prepare the trouble shooting chart for the following troubles in transformer. i) Zero output voltage ii) Low output voltage iii) Oil temperature is very high iv) Overheating of transformer winding	A	6	
	f)	State the activities that are carried during maintenance of LV switchgear.	A	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

/SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL: -3 PROGRAMS: Electrical Engineering

COURSE CODE: -EEG307 / EEF307

COURSE NAME: - DC Machine & Transformers

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	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State any four parts of DC machine.	R	1	2
	b)	Give classification of DC generator.	U	1	2
	c)	Compare lap and wave winding with any two points.	A	1	2
	d)	Write the applications of DC Shunt Motor and DC series Motor.	A	2	2
	e)	Define transformation ratio.	R	3	2
	f)	State the types of transformer's on basis of voltage and construction.	U	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	State and explain operation of DC generator.	R	1	4
	b)	Derive the emf equation of DC generator.	U	1	4
	c)	Explain speed control of DC shunt motor by using field current control method.	U	2	4
	d)	With neat circuit diagram state working of a 3 point starter used for DC shunt motor.	R	2	4
	e)	A 230 V, 4 Pole DC Motor has Ra =0.5 ohm. Find the back emf in motor when armature current is 25 Amp. If armature is lap wound with 320 conductors and useful flux/pole is 50 mwb. Also calculate speed.	A	2	4
	f)	A single phase transformer has 300 turns on it's primary side and 750 turns on it's secondary side, the maximum flux density in the core is 1 Wb per meter square, calculate: 1) The net cross sectional area of the core. 2) The emf induced in secondary side. The primary of transformer is connected to 440 V, 60 Hz supply.	A	3	4
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw a neat diagram of DC machine and label it.	A	1	4
	b)	Draw a speed -torque characteristics of DC shunt motor and DC series motor.	A	2	4
	c)	Draw labeled schematic circuit diagram of DC shunt motor. Write equation for Voltage and current.	A	2	4
	d)	State the main features of ideal transformer and also draw phasor diagram for no load condition.	R	3	4
	e)	Explain why transformer is rated in KVA?	U	3	4
	f)	Explain working of single phase transformer with neat diagram	A	3	4

Q.4		Attempt any **FOUR:**			**08**
	a)	State two advantages of autotransformer.	U	4	
	b)	Give any two advantages of open delta connection of 3 phase transformer.	U	6	
	c)	State any two conditions for parallel operation of transformer.	U	5	
	d)	State applications of isolation transformer.	A	4	
	e)	State need of parallel operation of transformer .	U	5	
	f)	Give the applications of 3 phase transformer.	A	6	
Q.5		Attempt any **FOUR** :			**16**
	a)	Describe the necessity of All day efficiency in case of certain type of transformer.	U	4	
	b)	A single phase 50KVA , 2400/120V 50Hz transformer give following test results O.C. test – 120volt ,9.85A,396watts S. C. test – 92 volt , 20.8amp., 810 watts calculate 1) The equivalent cut circuit constant 2) efficiency at rated KVA & P. F 0 .8 lag 3)Voltage regulation	A	4	
	c)	Two Single phase transformers A & B rated at 250KVA each are operated in parallel on both sides . Percentage impedance for A & B are (1+j6) & (1.2 +j4.8) respectively .Compute the load shared by each when the total load is 500KVA at 0.8 pf lagging.	A	5	
	d)	~~Describe the significance of vector grouping of 3 phase transformer.~~ Identify following vector groups ① Dd0 ② Dy5 ③ Yz0, ④ Yz2	U	6	
	e)	Explain with circuit diagram , the direct loading tests on single phase transformer , how the efficiency and regulation at given load condition is determined.	A	4	
	f)	Compare power transformer & distribution transformer based on the following parameters i) Typical Voltages 2) Power rating 3) Maximum efficiency 4) Types of efficiency	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Discuss the conditions to be satisfied for parallel operation of 3 phase transformer.	U	6	
	b)	With neat diagram ,explain open circuit test ~~& short circuit test~~ carried on single phase transformer.	U	4	
	c)	Describe the construction and working principle of isolation transformer.	U	4	
	d)	Draw the circuit diagram for parallel operation of transformer.	U	5	

P. T. O.

	e)	For a 1000KVA transformer the full load copper & iron losses are 9 KW & 7 KW respectively, During a day of 24 hours , it is loaded as follows No. of hours | Loading | P. F. 6 | 800KW | 0.8 10 | 600KW | 0.75 4 | 200KW | 0.8 4 | 0 | - Calculate all day efficiency .	A	4	
	f)	Define harmonics & state its effect in transformer connections.	U	6	

****

3/3

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - Fourth PROGRAM : Electrical Engineering

COURSE CODE: - EEG404

COURSE NAME: - Energy conservation & Audit

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

QN	SQN	**SECTION –II**	R/U/A	Co EEG 404	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State any two advantages of installing high frequency electronic ballasts in place of conventional ballast in case of lighting system.	R	4	02
	b)	List out the any two commercial losses that take place in transmission and distribution system.	R	5	02
	c)	Define the term "Simple payback period" and state how it helps in Energy Audit Project.	U	5	02
	d)	State any two methods of reducing technical losses in transmission & distribution system.	U	5	02
	e)	Draw a neat labelled Energy flow diagram for an Induction Motor.	R	6	02
	f)	Define Energy Audit as per Energy Conservation Act, 2001.	R	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Discuss light control gears ballast used in lighting control	A	4	04
	b)	Explain energy conservation techniques in transmission and distribution systems by reducing I^2R losses.	R	5	04
	c)	Prepare any eight questions related to energy audit of shopping mall.	A	6	04
	d)	Discuss primary three considerations to ensure energy efficiency in lighting system.	A	4	04
	e)	Discuss the balancing phase current energy conservation techniques in distribution system.	A	5	04
	f)	State difference between "walk through audit" and "detailed audit".	A	6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	List out energy conservation techniques in fans & electronic reguators.	R	4	04
	b)	With neat diagram explain use of "reactive power controller" to reduce technical losses in transmission and distribution system.	U	5	04
	c)	Describe the different steps involved in detailed energy audit procedure.	U	6	04
	d)	Explain how energy conservation can be obtained by replacing light sources (lamps) only.	U	4	04
	e)	State any four major energy audit instruments and explain their uses.	U	6	04
	f)	State the need & objectives of Energy Audit.	A	6	4

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL: - IV PROGRAM: ELECTRICAL ENGINEERING

COURSE CODE: -EEG404

COURSE NAME: -ENERGY CONSERVATION & AUDIT

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-EEG 404	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define energy demand	R	1	
	b)	Define Energy conservation.	R	1	
	c)	State the need of Cogeneration.	U	2	
	d)	Define energy efficient motor.	R	3	
	e)	List the name of energy efficient transformer.	R	3	
	f)	State any two applications Variable Frequency Drive.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Discuss roles and responsibilities of MEDA(Maharashtra Energy Development Agency)	A	1	
	b)	State and explain factors to be considered for the selection of Co-Generation system.	U	2	
	c)	Define power factor tariff. How it helps in Energy conservation	A	2	
	d)	List the factors affecting the energy efficiency in electrical motors	U	3	
	e)	State the advantages of energy efficient transformer	U	3	
	f)	Discuss the intelligent power factor controller (IPFC) for energy conservation techniques.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Discuss star lebelling with its benefits.	A	1	
	b)	Describe the relevant clauses of energy conservation.	U	1	
	c)	With neat block diagram explain gas turbine co- generation	U+R	2	
	d)	Compare Energy efficient motor with standard motor.	U+R	3	
	e)	Discuss the following energy conservation methods in transformer by i) Load sharing, ii) Parallel operation.in brief.	A	3	
	f)	State the energy conservation opportunities in the transformer	A	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEG309/EEF309**

COURSE NAME **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **11/ 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 EEG 309	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Classify amplifiers.	U	1	
	b)	Draw single stage CE amplifiers.	A	1	
	c)	State Barkhausen Criteria for oscillator.	R	2	
	d)	Draw pin diagram of voltage regulator IC 7812.	A	3	
	e)	List out coupling methods in multistage amplifiers.	R	1	
	f)	Define Load and Line regulation.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Differentiate between RC oscillators and LC oscillators. (any four points)	U	2	
	b)	Explain with neat circuit diagram of colpitts oscillator.	U	2	
	c)	How regulated power supply work. Explain with neat block diagram.	U	3	
	d)	Draw neat labeled circuit diagram of transformer coupled amplifier. Give working of each component in circuit.	A	1	
	e)	State the Features of following IC (two features each) i) IC 7812 ii) IC 7912	R	3	
	f)	Explain with neat circuit diagram of single stage CE amp.	U	1	
Q.3		Attempt any **FOUR:**			16
	a)	Explain IC 723 is a variable voltage regulator.	U	3	
	b)	For Hartley oscillator L_1 =0.1H, L_2 =0.5H, C =10 μF, find sinusoidal output frequency.	A	2	
	c)	Compare between class A and class B power amp. on following points i) Circuit diagram ii) Q-point iii) Applications iv) Efficiency	U	1	
	d)	Explain with example IC 723 as low voltage and high voltage regulator.	A	3	
	e)	Explain internal block diagram of IC 555.	U	2	
	f)	Draw and explain two stages RC coupled CE amplifier.	A	1	

P.T.O

QN	SQN	Question Text	R/U/A	Co EEG 309	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw pin diagram of IC 741.	R	4	
	b)	Define i) CMRR ii) SVRR	R	4	
	c)	Calculate gain of non-inverting amplifier if RF=10KΩ and R_1=5KΩ.	A	5	
	d)	Draw a transfer curve of Ideal OP-amp.	R	4	
	e)	Find One's complement of the following binary numbers i) 0100111001 ii) 11011010	A	6	
	f)	State a commutative law and associative law of Boolean algebra.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain level shifting stage of operational amplifier with circuit diagram.	U	4	
	b)	Draw the block diagram and explain functions of all block of OP-Amp.	U	4	
	c)	Compare open loop and closed loop configuration of OP-amp (any four points)	U	5	
	d)	Derive the expression for the output voltage of basic differentiator circuit.	U	5	
	e)	Explain with diagram type and working principle of successive approximation ADC.	U	6	
	f)	Perform following operation using 2's complement method i) 6-4 ii) 7-3	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain practical transfer curve of OP-amp.	U	4	
	b)	Define i) Input offset voltage ii) Input offset current. iii) Input bias current iv) Offset voltage.	R	4	
	c)	Compare inverting and non- inverting amplifier (four points)	U	5	
	d)	Draw the circuit for voltage follower and explain its working.	U	5	
	e)	For non- inverting summing amplifier having input V_a, V_b, V_c such that V_a= +1V, V_b = +2V, V_c = +3V. If R_F = 10KΩ, R_1 = 5KΩ, calculate the output voltage. Draw the circuit diagram.	A	5	
	f)	Perform following operation i) Find the 2's complement of the number 1) 01100100 2) 10010010. ii) Add the binary number 1) 1001 and 1111 2) 0101 and 0011.	A	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO.

LEVEL : - First PROGRAM : EE

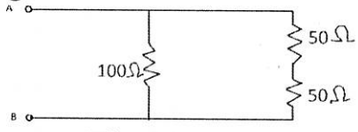
COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTALS OF 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 electric current and state its unit.	R	1	
	b)	State Krichhoff's current law and Krichhoff's voltage law.	R	2	
	c)	Define capacitance and state its unit.	R	3	
	d)	State Ohm's law and its equation.	R	2	
	e)	Define work and state its unit.	R	1	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Distinguish between Direct current and Alternating current. (Any four points)	U	1	
	b)	Define ideal voltage source and practical voltage source. Draw the symbol for each.	U	1	
	c)	Compare series circuit and parallel circuit.	U	2	
	d)	Calculate the equivalent resistance between points A and B in the Fig. No.1.  Fig. No. 1	U	2	
	e)	List any three types of capacitor. Give one application of each type.	U	3	
	f)	Distinguish between series combination of capacitor and parallel combination of capacitor. (Any four points)	U	3	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Three capacitors 15μf, 18μf and 12μf are connected in a circuit. Find equivalent capacitance when they are connected in - (i) series (ii) parallel	A	3	
	b)	Define three effects of electric current. Give one application of each.	A	1	
	c)	Explain star-to-delta conversion and delta-to-star conversion of resistive circuit.	A	2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER-2024

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTAL OF 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)	Explain the concept of Mutually Induced EMF.	R	6	
	b)	What are the different types of Magnet & give their examples	U	5	
	c)	Define & Explain Magnetic Field Strength.	U	4	
	d)	State & Explain Lenz's Law for induced EMF	R	6	
	e)	Define & state its unit i) Reluctivity ii) Permeability	U	5	
	f)	When a current of 2mA is supplied to a coil with 100 turns, a magnetic flux of magnitude 0.2Wb is linked with it. Find the self-inductance of this coil.	A	6	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Compare Electric Circuit & Magnetic Circuit.(Any 4 Points)	R	5	
	b)	Define following terms related to AC Circuit i) Frequency ii) Time Period iii) Cycle iv) Amplitude	U	6	
	c)	Explain the generation of Magnetic field due to current carrying conductor.	R	4	
	d)	State Faradays First & Second Law of electromagnetic induction.	R	6	
	e)	Explain the concept of Toroid & give their application.	R	4	
	f)	State the application of Permanent Magnet & Electromagnet.(4 Application each)	R	5	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Draw neat labeled circuit & diagram for B-H curve & discuss on Hysteresis Loop.	U	5	
	b)	A non-magnetic ring having 5cm mean length & cross section is $3cm^2$ it is uniformly wound having 200 turns. Calculate, i) Magnetic field strength having current 2 Amp ii) Magnetic flux density ($\mu_r = 300$)	A	4	
	c)	Draw & Explain the phenomenon of Mutual Induction & Self induction.	U	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

/SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **05** PROGRAM : **ELECTRICAL ENGG**

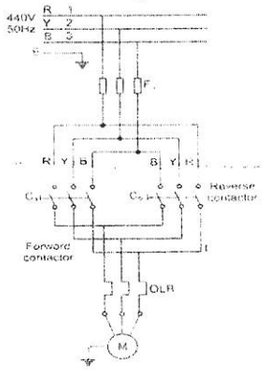
COURSE CODE :- **EEG502**

COURSE NAME :- **INDUSTRIAL AUTOMATION AND CONTROL**

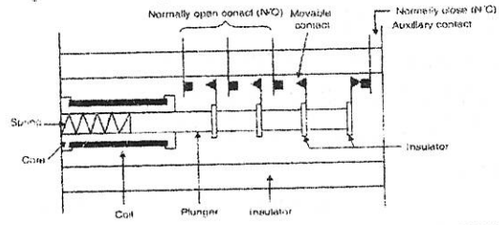
MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 10/5/2024

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)	Give the classification of PLC on the basis of number of input/output.	R	3	
	b)	Draw the power diagram for star-delta starter.	R	2	
	c)	Define the term automation and list its types.	R	1	
	d)	Give any four advantages of PLC over conventional relays.	R	1	
	e)	Classify the following devices into input and output devices:- Pressure switch, motor, temperature sensor, bulb	A	2	
	f)	State the function of programming devices in PLC.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain the operation of contact type limit switch with diagram.	U	2	
	b)	Describe DC input module with neat block diagram.	U	3	
	c)	Compare between fixed automation and flexible automation w.r.t following points (i)Purpose. (ii) Flexibility in providing product variety (iii) Cost (iv) Examples	U	1	
	d)	Identify the type of starter used for induction motor. Draw the control circuit for the same and explain its operation in brief. 	A	2	
	e)	Explain the function of communication module and stepper motor module used in PLC.	U	3	
	f)	Develop control and power circuit for lifting magnet used as a material handling equipment.	A	2	

(P T.O.)

Q.3		Attempt any **FOUR:**			**16**
	a)	Describe operation of analog output module with the help of block diagram.	U	3	
	b)	Explain the function of any two automation tools used in process industry.	U	1	
	c)	Draw the bock diagram of PLC and explain function of CPU.	U	3	
	d)	Identify the name of devices shown in fig below and explain its operation in brief 	A	2	
	e)	Explain the types of PLC on the basis of input/output expansion capacity.	U	3	
	f)	Draw the power circuit for DOL starter for 3-phase induction motor and explain its operation in brief.	U	2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

/SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : Electrical Engineering

COURSE CODE :- EEG 502

COURSE NAME :- Industrial Automation & Control

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

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Byte and Word related with binary system with example.	R	EEG 502 -4	
	b)	State any four PLC programming languages.	R	EEG 502 -5	
	c)	List any four applications of PLC.	R	EEG 502 -5	
	d)	Identify the specified components of SCADA.	R	EEG 502 -6	
	e)	Enlist the benefits of SCADA.	R	EEG 502 -6	
	f)	State the concept of distributed control system	R	EEG 502 -6	
Q.5		Attempt any **FOUR:** Ladder diagram for NAND & NOR			**16**
	a)	Construct ~~output energize instructions for PLC.~~ logic functions.	A	EEG 502 -4	
	b)	Describe down counter instruction in PLC with control word.	U	EEG 502 -4	
	c)	Explain PLC based water level controller.	U	EEG 502 -5	
	d)	Construct pipeline control by using SCADA.	A	EEG 502 -6	
	e)	Explain process control architecture with object linking and embedding.	U	EEG 502 -6	
	f)	Develop ladder program for automatic bottle filling system using PLC.	A	EEG 502 -5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Develop ladder diagram for basic logic gates. (NOT, AND. OR)	A	EEG 502 -4	
	b)	Illustrate PLC Timer (OFF Delay) in detail.	A	EEG 502 -4	
	c)	Describe the architecture of SCADA.	U	EEG 502 -6	
	d)	Develop ladder diagram for temperature control ON OFF using PLC.	A	EEG 502 -5	
	e)	Illustrate Distributed control system in detail.	A	EEG 502 -6	
	f)	Describe forward – reverse control three phase induction motor used in PLC.	U	EEG 502 -5	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIFTH** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEF502**

COURSE NAME **ELECTRICAL MACHINE CONTROL AND AUTOMATION**

MAX. MARKS : **80** TIME : **03 Hrs.** DATE :- **10/ 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.
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 EEF 502	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State any two disadvantages of manual control	R	1	
	b)	Draw 2 wire control circuit and state its significance.	R	1	
	c)	Draw circuit symbol of i) Fuse-switch unit ii) contactor.	R	2	
	d)	State any two applications of limit switch.	A	2	
	e)	What is thermistor?	U	3	
	f)	State the meaning of single-phasing.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Distinguish clearly between semi-automatic and Automatic control on the basis of any two points.	A	1	
	b)	Describe the necessity of interlocking of drives in industrial application.	A	2	
	c)	Explain the application of Frequency responsive relay.	A	2	
	d)	Explain any four ratings of contactor.	U	2	
	e)	Explain any one application of pressure switch.	A	2	
	f)	With neat diagram, explain the operation of float switch.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	With neat diagram, explain the operation of Pneumatic timer.	U	2	
	b)	With neat diagram, explain the operation of Rotary cam type limit switch.	U	2	
	c)	Elaborate overall protection of AC motors.	U	3	
	d)	Explain the necessity of phase-failure protection of AC motors.	U	3	
	e)	Explain the role of fuse and contactor in motor feeder circuit.	A	3	
	f)	Explain why under-voltage protection is essential for AC motors.	A	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL: - V PROGRAM: ELECTRICAL ENGINEERING

COURSE CODE :- EEF502

COURSE NAME :- ELECTRICAL MACHINE CONTROL & AUTOMATION

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

QN	SQN	**SECTION –II**	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**		EEF 502-	**08**
	a)	Define plugging of motor.	R	4	
	b)	State the use of ladder diagram.	A	6	
	c)	Justify the purpose of starter for slip ring induction motor.	A	4	
	d)	List the advantages of automatic control for a pump (Any 04).	U	5	
	e)	Define PLC & Justify its use (Any 02).	R/A	6	
	f)	State the limitations of DOL starter.	U	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	With neat diagram discuss lifting magnet in industrial control circuits.	A	5	
	b)	State the advantages of digital logic over relay logic.	U/R	6	
	c)	Draw the power & control circuits of random reversing type for three phase induction motor.	A	4	
	d)	Draw the power & control circuits for motors using automatic autotransformer type starter.	A	4	
	e)	With neat diagram explain control of electrical oven.	A	5	
	f)	Discuss dynamic breaking for three phase induction motor.	U/A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw control & power circuits diagram of definite time limit starter for three phase wound rotor using individual timer.	A	4	
	b)	With neat diagram discuss the working of a programmable logic controller.	U/R	6	
	c)	Discuss the planer machines in industrial control circuits.	A	5	
	d)	Discuss with neat diagram the control circuits & power circuits of forward –stop- reverse type for three phase induction motor.	A	4	
	e)	With neat power & control diagram discuss secondary frequency acceleration starter for three phase induction motor.	A	4	
	f)	Draw & explain the block diagram of PLC.	R/U	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM SUMMER -2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **THIRD** PROGRAM : **ELECTRICAL ENGINEERING**

COURSE CODE :- **EEG304**

COURSE NAME **ELECTRICAL AND ELECTRONICS MEASUREMENT**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **09/ 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 EEG 304	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define .Measurement'. State its purpose.	R	1	
	b)	State the types of analog instruments.	R	1	
	c)	State classification of resistances according to their values.	R	2	
	d)	State the applications of 'Anderson Bridge'.	A	2	
	e)	State the errors occurred in Wattmeter.	R	3	
	f)	State the features of balanced load in 3 ph system.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	'PMMC Instrument can only measure DC quantities'. Justify the given statement.	A	1	
	b)	Define each of following terms: i) drift ii) precision iii) reproducibility iv) sensitivity.	R	1	
	c)	Explain working principle of digital voltmeter with neat diagram.	U	1	
	d)	Explain Kelvin double bridge method for measurement of low resistance.	U	2	
	e)	Explain in brief following errors in Wattmeter i) Errors due to stray magnetic fields. ii) Errors due to Eddy currents.	U	3	
	f)	Explain the effect of power factor on Wattmeter readings connected for measurement of 3 phase power with two Wattmeter method.	A	3	
Q.3		Attempt any **TWO:**			**16**
	a)	State and explain different types of errors takes place during measurement.	U & A	1	
	b)	Draw a neat labelled diagram of Megger. Explain its working in brief.	A & U	2	
	c)	With neat circuit diagram, explain measurement of power in three phase balanced load using two Wattmeters.	A	3	

P.T.O

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

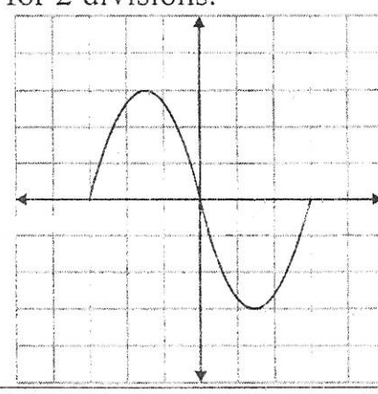
EXAM SEAT NO. | | | | | | |

LEVEL : - III PROGRAM : EE

COURSE CODE :- EEG304

COURSE NAME :- Electrical and Electronic Measurement

MAX. MARKS : 80 TIME : 03 Hrs DATE :-09/5/2024

QN	SQN	Question Text	R/U/A	Co EEG 304	Marks
Q.4		Attempt any **FOUR:**			08
	a)	List methods (any two) used for extension of range of ammeter.	R	4	02
	b)	Calculate the CT ratio required to measure the rated current of 1kA, using an ammeter having scale from 0 to 10 A.	A	4	02
	c)	List the three types of transducers based on the principle of transduction.	U	5	02
	d)	Describe in short, the piezoelectric effect.	U	5	02
	e)	List the applications (any two) of CRO.	R	6	02
	f)	List the applications (any two) of function generator	R	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain the necessity of extension of range of DC ammeter. Illustrate application of shunt used in ammeter with circuit diagram.	A	4	04
	b)	Draw the block diagram of single-phase digital energy meter and explain working of each block.	U	4	04
	c)	Explain in brief, the construction and working principle of RTD.	U	5	04
	d)	Explain in brief, the construction and working principle of Bourdon tube.	U	5	04
	e)	Draw the block diagram of CRO and explain each block.	U	6	04
	f)	Explain strip chart recorder with the help of diagram.	U	6	04
Q.6		Attempt any **FOUR:**			16
	a)	For the sinusoidal waveform shown in figure, find 1)peak to peak voltage, 2) Maximum voltage 3) RMS voltage. Consider vertical attenuation is 3mV for 2 divisions. 	A	6	04
	b)	Distinguish between thermistor and thermocouple. (any 4 points)	A	05	04
	c)	Draw the block diagram of prepaid energy meter and explain working of each block.	U	04	04
	d)	Explain the working principle of induction type watt hour meter with the help diagram.	U	04	04
	e)	Explain the working principle of electrical resonance type frequency meter with the help diagram.	U	04	04
	f)	Explain the working principle and construction of rotating type phase sequence indicator meter with the help diagram.	U	04	04

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

/ SUMMER-2024

EXAM SEAT NO. | | | | | | |

LEVEL : - FOURTH PROGRAM : ELETRICAL ENGINEERING

COURSE CODE :- EEG-402 / EEF 403

COURSE NAME :- SWITCHGEAR & PROTECTION

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

QN	SQN	**SECTION –II**	R/U/A	Co EEG-402	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State types of lightening arresters used in power systems.	R	CO4	
	b)	State various occurring faults in an Alternator.	R	CO5	
	c)	State function of Buchholz relay in transformer.	R	CO5	
	d)	~~Comments on~~ State any two abnormalities occur in transformer as a faults.	R	CO5	
	e)	State need for bus-bar protection	R	CO6	
	f)	State advantages of time graded over current graded over current protections.	R	CO6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with construction & principle of operation of horn gap arrester.	U	CO4	
	b)	Draw labelled diagram of surge absorber and explain its working.	U	CO4	
	c)	Explain with suitable circuit diagram restricted earth fault protection in transformer.	A	CO5	
	d)	Explain effect of overheating and related faults in an Alternator.	A	CO5	
	e)	Explain Feeder protection schemes.	U	CO6	
	f)	Explain with labelled sketch Differential pilot wire protection in transmission lines.	U	CO6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain construction & working with suitable sketch ZnO type lightening arrester	U	CO4	
	b)	Describe schemes for protection against travelling waves.	U	CO4	
	c)	~~Comment on~~ Explain negative phase sequence effect occurring in an Alternator	U	CO5	
	d)	Draw neat labelled sketch of Bucholz relay & explain its use in protection scheme for transformer protection.	U	CO5	
	e)	Elaborate briefly incipient faults occurring in the transformer	U	CO5	
	f)	Explain with suitable circuit diagram time graded protection in transmission line.	U	CO6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : E E

COURSE CODE :- EEG402 / EEF403

COURSE NAME :- Switchgear & Protection

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 four advantages of substation earthing.	U	1	02
	b)	Draw the single line diagram of indoor substation.	R	1	02
	c)	Draw the basic circuit of overcurrent relay protection scheme.	U	2	02
	d)	Describe application of C.T. and P.T. in protective relaying circuits.	A	2	02
	e)	State two functions of protective systems in power system.	A	2	02
	f)	Define Making capacity and Breaking capacity related with circuit breaker.	U	3	02
Q.2		Attempt any **FOUR:**			**16**
	a)	State the bus bar arrangements in Electrical substation. Draw the circuit diagram for sectionalization bus-bar arrangement.	R	1	04
	b)	Compare indoor substation with outdoor substation on four points.	A	1	04
	c)	Explain construction and characteristics of H.R.C. fuse with neat sketch and graph.	U	3	04
	d)	Draw the neat sketch of Air Brake circuit breaker. Explain high resistance method of arc extinction.	A	3	04
	e)	Explain in brief four causes of faults in power system.	U	3	04
	f)	Describe any of the four advantages of SF6 circuit breaker over other types of circuit breakers.	A	3	04
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain the significance of time multiplier setting and plug setting multiplier in case of overcurrent relay.	A	2	04
	b)	State four essential qualities of protection and explain each briefly.	U	2	04
	c)	Draw the block diagram of static overcurrent relay. Explain it's operation.	U	2	04
	d)	Define the following terms related to protective relays: (i) Protective relay, (ii) Pickup current, (iii) Relay operating time and (iv) Reset.	U	2	04
	e)	Explain the working principle of differential relay.	R	2	04
	f)	Explain operation of microprocessor-based relay with neat, labelled block diagram.	U	2	04

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL: - Third PROGRAM: Electrical Engineering
COURSE CODE: - EEH301
COURSE NAME: - Electrical Power Generation
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)	List the various sources of energy.	R	EEH301-1	
	b)	Define: a) Cold reserve , b) Hot reserve	U	EEH301-2	
	c)	Give the application of thermal power station.	A	EEH301-3	
	d)	List any two hydro power stations in Maharashtra state with their capacity.	R/U	EEH301-3	
	e)	State the meaning of chain reaction.	A	EEH301-3	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Discuss the environmental issues related to electrical power generation.	U	EEH301-1	
	b)	State the advantages & disadvantages of hydro power plant.	R/U	EEH301-3	
	c)	Discuss the importance of electrical power in day-to-day life.	R	EEH301-1	
	d)	Classify the hydro power station & Draw the basic layout of hydro power plant.	R	EEH301-3	
	e)	List the two major nuclear power stations in Maharashtra with their capacity & Give the applications of nuclear power station.	A/U	EEH301-3	
	f)	Define: a) maximum demand, b) connected load, c) Demand factor, d) load factor.	A/U	EEH301-2	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Explain load curve & load duration curve with their importance	U/R	EEH301-2	
	b)	State the advantages (Any three) & disadvantages of thermal power station (Any three)	A/U	EEH301-3	
	c)	Discuss nuclear power station with suitable block diagram & functions of their auxiliary components.	A/U	EEH301-3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

. . / SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : : Electrical Engineering
COURSE CODE :- EEH 301
COURSE NAME :- ELECTRICAL POWER GENERATION
MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 4/5/2024

QN	S QN	Question Text	R/ U/ A	Co	Ma rks
Q.4		**Attempt any FOUR: (2 X 4)** photovoltaic cell			**08**
	a)	List the applications of ~~flat plate solar air collector~~.	R	4	2
	b)	State any two applications of wind energy.	R	4	2
	c)	State the different types of material used for the solar photovoltaic.	R	4	2
	d)	State the various types of wind turbines used on the basis of position of rotor.	U	4	2
	e)	State limitations of tidal power generation.	R	5	2
	f)	List any two applications of fuel cells.	R	6	2
Q.5		**Attempt any FOUR: (4 X 4)**			**16**
	a)	Explain with neat diagram the working and material used in photovoltaic cell.	U	4	04
	b)	Describe main features of various types of generators and their suitability w.r.t wind power generation.	A	4	04
	c)	Explain the KVIC type digester in detail.	U	5	04
	d)	Write down the advantages of tidal power plants.	R	5	04
	e)	Draw and explain open cycle turbine system in ocean thermal electric conversion. (OTEC)	U	5	04
	f)	Draw and explain construction & working of Fuel cell.	U	6	04
Q.6		**Attempt any TWO: (6 X 2)** Describe solar array			**12**
	a)	~~State any two types of solar collector~~ with their particular application.	A	4	06
	b)	Draw schematic layout of electricity generation by using biomass, explain it in brief.	A	5	06
	c)	State principle of geothermal energy power plant. State its two advantages and two applications.	A	6	06

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - Fifth PROGRAM : Electrical Engineering

COURSE CODE :- EEG 505/EEF505

COURSE NAME :- Electrical Drives

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)	Name the Electrical Motors used for driving Traction Load.	U	CO1	
	b)	Specify any Two examples of Traction Load.	R	CO1	
	c)	Enlist the Braking methods used in Traction Drives.	R	CO2	
	d)	Draw the Speed-Torque characteristick of Induction motor.	U	CO2	
	e)	Draw the circuit diagram of Split phase induction motor.	U	CO2	
	f)	List the four advantages of Electrical Drives over other types of Drives.	A	CO3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Enlist the Governing factors for selection of Electrical Drive.	U	CO2	
	b)	Enlist the Starting methods for Single phase Induction Motor. Explain shaded pole method with neat diagram.	A	CO2	
	c)	Differentiate between Group drive and Individual drive.	R	CO1	
	d)	Justify using diagram the self-starting characteristic of Three phase Induction motor.	U	CO3	
	e)	List the advantages of Converter fed Induction motor over other methods	R	CO3	
	f)	State the advantages of slip energy recovery system of Speed control in Induction motor.	U	CO1	
Q.3		Attempt any **FOUR:**			**16**
	a)	Which D.C.Drives are used as Traction Motors ? Why ?	A	CO1	
	b)	Explain the Regenerative Braking method used in ~~Traction~~ DC shunt Drives along with pre-requisite conditions.	U	CO2	
	c)	Explain the speed control of Induction motor by using variable frequency converter method.	U	CO3	
	d)	List the speed control methods of Three phase induction motor. Explain Rotary (Resistance) control method with help of neat diagram	A	CO3	
	e)	List the speed control methods of D.C. motor. Explain any one control method with help of neat diagram	A	CO3	
	f)	Compare Synchronous motor and Induction motor on basis of ~~Speed and Torque characteristic.~~ i) Starting method ii) pf	A	CO2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG505/EEF505

COURSE NAME :- Electric Drives

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)	Describe in short any two applications of IGBT.	A	04	
	b)	State any two switching devices used in the three phase inverter.	R	04	
	c)	If input voltage of boost converter is 250V DC and duty ratio of boost converter is 0.4, calculate the output voltage of it.	A	05	
	d)	List any two advantages of fully controlled converter drive.	R	05	
	e)	List any two requirements of drives used in textile industry.	R	06	
	f)	List stages of the process of sugar mills.	R	06	
Q.5		Attempt any **TWO:**			**16**
	a)	Explain microcontroller based DC motor control with neat labeled diagram.	A	06	
	b)	Explain the basic architecture of PLC. Describe in short, any one application of PLC in electric motor drive.	A	06	
	c)	Illustrate the speed control of the DC motor using type C chopper.	A	04	
Q.6		Attempt any TWO			**16**
	a)	With neat labeled diagram, explain the speed control of separately excited DC motor using single phase, fully controlled converter.	A	05	
	b)	With neat labeled diagram, explain the speed control of separately excited DC motor using single phase dual converter.	A	05	
	c)	i) Draw the neat labeled circuit diagram of type D chopper drive ii) Explain principle of operation of phase locked loop control.	U U	04 06	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - FOURTH PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG405/EEF406.

COURSE NAME :- POWER ELECTRONICS

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.
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 commutation.	R	EEG405-1	
	b)	Draw single phase controlled rectifier with resistive load.	R	EEG405-2	
	c)	Classify choppers.	U	EEG405-3	
	d)	Define controlled rectifier.	R	EEG405-2	
	e)	Compare step up and step down chopper.(2 points)	U	EEG405-3	
	f)	Enlist control strategies in chopper.	R	EEG405-3	
Q.2		Attempt any **FOUR:**			16
	a)	Explain V-I characteristics of UJT.	U	EEG405-1	
	b)	Explain three phase half converter with R load for 45°firing angle.	U	EEG405-2	
	c)	With neat circuit diagram, explain Jone's chopper.	U	EEG405-3	
	d)	Compare SCR and TRIAC.(4 points)	U	EEG405-1	
	e)	Explain single phase half controlled rectifier with RL load without freewheeling diode.	U	EEG405-2	
	f)	Draw and explain symmetrical configuration of bridge converter.	U	EEG405-2	
Q.3		Attempt any **FOUR:**			16
	a)	Draw VI characteristics of TRIAC and DIAC.	U	EEG405-1	
	b)	Explain effect of input source impedance on single phase full wave controlled rectifier.	U	EEG405-2	
	c)	With neat circuit diagram, explain Morgan's chopper.	U	EEG405-3	
	d)	Draw and explain class B commutation.	U	EEG405-1	
	e)	Explain Mid- point converter.	U	EEG405-2	
	f)	Draw waveforms of full controlled rectifier with RL load without freewheeling diode.	U	EEG405-2	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : -4 PROGRAM :Electrical Engineering

COURSE NAME :- POWER ELECTRONICS Course code : EEG405 / EEF406.

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.
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)	Define the term inverter.	R	4	
	b)	Draw the circuit diagram of three phase bridge inverter.	U	4	
	c)	Explain voltage control in single phase inverter.	U	4	
	d)	Give the classification of cycloconverter.	R	5	
	e)	State the application of SMPS.	R	6	
	f)	State the need of UPS.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain working of modified series inverter.	U	4	
	b)	With the help of circuit diagram and waveform explain single pulse width modulation in inverter.	U	4	
	c)	Describe single phase to single phase cycloconverter with diagram.	A	5	
	d)	Draw the circuit diagram and waveform of single phase to bridge cycloconverter.	A	5	
	e)	Describe speed control three phase induction motor for phase control.	U	6	
	f)	Explain with diagram battery charger by using SCR.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain working of parallel inverter with feedback diode.	U	4	
	b)	Draw the circuit diagram and waveform of McMurray full bridge inverter.	U	4	
	c)	Describe three phase to single phase cycloconverter with diagram.	A	5	
	d)	Draw and explain block diagram of offline UPS.	U	6	
	e)	With the help of circuit diagram explain working of single phase half controlled drive for DC motor.	U	6	
	f)	Explain with diagram emergency light system by using SCR.	A	6	

****

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 2024

EXAM SEAT NO. | | | | | | |

LEVEL : -FIVE PROGRAM : Electrical Engineering.

COURSE CODE :- EEG504 COURSE NAME :- MICROCONTROLLER APPLICATION

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.
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 EEG504	Marks
Q.1		Attempt any **FOUR** of the following.			**08**
	a)	State any two features of AT89C51 Microcontroller.	R	1	2
	b)	Define Control bus and data bus of microcontroller 8051.	U	1	2
	c)	Find the values to be load in TH1 and TL1 register to generate the time delay of 20ms.	A	2	2
	d)	Define the following pin function of microcontroller. 1. PSEN 2. ALE	U	2	2
	e)	Identify which flag of PSW register get affected after execution of following instruction. ANL A, #data. SUBB A, R2.	U	3	2
	f)	State any two instructions for Logical OR and Logical AND operation.	R	3	2
Q.2		Attempt any **FOUR** of the following.			**16**
	a)	Compare any three family member of 8051 microcontroller on the basis of RAM, ROM, Timer and Interrupts.	R	1	4
	b)	Draw the format of Program status word register and also write the significance of every bit.	U	2	4
	c)	Explain the various ports of 8051 microcontroller.	U	2	4
	d)	Write assembly language program to add two 16 bit numbers. 1st number is stored at location 31H and 32 H , 2nd number is stored at location 51H and 52H internal RAM location . stored the result at 61H and 62H, stored the carry at 60H location.	A	3	4
	e)	Explain the function of PUSH and POP instruction of 8051 microcontroller.	U	3	4
	f)	Assume internal RAM memory contains the following data. Write 8051 ALP to search for value equal to 65. If value 65 exists in the table then store it in R4. If value does not exists in the table then make R4= 0. *Data: 40H=76, 41H=79, 42H=22H, 43H=65, 44H=62h*	A	3	4
Q.3		Attempt any **FOUR** of the following			**16**
	a)	State and explain any four selection factor of microcontroller.	U	1	4
	b)	Draw and explain the RAM and ROM memory organization of 8051 Microcontroller.	U	2	4
	c)	Develop an assembly language program to arrange the 10 number in ascending order. The 10 numbers are stored at memory location 50H onwards.	A	3	4
	d)	Compare Microprocessor and Microcontroller (any four points)	R	1	4
	e)	Draw the format of TCON SFR and also write the significance of every bit.	U	2	4
	f)	Identify the addressing modes and no of bytes of following instructions. 1. ANL A, @Ri 2. INC DPTR 3. LJMP 4000H 4. MOV A, Direct	A	3	4

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER 2024

EXAM SEAT NO. | | | | | | |

LEVEL : - **FIVE** PROGRAM :**ELECTRICAL ENGG:**

COURSE CODE :- **EEG504**

COURSE NAME :- **MICROCONTROLLER AND APPLICATION**

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

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List the various modes of timer in 8051 microcontrollers	R	5	
	b)	Draw interfacing diagram of 4 x 4 keyboard matrix with 8051 microcontrollers.	U	6	
	c)	Draw the format of SCON Register.	R	5	
	d)	Draw the format of PCON register	R	5	
	e)	Find the number or steps for revolution (360°) of stepper motor with steep angle of 1.8° and 5.0°	A	6	
	f)	State the use of pull-up register connected to Port-0 pins	R	4	
Q.5		Attempt any **FOUR:**			**1**
	a)	Draw the interfacing diagram of 4 X 4 matrix keyboard with 8051 microcontrollers.	U	6	
	b)	Describe the working of timer in mode-1 with logical diagram.	U	4	
	c)	Draw interfacing diagram if 8 LED's are connected to port 1 of 8051. Write on ALP to toggle all LED's on port 1. Assume suitable delay.	A	5	
	d)	Draw and explain the internal port structure of port-0 of 8051 microcontroller.	U	4	
	e)	Draw interfacing of 7 segment display with 8051 and write a program to display 0 to 9 numbers on it.	A	4	
	f)	Differentiate between absolute decoding and linear decoding technique (any 4 points)	U	5	
Q.6		Attempt any **FOUR:**			**1**
	a)	Develop ALP to display message 'WELCOME' on LCD display	A	6	
	b)	Draw the interfacing diagram of seven-segment display with 8051 microcontrollers.	U	5	
	c)	Describe MODE 1 & MODE 2 of data transmission and reception of serial port in 8051	U	4	
	d)	Draw interfacing diagram of 1K X 8 external data RAM to 8051 microcontrollers with address mapping table.	U	5	
	e)	Develop ASM program to transfer letter 'Y' serially at 9600 baud rate continuously port 0	A	4	
	f)	Develop a program to generate 50% duty cycle square wave on pin P1.2 interrupt delay. (Assume XTAL = 11.0592 MHz)	A	5	

****