GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~ / SUMMER – 23

EXAM SEAT NO. | | | | | | |

LEVEL : - THIRD PROGRAM : ELECTRICAL ENGG.

COURSE CODE :- EEG-303

COURSE NAME :- ELECTRIC CIRCUITS

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 9 / 6 /23

Instruction :-

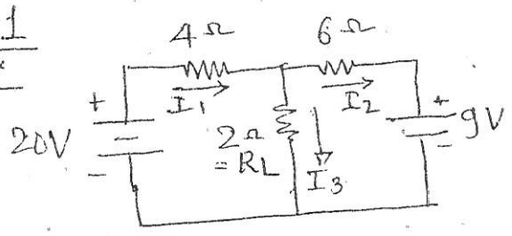
1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable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

QN	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State Ohm's law with their limitations.	R	CO1	02
	b)	Using suitable circuit diagram state Kirchhoff's voltage law.	R	CO1	02
	c)	Define sinusoidal current quantity stating with equation & waveform.	R	CO2	02
	d)	Convert Z=3+j4 Ω into polar form Z<θ Ω.	A	CO3	02
	e)	With suitable diagrams and labels explain Rectangular form & Polar form representation of vectors of an AC quantity.	A	CO3	02
	f)	Comment on power consumed by purely resistive 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 02 ohms resistor as shown in fig. No-01.	A	CO1	04
	b)	Describe using neat labeled diagram & wave form of working principle of elementary generator for generation of alternating current & voltage.	U	CO2	04
	c)	If A= 4+j6 & B= 3+j5 calculate A+B, A-B, A*B, A/B in polar form.	A	CO2	04
	d)	Describe response of AC supply analytically in pure inductive circuit with circuit diagrams and waveforms.	U	CO3	04
	e)	Solve the given R-L series AC circuit shown in (fig no-02) to find impedance of the circuit.	A	CO3	04
	f)	Derive an expression for resonant frequency (Fr) in R-L-C series AC circuit.	A	CO3	04
Q.3		Attempt any **FOUR:**			**16**
	a)	Calculate maximum power transferred to load resistance 05 ohms in a given network of (Fig. no-03.)	A	CO1	04
	b)	An AC voltage of Vac = 100Sin 314t volts given to 25 ohms impedance Calculate following i) Maximum Voltage & Average voltage ii) Root Mean square value of voltage & current.	A	CO1	04
	c)	Draw Phasor diagram for addition of two AC voltage vectors v1 = 200<0° volts & v2 = 100<45° volts.	A	CO2	04
	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 30 ohms inductance of 0.35 H & capacitance of 250 Microfarads connected across 1 phase 240 volts, 50 Hz AC supply calculate i) Voltage across R, L & C ii) Current iii) Power & Power factor.	A	CO2	04
	f)	Explain significance of Q Factor in R-L-C series circuit.	A	CO3	04

QN	SQN	QUESTION TEXT`	RUA	CO EEG 303	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	State superposition and maximum power transfer theorem for A.C. circuits.	R	05	
	b)	Define admittance and conductance related with AC circuit and state their units.	R	04	
	c)	Define quality factor for parallel resonance and write its mathematical expression.	R	04	
	d)	State the relationship between voltage and current in parallel circuit of AC supply system.	R	04	
	e)	Define the term phase sequence.	R	06	
	f)	List any four advantages of polyphones system.	R	06	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Calculate the value of branch current and total current if the two impedances Z_1 and Z_2 are connected in parallel. The first branch takes leading current of 18A of resistance 7Ω and second branch takes lagging p.f. 0.85. Total value of power supplied is 7 kw and applied voltages being (110 + 220)y.	A	04	
	b)	Calculate the value of branch current I_1 and I_2 also draw the phasor diagram with reference figure (5(b)).	U	04	
	c)	Calculate the valve of maximum power of load impedance 2_L so that maximum power can be transferred is in the network of figure 5 (c).	A	05	
	d)	Compute Thevenins equivalent network for figure. 5(d).	U	05	
	e)	Explain briefly the relation between voltage, current and power in a balanced star connected load.	U	06	
	f)	Discuss the expression for the total power consumed in a balanced 3Ø AC circuit is similar for star and delta connection. Draw its phasor diagram in both cases.	U	06	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Calculate the value of quality factor, C of circuit resonance at 50Hz, if a coil having R=30Ω, L=0.6H connected parallely with C.	A	04	
	b)	Explain with neat sketch, how three phase voltages are generated.	U	06	
	c)	Calculate the value of resistance and inductance in each branch of stat connected load consumes 2500 walt, it is connected to 3Ø, 415v, 50Hz supply at 0.8lag.p.f.	A	06	
	d)	Calculate the value of current Ic as shown in figure 6(d) by using Nortans Theorm.	A	05	
	e)	Calculate the value of current IL in the circuit shown in 6(e) with the help of superposition theorm.	A	05	
	f)	Discuss the relationship between line and phase value of current and voltages in 3Ø star and delta connected AC supply system.	U	06	

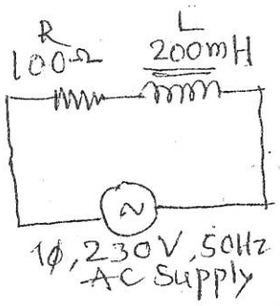
P.T.O.

Fig No 01
Q 2-a)



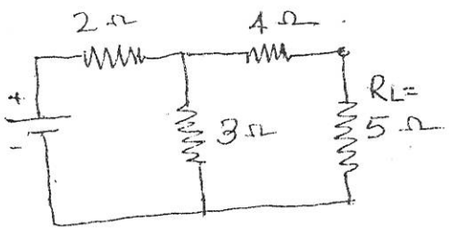
Use Superposition theorem to find current I_3 in 2Ω Load resistor.

Fig No 02
Q 2-e)



Z = ?

Fig No 03
Q-3-a)



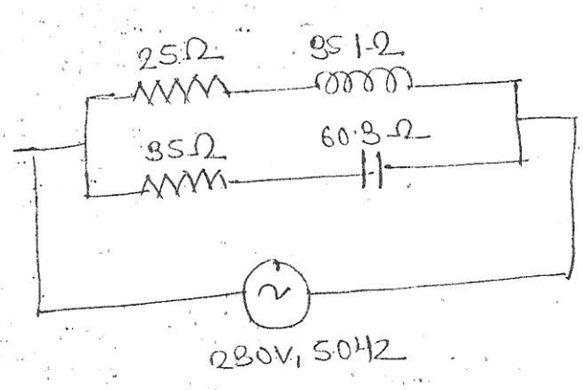
P_{max} in 5Ω ?

× × ×

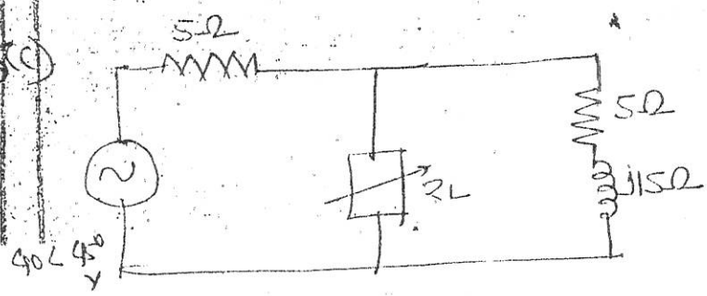
P.T.O.

3|4

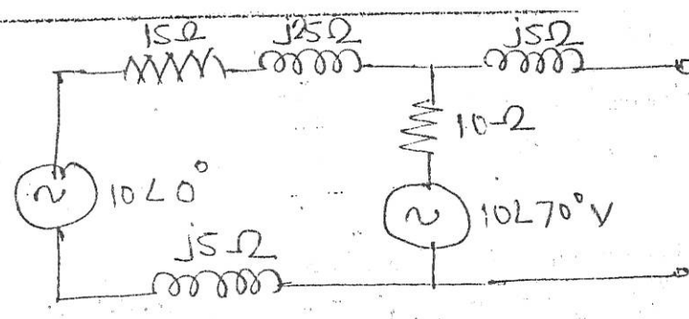
5(b)


25Ω
95·1Ω
85Ω
60·8Ω
280V, 50Hz

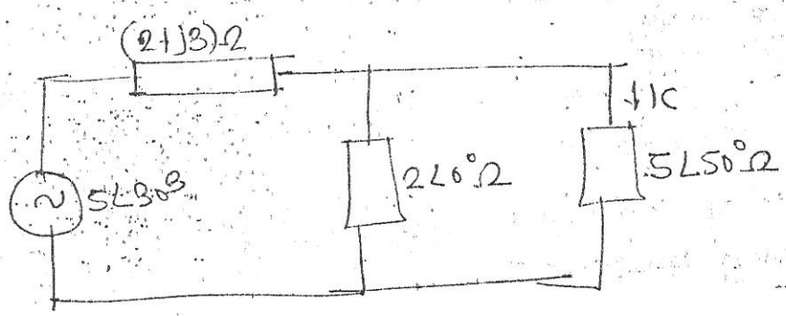
5(c)


5Ω
5Ω
ZL
j15Ω
40∠45° V

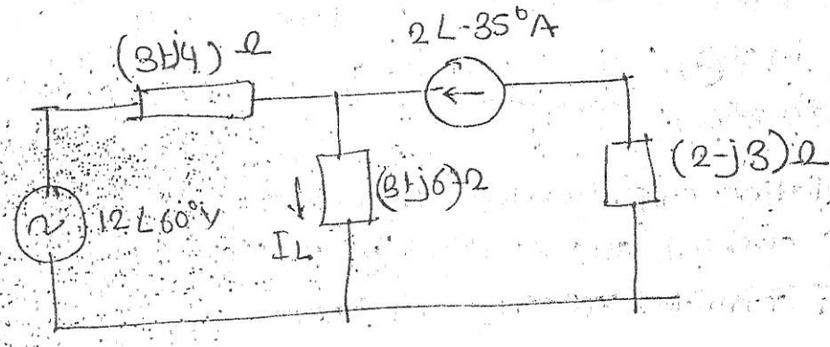
5(d)


15Ω
j25Ω
j5Ω
10Ω
10∠0°
10∠70° V
j5Ω

6(a)


(2+j3)Ω
IC
5∠30° A
2∠0°Ω
5∠50°Ω

6(b)


(3+j4)Ω
2∠-35° A
(3+j6)Ω
(2-j3)Ω
12∠60° V
IL

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **EEG 306** / EEF306 COURSE NAME: **Electrical power Generation**

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

Instruction :-

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

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QN	SQN	QUESTION TEXT	RUA	CO EEG 306	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Enlist the types of pollution due to thermal power station.	R	3	
	b)	Give the operating Grid voltage in case of state grid and national grid.	R	2	
	c)	Define state grid and national grid.	U	2	
	d)	State the impact and reason for the blackout.	A	2	
	e)	Enlist any two hydropower plant with their capacity in Maharashtra.	U	3	
	f)	Define 'Nuclear Fission' chain reaction.	R	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Give the importance of electrical energy in day to day life.	U	1	
	b)	Describe any four safe practices for hydropower plant.	A	3	
	c)	List any four causes of faults on grid system.	A	2	
	d)	Explain the purpose of shielding and reflector in a nuclear reactor.	R	3	
	e)	Explain working of each of the following in thermal power plant i) Induced drought ii) Forced drought iii) Boiler iv) Superheater.	R	3	
	f)	State any four advantages and four disadvantages of hydroelectric power plant.	A	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Compare base load and peak load power plants.	U	2	
	b)	List the major ouxillaries of Nuclear power station. Explain the coolant used in nuclear reactor in brief.	R	3	
	c)	Give the classification of hydropower station based on head, storage and poundage.	U	3	
	d)	Give the factors for selection of site for nuclear power plant.	A	3	
	e)	State any four thermal power plants in Maharashtra with their capacities.	A	3	
	f)	Enlist the different environmental issues arising due to electrical power generation.	R	1	

P.T.O.

(1/2)

QN	SQN	QUESTION TEXT	RUA	CO EEG 306	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	State the types of photovoltaic cell used in solar power plant.	R	4	
	b)	State the any two advantages of vertical axis wind mills.	R	4	
	c)	Write composition of Bio-gas.	R	5	
	d)	State the basic principle of electricity generation from tidal power.	R	5	
	e)	State any two applications of solar energy.	R	4	
	f)	Enlist any two advantages of geothermal energy.	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	With a neat diagram explain solar photovoltaic power plant.	U	4	
	b)	Explain the factors governing selection of site for wind power plant.	U	4	
	c)	List the types of Bio-gas plant. Explain any one with suitable diagram.	U	5	
	d)	Write advantages of Tidal power.	U	5	
	e)	Write applications of Magnatohydro Dynamics (MHD)	U	6	
	f)	State advantages and limitations of fuel cell.	U	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Compare Flat plate collectors and concentrating type collectors. (Any four points)	A	4	
	b)	Compare Horizontal axis wind turbine and vertical Axis wind turbine on the basis of i) Mounting arrangement of turbine ii) Design iii) Cost iv) Maintenance.	A	4	
	c)	Describe the features biomass as fuel for biomass power plant	A	5	
	d)	Explain with sketch closed cycle system of OTEC.	A	5	
	e)	State limitations of Geothermal power plant.	A	6	
	f)	Describe construction and working of fuel cell.	A	6	

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **EEG101** COURSE NAME: **Fundamental of Electricity & Magnetism**

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

Instruction :-

1) Answer must be written in main answer book provided. (and supplements if required)
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QN	SQN	QUESTION TEXT	RUA	CO EEG 101	Marks
Q.1	A	Attempt any **FOUR**			**(08)**
	a)	Define electric charge & give its unit.	R	01	
	b)	Define electric potential.	R	01	
	c)	Define electric current. Give its unit.	R	01	
	d)	Define Resistance. Give its unit.	R	01	
	e)	State ohm's law.	R	02	
	f)	Define capacitance developed between two parallel plate.	R	03	
Q.2	A	Attempt any **FOUR**			**(16)**
	a)	Describe Magnetic effect of electric current in detail.	U	01	
	b)	Electric furnace takes current of 5A, when connected to 230v, 60Hz supply. If it is used for 2hrs in a day calculate required power & energy for 30 days.	A	01	
	c)	Derive the expression for equivalent resistance when two resistance of R_1, ohm and R_2 ohm are connected in series.	U	02	
	d)	Derive expression for equivalent capacitance of capacitors when two capacitors of capacitance in C_1 farad & C_2 farad are connected in series	A	03	
	e)	Two capacitors of 50 μf each are connected in parallel and this combination is connected in series with two capacitors of 80 μf & 40 μf each. Calculate equivalent of the circuit.	A	03	
	f)	Derive current division formula for 2 resistors.	A	02	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Explain concept of ideal & practical voltage source.	R	01	
	b)	If temperature co-efficient of copper wire is 0.00393 per degree at 20^0 c. Find the resistance at 20^0c if initial resistance i.e. at 0^0c is 20Ω	A	01	
	c)	Define breakdown voltage and Di-electric strength for a capacitor.	R	03	
	d)	Explain parallel plate capacitor having composite Di-electric medium.	U	03	
	e)	Derive equation which is used for finding equivalent capacitances when 3 capacitances are connected in parallel.	U	03	
	f)	Derive voltage division formula for 2 resistors R1 & R2.	U	02	

QN	SQN	QUESTION TEXT	RUA	CO EEG 101	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Define 'toroid' and give any two application of it.	R	05	
	b)	What is hysteresis in magnetic circuit?	R	05	
	c)	State faraday's laws of electromagnetic induction.	R	06	
	d)	State Ampere circuital law.	U	04	
	e)	Define magnetic field intensity and give its unit.	R	04	
	f)	Define self inductance and state its unit.	U	06	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain in detail leakage flux, useful flux and fringing effect.	R	05	
	b)	Define permeability of free space state its unit. State its value.	R	04	
	c)	With neat diagram, distinguish between statically induced emf and dynamically induced emf.	R	06	
	d)	An iron ring of cross sectional area of $10cm^2$ wound with 200 turns calculate magnetizing current required to produce flux of 0.1 mwb. Its mean length of magnetic path is 30cm and relative permeability of iron 470.	A	05	
	e)	With neat sketch explain the solenoid. Give its magnetic field strength value inside the solenoid and at its end.	A	04	
	f)	If a coil of 150 turns is linked with flux of 0.01 wb. When carrying current of 20A. Calculate the inductance of coil. If this current is uniformly reversed in 10 msec. Calculate the induced emf. If second coil of 200 turns is uniformly wound over first coil. Find mutual inductance between two coil.	A	06	
Q.6		Attempt any **FOUR**			**(16)**
	a)	i) Justify that relative permeability is unit less quantity. ii) State the expression showing relation between magnetic flux density and field intensity.	A	04	
	b)	What is inductance of coil of 200 turns wound over a circular tube of 25cm long having 5cm radius.	R	06	
	c)	A coil consisting of 100 turns is placed in magnetic field of 0.3 mwb calculate average emf induced in the coil when it is moved in 0.10 seconds from given field of 0.1 mwb. If the resistance of coil is 300Ω find induced current in the coil.	U	06	
	d)	Compare electric circuit and magnetic circuit (any four point)	U	05	
	e)	Give the properties of permanent magnet and electromagnet. State its application.	A	05	
	f)	The field winding of dc electromagnet is wound with 960 turns and has resistance of 50Ω when the exciting voltage is 200v, the magnetic flux linking the coil is 10 mwb calculate self inductance of coil and energy stored in magnetic field.	A	06	

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~~WINTER~~/SUMMER 2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG504**

COURSE NAME :-**MICROCONTROLLER APPLICATION**

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

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
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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 Address Bus and Control Bus.	R	1	
	b)	Describe the function of SWAP A instruction of 8051.	U	3	
	c)	List the various menus (tabs) seen on Keil IDE compiler.	R	1	
	d)	Draw the format of TMOD register in 8051 microcontrollers.	R	2	
	e)	Enlist Assembler directives of 8051 family.	U	3	
	f)	State function of MUL AB and DIV AB instruction.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain the function of following resistor of 8051 microcontroller. i) Program counter ii) Stack pointer iii) Data pointer iv) Accumulator.	U	3	
	b)	Compare between microprocessor and microcontroller. (Any 4 points)	U	1	
	c)	Draw a labelled pin diagram of 8051 Microcontroller.	U	2	
	d)	Explain any four factors considered for selection of microcontrollers.	U	1	
	e)	Draw and explain format of PCON register.	U	2	
	f)	Develop an assembly language program to arrange 10 numbers in ascending order. Write comments.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw the format of TMOD register. Give value of TMOD register select Timer 0 mode 1 and Timer 1 mode 2.	U	2	
	b)	Compare Von Neuman and Harvard architecture (any four points)	U	1	
	c)	Develop an assembly language program to add 16-bit numbers stored in internal RAM location 40H onwards. Store the result at memory location 60H and 61 H. Draw flowchart for program.	A	3	
	d)	State the use of following Bits/ Flags. i)RS0 ii)RSl iii)Cy iv) P	U	2	
	e)	Develop an assembly language program to find 2's complement of number 55H. Also count no of '1' s and '0' s in the result and store the count in R5 and R6 registers. Write comments for program.	A	3	
	f)	Describe accessing of stack in 8051.	U	3	

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SUMMER/~~WINTER~~ 2023

EXAM SEAT NO. | | | | | | |

LEVEL : -FIVE PROGRAM : EE

COURSE CODE :- EEG504 COURSE NAME :- MICROCONTROLLER APPLICATION

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

QN	SQN	SECTION –II	R/U/A	Co EEG 504	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the dual role of Port 2.	R	4	
	b)	Develop assembly language program to monitor the status of pin P1.3, when it is high, Send 55H to P2.	A	4	
	c)	Write the steps for execution of an interrupt.	R	4	
	d)	Find out the number of address lines required for accessing memory of 1Kbytes ROM.	A	4	
	e)	State the function of L293D IC used in DC motor interfacing.	U	5	
	f)	Draw the interfacing diagram of temperature sensor with 8051 microcontrollers.	R	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw the Interfacing diagram of Relay with 8051 Microcontroller, develop an assembly language program to turn ON and OFF the Bulb connected to microcontroller pin P1.2 through Relay.	A	4	
	b)	Interface Seven Segment display with 8051 microcontrollers, write an assembly language program to display 0 to 5 on Seven segment display. (use Common cathode method).	U	4	
	c)	Assuming that clock pulses are fed into pin P3.5 (T1), write an assembly language program for counter 1 in mode 2 to count the pulses and display the state of the TL1 on P2.	A	4	
	d)	Draw the IP register format , also write the significance of each bit.	R	4	
	e)	Write the SCON register format , also write the significance of each bit.	A	4	
	f)	Interface DC motor with 8051 microcontroller, develop assembly language program to rotate DC motor in clockwise direction.	U	5	
Q.6		Attempt any **FOUR** of the following.			**16**
	a)	Explain the Port 0 structure with suitable diagram.	U	4	
	b)	Develop Assembly language program to generate the 1 khz frequency on port pin P1.5 using Timer 0 , mode 1 Assume XTAL = 12Mhz.	A	4	
	c)	State the difference between Polling method and interrupt method. (Any four points)	R	4	
	d)	Explain the different mode of Serial communication.	U	4	
	e)	Write a program in which the 8051 reads data from P1 and writes it to P2 continuously while giving a copy of it to the serial port to be transferred serially. Assume that XTAL=11.0592 Mhz. Set the baud rate at 9600. (use interrupt method).	A	4	
	f)	Draw the interfacing of 8051 Microcontroller with LCD, also write assembly language program to display message "GPKP" on LCD.	A	5	

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~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - THIRD PROGRAM : Electrical Engg.

COURSE CODE :- EEG305

COURSE NAME :- ELECTRICAL ENGINEERING MATERIAL

MAX. MARKS : **40** TIME : **02 Hrs** DATE :- 6 /6 / **23**

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of non-programmable pocket calculator is permissible.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	**SECTION -I**	R/ U/ A	Co EEG305	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define Curie temperature.	U	CO-2	
	b)	Define Conducting Material	R	CO-1	
	c)	Define temperature coefficient of resistance.	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 gaseous and liquid insulating material	U	CO-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain the hysteresis curve in details.	R	CO-2	
	b)	State the thermal and electrical properties of conducting material.	A	CO-1	
	c)	Compare soft and hard magnetic material(Any four points)	A	CO-2	
	d)	Explain the electrical and mechanical properties of copper conductor.	U	CO-1	
	e)	Explain the effect of temperature rise on the properties of insulating material.	A	CO-1	
	f)	Explain the Breakdown in insulating material.	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.	U	CO-2	
	b)	a) Draw hysteresis loop for : i) Hard steel ii) Wrought iron iii) Alloyed steel. iv) Wood	A	CO-2	
	c)	Explain the suitability of aluminium as an electrical conductor with respect to its mechanical and electrical properties	A	CO-1	
	d)	State four reasons for failure of gaseous and solid dielectric materials.	U	CO-3	
	e)	Give one application of following insulating material i)Mica ii)Porcelain iii)Transformer oil iv)Asbestos.	A	CO-3	
	f)	State any four desired characteristics of Insulating material and explain any two of them in detail.	R	CO-3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - IV PROGRAM: ELECTRICAL ENGINEERING

COURSE CODE: - EEG404

COURSE NAME: - ENERGY CONSERVATION & AUDIT

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

Instruction :-

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

QN	SQN	**SECTION -I**	R/ U/ A	Co-EEG 404	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Name any two Primary and secondary energy sources.	R	1	
	b)	Define Energy conservation.	R	1	
	c)	State the need of Cogeneration.	U	2	
	d)	Define energy efficient motor.	R	3	
	e)	State the use of periodic maintenance.	R	3	
	f)	State any two applications Variable Frequency Drive.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Define energy conservation and energy audit.	U	1	
	b)	State and explain factors to be considered for the selection of Co-Generation system.	U	2	
	c)	With neat block diagram explain steam turbine co-generation.	A	2	
	d)	State the significant features of energy efficient motors.	U	3	
	e)	Explain the use epoxy resin cast type transformer from energy conservation point of view	A	3	
	f)	Discuss variable frequency drives (VFD) in energy conservation techniques in brief with block diagram.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Discuss the salient features of electricity Act 2003.	U+R	1	
	b)	Elaborate the term commercial energy and non-commercial energy.	R	1	
	c)	With neat block diagram explain gas turbine co- generation	U+R	2	
	d)	Compare Energy efficient motor with standard motor.	U	3	
	e)	Discuss amorphous core transformer from energy conservation point of view.	A	3	
	f)	Discuss soft starter with block diagram in energy conservation technique.	A	3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - Fourth PROGRAM: Electrical Engineering

COURSE CODE: - EEG404

COURSE NAME: - Energy conservation & Audit

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

QN	SQN	SECTION –II	R/U/A	Co EEG404	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define the following terms: (i) Luminous intensity (ii) Lux	R	4	02
	b)	State any two benefits of phase balancing.	R	5	02
	c)	State any two reasons of line losses.	U	5	02
	d)	State the losses in secondary distribution system. (Any two)	U	5	02
	e)	Define energy audit and state its need.	R	6	02
	f)	State any two advantages of ABC Analysis.	R	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Discuss the two control gear used in lighting equipment a) Ballast, b) Ignitors.	U	4	04
	b)	State different energy conservation techniques in Transmission and distribution System.	R	5	04
	c)	Provide probable questionnaire to carry out energy audit of an electrical workshop. three consideration	A	6	04
	d)	Discuss the primary ~~conservation~~ to ensure energy efficiency in lighting system.	A	4	04
	e)	How power factor and load factor contributes to technical losses in transmission and distribution system?	A	5	04
	f)	State the difference between energy conservation and energy audit.	A	6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	State any four energy conservation techniques in lighting systems.	R	4	04
	b)	Explain maximum demand controller and KVAR controller for distribution system.	U	5	04
	c)	State any four major energy audit instruments and explain their uses.	U	6	04
	d)	Explain the energy conservation techniques in lighting system by installation of separate transformer / servo stabilizer of lighting.	U	4	04
	e)	Describe the different steps involved in detailed energy audit procedure.	U	6	04
	f)	Define & explain the procedure to calculate the payback period. Also state its significance.	A	6	4

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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SUMMER- 23

EXAM SEAT NO. | | | | | | |

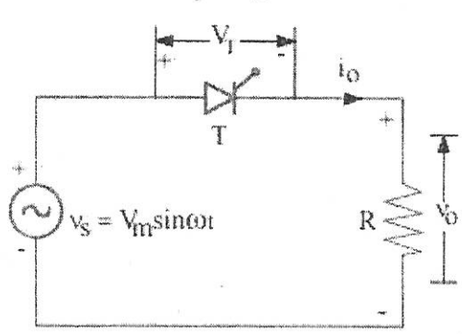
LEVEL : -4 PROGRAM : Electrical Engineering

COURSE NAME :- POWER ELECTRONICS COURSE CODE : EEG 405/EEF406

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

Instruction :-

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

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define the terms controlled rectifier.	R	2	
	b)	List triggering or turn on methods of SCR	R	1	
	c)	Give the classification of controlled rectifier.	R	2	
	d)	Give the classification of chopper.	R	3	
	e)	Compare between Natural and Forced Commutation.	U	1	
	f)	Compare between half wave and full wave controlled rectifier.	U	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Design two transistor analogy of SCR with the help of circuit diagram.	A	1	
	b)	Draw circuit symbol of i) Power Transistor ii) MOSFET iii) SCR iv)UJT	U	1	
	c)	Design Single phase full wave bridge converter with RL load with the help of circuit diagram and waveform.	A	2	
	d)	With the help of circuit diagram and waveform explain effect of source impedance on the performance of single phase controlled rectifier.	U	2	
	e)	With the help of circuit diagram and waveform describe working of Three phase full converter with RL load.	U	2	
	f)	Explain working of Jones chopper with the help of circuit diagram and waveform.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw and explain VI characteristics of TRIAC.	U	1	
	b)	With the help of circuit diagram explain working of RC triggering circuit.	U	1	
	c)	Identify given circuit diagram and explain its working with waveform. 	A	2	
	d)	Give the comparison between symmetrical and asymmetrical Bridge converter.	U	2	
	e)	Describe Morgan's chopper with diagram.	A	3	
	f)	Explain working principle of step up chopper.	U	3	

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~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FOURTH PROGRAM : ELECTRICAL ENGG

COURSE CODE :- EEG405 / EEF406

COURSE NAME :- POWER ELECTRONICS

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

Instruction :-

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

QN	SQN	**SECTION –II**	R/U/A	Co EEG 405	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Specify the four important industrial application of inverter.	R	4	
	b)	Explain why cyclo-converters are suitable for low frequencies only.	U	5	
	c)	Mention the classification of inverter according to wave shape of output voltage.	R	4	
	d)	State the advantages of electronically controlled schemes of speed control of electric drives over the conventional electrical method.	R	6	
	e)	Describe a cyclo-converter . State its application .	A	5	
	f)	Draw the block diagram of schemes for induction motor speed control by voltage source inverter.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Mention the main advantages and disadvantages of external control of D.C. input voltage of single-phase inverter.	U	4	
	b)	Explain the basic principle of operation of a cyclo-converter with a neat equivalent circuit diagram.	U	5	
	c)	Describe a circuit diagram of parallel inverter employing feedback-diodes.. Explain the working of inverter with the help of voltage and current waveform	R	4	
	d)	Describe mid-point configuration single phase cyclo-conveter with circuit diagram and waveform(resistive load at firing angle 45^0).	R	5	
	e)	Explain the circuit diagram of battery charger using SCR.	A	6	
	f)	Draw and explain the block diagram of off-line UPS.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	We often required to vary the output voltage of inverter in many industrial applications, specify the reasons.	A	4	
	b)	Describe speed control of three phase induction motor using stator voltage control.	U	6	
	c)	Explain the simple SCR Series inverter circuit employing Class A type commutation. Draw the waveform. State the limitation of this series inverter.	U	4	
	d)	Draw a diagram of McMurray Half-bridge inverter.. Explain the working of inverter with the help waveform.	R	4	
	e)	Describe a three-phase to single-phase cyclo-converter.	U	5	
	f)	Explain the circuit diagram of emergency lighting system.	A	6	

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~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : DEE/Electrical engg.

COURSE CODE :- EEG505/EEF505

COURSE NAME :- Electric Drives

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

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
3) Use of a 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 505	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List any four basic components used in AC motor drive for the speed control of induction motor.	R	01	02
	b)	State any two advantages of individual drive.	R	01	02
	c)	List the types (any four) of electric drives based on type of motor used.	R	02	02
	d)	Compare three phase induction motor and three phase synchronous motor. (Any two points)	A	02	02
	e)	Draw the circuit diagram for rotor resistance control of three phase slip ring induction motor.	U	03	02
	f)	Explain in brief, any two advantages of frequency control method for speed control induction motor.	A	03	02
Q.2		Attempt any **FOUR:**			**16**
	a)	State any two advantages of group drive and individual drive each.	U	01	04
	b)	Draw neat labeled speed Vs torque characteristics of three phase induction motor. Show motoring region and generating region.	U	02	04
	c)	Draw neat labeled, speed Vs torque characteristics of the following motors: i) DC shunt motor ii) DC series motor	R	02	04
	d)	Explain starting of synchronous motor using pony motor.	A	02	04
	e)	With neat labeled diagram, illustrate working principle of Kramer drive.	A	03	04
	f)	Explain working principle of stator voltage control using a shunt reactor for speed control of induction motor.	A	03	04
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain in detail, the inverted V curves of synchronous motor.	U	02	04
	b)	Illustrate plugging of separately excited DC motor.	A	02	04
	c)	Compare AC drive system and DC drive system based on their advantages and disadvantages. (any four points)	A	01	04
	d)	Explain field control method for speed control of DC motor. State its one advantage and one disadvantage.	U	03	04
	e)	Explain in brief working principle of liquid starter and list any two advantages of the liquid starter.	U	03	04
	f)	Compare with proper explanation, between induction motor and synchronous motor on following two points, i) Starting torque ii) Power factor	A	03	04
		1/2			

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~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG505/EEF505

COURSE NAME :- ELECTRICAL DRIVES

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

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		~~Attempt any **FOUR:**~~			**08**
	a)	Define duty cycle of chopper.	R	4	
	b)	Sketch the four Quadrant Chopper Drive.	R	4	
	c)	State the difference between chopper and rectifier.	R	5	
	d)	Draw the circuit diagram of three phase half wave controlled converter drive.	R	5	
	e)	State the rating and specification of stepper motor	R	6	
	f)	List any two drive motors used in textile industries.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain frequency control inverter using Power MOSFET with a neat circuit diagram.	U	4	
	b)	Compare Class A and Class B chopper drive	A	4	
	c)	Draw the circuit diagram of single phase semi converter drive and explain its operation.	U	5	
	d)	Draw and explain the circuit diagram and waveforms of 3ϕ full converter drive.	A	5	
	e)	Draw labelled block diagram of Phase Lock Loop (PLL) control DC motor drive. State the function of each block	U	6	
	f)	State the sequence of stages involved in Sugar Mill and the types of drive used for it.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and describe first Quadrant Chopper Drive.	U	4	
	b)	Compare the performance of single phase converter DC drive and three pahse converter DC drive	A	5	
	c)	Draw and explain the circuit diagram and waveforms of 1 ϕ half wave converter drive.	U	5	
	d)	Explain steel rolling mills and the drives used at each stage	A	6	
	e)	Draw and explain the block diagram of microprocessor based DC motor controller.	U	6	
	f)	With neat sketch explain the PLC controlled motor drives	A	6	

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~~WINTER~~/SUMMER23

EXAM SEAT NO. | | | | | | |

LEVEL: -4 PROGRAMS: Electrical Engineering

COURSE CODE: -EEG402

COURSE NAME: - Switchgear and Protection

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

Instruction:-

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

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State the function of current transformer used in substation.	U	1	2
	b)	Define protective relay.	R	2	2
	c)	List the protective relaying for power system.	R	2	2
	d)	State faults occurs in electrical system.	U	3	2
	e)	Draw time current characteristics of relay	R	2	2
	f)	Define a substation.	U	1	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Define the following terms and state their limits if any 1. Recovery voltage 2. Restriking voltage 3. Rate of rise of restriping voltage related to CB. Draw suitable diagram to show them.	R& U	3	4
	b)	Explain microprocessor based relay with suitable diagram	A	2	4
	c)	Compare outdoor substation with indoor substation.	A	1	4
	d)	With neat labeled diagram explain working of semi closed fuse.	U	3	4
	e)	State types of electromagnetic relays and explain one with suitable diagram.	R& U	2	4
	f)	Explain static over current relay with neat diagram.	A	2	4
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain phase comparator and amplitude comparator.	U	2	4
	b)	Draw and explain working of vaccum circuit breaker.	R& U	3	4
	c)	Draw a neat diagram of reverse power relay and explain its operation.	U	2	4
	d)	Explain working of distance relaying and its fields of application.	A	2	4
	e)	Draw a neat labeled diagram showing the locations of placement of current limiting reactors in the power system.	R	1	4
	f)	State various abnormal conditions which can develop in electric circuits. State its effects on power system.	U	3	4

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~~SUMMER/WINTER~~ S / 23

EXAM SEAT NO. | | | | | | |

LEVEL : - 4 PROGRAM : E.E.

COURSE CODE :- EEG402

COURSE NAME :- Switchgear Protection

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

QN	SQN	**SECTION –II**	R/U/A	Co EEG402	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Name the external causes of over voltages in power system.	R	4	02
	b)	State two advantages and two disadvantages of Buchholz relay.	R	5	02
	c)	State any four abnormalities taking place in case of transformer in the substation.	U	5	02
	d)	State one cause of occurring the following faults in three phase transformers: (i) Saturation of magnetic core and (ii) Inter-tern fault.	U	5	02
	e)	State one protective device used for protection of alternator against: (i) Rotor overheating and (ii) Motoring.	U	5	02
	f)	State the function of bus bar and feeder.	U	6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw the neat sketch of Horn gap lightning arrester, explain in brief.	R	4	04
	b)	Explain direct stroke and indirect stroke of lightning.	U	4	04
	c)	Define the term insulation coordination & explain in brief its necessity in power system.	U	4	04
	d)	Explain the differential pilot wire protection scheme of transmission line using Merz-Price voltage balanced system.	R	6	04
	e)	Explain working of impedance relay.	R	6	04
	f)	Describe with neat diagram the time graded overcurrent protection for radial feeders.	A	6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw neat, labelled diagram with proper current direction of differential protection used for protection of alternator and single phase transformer.	U	5	04
	b)	Explain working of Buchholz relay used for protection of 3 phase transformer.	R	5	04
	c)	Distinguish between surge absorber and surge arrester.	A	4	04
	d)	Explain the earth fault protection scheme of alternator.	U	5	04
	e)	Draw the neat sketch of protection scheme of radial feeders and parallel feeder.	R	6	04
	f)	A 3-phase transformer having line voltage ratio of 0.4 kV/11 kV is connected in star/ star and protective transformer on the 400 V side have a current ratio of 500/5. Calculate the current ratio of the protective transformer required on the 11 kV side.	A	5	04

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **EEG 311** COURSE NAME: **ELECTRICAL ESTIMATION & CONTRACTING**

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

Instruction -

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

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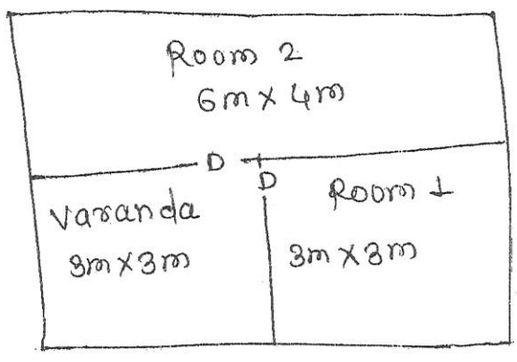
QN	SQN	QUESTION TEXT	RUA	CO EEG311	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Draw symbols of the following. i) Exhaust Fan ii) Bell	R	1	
	b)	List types of electrical installation.	R	1	
	c)	State two factors deciding size of Conduit.	R	2	
	d)	Discuss the types of wiring in residential installation. (Any two)	U	2	
	e)	Give four examples of commercial unit.	U	3	
	f)	State standard specifications of ELCB available in market.	R	3	
Q.2		Attempt any **FOUR**			**(16)**
	a)	List general requirements of electrical installation.	R	1	
	b)	State the principles in design of lighting and power sub circuits.	R	2	
	c)	State the sequence followed to prepare the estimate for commercial electrical installation.	R	3	
	d)	Explain selection of main switch and distribution board for residential electrical installation.	U	2	
	e)	Prepare wiring and single line diagram for one Fluorescent tube, one lamp, one ceiling fan And one three pin socket. (100 watts)	A	2	
	f)	A seminar hall of 15m X 6m X 4m is to be fitted with 10 fan, 15 tubes and one power socket. Draw complete wiring diagram for above load and calculate total phase wire required from main board.	A	3	
Q.3		Attempt any **TWO**			**(16)**
	a)	Draw installation plan and calculate length, load of phase wire for given installation in figure No. 1 having 3 ceiling fans, 3 Fluorescent tubes, four 3 pin sockets (6A) and 3 lamps. 	A	2	
	b)	A shop of size 4m X 6m is to be provided with 14 Fluorescent tubes each 80 watts, 06 ceiling fans each 60watts and 6 5 Amp three pin sockets 100watt. Draw installation plan and select the distribution board for given load.	A	3	
	c)	i) Examine the any four qualities of good estimators ii) Recommend and justify the earthing system used for individual commercial complex.	U	3	

QN	SQN	QUESTION TEXT	RUA	CO EEG311	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Discuss basic fields for IE rules in briefly.	R	4	
	b)	State basic requirements of factory electrical installation.	R	4	
	c)	Comment on various type of cables used for electrical installation.	R	4	
	d)	Give reasons for testing of electrical installation in necessary before switch on the supply system.	U	5	
	e)	Explain briefly function of 'Megger' instruments.	U	5	
	f)	State types of contracts used in the engineering & construction industry.	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Describe general considerations for design of estimate the electrical installation in factory.	U	4	
	b)	If overloading condition are considered how to calculate final rated current for installation design.	A	4	
	c)	Comment on final current calculations method with consideration of starting current of motor of rating 3KW, 5 KW, 10KW.	A	4	
	d)	Describe wiring installation test method briefly.	U	5	
	e)	Elaborate information given in Tender notice.	R	6	
	f)	Briefly explain step by step procedure to prepare Tender documents.	U	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	A floor mill has two motors 5HP & 10 HP works on 3 phase, 415 V, 50Hz AC supply prepare estimate & costing for their electrical mains board.	A	4	
	b)	Prepare an estimate & costing for Mains D.B. with MCB-TPN protection backup by ICTP & with control board arrangement for above floor mill problem. (Given Q.6 a)	A	4	
	c)	Draw labelled diagram & detailed specification single line diagram for above floor mill problem. (Given Q.6 a & b)	A	4	
	d)	Sketch labelled diagram of "Meger"& Explain its function briefly.	U	5	
	e)	Explain briefly submission procedure of Tender document.	U	6	
	f)	Comment on "Execution of work" process.	U	6	

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEF502**

COURSE NAME **ELECTRICAL MACHINES CONTRL AND AUTOMATON**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **01/ 06 / 2023**

Instruction :-

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

QN	SQN	SECTION -I	R/U/A	Co EEF 502	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Write the advantages of electromagnetic control for electrical machine systems.	U	1	
	b)	Write two functions of relays in magnetic control circuits.	U	2	
	c)	Explain the need for selector switches.	U	2	
	d)	Write the conditions for single phasing fault to occur for a three phase motor.	U	3	
	e)	Explain the three wire control circuit with neat sketch.	U	1	
	f)	Draw the symbols for: Pressure switch NC contact and Thermal overload relay trip contact.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain with a neat sketch the operation of the solenoid type contactor. State two applications for it.	U/A	2	
	b)	Explain the working of Bimetallic thermal overload relay with labeled sketches.	A	2	
	c)	Define a float switch. Describe with circuit/sketch its use in water level monitoring of over head tanks.	A	2	
	d)	Describe working of the frequency responsive relay.	U	2	
	e)	Write the need for the control transformer and illustrate the calculations to determine its rating.	A	2	
	f)	Explain the working of the HRC fuse with neat sketches and state the parameters to specify the ratings of the same.	U/A	2	
Q.3		Attempt any **TWO :**			**16**
	a)	i) Explain with neat sketch any one method of interlocking drives. ii) A 230 V, 4 ½ hp, single phase induction motor is to be provided a starting and protective system. Determine the components of the system and their ratings.	A A	1 3	
	b)	i) Compare the two wires and three wires controls. ii) A 3 phase 400V, 50 hp, squirrel cage induction motor needs to be protected against external overloads and under voltage conditions. Suggest with justification the relevant devices. (with ratings)	U A	1 3	
	c)	i) Write two advantages of remote control systems of electric motors. ii) Explain with diagrams the following protection schemes for electric motors (a.c. motors): short circuit, phase failure and over temperature by negative coefficient thermistors.	U A	1 3	

P.T.O.

QN	SQN	SECTION II	RUA	CO EEF 502	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	State any two differences between control circuit and power circuit.	R	4	
	b)	State the concept of DC injection braking.	R	4	
	c)	State the concept of Plugging.	R	4	
	d)	State the necessity of braking of motor.	R	4	
	e)	Draw a ladder diagram for logic operation EXOR.	U	6	
	f)	State two features of control circuit for overhead crane.	R	5	
Q.5		Attempt any **FOUR**			**(16)**
	a)	List any four advantages of PLC.	U	6	
	b)	Describe any two advantages of digital logic over relay logic.	U	6	
	c)	Draw neat ladder diagram of DOL starter and explain.	A	6	
	d)	Explain any four features to be incorporated in control circuit for a water pump.	A	5	
	e)	With neat diagram, explain control circuit for lifting magnet.	A	5	
	f)	Explain any four features to be incorporated in control circuit of electrical oven.	A	5	
Q.6		Attempt any **TWO**			**(16)**
	a)	Draw control & power circuit of semi automatic Star-Delta starter & explain its operation in brief.	U / A	4	
	b)	Draw control & power circuit for current limit acceleration starter of 3 phase slip-ring induction motor & explain in brief.	U / A	4	
	c)	Draw control & power circuit for plugging of 3 phase induction motor and explain its operation in brief.	U / A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - Fifth PROGRAM: Electrical Engineering

COURSE CODE: - EEG502`

COURSE NAME: - Industrial Automation & Control

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

Instruction :-

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

QN	SQN	SECTION -I	R/U/A	Co EEG502	Marks
Q.1		**Attempt any FOUR:**			**08**
	a)	State the need of automation.	R	1	
	b)	Enlist the different systems used for industrial automation.	R	1	
	c)	List the different input devices used with PLC.	R	2	
	d)	Draw the diagram of star delta starter.	A	2	
	e)	Enlist the digital input module specifications.	R	3	
	f)	List the different parts of PLC.	R	3	
Q.2		**Attempt any FOUR:**			**16**
	a)	Explain SCADA system used for industrial automation.	U	1	
	b)	Explain forward and reverse control of induction motor.	A	2	
	c)	1. State commonly used motor control circuits. 2. Enlist any four commonly used symbols used in industrial control circuit.	R	2	
	d)	Explain DOL starter with neat diagram. (Control circuit)	U	2	
	e)	Explain the PID control module of PLC.	U	3	
	f)	Draw the block diagram of analog input module and explain each block in detail.	A	3	
Q.3		**Attempt any FOUR:**			**16**
	a)	Describe the evolution of PLC in automation industry.	A	1	
	b)	Draw and explain control and power circuit diagrams of hoist control.	A	2	
	c)	Draw the block diagram of digital output module and explain each block in detail.	A	3	
	d)	Explain inductive and capacitive proximity switches in detail.	U	1	
	e)	Explain the communication module of PLC in detail.	U	2	
	f)	Draw the block diagram of digital input module and explain each block in detail.	A	2	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : Electrical Engineering

COURSE CODE :- EEG 502

COURSE NAME :- Industrial Automation & Control

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

QN	SQN	SECTION –II	R/U/A	Co EEG 502	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw the symbol and give the function of normally open and normally closed instructions in PLC.	R	4	
	b)	State the seal in circuits using PLC.	R	5	
	c)	List any four applications of PLC.	R	5	
	d)	Draw the block diagram of SCADA.	A	6	
	e)	State benefits of SCADA.	R	6	
	f)	List the various editors of SCADA.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Construct and explain the ladder diagram for AND and NAND logic function	A	4	
	b)	Describe Up Counter instruction in PLC with its control word.	U	4	
	c)	Explain DOL starter with ladder and wiring diagram.	U	5	
	d)	Construct traffic control system by using SCADA.	A	6	
	e)	Explain process control architecture with object linking and embedding.	U	6	
	f)	Develop ladder program for Automatic Bottle Filling System using PLC with suitable assumptions.	A	5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain program scan process applied to single rung.	U	4	
	b)	Illustrate PLC Timer (ON Delay) in detail.	A	4	
	c)	Describe the steps for creating SCADA screen for simple object.	U	6	
	d)	Develop ladder diagram for 3 motor operations for following conditions i) Start push button starts motors M1 and ii) after 10 seconds motor M2 starts and iii) after 10 seconds motor M3 starts iv) Stop PB stops all motors	A	5	
	e)	Illustrate distributed control system in detail.	A	6	
	f)	Describe forward – reverse control three phase induction motor used in PLC.	U	5	

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SUMMER/WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - IV PROGRAM: ELECTRICAL ENGINEERING
COURSE CODE: - EEG401
COURSE NAME: - INDUSTRIAL MACHINES
MAX. MARKS: **80** TIME: **03 Hrs** DATE: 31/5/23

Instruction:-

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

QN	S QN	**SECTION -I**	R/ U/ A	Co-EEG 401	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist any four parts of 3-Phase induction. State their functions.	R	1	
	b)	Give the types of three phase induction motor.	R+U	1	
	c)	State the importance of circle diagram.	A	2	
	d)	List the methods to be carried out on 3 phase motor to construct the circle diagram.	R	2	
	e)	Enlist the types of starter to be used for starting the three phase induction motor.	U	3	
	f)	Name the different methods of speed control of three phase squirrel induction motor.	A	3	
Q.2		Attempt any **two.**			**16**
	A)	i) Draw and explain power flow diagram for a three phase induction motor.	R+U	1	
		ii) State any four applications for each of 3 phase squirrel cage induction& 3 phase slip ring Induction motor.	A	3	
	B)	A 400 V 40 HP 50 Hz. 4 pole delta connected induction motor gave the following test data. No load test: 400 V, 20Amp, 1200 W Blocked rotor test: 100 V, 45 Amp, 2800 W Draw the circle diagram and determine i) full load line current and power factor ii) maximum output power , iii) maximum torque, iv) Full load efficiency Assume stator and rotor cu losses to be equal at standstill.	A	2	
	C)	i) Derive the condition for maximum torque under running condition.	U	1	
		ii) Draw and explain the star delta starter for three induction motor.	A	3	
Q.3		Attempt any **two.**			**16**
	A)	i) Draw torque slip characteristic of three phase induction motor. State effect of change of rotor resistance on it.	R+U	1	
		ii) Three phase induction motor is known as a generalized transformer. Justify.	U	1	
	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) Describe with neat diagram the working principle of three phase induction motor.	U+R	1	
		ii) With proper diagram explain soft starters for three phase induction motor.	A	3	

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~~WINTER~~/SUMMER-2023

EXAM SEAT NO. | | | | | | |

LEVEL: -4 PROGRAMS: Electrical Engineering

COURSE CODE: -EEG401

COURSE NAME: - Industrial Machines

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

QN	SQN	SECTION-II	R/U/A	Co EEG 401	Marks
Q.4		**Attempt any FOUR:**			**08**
	A	Define load angle in synchronous motor.	R	5	
	B	State advantages of rotating field in an alternators.	R	4	
	C	State the types of windings in three phase alternator.	R	4	
	D	List any two applications of hysteresis motor.	R	6	
	E	State suitable single phase motor for following applications: (i) Table fan (ii) Mixers and Grinders.	R	6	
	F	List methods of starting of synchronous motor	R	5	
Q.5		**Attempt any FOUR:**			**16**
	a	Draw and explain 'V' and 'inverted' V' curves' for synchronous motor.	U	5	
	b	Explain synchronous impedance method of finding Regulation of three phase alternator.	U	4	
	c	Explain the construction and working of Shaded pole induction motor.	A	6	
	d	Explain construction and working of universal motor.	U	6	
	e	Compare synchronous motor with three phase induction motor.	U	5	
	f	Define Regulation of an Alternator . How it can be obtained by direct loading method .	R	4	
Q.6		**Attempt any FOUR:**			**16**
	a	Give the two applications of each motor : i) A.C. series motor ii) Universal motor iii) Linear induction motor iv) Shaded pole induction motor.	A	6	
	b	Derive the emf equation of three phase alternator.	A	4	
	c	Explain the double field revolving theory related with working of single phase induction motor.	A	6	
	d	Explain working of synchronous motor on load with constant excitation.	A	5	
	e	Expalin Hunting in case of Synchronous motor.	A	5	
	f)	Explain the factors affecting the terminal voltage of an alternator with neat diagram and vector diagram.	A	5	

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : Electrical Engineering

COURSE CODE :- EEG 310

COURSE NAME :- Transmission & Distribution of Electrical Power

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

Instruction :-

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

QN	SQN	Question Text	R/U/A	EEG 310	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Name the main parameters of Transmission Line.	R	CO2	
	b)	Name two most commonly used Conducting materials with their Conductivity	R	CO1	
	c)	State any two disadvantages of of Proximity effect.	U	CO2	
	d)	State the effect of Power Factor on performance of Transmission lines	U	CO3	
	e)	Name different types of Underground Cables based on Voltage level	A	CO1	
	f)	Define Corona Effect.	R	CO2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare Transmission and Distribution lines on basis of carrying Capacity.	U	CO3	
	b)	Explain Proximity Effect related to Conductors.	R	CO2	
	c)	Explain Bipolar HVDC Link with neat diagram	A	CO3	
	d)	Explain with neat diagram the Shackle Insulators.	R	CO1	
	e)	List the advantages of Underground cables over Overhead lines.	U	CO1	
	f)	Compare HVDC transmission with EHVAC transmission system.	A	CO3	
Q.3		Attempt any **FOUR:**			**16**
	a)	State and explain factors affecting Corona	R	CO2	
	b)	Explain Skin Effect related to Conductors in Transmission lines..	R	CO2	
	c)	Explain Inductive coupling wireless power transmission System	A	CO3	
	d)	Explain method of improving string efficiency by using Guard ring.	R	CO1	
	e)	Explain in brief the procedural steps in construction of 110 KV transmission system.	A	CO3	
	f)	A single phase line transmits 1000 KW at PF of .85 lagging. It has total resistance of 2 ohms and inductive resistance of 3 ohms. Determine i) Voltage Regulation ii) Transmission Efficiency	A	CO2	

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : Diploma in Electrical Engineering

COURSE CODE :- EEG310

COURSE NAME :- TRANSMISSION AND DISTRIBUTION OF ELE. POWER

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

QN	SQN	Question paper Text	R/U/A	Co EEG 310	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define : i) Feeder, ii) Distributor	R	5	2
	b)	Enlist four equipment's in substations.	R	5	2
	c)	Draw SLD (single line diagram) of 11KV/415 Volt substation.	R	5	2
	d)	Draw main connection scheme used in substation.	R	5	2
	e)	Enlist different types of tariffs.	R	6	2
	f)	State significance of power factor.	R	6	2
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain any two design considerations in distribution system.	U	5	4
	b)	Draw the layout of indoor substation and explain any two major components.	U	5	4
	c)	State the factors to be considered in design of feeder and distributor.	U	5	4
	d)	Draw layout of radial and grid type distribution schemes.	U	5	4
	e)	State the desirable characteristics of tariff.	U	6	4
	f)	Explain the drawbacks of low power factor in distribution system.	U	6	4
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain in short, considerations for selection of site for distribution substation. (Any four)	A	5	4
	b)	Draw Single line diagram of 33/11 KV substation.	A	5	4
	c)	Compare radial and ring type distribution schemes based on the advantages and disadvantages. (any four)	A	5	4
	d)	Load of 460 kVA at power factor of 0.87lagging is connected to 415 V, three-phase distribution line having billing charges of 650 Rs. /kVA demand. Calculate the saving in rupees if power factor is improved to 0.97lagging.	A	6	4
	e)	An alternator is supplying load of 300 kw at a power factor of 0.8 lagging. If power factor becomes unity, calculate kw supplied by alternator for same kva loading?	A	6	4
	f)	A single phase motor connected to 400 Volts, 50Hz supply takes 9 Ampere current at a power factor of 0.7 lagging. Calculate the capacitance required in parallel with the motor to raise the power factor at 0.9 lagging.	A	6	4

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - V

PROGRAM: Electrical Engineering

COURSE CODE: - EEG501/EEF501

COURSE NAME: - ELECTRICAL TESTING & COMMISSIONING

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

Instruction:-

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

QN	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State the factors on which severity of shock depends. (Any 2 points)	R	1	02
	b)	State the importance of Electrical maintenance.(Any 2 Points)	R	2	02
	c)	State any two objectives of routine test.	R	3	02
	d)	List out any two precautions to be taken to avoid fire caused by Electrical reason.	R	1	02
	e)	State any two objectives of preventive maintenance of electrical equipment's.	R	2	02
	f)	State the meaning of special test. Give one example of special test in case of transformer or electrical rotating machines.	R	3	02
Q.2		Attempt any **FOUR:**			**16**
	a)	List out Do's and Don'ts to achieve safety for electrical supervisor while working in substation (any four points).	U	1	**04**
	b)	Describe the factors affecting the preventive maintenance schedule.	U	2	04
	c)	Explain high voltage test conducted on three phase induction motor.	U	3	04
	d)	Give the effects of misalignments on the performance of machines.	U	1	04
	e)	Explain the total productive maintenance of electrical machines and equipment.	U	2	04
	f)	Describe routine, preventive & breakdown maintenance with suitable examples.	A	3	04
Q.3		Attempt any **Four:**			**16**
	a)	Write down procedure to open or use the fire extinguisher	A	1	04
	b)	Compare direct , Indirect and Regenerative methods of testing	A	2	04
	c)	Describe with neat diagram open circuit voltage ration test conducted on three phase slip ring induction motor.	A	3	04
	d)	Describe the objective of testing in case of electrical machines or equipment's.	R	2	04
	e)	Discuss the reduced voltage running up test carried out on three phase and single induction motor	U/R	3	04
	f)	List the methods of providing artificial respiration to the person who receive electrical shock. Explain mouth to mouth artificial respiration method in short.	A	1	04

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WINTER / SUMMER 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - VI PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG-501 / EEFS01

COURSE NAME :- ELECTRICAL TESTING & COMMISSIONING

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

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Write any two properties of good transformer oil.	R	CO4	02
	b)	State any four routine test carried out on every transformer.	R	CO4	02
	c)	Write type of insulating material under 'Y/O' class.	R	CO5	02
	d)	State the process of re-varnishing methods.	R	CO5	02
	e)	Describe in brief the method of cleaning the insulation covered by dust.	R	CO6	02
	f)	Write two effects of misalignment in direct coupled drives.	R	CO6	02
Q.5		Attempt any **FOUR:**	U		**16**
	a)	Describe in brief working operation of Wheatstone bridge for measurement of DC resistance of medium value.	A	CO4	04
	b)	Describe with neat labeled diagram the procedure of flash point test on transformer oil.	U	CO4	04
	c)	Give classification of insulating materials as per IS 8504 (part III) 1994.	A	CO5	04
	d)	Write procedure for alignment of two shafts in direct coupled drives.	U	CO5	04
	e)	Describe equivalent short circuit test to check temperature rise in power frequency transformer.	A	CO6	04
	f)	Describe internal & external faults in a failure of electrical equipment.	A	CO6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	With the help of neat diagram explain the procedure and purpose of separate source withstand test on transformer.	A	CO4	04
	b)	With the help of neat diagram explain open delta (delta delta) test on transformer.	A	CO4	04
	c)	List four electrical faults and four magnetic faults in electrical machines with reasons for their occurrence.	U	CO4	04
	d)	Explain with suitable sketches thermometer based temperature measurement in the internal winding parts of electric machines.	A	CO5	04
	e)	Draw neat labeled diagram of centrifugal type insulating oil filtration.	A	CO5	04
	f)	Prepare trouble shooting chart for 3phase transformer.	R	CO6	04

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **EEG 307** COURSE NAME: **D. C. MACHINES & TRANSFORMERS**

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

Instruction :-

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

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QN	SQN	QUESTION TEXT	RUA	CO EEG 307	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Give reason why shaft torque is less than armature torque in a DC motor.	U	2	
	b)	State the purpose of pole shoe in a DC machines or in DC generator.	A	1	
	c)	State the reason why the armature of DC machine or DC generator is made of silicon steel.	A	1	
	d)	Explain what will happen if the Primary of a transformer is connected to DC supply.	U	3	
	e)	State the advantages of oil over air as a cooling medium in transformer.	A	3	
	f)	State why the speed of a shunt motor practically constant.	U	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Describe the working principle of 1 Phase transformer with neat diagram.	U	3	
	b)	Explain the speed control of DC motor by flux control method.	A	2	
	c)	List the various parts of DC generator. & give their functions.	U	1	
	d)	Discuss the functions of conservator & Breathers in single phase transformer.	A	3	
	e)	Discuss the concept & significance of back emf.	U	2	
	f)	A long shunt compound generator delivers a load current of 50Amp at 500 volt & has armature series field & shunt field resistance of 0.05Ω, 0.03 Ω & 250 Ω respectively. Calculate the generated voltage & the armature current. Allow 1 volt per brush for constant drop.	A	1	
Q.3		Attempt any **FOUR**			**(16)**
	a)	The maximum flux density in the core of a 250/3000 volts, 50 Hz 1Phase transformer is 1.2 wb/m^2. If the emf per turn is 8 volt, determine i) Primary & secondary turns ii) Area of the core.	A	3	
	b)	Describe the principle of operation of DC generator.	U	1	
	c)	State the need of starter, explain three point starter.	A	2	
	d)	List the applications of DC generator.	A	1	
	e)	Discuss with phasor diagram the transformer on load.	U	3	
	f)	A 220 V shunt motor has an armature resistance of 0.2 Ω & field resistance of 110 Ω. The motor draws 5 Amp at 1500 rpm at no load. Calculate the speed & shaft torque if the motor draws 52 Amp at rated voltage.	A	2	

P.T.O.

QN	SQN	QUESTION TEXT	RUA	CO EEG 307	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	State design features of power transformer.	U	6	
	b)	State the effect of the third harmonics when winding is delta connected .	U	6	
	c)	Identify Dd6 , Dy0	U	6	
	d)	State formulae for load shared by transformer A & B	R	5	
	e)	State condition to be satisfied for parallel operation of transformer.	U	5	
	f)	Define – Autotransformer.	R	4	
Q.5		Attempt any **FOUR**			**(16)**
	a)	At full load the cu loss & iron losses in a 100KVA transformer are each equal to 3kW. Find efficiency at a load of 75KVA with p.f. of 0.8	A	4	
	b)	Explain function of isolation transformer with its application.	U	4	
	c)	Draw & explain open circuit test conducted for a single phase transformer.	U	4	
	d)	Compare power transformer & distribution transformer with any four points.	A	6	
	e)	Draw a star delta connection & delta star connection. Also state one application of it.	U	6	
	f)	Two 2200/110v transformer operated in parallel to share a load of 125KVA at 0.6 p.f. logging transformer are rated as A: 100KVA, 0.8% resistance & 10% reactance B: 50KVA, 1% resistance & 6% reactance Find load shared by each transformer.	A	5	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Derive condition for maximum efficiency of a transformer.	U	4	
	b)	State any two advantages & two disadvantages of autotransformer.	U	4	
	c)	State conditions to be satisfied for parallel operation of single phase transformer.	U	5	
	d)	Find all day efficiency of 500KVA transformer whose Cu loss & iron loss at full load are 4kW & 3kW respectively. Its loading pattern is as follows.	A	4	
	e)	Draw an equivalent circuit diagram of transformer which is referred to secondary and also state its rotations.	U	4	
	f)	Explain scott connection with neat diagram.	U	6	

No. of hours	Load in kW	Power factor
10	400	0.8
10	300	0.6
04	100	0.8

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG102**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **27/ 05 / 2023**

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co EEG 102	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give any two differences in PN junction diode and zener diode.	R	1	
	b)	State the need of filter and give its types.	R	2	
	c)	Define and give values for i) Average output voltage ii) Peak inverse voltage corresponding to bridge rectifier.	R	2	
	d)	State which configuration of the transistor is useful for the amplification and as a switch?	U	3	
	e)	Draw symbols of PNP & NPN transistors.	R	3	
	f)	Convert $(100)_{10}$ into hexadecimal number.	A	4	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain V-I characteristics of P-N junction diode.	U	1	
	b)	Explain the operation of zener as a voltage regulator.	U	1	
	c)	Draw and explain half wave rectifier with I/O waveform.	U	2	
	d)	Compare C filter, L filter and LC filter. (any four points)	U	2	
	e)	Explain the operating principle of PNP transistor with the help of construction diagram.	U	3	
	f)	Convert :- $(174)_{10} = (?)_2$ $(186)_{10} = (?)_2$	A	4	
Q.3		Attempt any **FOUR:**			16
	a)	Explain the formation of P-type and N-type material from intrinsic semiconductor.	U	1	
	b)	State any four applications of full wave Bridge rectifier.	R	2	
	c)	Compare conductor, insulator and semiconductor (any four points)	U	1	
	d)	Prove the relation $\beta = \frac{\alpha}{1-\alpha}$.	A	3	
	e)	Draw half wave rectifier and give the values of PIV, ripple factor, rectification efficiency and TUF.	U	2	
	f)	Draw the symbol of XOR and XNOR gate along with its truth table.	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 6 PROGRAM : Electrical Engineering

COURSE CODE :- EEG 403

COURSE NAME :- Electrical Power Utilization and Traction

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

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	EEG 403	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List the desirable charactersticks of Traction motor.	R	CO1	
	b)	List different types of Over Head Equipments used in Locomotive	R	CO2	
	c)	List the requirements of Train Lighting system.	U	CO3	
	d)	List the Drives used for driving Electric Trains ?	U	CO1	
	e)	List the current collecting methods used with A.C. Locomotive.	R	CO2	
	f)	Explain the need of Locomotive maintenance.	A	CO3	
Q.2		Attempt any **FOUR:**			**16**
	a)	List and Explain the functions of major Equipments used in Substation.	R	CO1	
	b)	List and explain different types of Duty cycles.	U	CO2	
	c)	Name the D.C. Drives used as Traction Drives. Justify in detail.	U	CO1	
	d)	Draw and explain the sketch of Feeding Post.	R	CO1	
	e)	Draw neat circuit diagram used to obtain Constant Output in Train Lighting.	A	CO3	
	f)	Compare between the A.C. and D.C. methods of Track Electrification in terms of ratings and substations	A	CO2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw neat labelled sketch of A. C. Locomotive and state functions of equipments installed in it.	R	CO3	
	b)	Draw the Speed -Torque characterstic and explain the behaviour of Three phase Induction motor.	A	CO1	
	c)	Enlist the Electrical faults and causes related to Locomotive maintenance.	U	CO3	
	d)	Draw neat circuit diagram used to obtain Unidirectional polarity in Train Lighting.	A	CO3	
	e)	Draw neat diagram and explain working of Pantograph.	R	CO2	
	f)	List two types of Overlap and Explain in brief.	U	CO1	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

~~WINTER~~/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - PROGRAM: Electrical Engineering

COURSE CODE: - EEG 403

COURSE NAME: - Electrical Power Utilization and Traction

MAX. MARKS: **40** TIME: **1.5 Hrs** DATE: -27/5/**23**

QN	SQN	**SECTION –II**	R/U/A	CO	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State four equipments required for arc welding.	R	EEG 403-4	
	b)	State four applications arc welding.	R	EEG 403-4	
	c)	Compare AC drives with DC drives on two points.	A	EEG 403-5	
	d)	Define short time loading and draw its graphical representation.	R	EEG 403-5	
	e)	State four advantages of resistance ovens.	R	EEG 403-6	
	f)	State four disadvantages of electrical heating.	R	EEG 403-6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare AC welding with DC welding on four points.	A	EEG 403-4	
	b)	Describe with neat sketch the working principle of seam welding.	U	EEG 403-4	
	c)	What is individual drive? State three advantages and three disadvantages of individual drive.	R	EEG 403-5	
	d)	Define load equalization. Explain how it is obtained for electric motors?	U	EEG 403-5	
	e)	With neat diagram explain the working of direct resistance heating.	U	EEG 403-6	
	f)	State four advantages and four applications of high frequency eddy current heating.	R	EEG 403-6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Recommend relevant motor for the following application with justification: (i) Rolling mill drives and (ii) Crains.	A	EEG 403-5	
	b)	State suitable enclosure with justification for electric drives used in following places: (i) Petroleum stations and (ii) Damp situations.	A	EEG 403-5	
	c)	A certain motor operates continuously on the following duty cycle: (i) 40kW for 10 seconds, (ii) 80kW for 10 seconds, (iii) 120kW for 6 seconds, (iv) 100kW for 20 seconds and (v) idling for 14 seconds. Compute the required size of motor in kW.	A	EEG 403-5	
	d)	Explain with neat sketch the working of coreless type induction furnace.	U	EEG 403-6	
	e)	Explain in brief four essential requirements of good heating element.	U	EEG 403-6	
	f)	Explain with neat diagram the operation of indirect arc furnace.	U	EEG 403-6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **EEF 504** COURSE NAME: **MICROCONTROLLER**

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

Instruction :-

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

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QN	SQN	SECTION I	RUA	CO EEF 504	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Explain the function of following instructions. i) MOV A, @ RO ii) MUL A B	U	3	
	b)	Write the uses of A and B Registers.	R	2	
	c)	State advantages of microcontroller over microprocessor .	R	1	
	d)	Write the function of $\overline{EA}$ / Vpp pin of the 8051	U	2	
	e)	Write a program to add two numbers 11H & 22H and store the result in R4 register.	A	3	
	f)	State any four MCS – 51 family members.	R	1	
Q.2		Attempt any **FOUR**			**(16)**
	a)	State any four architectural features of 8051.	U	1	
	b)	Draw the internal RAM structure of 8051 microcontroller & Explain it.	U	2	
	c)	i) Write a program to multiply two 8 bit numbers 02H & 03 H and store the result at 20H internal RAM memory location. ii) Write a program to divide 08H & 04 H & store the result in 20H & 21H memory location	A	3	
	d)	With the help of example explain the following : i) Direct addressing mode ii) Indirect addressing mode iii) Register addressing mode iv) Immediate addressing mode	U	3	
	e)	Write the format of SCON register & explain each bit.	U	2	
	f)	Explain the functions of following instructions. i) JNC label ii) MOV DPTR, #3000H iii) MOVC A, @ A+DPTR iv) RRC A	U	3	
Q.3		Attempt any **FOUR**			**(16)**
	a)	Draw and Explain each bit of PSW register.	U	2	
	b)	Identify the addressing modes of the following instructions: i) MOV A, # 10H ii) MOV A, B iii) MOV A, 10H iv) MOV 10H, 20H	A	3	
	c)	Differentiate 8051 family member AT89C51, 8052, 8031, 8751 w.r.t. following points. i) Memory capacity ii) No. of I/O Lines iii) Number of timer & counters iv) Interrupt sources.	U	1	
	d)	Write on ALP to exchange two blocks of Ten data bytes stored in internal RAM location 30H & 40H respectively. Mention comments in program.	A	3	
	e)	Draw labelled pin diagram of 8051.	U	2	
	f)	Explain alternate function of part 3 of 8051 microcontroller.	U	2	

P.T.O.

QN	SQN	SECTION II	RUA	CO EEF504	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Find the value of TH1 and TL1 to generate square of 1 KHz using mode 1 of timer.	U	4	
	b)	List any four interrupt sources in 8051.	R	4	
	c)	Differentiate between linear decoding and absolute decoding. (Any two)	R	5	
	d)	Find the address Map table if we interface 8K bytes ROM with 8051 at starting address 8000H.	U	5	
	e)	Describe the function of R5 and E pins of LCD.	U	6	
	f)	Draw the pin diagram of 0808 DAC	R	6	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Draw the format of IE register and explain the significance of each bit.	R	4	
	b)	Write assembly language program to send continuously message "Hello" serially at 9600 baud rate.	A	4	
	c)	Draw interfacing diagram to interface relay to pin P1.0 & write assembly language program to ON and OFF the relay with some delay.	A	5	
	d)	Draw interfacing diagram of 8K bytes EPROM to 8051 also give the address Map table.	U	5	
	e)	Draw interfacing diagram of 8 bit ADC 0808 with 8051 microcontroller	U	6	
	f)	Write assembly language program to rotate stepper motor clockwise. Use normal 4 step sequence.	A	6	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Write assembly language program to generate square wave of 2KHz using timer 1 on pin P2.0. Assume crystal frequency = 11.0592 MHz	A	4	
	b)	Explain the two operating modes (mode 1 and mode 2) of serial communication of 8051 microcontroller.	R	4	
	c)	Draw interfacing diagram of 8 LEDs to part 2 of 8051 microcontroller. Write assembly language program to make LED ON and OFF with some delay.	A	5	
	d)	With the help of diagram explain the part 3 structure for input and output mode.	R	4	
	e)	Draw interfacing diagram for 8051 with seven segment display.	U	5	
	f)	Draw the interfacing diagram of keyboard (4X4 matrix) with 8051 also explain logic to detect pressed key.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - PROGRAM : ELECTRICAL ENGINERING

COURSE CODE :- EEG304

COURSE NAME :- ELECTRICAL & ELECTRONICS MEASUREMENT

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

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co EEG304-	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define following terms related with measuring instrument :- i) Accuracy ii) Precision	R	1	
	b)	State how resistances are classified according to their ranges.	R	2	
	c)	State the working principle of dynamo meter type watt meter.	R	3	
	d)	List any four errors that occur in measuring instruments .	R	1	
	e)	A single phase watt meter rated for 600 V; 10A is having full scale deflection of 3000 watt. Find the multiplying factor of the watt meter?	R	3	
	f)	Write down any two disadvantages of PMMC instruments.	R	1	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain any one moving iron instrument with neat sketch.	A	1	
	b)	Explain with neat sketch, High resistance measurement using megger.	U	2	
	c)	Explain the effect of power factor on wattmeter reading in case of two wattmeter method.	U	3	
	d)	Compare analog instrument to digital instrument on the basis of accuracy, resolution, power required and portability.	U	1	
	e)	Draw neat diagram of measurement of power in 3 phase Balanced system with one wattmeter method.	A	3	
	f)	Explain Measurement of capacitance by Schering Bridge with neat diagram.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Select and Illustrate any one suitable method to measure the low resistances.	A	2	
	b)	Which meter has a greater sensitivity and why? Meter A having a range of 0-10 V and a multiplier resistance of 18 kΩ and meter B with a range of 0-300 V and multiplier resistance of 298 kΩ? Both meter movements have a resistance of 2 kΩ.	A	1	
	c)	Explain measurement of inductance by Anderson Bridge with neat diagram.	U	2	
	d)	A watt meter with its current coil in line R and pressure coil across Y and B reads 3.2kW for a balanced load of 0.6 lagging p.f. The supply voltage is 400 V. Determine i) current ii)power and iii) reactive volt ampere of the load	A	3	
	e)	Explain with neat sketch; the construction and working principle of Repulsion type moving Iron instrument.	U	1	
	f)	Explain Maximum demand indicator with neat diagram.	U	3	

P.T.O.

QN	SQN	SECTION - II	RUA	CO EEG304	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	List any four transducers used for measurement of temperature.	R	2	
	b)	State the seeback effect	U	2	
	c)	State the working principle of thermistor.	A	2	
	d)	State the examples of active transducers (Any four)	R	2	
	e)	Draw the block diagram of prepaid energy meter.	R	2	
	f)	Draw the block diagram of digital three phase energy meter.	R	2	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Explain the construction of bellows with the help of neat labeled diagram.	A	4	
	b)	Explain the working principle of function generator using block diagram.	A	4	
	c)	Draw the block diagrams of AC and DC signal conditioning systems in instrumentation.	R	4	
	d)	Explain the method of frequency measurement using CRO with the help of Lissajous pattern.	A	4	
	e)	Explain Rotating type three phase sequence indicator with diagram.	U	4	
	f)	Explain the working principle of tri-vector meter with the help of neat labeled diagram.	A	4	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Describe the application of shunt for range extension of ammeter.	U	4	
	b)	Explain the working principle of single phase digital energy meter with the help of block diagram.	A	4	
	c)	Explain construction of single phase power factor meter with the help of diagram.	A	4	
	d)	Explain working principle of Weston type frequency meter with the help of diagram.	A	4	
	e)	Describe any four applications of CRO	A	4	
	f)	Explain construction and working of diaphragm.	U	4	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG309**

COURSE NAME **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **24/ 05 / 2023**

Instruction :-

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

QN	SQN	Question Text	R/U/A	Co EEG 309	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List different types of transistor biasing method.	R	1	
	b)	Define DC load line and Q point.	R	1	
	c)	State Barkhausen's criteria for oscillator.	R	2	
	d)	Give classification of oscillator.	U	2	
	e)	Draw a pin diagram of IC 7812.	R	3	
	f)	Give any two application of IC723 voltage regulator.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain with circuit diagram single stage CE amplifier.	U	1	
	b)	Compare class A and class B power amplifier (any four points)	U	1	
	c)	Describe operation of monostable multivibrator using IC 555 with circuit diagram.	U	2	
	d)	Draw a circuit diagram of Colpitt's oscillator and Hartley oscillator. Stat their frequency formula.	R	2	
	e)	Explain load and line regulation.	U	3	
	f)	Draw a pin diagram of IC723 and explain feature of IC723	U	3	
Q.3		Attempt any **FOUR:**			16
	a)	Compare IC 78XX and IC79XX series voltage regulator (any four points)	U	3	
	b)	Draw and explain block diagram of regulated power supply.	U	3	
	c)	Draw a circuit diagram and waveform of astable multivibrator using IC555.	R	2	
	d)	Explain RC phase shift oscillator with circuit diagram.	U	1	
	e)	Describe operation of two stage RC coupled CE amplifier with circuit diagram.	U	1	
	f)	Identify given circuit diagram and explain its operation. (Fig.1)	A	1	

P.T.O

QN	SQN	Question Text	R/U/A	Co EEG 309	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define virtual ground in op-amp.	R	5	
	b)	State De-Morgan's first theorem.	R	6	
	c)	Draw pin diagram of IC 741	A	4	
	d)	Solve following binary operations. i) $(1011)_2 + (0110)_2$ ii) $(101101)_2 - (101010)_2$.	A	6	
	e)	Give the ideal values of following parameter related to op-amp IC741- i) CMRR ii) Input offset voltage.	R	4	
	f)	Draw open loop configuration of op-amp.	A	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	State the types of DAC and explain any one.	U	6	
	b)	Draw and explain non-inverting amplifier using op-amp IC741.	A	5	
	c)	Find output voltage of following circuit diagram. (summing amp.) Where V_1=10V, V_2=5V, V_3=(-2V) R_1 =RF=1kΩ (Fig.2)	A	5	
	d)	Find 2's compliment of following -: i) $(1100101011)_2$ ii) $(20)_{10}$ iii) $(1A)_{16}$ iv) $(36)_{10}$.	A	6	
	e)	Draw neat labelled block diagram of operational amplifier and explain.	U	4	
	f)	Explain following parameters related with IC741. i) Input offset current. ii) SVRR.	U	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and explain integrator using op-amp.	A	5	
	b)	For subtractor V_1=10V, V_2 =20V, V_3=(-5V) RF= R_1 = 10kΩ for non-inverting configuration. Find out output voltage.	A	5	
	c)	Explain any two Laws of Boolean algebra.	U	6	
	d)	Give ideal and practical parameters of IC741. i) Input bias current ii) Slew rate iii) Bandwidth iv) Input voltage range.	R	4	
	e)	Explain pin function of op-amp IC741- i) Pin 1 ii) Pin 3 iii) Pin 2 iv) Pin 7.	U	4	
	f)	Draw neat circuit diagram of inverting scaling amplifier.	A	5	

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Q. (3)

f)

Fig. 1.

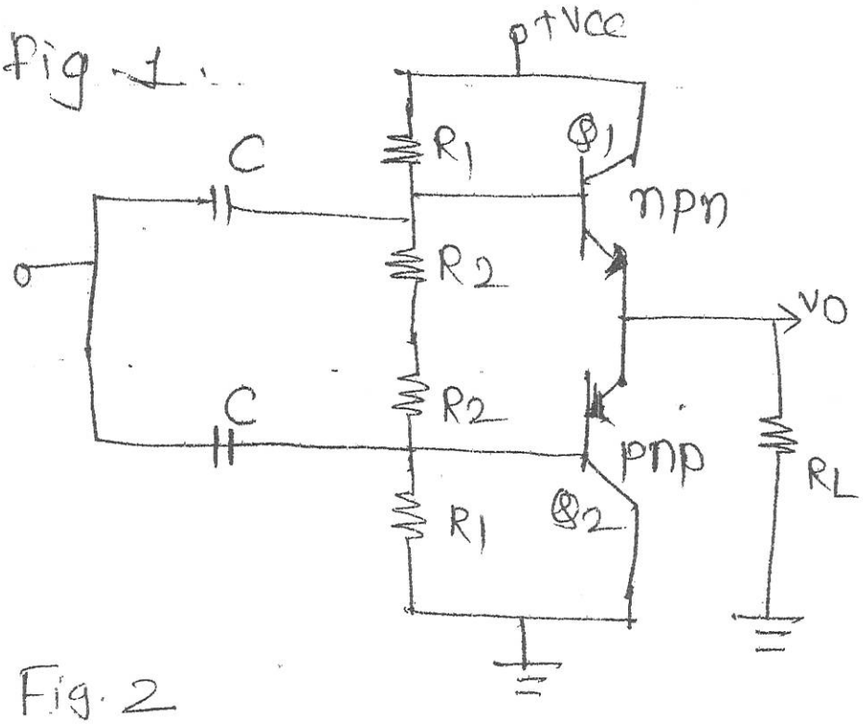
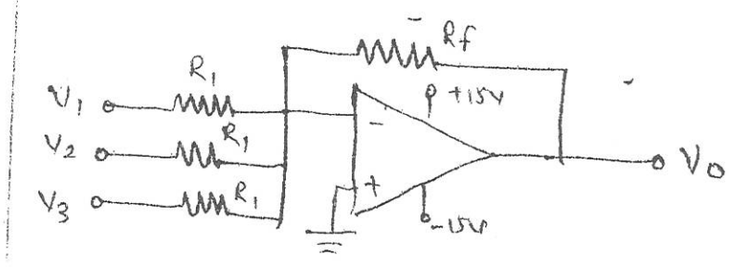


Fig. 2



Q. 5 (c)

Q 5)

c)

P-3/3

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

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EVEN TERM END EXAM SUMMER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE: **ME6309** COURSE NAME: **Basic Electrical and Electronics Engineering**

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

Instruction :-

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

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QN	SQN	QUESTION TEXT`	RUA	CO ME6309	Marks
Q.1	A	Attempt any **FOUR**			**(08)**
	a)	Define power and energy.	R	01	
	b)	Two resistances each of 5Ω are connected in parallel. Calculate equivalent resistance between them.	A	01	
	c)	Define RMS value and average Value with respect to alternating quantity.	R	02	
	d)	Define earthing and state its types.	R	02	
	e)	Write EMF equation of 1-Ø transformer.	R	03	
	f)	State any two application of slipring induction motor.	R	03	
Q.2	A	Attempt any **FOUR**			**(16)**
	a)	Compare electric circuit and magnetic circuit on any four points.	U	01	
	b)	Draw balanced three phase Delta connected load. Show various line & phase quantities on it. Also write relationship between line and phase values of voltages and current.	R	02	
	c)	Give any four advantages of three phase system over single phase system.	U	02	
	d)	Explain the construction and working principle of single phase transformer.	U	03	
	e)	Describe construction of capacitor start capacitor run Induction motor with neat diagram.	A	03	
	f)	Explain generation of alternating voltage with single elementary alternator.	U	03	
Q.3		Attempt any **FOUR**			**(16)**
	a)	State and explain faradays law of electromagnetic Induction.	U	01	
	b)	Explain the following terms. i)Waveform ii) Cycle iii) Frequency iv) Time period	U	02	
	c)	Describe importance of Earthing.	A	02	
	d)	Explain working of resistance split phase induction motor with neat diagram.	U	03	
	e)	Define efficiency & regulation & transformation ratio of single phase transformer.	R	03	
	f)	Describe construction & working of 3-Ø induction motor.	A	03	

QN	SQN	QUESTION TEXT	RUA	CO MEG 309	Marks
Q.4		Attempt any **FOUR**			**(08)**
	a)	Draw symbol and unit of Resistor.	R	04	
	b)	List two application of capacitor.	R	04	
	c)	Define Rectification.	R	05	
	d)	List types of semiconductors.	R	06	
	e)	List types of BJT.	R	06	
	f)	Define transistor Biasing.	R	06	
Q.5		Attempt any **FOUR**			**(16)**
	a)	Calculate the value of resistor if the sequence of the colour rings on a certain fixed resistor is orange, blue, red, golden and draw its colour coding band representation in form of significant digit, multiplier and tolerance.	A	04	
	b)	Compare linear IC and digital IC (any four points)	U	04	
	c)	Sketch and explain zener diode as voltage regular.	U	05	
	d)	Draw the circuit diagram and output waveform of series inductor and shunt capacitor filter.	U	05	
	e)	Explain circuit diagram of single stage amplifier with two applications.	U	06	
	f)	Derive relationship between alpha (α) beta (β) of BJT.	A	06	
Q.6		Attempt any **FOUR**			**(16)**
	a)	Explain the operating principle of NPN transistor.	U	06	
	b)	Draw & explain cut – off, saturation and active operating regions by using different modes of transistor biasing.	U	06	
	c)	Identify a four band colour code for the following resistors. i) $150\Omega \pm 5\%$ ii) $2.7k\Omega \pm 10\%$	A	04	
	d)	Draw and explain full wave bridge rectifier.	U	05	
	e)	Compare P-N junction diode and zener diode on following parameters. i) Symbol ii) Doping level iii) Characteristics iv) Applications.	U	05	
	f)	Draw circuit diagram for π – filter (CLC filter) and explain its working with waveforms.	U	05	