GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG-403

COURSE NAME :- ELECTRICAL POWER UTILIZATION & TRACTION

MAX. MARKS : 80 TIME : **3 Hrs** DATE :- 28/11/2023

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State types of DC electrical traction system.	R	CO1	02
	b)	Enlist various components of feeding post	R	CO1	02
	c)	Explain briefly height in OHE system.	U	CO2	02
	d)	Explain briefly function of conductor rail in electric locomotive.	U	CO2	02
	e)	State components of Auxiliary circuit in electric locomotive.	R	CO3	02
	f)	Enlist various traction motors suitable for electric locomotive.	R	CO3	02
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain various types of protections used for traction transformer & OHE systems.	U	CO1	04
	b)	Explain briefly Insulated & uninsulated overlaps.	U	CO2	04
	c)	Explain with neat sketch polygonal types of catenary construction systems.	A	CO2	04
	d)	Explain with neat labeled sketch 'Bow collector type current collection system'.	A	CO2	04
	e)	Explain with neat labeled sketch of OHE supply 1phase AC 25 kV circuit breaker its type, and working operation used for locomotive.	A	CO3	04
	f)	Draw labeled circuit diagram of electric locomotive Auxiliary equipments.	U	CO3	04
Q.3		Attempt any **FOUR:**			
	a)	Draw labeled circuit diagram of protective system for traction substation transformer.	R	CO1	**16**
	b)	Explain the differences between circuit breaker & Interrupter.	R	CO2	04
	c)	Explain composition of contact wire and catenary wire of OHE system.	R	CO2	04
	d)	State the functions & draw neat labeled sketch of Faiveley's pantograph.	U	CO3	04
	e)	State & enlist various types contactor and their typical function in locomotive.	U	CO3	04
	f)	Explain with neat sketch how to obtain unidirectional polarity & constant output from under frame generation system.	R	CO3	04

P.T.O.

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - IV PROGRAM: Electrical Engineering

COURSE CODE: - EEG 403

COURSE NAME: - Electrical Power Utilization and Traction

MAX. MARKS: **40** TIME: **1.5 Hrs** DATE: -28 / 11 / **23**

QN	SQN	**SECTION –II**	R/U/A	CO	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State four advantages of electric welding.	R	EEG 403-4	
	b)	State four applications of resistance welding. .	R	EEG 403-4	
	c)	State four disadvantages of DC drives.	R	EEG 403-5	
	d)	Define continuous loading and draw its graphical representation.	U	EEG 403-5	
	e)	List four names of heating element materials.	R	EEG 403-6	
	f)	Define the following heat transfer methods: (i) Conduction and (ii) Convection.	R	EEG 403-6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare metal arc welding with carbon arc welding on four points.	A	EEG 403-4	
	b)	Describe with neat sketch the working principle of spot welding.	U	EEG 403-4	
	c)	What is group drive? State three advantages and three disadvantages of group drive.	R	EEG 403-5	
	d)	Explain in brief four factors governing selection of electric drive for particular application.	U	EEG 403-5	
	e)	With neat diagram explain the working of indirect resistance heating.	U	EEG 403-6	
	f)	State eight applications of dielectric heating.	R	EEG 403-6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Recommend relevant motor for the following application with justification: (i) Air compressor and (ii) Elevators.	A	EEG 403-5	
	b)	State suitable enclosure with justification for electric drives used in following places: (i) Coal mines and (ii) Chemical industries.	A	EEG 403-5	
	c)	A certain motor operates continuously on the following duty cycle: (i) 100kW for 10 minutes, (ii) 50kW for 8 minutes, (iii) No load for10 minutes and (iv) 150kW for 5 minutes. Compute the required size of motor in kW.	A	EEG 403-5	
	d)	Explain with neat sketch the working of core type induction furnace.	U	EEG 403-6	
	e)	Explain in brief four causes of failure of resistance heating element.	U	EEG 403-6	
	f)	Explain with neat diagram the operation of direct arc furnace.	U	EEG 403-6	

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WINTER / SUMMER 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG-403

COURSE NAME :- ELECTRICAL POWER UTILIZATION & TRACTION

MAX. MARKS : 80 TIME : **3 Hrs** DATE :- 28/11/2023

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State types of DC electrical traction system.	R	CO1	02
	b)	Enlist various components of feeding post	R	CO1	02
	c)	Explain briefly height in OHE system.	U	CO2	02
	d)	Explain briefly function of conductor rail in electric locomotive.	U	CO2	02
	e)	State components of Auxiliary circuit in electric locomotive.	R	CO3	02
	f)	Enlist various traction motors suitable for electric locomotive.	R	CO3	02
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain various types of protections used for traction transformer & OHE systems.	U	CO1	04
	b)	Explain briefly Insulated & uninsulated overlaps.	U	CO2	04
	c)	Explain with neat sketch polygonal types of catenary construction systems.	A	CO2	04
	d)	Explain with neat labeled sketch 'Bow collector type current collection system'.	A	CO2	04
	e)	Explain with neat labeled sketch of OHE supply 1phase AC 25 kV circuit breaker its type, and working operation used for locomotive.	A	CO3	04
	f)	Draw labeled circuit diagram of electric locomotive Auxiliary equipments.	U	CO3	04
Q.3		Attempt any **FOUR:**			
	a)	Draw labeled circuit diagram of protective system for traction substation transformer.	R	CO1	**16**
	b)	Explain the differences between circuit breaker & Interrupter.	R	CO2	04
	c)	Explain composition of contact wire and catenary wire of OHE system.	R	CO2	04
	d)	State the functions & draw neat labeled sketch of Faiveley's pantograph.	U	CO3	04
	e)	State & enlist various types contactor and their typical function in locomotive.	U	CO3	04
	f)	Explain with neat sketch how to obtain unidirectional polarity & constant output from under frame generation system.	R	CO3	04

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - IV PROGRAM: Electrical Engineering

COURSE CODE: - EEG 403

COURSE NAME: - Electrical Power Utilization and Traction

MAX. MARKS: **40** TIME: **1.5 Hrs** DATE: -28 / 11 / **23**

QN	SQN	**SECTION –II**	R/U/A	CO	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State four advantages of electric welding.	R	EEG 403-4	
	b)	State four applications of resistance welding. .	R	EEG 403-4	
	c)	State four disadvantages of DC drives.	R	EEG 403-5	
	d)	Define continuous loading and draw its graphical representation.	U	EEG 403-5	
	e)	List four names of heating element materials.	R	EEG 403-6	
	f)	Define the following heat transfer methods: (i) Conduction and (ii) Convection.	R	EEG 403-6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Compare metal arc welding with carbon arc welding on four points.	A	EEG 403-4	
	b)	Describe with neat sketch the working principle of spot welding.	U	EEG 403-4	
	c)	What is group drive? State three advantages and three disadvantages of group drive.	R	EEG 403-5	
	d)	Explain in brief four factors governing selection of electric drive for particular application.	U	EEG 403-5	
	e)	With neat diagram explain the working of indirect resistance heating.	U	EEG 403-6	
	f)	State eight applications of dielectric heating.	R	EEG 403-6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Recommend relevant motor for the following application with justification: (i) Air compressor and (ii) Elevators.	A	EEG 403-5	
	b)	State suitable enclosure with justification for electric drives used in following places: (i) Coal mines and (ii) Chemical industries.	A	EEG 403-5	
	c)	A certain motor operates continuously on the following duty cycle: (i) 100kW for 10 minutes, (ii) 50kW for 8 minutes, (iii) No load for10 minutes and (iv) 150kW for 5 minutes. Compute the required size of motor in kW.	A	EEG 403-5	
	d)	Explain with neat sketch the working of core type induction furnace.	U	EEG 403-6	
	e)	Explain in brief four causes of failure of resistance heating element.	U	EEG 403-6	
	f)	Explain with neat diagram the operation of direct arc furnace.	U	EEG 403-6	

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SUMMER/WINTER- 2022

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : ELECTRICAL ENGINEERING
COURSE CODE :- EEG401
COURSE NAME :- INDUSTRIAL MACHINES
MAX. MARKS : **80** TIME : **03 Hrs** DATE : 30 /11/ **2022**

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	CoEE G401	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List the types of alternator according to the construction.	A	4	
	b)	Define Pitch factor.	U	4	
	c)	State in brief phases swinging in synchronous motor.	A	5	
	d)	Define load angle.	R	5	
	e)	List the names of single phase induction motor.	R	6	
	f)	State the applications of capacitor start capacitor run induction motor.	A	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Define voltage regulation of an alternator. Explain various factor which may affect the regulation of an alternator	U	4	
	b)	Derive the emf equation for an alternator from the fundamentals showing clearly the depressive for pitch factor & distribution factor.	R+U	4	
	c)	Discuss the advantages of rotating field type alternator.	R+U	4	
	d)	Discuss why synchronous motor is not self-starting with the methods are generally used to start Synchronous motor.	U	5	
	e)	Explain two important functions served by damper winding in synchronous motor. State the various applications synchronous Motor	A	5	
	f)	Describe the construction & working of a shaded-pole motor.	R+U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain the different methods of excitation system of alternator	A	4	
	b)	A 50 KVA, 500 V, A.C generator gave the following test results. Open Circuit test: A field current of 12 amp is produced an emf of 300 Volts Short circuit test: A field current of 12 Amp caused a current of 175 Amp to flow in the short circuited armature. The effective armature resistance is o.2 ohm. Calculate a) The synchronous impedance and synchronous reactance. b) If the a.c. generator is supplying full load current of 100 Amp. at 0.8 p.f lagging, to what value would the terminal voltage rise if the load were removed? Also find voltage regulation for this load and power factor.	A	4	
	c)	Explain the operation of a Synchronous motor.	A	5	
	d)	Discuss 'V' curves & inverted 'V' across of a Synchronous motor	U+R	5	
	e)	Explain why single phase I.M. is not self-starting. Explain the methods to make itself starting.	A	6	
	f)	Explain the working principle of a capacitor start Induction run with the help of neat diagram.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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SUMMER/WINTER-

EXAM SEAT NO. | | | | | | |

LEVEL: -4 PROGRAMS: Electrical Engineering

COURSE CODE: -EEG401

COURSE NAME: - Industrial Machines

MAX. MARKS: **80** TIME: **03 Hrs** DATE: 30/11/2023

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.
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6) Use of Mobile is strictly prohibited.

QN	SQN	SECTION -I	R/U/A	Co EEG 401	Mark
Q.1		Attempt any **four of the following.**			**08**
	a)	Draw torque slip characteristics of three phase Induction motor.	U	1	
	b)	Which test is required to find no load power factor while drawing circle diagram of three phase induction motor ?	U	2	
	c)	What are the different losses in an induction motor?	U	3	
	d)	Write down any two disadvantage of slip ring induction motor.	A	1	
	e)	Draw neat diagram of star delta starter for three phase induction motor.	R	3	
	f)	Write down any two applications of three phase slip ring induction motor.	A	3	
Q.2		Attempt any **four of the following.**			**16**
	a)	Explain how rotating magnetic field is produced in case of three phase induction motor.	U	1	
	b)	A 3.5KW 3phase 220 volt 50 HZ 4 pole star connected induction motor gave the following test results : No load Test: V_0=220volt, I_0=5 Amp, W_0=385 Watt Blocked rotor test: V_{sc}=110volt, I_{sc}=20 Amp, W_{sc}=1870 Watt Find No load power factor angle and short circuited power factor angle from above tests.	A	2	
	c)	Explain the effect of injection of EMF in rotor circuit of slip ring induction motor.	U	3	
	d)	Explain the pole changing method of speed control of induction motor .	R	3	
	e)	Derive expression for torque under running condition of an ind. motor.	R	1	
	f)	A 6-pole induction motor is supplied from a 400 volt ,three phase,50 –Hz supply system. The frequency of the rotor induced emf is 2Hz .Calculate a)The percentage slip b)The rotor speed .	A	2	
Q.3		Attempt any four of the following.			**16**
	a)	Explain with neat diagram blocked rotor test on three phase ind. motor.	U	2	
	b)	Draw the circle diagram for 14.92Kw,50Hz,400 Volt ,three phase star connected induction motor from following data No load Test: V_0=400volt, I_0=9 Amp, $\cos\phi_0$ =0.2 Blocked rotor test: V_{sc}=200 volt, I_{sc}=50 Amp, $\cos\phi_{sc}$ =0.4	A	2	
	c)	Draw equivalent circuit of three phase induction motor and show all parameters on it.	A	1	
	d)	Draw and explain power flow diagram of three phase induction motor.	A	1	
	e)	Derive ratio between full load torque and maximum torque of three phase induction motor.	R	1	
	f)	State different methods used for controlling speed of 3 phase induction motor and explain any one method in detail.	A	3	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.
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SUMMER/WINTER- 2022

EXAM SEAT NO. | | | | | | |

LEVEL : - IV PROGRAM : ELECTRICAL ENGINEERING
COURSE CODE :- EEG401
COURSE NAME :- INDUSTRIAL MACHINES
MAX. MARKS : **80** TIME : **03 Hrs** DATE :30 /11/ **2022**

Instruction :-
1) Answers of two sections must be written in separate section answer book provided.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQ N	SECTION –II	R/ U/ A	CoEE G401	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	List the types of alternator according to the construction.	A	4	
	b)	Define Pitch factor.	U	4	
	c)	State in brief phases swinging in synchronous motor.	A	5	
	d)	Define load angle.	R	5	
	e)	List the names of single phase induction motor.	R	6	
	f)	State the applications of capacitor start capacitor run induction motor.	A	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Define voltage regulation of an alternator. Explain various factor which may affect the regulation of an alternator	U	4	
	b)	Derive the emf equation for an alternator from the fundamentals showing clearly the depressive for pitch factor & distribution factor.	R+U	4	
	c)	Discuss the advantages of rotating field type alternator.	R+U	4	
	d)	Discuss why synchronous motor is not self-starting with the methods are generally used to start Synchronous motor.	U	5	
	e)	Explain two important functions served by damper winding in synchronous motor. State the various applications synchronous Motor	A	5	
	f)	Describe the construction & working of a shaded-pole motor.	R+U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain the different methods of excitation system of alternator	A	4	
	b)	A 50 KVA, 500 V, A.C generator gave the following test results. Open Circuit test: A field current of 12 amp is produced an emf of 300 Volts Short circuit test: A field current of 12 Amp caused a current of 175 Amp to flow in the short circuited armature. The effective armature resistance is o.2 ohm. Calculate a) The synchronous impedance and synchronous reactance. b) If the a.c. generator is supplying full load current of 100 Amp. at 0.8 p.f lagging, to what value would the terminal voltage rise if the load were removed? Also find voltage regulation for this load and power factor.	A	4	
	c)	Explain the operation of a Synchronous motor.	A	5	
	d)	Discuss 'V' curves & inverted 'V' across of a Synchronous motor	U+R	5	
	e)	Explain why single phase I.M. is not self-starting. Explain the methods to make itself starting.	A	6	
	f)	Explain the working principle of a capacitor start Induction run with the help of neat diagram.	A	6	

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(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER-

EXAM SEAT NO. | | | | | | |

LEVEL: -4 PROGRAMS: Electrical Engineering

COURSE CODE: -EEG401

COURSE NAME: - Industrial Machines

MAX. MARKS: **80** TIME: **03 Hrs** DATE: 30/11/2023

Instruction:-

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QN	SQN	SECTION -I	R/U/A	Co EEG 401	Mark
Q.1		Attempt any **four of the following.**			**08**
	a)	Draw torque slip characteristics of three phase Induction motor.	U	1	
	b)	Which test is required to find no load power factor while drawing circle diagram of three phase induction motor ?	U	2	
	c)	What are the different losses in an induction motor?	U	3	
	d)	Write down any two disadvantage of slip ring induction motor.	A	1	
	e)	Draw neat diagram of star delta starter for three phase induction motor.	R	3	
	f)	Write down any two applications of three phase slip ring induction motor.	A	3	
Q.2		Attempt any **four of the following.**			**16**
	a)	Explain how rotating magnetic field is produced in case of three phase induction motor.	U	1	
	b)	A 3.5KW 3phase 220 volt 50 HZ 4 pole star connected induction motor gave the following test results : No load Test: V_0=220volt, I_0=5 Amp, W_0=385 Watt Blocked rotor test: V_{sc}=110volt, I_{sc}=20 Amp, W_{sc}=1870 Watt Find No load power factor angle and short circuited power factor angle from above tests.	A	2	
	c)	Explain the effect of injection of EMF in rotor circuit of slip ring induction motor.	U	3	
	d)	Explain the pole changing method of speed control of induction motor .	R	3	
	e)	Derive expression for torque under running condition of an ind. motor.	R	1	
	f)	A 6-pole induction motor is supplied from a 400 volt ,three phase,50 –Hz supply system. The frequency of the rotor induced emf is 2Hz .Calculate a)The percentage slip b)The rotor speed .	A	2	
Q.3		Attempt any four of the following.			**16**
	a)	Explain with neat diagram blocked rotor test on three phase ind. motor.	U	2	
	b)	Draw the circle diagram for 14.92Kw,50Hz,400 Volt ,three phase star connected induction motor from following data No load Test: V_0=400volt, I_0=9 Amp, $\cos\phi_0$ =0.2 Blocked rotor test: V_{sc}=200 volt, I_{sc}=50 Amp, $\cos\phi_{sc}$ =0.4	A	2	
	c)	Draw equivalent circuit of three phase induction motor and show all parameters on it.	A	1	
	d)	Draw and explain power flow diagram of three phase induction motor.	A	1	
	e)	Derive ratio between full load torque and maximum torque of three phase induction motor.	R	1	
	f)	State different methods used for controlling speed of 3 phase induction motor and explain any one method in detail.	A	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 20

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEF502

COURSE NAME :- ELECTRICAL MACHINE CONTROL & AUTOMATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30 /11 /2023

Instruction :-

1) Answers of two sections must be written in separate section answer book provided.
2) Illustrate your answers with sketches wherever necessary.
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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 control transformer.	R	EEF 502-2	
	b)	State the difference between relay & release.	R	2	
	c)	Draw the symbol for NO & NC type of contactor.	A	1	
	d)	State the advantages of fuse switch unit.	U	2	
	e)	Define limit switch.	R	2	
	f)	State the basic function of switch fuse, contactor & overload relay.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain the control circuit for under voltage protection in case of motors.	U	3	
	b)	With neat sketch discuss the semiconductor fuse.	A	2	
	c)	Discuss the phase failure protection in case of motors.	A	3	
	d)	Describe the working of float switch & state its two applications.	A	2	
	e)	Discuss interlocking of drives with necessary diagram.	A	1	
	f)	Discuss the power diagram & control diagram with suitable diagrams.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Discuss the selection of fuse, overload relay & contactors for motors.	U	3	
	b)	With neat diagram explain bimetallic thermal overload relay.	A	2	
	c)	Discuss with neat diagram the remote control operation of a motor.	A	1	
	d)	With neat diagram explain the speed actuating sensing switches.	A	2	
	e)	Discuss the two advantages of magnetic control & two disadvantages of manual control.	U	1	
	f)	Discuss over temperature protection (thermistor) for motors.	A	3	

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QN	SQN	SECTION –II	R/U/A	Co EEF 502	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define plugging.	R	4	
	b)	Define dynamic Braking.	R	4	
	c)	List out the components of DOL starter.	R	4	
	d)	List out the reduced voltage starters of induction motors.	R	4	
	e)	State two features of control circuit for planer machine.	R	5	
	f)	Name any two devices used to provide input to PLC.	R	6	
Q.5		Attempt any **TWO:**			**16**
	a)	Draw control and power circuit of Electric Oven and explain the operation.	A	5	
	b)	Draw a neat block diagram of PLC and explain its operation.	U	6	
	c)	i) Explain any two features to be incorporated in control circuit of Lifting magnet. ii) Draw ladder diagram for standard start-stop-seal circuit and explain the operation	A U	5 5	4 4
Q.6		Attempt any **TWO:**			**16**
	a)	Draw control and power circuit for forward-stop-Reverse control of 3ϕ induction motor and explain operation in brief.	U/A	4	
	b)	Draw control and power circuit for Auto - transformer starter of 3ϕ induction motor and explain operation in brief.	U/A	4	
	c)	Draw control and power circuit for Secondary Frequency Acceleration Starter for 3ϕ slip-ring induction motor.	U/A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 20

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEF502

COURSE NAME :- ELECTRICAL MACHINE CONTROL & AUTOMATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-30/11/2023

Instruction :-

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

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State the function of control transformer.	R	EEF 502-2	
	b)	State the difference between relay & release.	R	2	
	c)	Draw the symbol for NO & NC type of contactor.	A	1	
	d)	State the advantages of fuse switch unit.	U	2	
	e)	Define limit switch.	R	2	
	f)	State the basic function of switch fuse, contactor & overload relay.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain the control circuit for under voltage protection in case of motors.	U	3	
	b)	With neat sketch discuss the semiconductor fuse.	A	2	
	c)	Discuss the phase failure protection in case of motors.	A	3	
	d)	Describe the working of float switch & state its two applications.	A	2	
	e)	Discuss interlocking of drives with necessary diagram.	A	1	
	f)	Discuss the power diagram & control diagram with suitable diagrams.	U	2	
Q.3		Attempt any **FOUR:**			**16**
	a)	Discuss the selection of fuse, overload relay & contactors for motors.	U	3	
	b)	With neat diagram explain bimetallic thermal overload relay.	A	2	
	c)	Discuss with neat diagram the remote control operation of a motor.	A	1	
	d)	With neat diagram explain the speed actuating sensing switches.	A	2	
	e)	Discuss the two advantages of magnetic control & two disadvantages of manual control.	U	1	
	f)	Discuss over temperature protection (thermistor) for motors.	A	3	

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QN	SQN	SECTION –II	R/U/A	Co EEF 502	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define plugging.	R	4	
	b)	Define dynamic Braking.	R	4	
	c)	List out the components of DOL starter.	R	4	
	d)	List out the reduced voltage starters of induction motors.	R	4	
	e)	State two features of control circuit for planer machine.	R	5	
	f)	Name any two devices used to provide input to PLC.	R	6	
Q.5		Attempt any **TWO:**			**16**
	a)	Draw control and power circuit of Electric Oven and explain the operation.	A	5	
	b)	Draw a neat block diagram of PLC and explain its operation.	U	6	
	c)	i) Explain any two features to be incorporated in control circuit of Lifting magnet. ii) Draw ladder diagram for standard start-stop-seal circuit and explain the operation	A U	5 5	4 4
Q.6		Attempt any **TWO:**			**16**
	a)	Draw control and power circuit for forward-stop-Reverse control of 3ϕ induction motor and explain operation in brief.	U/A	4	
	b)	Draw control and power circuit for Auto - transformer starter of 3ϕ induction motor and explain operation in brief.	U/A	4	
	c)	Draw control and power circuit for Secondary Frequency Acceleration Starter for 3ϕ slip-ring induction motor.	U/A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG502

COURSE NAME :- INDUSTRIAL AUTOMATION AND CONTROL

MAX. MARKS : **80** TIME : **03 Hrs** DATE :30/11/2023

Instruction :-

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

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give two reasons for the need of automation in the industry.	U	1	
	b)	What is mean by SCADA?	R	1	
	c)	Enlist any four analog and discrete inputs.	U	2	
	d)	Draw the diagram of pressure switch.	R	2	
	e)	State any two advantages of PLC.	U	3	
	f)	Write program scan process applied to single rung.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain selector switch with neat diagram	R	2	
	b)	Explain Relay as an output device.	A	2	
	c)	Explain solenoid valve as an output device.	U	2	
	d)	With neat diagram explain DCS.	R	1	
	e)	With neat sketch explain discrete input module of a PLC.	U	3	
	f)	Draw the structure of micro PLC and explain it.	R	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain the Evolution of PLC.	U	1	
	b)	Draw and explain Forward-stop-Reverse control and random reversing of induction motor.	A	2	
	c)	With neat diagram explain DOL starter.	R	2	
	d)	Draw the block diagram of AC input module and explain working of each block.	U	3	
	e)	Explain the term speed of execution	R	3	
	f)	Explain PID controller module.	A	3	

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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 :-30/11/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define byte and Word related to binary system.	R	4	
	b)	State the number of inputs and outputs required in ladder logic diagram for forward and reverse control of 3 phase induction motor.	R	5	
	c)	State ~~the number of inputs and outputs required in ladder logic diagram for forward and reverse control of 3 phase induction motor.~~ seal in circuit using PLC	R	5	
	d)	Define SCADA. State two benefits of using SCADA.	R	6	
	e)	Draw a ladder diagram for seal in circuit using PLC.	A	5	
	f)	Describe any two characteristics of SCADA.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	State any four relay type instructions used in PLC along with its symbol.	R	4	
	b)	Explain the up counter instruction used in PLC along with its word format.	U	4	
	c)	A pump is to be used to fill two storage tanks. The pump is manually started by the operator from a start/stop station. When the first tank is full, the control logic must be able to automatically stop flow to the first tank and direct flow to the second tank through the use of sensors and electric solenoid valves. When the second tank is full, the pump must shut down automatically. Indicator lamps are to be included to signal when each tank is full.	A/U	5	
	d)	Draw a ladder diagram for reverse control of 3 phase induction motor using PLC.	A	5	
	e)	Describe the steps involved in interfacing of PLC based application to a SCADA system.	U	6	
	f)	Draw block diagram of SCADA system and explain its parts.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain the CU, DN bits of Down counter instruction. State the method to reset the counter.	A	4	
	b)	Describe the retentive timer instruction used in PLC. State the method to reset it.	A	4	
	c)	Write a ladder logic program for tank level control with following conditions: a) Pump can be manually operated by START and STOP push buttons. b) Fill the tank first. When tank 1 is full fill tank 2. c) When both tanks are full light indicator ON d) Motor should off automatically.	A	5	
	d)	Draw a ladder diagram and explain with block diagram water distribution using SCADA	A	6	
	e)	State the steps involve in developing SCADA application for any simple system.	R	6	
	f)	Compare PLC and SCADA system on any four parameters	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG502

COURSE NAME :- INDUSTRIAL AUTOMATION AND CONTROL

MAX. MARKS : **80** TIME : **03 Hrs** DATE :30/11/2023

Instruction :-

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

QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give two reasons for the need of automation in the industry.	U	1	
	b)	What is mean by SCADA?	R	1	
	c)	Enlist any four analog and discrete inputs.	U	2	
	d)	Draw the diagram of pressure switch.	R	2	
	e)	State any two advantages of PLC.	U	3	
	f)	Write program scan process applied to single rung.	A	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain selector switch with neat diagram	R	2	
	b)	Explain Relay as an output device.	A	2	
	c)	Explain solenoid valve as an output device.	U	2	
	d)	With neat diagram explain DCS.	R	1	
	e)	With neat sketch explain discrete input module of a PLC.	U	3	
	f)	Draw the structure of micro PLC and explain it.	R	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain the Evolution of PLC.	U	1	
	b)	Draw and explain Forward-stop-Reverse control and random reversing of induction motor.	A	2	
	c)	With neat diagram explain DOL starter.	R	2	
	d)	Draw the block diagram of AC input module and explain working of each block.	U	3	
	e)	Explain the term speed of execution	R	3	
	f)	Explain PID controller module.	A	3	

P.T.O.

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 :-30/11/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define byte and Word related to binary system.	R	4	
	b)	State the number of inputs and outputs required in ladder logic diagram for forward and reverse control of 3 phase induction motor.	R	5	
	c)	State ~~the number of inputs and outputs required in ladder logic diagram for forward and reverse control of 3 phase induction motor:~~ seal in circuit using PLC	R	5	
	d)	Define SCADA. State two benefits of using SCADA.	R	6	
	e)	Draw a ladder diagram for seal in circuit using PLC.	A	5	
	f)	Describe any two characteristics of SCADA.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	State any four relay type instructions used in PLC along with its symbol.	R	4	
	b)	Explain the up counter instruction used in PLC along with its word format.	U	4	
	c)	A pump is to be used to fill two storage tanks. The pump is manually started by the operator from a start/stop station. When the first tank is full, the control logic must be able to automatically stop flow to the first tank and direct flow to the second tank through the use of sensors and electric solenoid valves. When the second tank is full, the pump must shut down automatically. Indicator lamps are to be included to signal when each tank is full.	A/U	5	
	d)	Draw a ladder diagram for reverse control of 3 phase induction motor using PLC.	A	5	
	e)	Describe the steps involved in interfacing of PLC based application to a SCADA system.	U	6	
	f)	Draw block diagram of SCADA system and explain its parts.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain the CU, DN bits of Down counter instruction. State the method to reset the counter.	A	4	
	b)	Describe the retentive timer instruction used in PLC. State the method to reset it.	A	4	
	c)	Write a ladder logic program for tank level control with following conditions: a) Pump can be manually operated by START and STOP push buttons. b) Fill the tank first. When tank 1 is full fill tank 2. c) When both tanks are full light indicator ON d) Motor should off automatically.	A	5	
	d)	Draw a ladder diagram and explain with block diagram water distribution using SCADA	A	6	
	e)	State the steps involve in developing SCADA application for any simple system.	R	6	
	f)	Compare PLC and SCADA system on any four parameters	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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SUMMER/WINTER - 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - III **PROGRAM: ELECTRICAL ENGINEERING**

COURSE CODE: - **EEG305**

COURSE NAME: - **ELECTRICAL ENGINEERING MATERIAL**

MAX. MARKS: 40 **TIME: 02 Hrs** **DATE: -01/12/2023**

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		R/ U/ A	Co-EEG305	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List the properties of conducting electrical materials.	R/U	1	
	b)	Classify the magnetic materials.	R	2	
	c)	List the names of soft magnetic materials.	R/U	2	
	d)	Predict two applications of mica as an insulating material	A	3	
	e)	State the raw materials used for porcelain.	A/U	3	
	f)	State the applications of nickel & tin (Each 02).	A	1	
Q.2		Attempt any **FOUR:** any two			**16**
	a)	Discuss the properties & use of tungsten used in electrical engineering.	A/U	1	
	b)	Give the comparison of copper & Aluminum. Carry four)	U	1	
	c)	Discuss the thermal classification of insulating materials.	A/U	2	
	d)	Discuss the types of paramagnetic of magnetic materials. Explain any two process in details & give its applications	R/U	2	
	e)	Give the properties of soft magnetic material & hard magnetic material (Any 04 for each).	A/U	3	
	f)	Discuss the breakdown in insulating gaseous & liquid dielectric.	A/U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Describe the impurities in ferromagnetic materials.	U	2	
	b)	State the effect of various factors that affect insulation resistance in insulating materials.	A/U	3	
	c)	Describe the significance of hysteresis loop of a magnetic materials	R/U	2	
	d)	Give the mechanical properties on the basis of viscosity, porosity, solubility in insulating materials	A/U	3	
	e)	Discuss the term specific resistance & temperature coefficient of resistance of conducting materials.	U/R	1	
	f)	State the electrical properties of conducting material brass & bronze.	A/U	1	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER - 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - III **PROGRAM: ELECTRICAL ENGINEERING**
COURSE CODE: - **EEG305**
COURSE NAME: - **ELECTRICAL ENGINEERING MATERIAL**
MAX. MARKS: 40 **TIME: 02 Hrs** **DATE: 01/12/2023**

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		R/ U/ A	Co-EEG305	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List the properties of conducting electrical materials.	R/U	1	
	b)	Classify the magnetic materials.	R	2	
	c)	List the names of soft magnetic materials.	R/U	2	
	d)	Predict two applications of mica as an insulating material	A	3	
	e)	State the raw materials used for porcelain.	A/U	3	
	f)	State the applications of nickel & tin (Each ~~02~~ 01)	A	1	
Q.2		Attempt any **FOUR:** any two			**16**
	a)	Discuss the properties & use of tungsten used in electrical engineering.	A/U	1	
	b)	Give the comparison of copper & Aluminum.	U	1	
	c)	Discuss the thermal classification of insulating materials.	A/U	2	
	d)	Explain cryo process in detail and give its applications Discuss the types of paramagnetic of magnetic materials	R/U	2	
	e)	Give the properties of soft magnetic material & hard magnetic material (Any 04 for each).	A/U	3	
	f)	Discuss the breakdown in insulating gaseous & liquid dielectric.	A/U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Describe the impurities in ferromagnetic materials.	U	2	
	b)	State the effect of various factors that affect insulation resistance in insulating materials.	A/U	3	
	c)	Describe the significance of hysteresis loop of a magnetic materials	R/U	2	
	d)	Give the mechanical properties on the basis of viscosity, porosity, solubility in insulating materials	A/U	3	
	e)	Discuss the term specific resistance & temperature coefficient of resistance of conducting materials.	U/R	1	
	f)	State the electrical properties of conducting material brass & bronze.	A/U	1	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER- 2022

EXAM SEAT NO. | | | | | | |

LEVEL: - IV PROGRAM :Electrical Engineering.

COURSE CODE: - EEG402

COURSE NAME: - Switchgear & Protection.

MAX. MARKS: **80** TIME: **03 HRS** DATE: 02 /12/ 2023

Instructions :-

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

QN	S QN	SECTION -I	R/ U/ A	CO	Marks
Q.1		Attempt any **FOUR** of the following.			**08**
	a)	State the classification of substations according to constructional features.	R	EEG402.1	02
	b)	State four advantages of duplicate bus bar arrangements in power systems.	R	EEG402.1	02
	c)	State the need of protective relaying. (Two points).	R	EEG402.2	02
	d)	Describe application of CT in protective system.	R	EEG402.2	02
	e)	State two advantages and disadvantages of Microprocessor based relays.	R	EEG402.2	02
	f)	Define the "Abnormal Condition" of power system.	R	EEG402.3	02
Q.2		Attempt any **FOUR** of the following.			**16**
	a)	State four substation equipments with their function.	A	EEG402.1	04
	b)	Draw a neat labeled diagram of: (i) Generator reactor, (ii) Feeder reactor, (iii) Tie-bar type bus bar reactor and (iv) Ring type bus bar reactor.	U	EEG402.1	04
	c)	Explain the working of Vacuum circuit breaker with neat diagram.	A	EEG402.3	04
	d)	With neat sketch explain high resistance arc extinction method in ACB.	U	EEG402.3	04
	e)	Compare HRC fuse with Semi-enclosed fuse on four points.	A	EEG402.3	04
	f)	Define the following terms related to Circuit breakers: (i) Arc voltage, (ii) Recovery voltage, (iii) Restriking voltage and (iv) RRRV.	R	EEG402.3	04
Q.3		Attempt any **FOUR** of the following.			**16**
	a)	Explain the operation of static overcurrent relay with the help of block diagram.	A	EEG402.2	04
	b)	Define the following terms related to protective relays: (i) Sensitivity, (ii) Selectivity, (iii) Reliability & (iv) Speed.	R	EEG402.2	04
	c)	With neat diagram explain the working of directional relay.	U	EEG402.2	04
	d)	With neat sketch explain the operation of attracted armature type electromagnetic relay.	U	EEG402.2	04
	e)	State three advantages, three disadvantages and application of translay relay.	R	EEG402.2	04
	f)	Explain the importance of time multiplier setting and plug setting multiplier in overcurrent relay.	A	EEG402.2	04

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL: - FOURTH PROGRAM: ELETRICAL ENGINEERING

COURSE CODE: - EEG-402

COURSE NAME: - SWITCHGEAR & PROTECTION

MAX. MARKS: 80 TIME: **03 Hrs** DATE: 02/12/2023

QN	SQN	SECTION –II	R/U/A	Co EEG402	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State two effects of lightening strokes on transmission line.	R	CO4	
	b)	State various occurring faults in an Alternator.	R	CO5	
	c)	State function of ~~breather~~ Buchholz relay in transformer.	R	CO5	
	d)	~~Discuss 'Internal faults' in transformer.~~ State any two internal faults in transformer	R	CO5	
	e)	State types of protection scheme used for transmission line.	R	CO6	
	f)	State 'Time graded over current' protections typically used for.	R	CO6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with construction & principle of operation of rod type lightening arrester.	U	CO4	
	b)	Explain over voltage on transmission line due to lightening phenomena.	U	CO6	
	c)	Explain with suitable circuit diagram differential over current protection in transformer.	A	CO5	
	d)	Explain reasons & effect of overheating of stator in an Alternator.	A	CO5	
	e)	Explain with suitable labelled circuit diagram of percentage differential protection scheme for transformer protection.	U	CO5	
	f)	Explain with labelled sketch scheme for 'Radial feeder' protection.	U	CO6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain with reasons over voltage faults in transmission lines.	U	CO4	
	b)	Describe schemes for carrier current protection of long transmission line.	U	CO4	
	c)	State various types of faults & its protection occurring in stator, rotor of an Alternator	U	CO5	
	d)	Draw neat labelled sketch of ~~conservator with breather~~ & explain its use in transformer protection. Buchholz relay	U	CO5	
	e)	Elaborate briefly differential protection schemes for the bus bars.	U	CO6	
	f)	Explain with **suitable** circuit diagram ~~metal leakage current~~ protection in bus bar system. High impedence relay	U	CO6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER- 2022

EXAM SEAT NO. | | | | | | |

LEVEL: - IV PROGRAM :Electrical Engineering.

COURSE CODE: - EEG402

COURSE NAME: - Switchgear & Protection.

MAX. MARKS: **80** TIME: **03 HRS** DATE: 02 /12/ 2023

Instructions :-

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

QN	S QN	SECTION -I	R/ U/ A	CO	Marks
Q.1		Attempt any **FOUR** of the following.			**08**
	a)	State the classification of substations according to constructional features.	R	EEG402.1	02
	b)	State four advantages of duplicate bus bar arrangements in power systems.	R	EEG402.1	02
	c)	State the need of protective relaying. (Two points).	R	EEG402.2	02
	d)	Describe application of CT in protective system.	R	EEG402.2	02
	e)	State two advantages and disadvantages of Microprocessor based relays.	R	EEG402.2	02
	f)	Define the "Abnormal Condition" of power system.	R	EEG402.3	02
Q.2		Attempt any **FOUR** of the following.			**16**
	a)	State four substation equipments with their function.	A	EEG402.1	04
	b)	Draw a neat labeled diagram of: (i) Generator reactor, (ii) Feeder reactor, (iii) Tie-bar type bus bar reactor and (iv) Ring type bus bar reactor.	U	EEG402.1	04
	c)	Explain the working of Vacuum circuit breaker with neat diagram.	A	EEG402.3	04
	d)	With neat sketch explain high resistance arc extinction method in ACB.	U	EEG402.3	04
	e)	Compare HRC fuse with Semi-enclosed fuse on four points.	A	EEG402.3	04
	f)	Define the following terms related to Circuit breakers: (i) Arc voltage, (ii) Recovery voltage, (iii) Restriking voltage and (iv) RRRV.	R	EEG402.3	04
Q.3		Attempt any **FOUR** of the following.			**16**
	a)	Explain the operation of static overcurrent relay with the help of block diagram.	A	EEG402.2	04
	b)	Define the following terms related to protective relays: (i) Sensitivity, (ii) Selectivity, (iii) Reliability & (iv) Speed.	R	EEG402.2	04
	c)	With neat diagram explain the working of directional relay.	U	EEG402.2	04
	d)	With neat sketch explain the operation of attracted armature type electromagnetic relay.	U	EEG402.2	04
	e)	State three advantages, three disadvantages and application of translay relay.	R	EEG402.2	04
	f)	Explain the importance of time multiplier setting and plug setting multiplier in overcurrent relay.	A	EEG402.2	04

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL: - FOURTH PROGRAM: ELETRICAL ENGINEERING

COURSE CODE: - EEG-402

COURSE NAME: - SWITCHGEAR & PROTECTION

MAX. MARKS: 80 TIME: **03 Hrs** DATE: 02/12/2023

QN	SQN	SECTION –II	R/U/A	Co EEG402	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State two effects of lightening strokes on transmission line.	R	CO4	
	b)	State various occurring faults in an Alternator.	R	CO5	
	c)	State function of ~~breather~~ buchholz relay in transformer.	R	CO5	
	d)	~~Discuss~~ State any two 'Internal faults' in transformer.	R	CO5	
	e)	State types of protection scheme used for transmission line.	R	CO6	
	f)	State 'Time graded over current' protections typically used for.	R	CO6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with construction & principle of operation of rod type lightening arrester.	U	CO4	
	b)	Explain over voltage on transmission line due to lightening phenomena.	U	CO6	
	c)	Explain with suitable circuit diagram differential over current protection in transformer.	A	CO5	
	d)	Explain reasons & effect of overheating of stator in an Alternator.	A	CO5	
	e)	Explain with suitable labelled circuit diagram of percentage differential protection scheme for transformer protection.	U	CO5	
	f)	Explain with labelled sketch scheme for 'Radial feeder' protection.	U	CO6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Explain with reasons over voltage faults in transmission lines.	U	CO4	
	b)	Describe schemes for carrier current protection of long transmission line.	U	CO4	
	c)	State various types of faults & its protection occurring in stator, rotor of an Alternator	U	CO5	
	d)	Draw neat labelled sketch of ~~conservator with breather~~ buchholz relay & explain its use in transformer protection.	U	CO5	
	e)	Elaborate briefly differential protection schemes for the bus bars.	U	CO6	
	f)	Explain with **suitable** circuit diagram ~~metal leakage current~~ high impedence relay protection in bus bar system.	U	CO6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM Winter -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **ELECTRICAL ENGINNERING**

COURSE CODE: **EEG 307** COURSE NAME: **D. C. MACHINE & TRANSFORMER**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **01/12 /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)	State function of yoke & commutator of DC motor.	R	1	
	b)	State various methods to control the speed of DC motor.	R	2	
	c)	State the reason, why transformers core is laminated.	A	3	
	d)	List the various losses in DC motor.	U	2	
	e)	State emf equation of generator (only formula)	R	1	
	f)	Name the armature winding having two parallel paths. State it's use.	R	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw the speed torque characteristics of DC series motor and explain in detail.	U	2	
	b)	Explain D.C. shunt motor with heat diagram.	R	2	
	c)	Draw a phasor diagram of transformer at no load.	R	3	
	d)	A 4 pole 1250 RPM DC generator has 72 slots and 12 conductors per slot on it's armature. The flux per pole is 0.02 wb. Calculate the emf induced when the armature is i) LAP wound ii) Wave wound	A	1	
	e)	Draw and explain working of single phase transformer.	U	3	
	f)	State the principle of operation of DC generator.	R	1	
Q.3		Attempt any **FOUR**			**(16)**
	a)	The core of 100KVA, 11000/550V 50Hz single phase core type transformer has a cross section of 20cm X 20cm. Find i) Primary & secondary turns. ii) EMF per turn if the maximum core density is 1.3 Tesla.	A	3	
	b)	State and explain significance of back emf.	A	2	
	c)	List any four applications of DC shunt motor.	A	2	
	d)	A LAP wound DC shunt generator having 80 slots with 10 conductors per slot generates on EMF of 400V on no load when running at a speed of 1000 rpm: Determine the flux per pole.	A	1	
	e)	A 3300/250V, 50Hz single phase transformer is built on a core having an effective cross sectional area of 125 cm^2 and 70 turns on the low voltage winding calculate: i) The value of the maximum flux density ii) Number of turns on a primary side.	A	3	
	f)	Derive expression of emf equation of single phase transformer.	U	3	

P.T.O.

QN	SQN	QUESTION TEXT	RUA	CO EEG 307	Marks
Q.4		**Attempt any FOUR**			**08**
	a)	Define all day efficiency of single phase transformer with it's formulae.	R	4	
	b)	State any two application of three phase transformer..	R	6	
	c)	Identify the following vector groups i) Dd5 ii) Dy2	R	6	
	d)	State any two need of parallel operation of single phase transformer.	U	5	
	e)	Define voltage ratio. Also write formulae.	R	6	
	f)	If transformer 1 & transformer 2 are connected in parallel, having same turn ratio, same rating, same per unit impedance. Then state the effect on load sharing.	U	5	
Q.5		**Attempt any FOUR**			**16**
	a)	State and explain method used for determination of iron loss of single phase transformer.	U	4	
	b)	Compare power transformer and distribution transformer with following parameters i) Losses ii) Application iii) Connection iv) Rating in MVA.	A	6	
	c)	Draw an approximate equivalent circuit diagram of single phase transformer & explain in detail.	A	4	
	d)	Find all day efficiency of a transformer rated at 25KVA. If it's maximum efficiency of 98% occurs at 20KVA unity P.F. with following load cycle during the day. 12hrs : 15 KW, 0.707 P.F. lag 06 hrs: 20 KW, 0.8 P.F. lag 06 hrs: 5KW, 0.9 P.F. lag	A	4	
	e)	Draw & Explain delta-star connection of three phase transformer.	U	6	
	f)	If two 2000KVA transformer are connected in parallel. Both have same per unit impedance, same turn ratio, connected to a common 3000KVA load. Determine load on transformer1 & transformer2. Also give comment on it.	A	5	
Q.6		**Attempt any FOUR**			**16**
	a)	State principle of isolation transformer. Also state advantages & disadvantages of it.	U	4	
	b)	Draw & Explain single phase autotransformer with it's advantages & disadvantages.	U	4	
	c)	Two single phase transformer with equal turns have impedance of (0.4+ j3) ohm. & (0.5+j8) ohm w.r.t. secondary. If they operate in parallel, determine how they will share a total load of 150KW at p.f. 0.85 lagging.	A	5	
	d)	Draw & explain star-star connection of three phase transformer.	U	6	
	e)	Draw & explain open circuit test of single phase transformer.	U	4	
	f)	In open circuit test of single phase transformer, the following test data was obtained. Primary voltage = 250V, Secondary voltage = 125V, Primary current = 0.5A & Power input = 50watt. Draw equivalent circuit of transformer under open circuit condition & calculate circuit component values of R0 & X0.	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM Winter -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **ELECTRICAL ENGINNERING**

COURSE CODE: **EEG 307** COURSE NAME: **D. C. MACHINE & TRANSFORMER**

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **01/12 /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)	State function of yoke & commutator of DC motor.	R	1	
	b)	State various methods to control the speed of DC motor.	R	2	
	c)	State the reason, why transformers core is laminated.	A	3	
	d)	List the various losses in DC motor.	U	2	
	e)	State emf equation of generator (only formula)	R	1	
	f)	Name the armature winding having two parallel paths. State it's use.	R	2	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Draw the speed torque characteristics of DC series motor and explain in detail.	U	2	
	b)	Explain D.C. shunt motor with heat diagram.	R	2	
	c)	Draw a phasor diagram of transformer at no load.	R	3	
	d)	A 4 pole 1250 RPM DC generator has 72 slots and 12 conductors per slot on it's armature. The flux per pole is 0.02 wb. Calculate the emf induced when the armature is i) LAP wound ii) Wave wound	A	1	
	e)	Draw and explain working of single phase transformer.	U	3	
	f)	State the principle of operation of DC generator.	R	1	
Q.3		Attempt any **FOUR**			**(16)**
	a)	The core of 100KVA, 11000/550V 50Hz single phase core type transformer has a cross section of 20cm X 20cm. Find i) Primary & secondary turns. ii) EMF per turn if the maximum core density is 1.3 Tesla.	A	3	
	b)	State and explain significance of back emf.	A	2	
	c)	List any four applications of DC shunt motor.	A	2	
	d)	A LAP wound DC shunt generator having 80 slots with 10 conductors per slot generates on EMF of 400V on no load when running at a speed of 1000 rpm: Determine the flux per pole.	A	1	
	e)	A 3300/250V, 50Hz single phase transformer is built on a core having an effective cross sectional area of 125 cm^2 and 70 turns on the low voltage winding calculate: i) The value of the maximum flux density ii) Number of turns on a primary side.	A	3	
	f)	Derive expression of emf equation of single phase transformer.	U	3	

P.T.O.

QN	SQN	QUESTION TEXT	RUA	CO EEG 307	Marks
Q.4		**Attempt any FOUR**			**08**
	a)	Define all day efficiency of single phase transformer with it's formulae.	R	4	
	b)	State any two application of three phase transformer..	R	6	
	c)	Identify the following vector groups i) Dd5 ii) Dy2	R	6	
	d)	State any two need of parallel operation of single phase transformer.	U	5	
	e)	Define voltage ratio. Also write formulae.	R	6	
	f)	If transformer 1 & transformer 2 are connected in parallel, having same turn ratio, same rating, same per unit impedance. Then state the effect on load sharing.	U	5	
Q.5		**Attempt any FOUR**			**16**
	a)	State and explain method used for determination of iron loss of single phase transformer.	U	4	
	b)	Compare power transformer and distribution transformer with following parameters i) Losses ii) Application iii) Connection iv) Rating in MVA.	A	6	
	c)	Draw an approximate equivalent circuit diagram of single phase transformer & explain in detail.	A	4	
	d)	Find all day efficiency of a transformer rated at 25KVA. If it's maximum efficiency of 98% occurs at 20KVA unity P.F. with following load cycle during the day. 12hrs : 15 KW, 0.707 P.F. lag 06 hrs: 20 KW, 0.8 P.F. lag 06 hrs: 5KW, 0.9 P.F. lag	A	4	
	e)	Draw & Explain delta-star connection of three phase transformer.	U	6	
	f)	If two 2000KVA transformer are connected in parallel. Both have same per unit impedance, same turn ratio, connected to a common 3000KVA load. Determine load on transformer1 & transformer2. Also give comment on it.	A	5	
Q.6		**Attempt any FOUR**			**16**
	a)	State principle of isolation transformer. Also state advantages & disadvantages of it.	U	4	
	b)	Draw & Explain single phase autotransformer with it's advantages & disadvantages.	U	4	
	c)	Two single phase transformer with equal turns have impedance of (0.4+ j3) ohm. & (0.5+j8) ohm w.r.t. secondary. If they operate in parallel, determine how they will share a total load of 150KW at p.f. 0.85 lagging.	A	5	
	d)	Draw & explain star-star connection of three phase transformer.	U	6	
	e)	Draw & explain open circuit test of single phase transformer.	U	4	
	f)	In open circuit test of single phase transformer, the following test data was obtained. Primary voltage = 250V, Secondary voltage = 125V, Primary current = 0.5A & Power input = 50watt. Draw equivalent circuit of transformer under open circuit condition & calculate circuit component values of R0 & X0.	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : Diploma in Electrical Engineering

COURSE CODE :- EEG510 / EEF508

COURSE NAME :- Non- Conventional Power Generation

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

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	S Q	SECTION -I	R/ U/ A	Co	Marks
Q.1		**Attempt any FOUR:**			**08**
	a)	State any two disadvantages of solar energy.	R	I	02
	b)	Name the main parts of solar power plant.	R	I	02
	c)	How wind power plants are classified?.	R	2	02
	d)	Define :- i) Lift force ii) Drag force	R	2	02
	e)	List different types of concentrating type solar collectors.	R	I	02
	f)	Define Zenith angle.	R	I	02
Q.2		Attempt any **FOUR:**			**16**
	a)	With neat sketch discuss the photo voltaic cell construction.	R	I	04
	b)	Draw a neat layout of geared wind power plant and label it.	R	2	04
	c)	Draw a neat labelled diagram of solar pond and explain its working.	U	I	04
	d)	Draw a neat diagram of WECS and state function of each parts / components.	U	2	04
	e)	Explain solar photo voltaic electric conversion with neat diagram.	A	I	04
	f)	State and explain safely systems and environmental aspects of Wind mill.	A	2	04
Q.3		Attempt any FOUR:			**16**
	a)	With a neat diagram explain solar power tower.	R	I	04
	b)	State the various problems occurred during operation of large wind power generators.	R	2	04
	c)	Why concentrating collectors are used in solar power plant.	U	I	04
	d)	Explain the factors Governing selection of site for wind power plant.	U	2	04
	e)	Explain space heating and cooling with suitable diagram.	A	I	**04**
	f)	Compare Horizontal axis and vertical axis wind machine .	A	2	04

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : -V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG510 / EEF508

COURSE NAME :- NON CONVENTIONAL POWER GENERATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02 /12/2023

QN	SQN	SECTION –II	R/U/A	Co EEG510	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the material used for power generation form biomass.	R	CO3	
	b)	Write basic principle of ocean thermal energy conversion.	U	CO4	
	c)	Give any two sites of tidal power plant in India.	R	CO4	
	d)	State any two energy sources of geothermal.	U	CO5	
	e)	State the methods used for energy conversion from biomass.	U	CO3	
	f)	Classify Small Hydro power station.	R	CO5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw a neat labelled diagram of fuel cell and explain its working.	U	CO5	
	b)	Draw and explain Deenbandhu Digestor biogas plant.	A	CO3	
	c)	State the types of Magneto-Hydro Dynamic (MHD) and draw any one type of MHD power generation plant.	U	CO5	
	d)	State advantages and limitation of tidal power generation.	A	CO4	
	e)	Explain double basin effects with neat diagram.	U	CO4	
	f)	State the site requirement for biogas power generation.	U	CO3	
Q.6		Attempt any **FOUR:**			**16**
	a)	State advantages and limitation of SHP.	A	CO5	
	b)	Draw neat labelled diagram of dry steam plant and explain its working.	A	CO5	
	c)	Explain KVIC digester biogas plant with neat labelled diagram.	U	CO3	
	d)	State the types of ocean thermal energy conversion system and explain one in detail.	U	CO4	
	e)	State advantages and limitations of MHD power generation	A	CO5	
	f)	Explain energy conversion from biomass combustion with suitable diagram.	A	CO3	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - FIFTH PROGRAM : Diploma in Electrical Engineering

COURSE CODE :- EEG510 / EEF508

COURSE NAME :- Non- Conventional Power Generation

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-02/12/2023

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	S Q	SECTION -I	R/ U/ A	Co	Marks
Q.1		**Attempt any FOUR:**			**08**
	a)	State any two disadvantages of solar energy.	R	1	02
	b)	Name the main parts of solar power plant.	R	1	02
	c)	How wind power plants are classified?.	R	2	02
	d)	Define :- i) Lift force ii) Drag force	R	2	02
	e)	List different types of concentrating type solar collectors.	R	1	02
	f)	Define Zenith angle.	R	1	02
Q.2		Attempt any **FOUR:**			**16**
	a)	With neat sketch discuss the photo voltaic cell construction.	R	1	04
	b)	Draw a neat layout of geared wind power plant and label it.	R	2	04
	c)	Draw a neat labelled diagram of solar pond and explain its working.	U	1	04
	d)	Draw a neat diagram of WECS and state function of each parts / components.	U	2	04
	e)	Explain solar photo voltaic electric conversion with neat diagram.	A	1	04
	f)	State and explain safely systems and environmental aspects of Wind mill.	A	2	04
Q.3		Attempt any FOUR:			**16**
	a)	With a neat diagram explain solar power tower.	R	1	04
	b)	State the various problems occurred during operation of large wind power generators.	R	2	04
	c)	Why concentrating collectors are used in solar power plant.	U	1	04
	d)	Explain the factors Governing selection of site for wind power plant.	U	2	04
	e)	Explain space heating and cooling with suitable diagram.	A	1	**04**
	f)	Compare Horizontal axis and vertical axis wind machine .	A	2	04

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : -V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG510 / EEF508

COURSE NAME :- NON CONVENTIONAL POWER GENERATION

MAX. MARKS : **80** TIME : **03 Hrs** DATE :02/12/2023

QN	SQN	**SECTION –II**	R/U/A	Co **EEG510**	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the material used for power generation form biomass.	R	CO3	
	b)	Write basic principle of ocean thermal energy conversion.	U	CO4	
	c)	Give any two sites of tidal power plant in India.	R	CO4	
	d)	State any two energy sources of geothermal.	U	CO5	
	e)	State the methods used for energy conversion from biomass.	U	CO3	
	f)	Classify Small Hydro power station.	R	CO5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw a neat labelled diagram of fuel cell and explain its working.	U	CO5	
	b)	Draw and explain Deenbandhu Digestor biogas plant.	A	CO3	
	c)	State the types of Magneto-Hydro Dynamic (MHD) and draw any one type of MHD power generation plant.	U	CO5	
	d)	State advantages and limitation of tidal power generation.	A	CO4	
	e)	Explain double basin effects with neat diagram.	U	CO4	
	f)	State the site requirement for biogas power generation.	U	CO3	
Q.6		Attempt any **FOUR:**			**16**
	a)	State advantages and limitation of SHP.	A	CO5	
	b)	Draw neat labelled diagram of dry steam plant and explain its working.	A	CO5	
	c)	Explain KVIC digester biogas plant with neat labelled diagram.	U	CO3	
	d)	State the types of ocean thermal energy conversion system and explain one in detail.	U	CO4	
	e)	State advantages and limitations of MHD power generation	A	CO5	
	f)	Explain energy conversion from biomass combustion with suitable diagram.	A	CO3	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM Winter -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **ELECTRICAL ENGINNERING**

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

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **04/12 /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.
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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 306	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Enlist the 'Nuclear Fuels'.	U	3	
	b)	What is meaning of load duration curve.	R	2	
	c)	Explain the following concept i) Connected load ii) Maximum demand.	R	2	
	d)	Describe the term Nuclear shielding in Nuclear power plant.	A	3	
	e)	Define the term 'Cold reserve' and 'Hot reserve'.	U	2	
	f)	Enlist the environmental issues of electrical power generation.	U	1	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Explain how load curves helps in the selection of size and number of generating units.	A	2	
	b)	Explain with layout the working of typical thermal power plant.	R	3	
	c)	Give four properties of good moderator for nuclear reaction control.	A	3	
	d)	State the function of each of the following elements in hydroelectric power plant. i) Dam ii) Surge tank iii) Penstock iv) Tail race.	R	3	
	e)	Explain working of pumped storage hydroelectric power plant.	U	3	
	f)	Give the classification of various sources of energy in terms of their use in power generation.	R	1	
Q.3		Attempt any **FOUR**			**(16)**
	a)	State any four advantages and four disadvantages of hydroelectric power plant.	A	3	
	b)	Draw schematic arrangement of hydroelectric power station and describe energy conversion process of hydro power plant.	R	3	
	c)	Define the terms i) Load factor ii) Diversity factor iii) Demand factor iv) Plant capacity factor	U	2	
	d)	List out any four electrical equipment used in hydroelectric power plant with their function.	R	3	
	e)	Explain the function of different parts of typical nuclear power plant with neat sketch.	A	3	
	f)	What are the criteria for selection of thermal power plant.	R	3	

P.T.O.

QN	SQN	QUESTION TEXT	RUA	CO EEG 306	Marks
Q.4		**Attempt any FOUR**			**08**
	a)	Draw the V-I characteristics of Solar Cell. Also define the efficiency of solar PV cell.	U	4	
	b)	State four disadvantages associated with the wind turbine generators.	A	4	
	c)	List four types of Bio-gas plants.	R	5	
	d)	State four factors to be considered in selecting the site for wind power plant.	U	4	
	e)	List two locations of geothermal energy resources in India.	R	6	
	f)	State four applications of Bio-gas energy.	R	5	
Q.5		**Attempt any FOUR**			**16**
	a)	Explain in brief the working of the photovoltaic cell with neat diagram.	U	4	
	b)	State eight applications of Solar- energy.	R	4	
	c)	Describe the operation of single basin arrangement for tidal power generation with neat diagram.	U	5	
	d)	State four advantages and four disadvantages of Bio- mass energy.	R	5	
	e)	Explain in brief the operation of Geothermal energy power plant with neat block diagram.	A	6	
	f)	State four advantages and four applications of magneto- hydro-dynamic power generation system.	R	6	
Q.6		**Attempt any TWO**			**16**
	a)	With neat labelled diagram explain the construction and working of vertical axis wind turbine.	U	4	
	b)	Explain with neat sketch the construction and operation of i) Open cycle ocean thermal energy convertion plant and ii) Closed cycle ocean thermal energy convertion plant.	A	5	
	c)	With neat labelled sketch explain construction and operation of 'Fuel cell'.	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

ODD TERM END EXAM Winter -2023

EXAM SEAT NO. | | | | | | |

LEVEL: **THIRD** PROGRAM: **ELECTRICAL ENGINNERING**

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

MAX. MARKS: **80** TIME: **3 HRS.** DATE: **04/12 /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 306	Marks
Q.1		Attempt any **FOUR**			**(08)**
	a)	Enlist the 'Nuclear Fuels'.	U	3	
	b)	What is meaning of load duration curve.	R	2	
	c)	Explain the following concept i) Connected load ii) Maximum demand.	R	2	
	d)	Describe the term Nuclear shielding in Nuclear power plant.	A	3	
	e)	Define the term 'Cold reserve' and 'Hot reserve'.	U	2	
	f)	Enlist the environmental issues of electrical power generation.	U	1	
Q.2		Attempt any **FOUR**			**(16)**
	a)	Explain how load curves helps in the selection of size and number of generating units.	A	2	
	b)	Explain with layout the working of typical thermal power plant.	R	3	
	c)	Give four properties of good moderator for nuclear reaction control.	A	3	
	d)	State the function of each of the following elements in hydroelectric power plant. i) Dam ii) Surge tank iii) Penstock iv) Tail race.	R	3	
	e)	Explain working of pumped storage hydroelectric power plant.	U	3	
	f)	Give the classification of various sources of energy in terms of their use in power generation.	R	1	
Q.3		Attempt any **FOUR**			**(16)**
	a)	State any four advantages and four disadvantages of hydroelectric power plant.	A	3	
	b)	Draw schematic arrangement of hydroelectric power station and describe energy conversion process of hydro power plant.	R	3	
	c)	Define the terms i) Load factor ii) Diversity factor iii) Demand factor iv) Plant capacity factor	U	2	
	d)	List out any four electrical equipment used in hydroelectric power plant with their function.	R	3	
	e)	Explain the function of different parts of typical nuclear power plant with neat sketch.	A	3	
	f)	What are the criteria for selection of thermal power plant.	R	3	

P.T.O.

QN	SQN	QUESTION TEXT	RUA	CO EEG 306	Marks
Q.4		**Attempt any FOUR**			**08**
	a)	Draw the V-I characteristics of Solar Cell. Also define the efficiency of solar PV cell.	U	4	
	b)	State four disadvantages associated with the wind turbine generators.	A	4	
	c)	List four types of Bio-gas plants.	R	5	
	d)	State four factors to be considered in selecting the site for wind power plant.	U	4	
	e)	List two locations of geothermal energy resources in India.	R	6	
	f)	State four applications of Bio-gas energy.	R	5	
Q.5		**Attempt any FOUR**			**16**
	a)	Explain in brief the working of the photovoltaic cell with neat diagram.	U	4	
	b)	State eight applications of Solar- energy.	R	4	
	c)	Describe the operation of single basin arrangement for tidal power generation with neat diagram.	U	5	
	d)	State four advantages and four disadvantages of Bio- mass energy.	R	5	
	e)	Explain in brief the operation of Geothermal energy power plant with neat block diagram.	A	6	
	f)	State four advantages and four applications of magneto- hydro-dynamic power generation system.	R	6	
Q.6		**Attempt any TWO**			**16**
	a)	With neat labelled diagram explain the construction and working of vertical axis wind turbine.	U	4	
	b)	Explain with neat sketch the construction and operation of i) Open cycle ocean thermal energy convertion plant and ii) Closed cycle ocean thermal energy convertion plant.	A	5	
	c)	With neat labelled sketch explain construction and operation of 'Fuel cell'.	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 23

EXAM SEAT NO. | | | | | | |

LEVEL : - 4 PROGRAM : Electrical Engineering

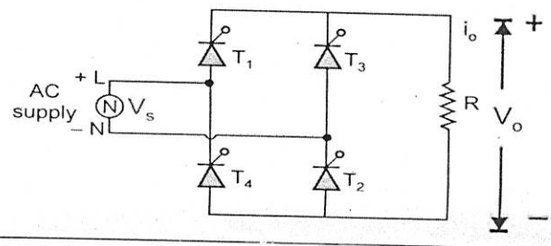
COURSE CODE :- EEG 405 / EEF406

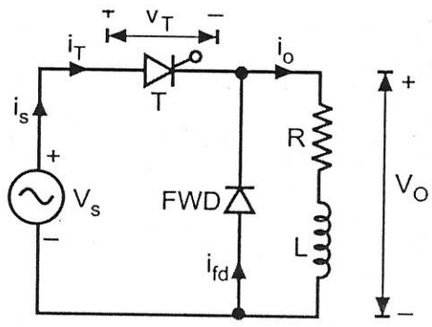
COURSE NAME :- Power Electronics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-04/12/2023

Instruction :-

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

QN	SQN	SECTION –I	R/U/A	CO	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw a symbol of DIAC and TRIAC	R	EEG 405-1	
	b)	List different turn on methods of SCR	R	EEG 405-1	
	c)	Give classification of chopper.	U	EEG 405-3	
	d)	Define meaning of control rectifier.	R	EEG 405-2	
	e)	Draw a circuit diagram of single phase half wave control rectifier with R-L load.	R	EEG 405-2	
	f)	Explain concept of chopper.	U	EEG 405-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare natural and forced commutation. (any 4 points.)	U	EEG 405-1	
	b)	Draw a diagram and waveform of class B commutation.	R	EEG 405-1	
	c)	Draw a diagram and waveform of single phase half wave control rectifier with R load and explain its working.	U	EEG 405-2	
	d)	Identify name of given circuit diagram and explain its operation. 	A	EEG 405-2	
	e)	Draw a circuit diagram of John's chopper and morgan's chopper	R	EEG 405-3	
	f)	Explain with diagram step down chopper.	U	EEG 405-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain UJT firing circuit with diagram and waveform.	U	EEG 405-1	
	b)	Draw and explain V-I characteristic of SCR.	U	EEG 405-1	
	c)	Explain with diagram three phase half converter with R load.	U	EEG 405-2	
	d)	Identify given circuit diagram and explain circuit operation.	A	EEG 405-2	

		 (a)			
	e)	Draw a circuit diagram and waveform of single phase midpoint converter with R load.	R	EEG 405-3	
	f)	Compare step up chopper and step down chopper.(any 4 points)	U	EEG 405-3	

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Give the classification of inverter.	R	4	
	b)	Draw the circuit diagram of three phase bridge inverter.	U	4	
	c)	Explain voltage control in single phase inverter.	U	4	
	d)	Define the term cycloconverter.	R	5	
	e)	Define the terms i) Back up time ii) Transfer time for UPS.	R	6	
	f)	State the need of SMPS.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain working of basic series inverter.	U	4	
	b)	With the help of circuit diagram and waveform explain single pulse width modulation in inverter.	U	4	
	c)	Describe single phase to single phase cycloconverter with diagram.	u	5	
	d)	Draw the circuit diagram and waveform of single phase to bridge cycloconverter.	U	5	
	e)	Describe working of DC series motor drive with diagram.	U	6	
	f)	Draw a battery charger by using SCR explain its working.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain working of parallel inverter.	U	4	
	b)	Draw the circuit diagram and waveform of McMurray half bridge inverter.	U	4	
	c)	Describe three phase to three phase cycloconverter with diagram.	A	5	
	d)	Draw and explain block diagram of online UPS.	U	6	
	e)	With the help of circuit diagram explain working of single phase half controlled drive for DC motor.	U	6	
	f)	Describe emergency light system by using SCR with diagram.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 23

EXAM SEAT NO. | | | | | | |

LEVEL : - 4 PROGRAM : Electrical Engineering

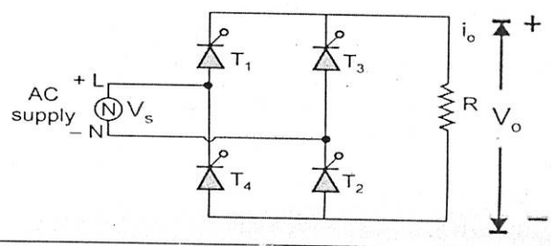
COURSE CODE :- EEG 405 / EEF406

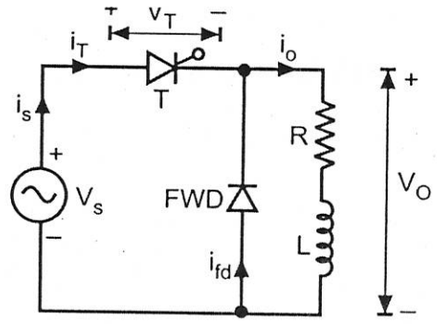
COURSE NAME :- Power Electronics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-04/12/2023

Instruction :-

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

QN	SQN	SECTION –I	R/U/A	CO	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Draw a symbol of DIAC and TRIAC	R	EEG 405-1	
	b)	List different turn on methods of SCR	R	EEG 405-1	
	c)	Give classification of chopper.	U	EEG 405-3	
	d)	Define meaning of control rectifier.	R	EEG 405-2	
	e)	Draw a circuit diagram of single phase half wave control rectifier with R-L load.	R	EEG 405-2	
	f)	Explain concept of chopper.	U	EEG 405-3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare natural and forced commutation. (any 4 points.)	U	EEG 405-1	
	b)	Draw a diagram and waveform of class B commutation.	R	EEG 405-1	
	c)	Draw a diagram and waveform of single phase half wave control rectifier with R load and explain its working.	U	EEG 405-2	
	d)	Identify name of given circuit diagram and explain its operation. 	A	EEG 405-2	
	e)	Draw a circuit diagram of John's chopper and morgan's chopper	R	EEG 405-3	
	f)	Explain with diagram step down chopper.	U	EEG 405-3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain UJT firing circuit with diagram and waveform.	U	EEG 405-1	
	b)	Draw and explain V-I characteristic of SCR.	U	EEG 405-1	
	c)	Explain with diagram three phase half converter with R load.	U	EEG 405-2	
	d)	Identify given circuit diagram and explain circuit operation.	A	EEG 405-2	

		 (a)			
	e)	Draw a circuit diagram and waveform of single phase midpoint converter with R load.	R	EEG 405-3	
	f)	Compare step up chopper and step down chopper.(any 4 points)	U	EEG 405-3	

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Give the classification of inverter.	R	4	
	b)	Draw the circuit diagram of three phase bridge inverter.	U	4	
	c)	Explain voltage control in single phase inverter.	U	4	
	d)	Define the term cycloconverter.	R	5	
	e)	Define the terms i) Back up time ii) Transfer time for UPS.	R	6	
	f)	State the need of SMPS.	R	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain working of basic series inverter.	U	4	
	b)	With the help of circuit diagram and waveform explain single pulse width modulation in inverter.	U	4	
	c)	Describe single phase to single phase cycloconverter with diagram.	u	5	
	d)	Draw the circuit diagram and waveform of single phase to bridge cycloconverter.	U	5	
	e)	Describe working of DC series motor drive with diagram.	U	6	
	f)	Draw a battery charger by using SCR explain its working.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	With the help of circuit diagram explain working of parallel inverter.	U	4	
	b)	Draw the circuit diagram and waveform of McMurray half bridge inverter.	U	4	
	c)	Describe three phase to three phase cycloconverter with diagram.	A	5	
	d)	Draw and explain block diagram of online UPS.	U	6	
	e)	With the help of circuit diagram explain working of single phase half controlled drive for DC motor.	U	6	
	f)	Describe emergency light system by using SCR with diagram.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - 4 PROGRAMS: Electrical Engineering

COURSE CODE: -EEG404

COURSE NAME: - Energy Conservation and Audit

MAX. MARKS: **80** TIME: **03 Hrs** DATE: 05/12/2023

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 EEG402	Marks
Q.1		Attempt any four of following:			**08**
	a)	Define Energy conservation.	R	1	2
	b)	State any two salient features of energy efficient motor.	U	3	2
	c)	Draw a neat diagram of Variable Frequency Drive.	A	3	2
	d)	State BEE rating and comment on it.	R	1	2
	e)	Define block rate tariff.	U	2	2
	f)	State any two needs of energy conservation in motor.	U	3	2
Q.2		Attempt any four of following:			**16**
	a)	State relevant clauses of energy conservation in Energy conservation Act 2001	U	1	4
	b)	Explain how to reduce energy bill by application of tariff system.	A	2	4
	c)	Compare energy efficient motor with conventional motor with any four specific points.	A	3	4
	d)	Explain energy conservation in three phase induction motor by – 1. Minimizing the idle and redundant running of motor. 2. Operating in star mode	U	3	4
	e)	State any four factors governing the selection of cogeneration system.	U	2	4
	f)	Compare soft starter with conventional starter with any four points.	U	3	4
Q.3		Attempt any four of following:			**16**
	a)	State and explain role of MEDA briefly.	A	1	4
	b)	State classification of Cogeneration system based on sequence of energy generation and explains one with block diagram.	U	2	4
	c)	State and explain salient features of Amorphous transformer.	A	3	4
	d)	Explain periodic maintenance of transformer in detail.	A	3	4
	e)	Explain energy conservation in three phase induction motor by – 1. Motor survey 2. Matching motor with loading	U	3	4
	f)	Explain how Maximum demand tariff and Power factor tariff are useful in energy conservation.	A	2	4

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL: - 4 PROGRAMS: Electrical Engineering

COURSE CODE: - EEG 404

COURSE NAME: - **Energy Conservation and Audit**

MAX. MARKS: **80** TIME: **03 Hrs** DATE: - 05 / 12 /2023

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Energy audit and its necessity.	R	6	
	b)	List four techniques of Efficient Energy Lighting.	U	4	
	c)	List any two commercial losses in electrical installation.	A	5	
	d)	List any two solid state devices used in lighting system.	U	4	
	e)	List any four instruments used for energy audit	A	6	
	f)	If 5 fans each of rating 60 watts ,are working for 8 hours in day , calculate the total consumption.	A	2	
Q.5		Attempt any **FOUR:**			**16**
	a)	State procedure to analyze in detail the existing lighting system.	A	4	
	b)	Draw the flow chart of energy audit procedure.	A	6	
	c)	Make use of balancing phase current technique to reduce technical losses in electrical installation.	U	5	
	d)	Draw and explain Sankey diagram.	U	6	
	e)	List any four causes of technical losses and also elaborate methods to reduce the these technical losses..	A	5	
	f)	~~List various methods of Inventory analysis and explain any one.~~	U	2	
Q.6		Attempt any **FOUR:**			**16**
	a)	List energy conservation equipments used in distribution system and explain any one in detail	A	5	
	b)	Explain the detailed program of of regular survey and adequate maintenance of lighting system.	U	4	
	c)	Explain energy conservation in lighting system by – 1. Installation of separate transformer 2. Servo stabilizer	U	4	
	d)	Prepare questionnaire for detailed energy audit of industrial facility	U	6	
	e)	Explain how energy conservation in distribution system done by controlling line losses.	A	4	
	f)	In a multipurpose hall 260 fluorescent lamp of 40 watt with choke of 15 watt. Out of these 150 are ON for 10 hours and remaining for 12 hours.100 fans each of 60 watt with regulator of 10 watt, out of these 60 fans ON for 10 hours and remaining for 12hrs. Iron choke replaced by electronic choke of 1 watt each costing Rs.300, fan regulating of 0.5 watt each costing of Rs. 125. Calculate 1. Daily energy consumption before and after replacement 2. Pay back period in days at Rs. 5/ unit	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL: - 4 PROGRAMS: Electrical Engineering

COURSE CODE: -EEG404

COURSE NAME: - Energy Conservation and Audit

MAX. MARKS: **80** TIME: **03 Hrs** DATE: -05/12/2023

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 EEG402	Marks
Q.1		Attempt any four of following:			**08**
	a)	Define Energy conservation.	R	1	2
	b)	State any two salient features of energy efficient motor.	U	3	2
	c)	Draw a neat diagram of Variable Frequency Drive.	A	3	2
	d)	State BEE rating and comment on it.	R	1	2
	e)	Define block rate tariff.	U	2	2
	f)	State any two needs of energy conservation in motor.	U	3	2
Q.2		Attempt any four of following:			**16**
	a)	State relevant clauses of energy conservation in Energy conservation Act 2001	U	1	4
	b)	Explain how to reduce energy bill by application of tariff system.	A	2	4
	c)	Compare energy efficient motor with conventional motor with any four specific points.	A	3	4
	d)	Explain energy conservation in three phase induction motor by – 1. Minimizing the idle and redundant running of motor. 2. Operating in star mode	U	3	4
	e)	State any four factors governing the selection of cogeneration system.	U	2	4
	f)	Compare soft starter with conventional starter with any four points.	U	3	4
Q.3		Attempt any four of following:			**16**
	a)	State and explain role of MEDA briefly.	A	1	4
	b)	State classification of Cogeneration system based on sequence of energy generation and explains one with block diagram.	U	2	4
	c)	State and explain salient features of Amorphous transformer.	A	3	4
	d)	Explain periodic maintenance of transformer in detail.	A	3	4
	e)	Explain energy conservation in three phase induction motor by – 1. Motor survey 2. Matching motor with loading	U	3	4
	f)	Explain how Maximum demand tariff and Power factor tariff are useful in energy conservation.	A	2	4

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL: - 4 PROGRAMS: Electrical Engineering

COURSE CODE: - EEG 404

COURSE NAME: - **Energy Conservation and Audit**

MAX. MARKS: **80** TIME: **03 Hrs** DATE: - 05 / 12 /2023

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define Energy audit and its necessity.	R	6	
	b)	List four techniques of Efficient Energy Lighting.	U	4	
	c)	List any two commercial losses in electrical installation.	A	5	
	d)	List any two solid state devices used in lighting system.	U	4	
	e)	List any four instruments used for energy audit	A	6	
	f)	If 5 fans each of rating 60 watts ,are working for 8 hours in day , calculate the total consumption.	A	2	
Q.5		Attempt any **FOUR:**			**16**
	a)	State procedure to analyze in detail the existing lighting system.	A	4	
	b)	Draw the flow chart of energy audit procedure.	A	6	
	c)	Make use of balancing phase current technique to reduce technical losses in electrical installation.	U	5	
	d)	Draw and explain Sankey diagram.	U	6	
	e)	List any four causes of technical losses and also elaborate methods to reduce the these technical losses..	A	5	
	f)	List various methods of Inventory analysis and explain any one.	U	2	
Q.6		Attempt any **FOUR:**			**16**
	a)	List energy conservation equipments used in distribution system and explain any one in detail	A	5	
	b)	Explain the detailed program of of regular survey and adequate maintenance of lighting system.	U	4	
	c)	Explain energy conservation in lighting system by – 1. Installation of separate transformer 2. Servo stabilizer	U	4	
	d)	Prepare questionnaire for detailed energy audit of industrial facility	U	6	
	e)	Explain how energy conservation in distribution system done by controlling line losses.	A	4	
	f)	In a multipurpose hall 260 fluorescent lamp of 40 watt with choke of 15 watt. Out of these 150 are ON for 10 hours and remaining for 12 hours.100 fans each of 60 watt with regulator of 10 watt, out of these 60 fans ON for 10 hours and remaining for 12hrs. Iron choke replaced by electronic choke of 1 watt each costing Rs.300, fan regulating of 0.5 watt each costing of Rs. 125. Calculate 1. Daily energy consumption before and after replacement 2. Pay back period in days at Rs. 5/ unit	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEF504**

COURSE NAME **MICROCONTROLLERS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **05/ 12 / 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 504	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give the comparision between microprocessor ad microcontroller (any four points)	R	1	
	b)	State the function of address bus and data bus.	U	1	
	c)	Write any four architectural features of 8051.	R	2	
	d)	Enlist SFRs used in serial port programming and interrupt programming.	U	2	
	e)	Find the addressing modes of following instructions. I)ADDC A, @ Ro ii) MOV A, #20H.	U	3	
	f)	Enlist any four Boolean processing instructions.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare the Harvard and Von-neuman architecture.	U	1	
	b)	Draw the block diagram of 8051 architecture.	R	2	
	c)	Draw the PSW register format and explain the significance of each bit.	R	2	
	d)	Explain the function of following registers i) Stack Pointer ii) DPTR iii) Program counter iv) Accumulator.	U	2	
	e)	Write Assembly language program for finding the largest number in given block of 5 numbers.	A	3	
	f)	Describe the function of following instructions i) XCH A, R_1 ii) MOV A, 50H iii) DAA iv) DIV A,B	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	What are selection factors of the microcontroller, explain it?	R	1	
	b)	With neat diagram explain Internal memory organization of 8051.	R	2	
	c)	Differentiate power down mode and idle mode of 8051. Which SFR is used to set these modes?	U	2	
	d)	Write an assembly language program to multiply two 8 bit numbers located at 40H and 41H and store the result at 50H and 51H.	A	3	
	e)	Classify the instruction set of 8051 with suitable example of each.	U	3	
	f)	Write an assembly language program to find two's complement of a number 55H and store the result in external memory location 3000H.	A	3	

P.T.O.

QN	SQN	SECTION –II	R/U/A	Co EEF 504	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Indicate which mode and which timer are selected for each of the following. i) MOV TMOD, #01H ii) MOV TMOD, # 20H.	U	4	
	b)	List the different modes for serial communication for 8051 µc.	U	4	
	c)	State the difference between the RET & RET1 instructions.	R	4	
	d)	Identify and write the number of address lines required to interface 2KB and 4KB of memory to 8051.	A	5	
	e)	Name the driver IC used to interface relay to 8051. Also state its features.	R	5	
	f)	List the applications of stepper motor.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write a program to generate square wave of 2KHz on P3.7 using timer 1 model, XTAL = 11.0592 MHz.	A	4	
	b)	Write a assembly language program to check P2.3. If it is high send 55H to P1 else send AAH TO P3.	A	4	
	c)	Explain any two modes used in serial communication.	U	4	
	d)	Interface a LED to port pin 1.5 and toggle the pin after 250usec. Assume XTAL= 12MHz.	R	5	
	e)	Draw interfacing diagram of stepper motor with 89C51 µc.	R	6	
	f)	Explain function of following pins of ADC i) SOC ii) EOC iii) OE iv) Clock	R	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write assembly language program to send message " GPK" serially at 9600 baud rate continuously. Assume XTAL = 11.0592MHz.	A	4	
	b)	Draw interfacing diagrams of 4KB EPROM and 4 KB RAM of 8051. Draw memory map.	U	5	
	c)	A 230V AC bulb is connected through a relay at P2.2. A light sensor is connected at P3.4. A light sensor produces a logic high in dark condition. Write a program to switch 'ON' bulb in Dark condition and switch it 'off' in Light condition.	A	5	
	d)	Draw interfacing diagram of 7-segment LED display with 8051 µc.	U	5	
	e)	Explain any four commands used for LCD initialization.	U	6	
	f)	Draw the interfacing diagram of 4 X 4 Matrix keyboard with 8051 µc.	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEF504**

COURSE NAME **MICROCONTROLLERS**

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- **05/ 12 / 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 504	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Give the comparision between microprocessor ad microcontroller (any four points)	R	1	
	b)	State the function of address bus and data bus.	U	1	
	c)	Write any four architectural features of 8051.	R	2	
	d)	Enlist SFRs used in serial port programming and interrupt programming.	U	2	
	e)	Find the addressing modes of following instructions. I)ADDC A, @ Ro ii) MOV A, #20H.	U	3	
	f)	Enlist any four Boolean processing instructions.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare the Harvard and Von-neuman architecture.	U	1	
	b)	Draw the block diagram of 8051 architecture.	R	2	
	c)	Draw the PSW register format and explain the significance of each bit.	R	2	
	d)	Explain the function of following registers i) Stack Pointer ii) DPTR iii) Program counter iv) Accumulator.	U	2	
	e)	Write Assembly language program for finding the largest number in given block of 5 numbers.	A	3	
	f)	Describe the function of following instructions i) XCH A, R_1 ii) MOV A, 50H iii) DAA iv) DIV A,B	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	What are selection factors of the microcontroller, explain it?	R	1	
	b)	With neat diagram explain Internal memory organization of 8051.	R	2	
	c)	Differentiate power down mode and idle mode of 8051. Which SFR is used to set these modes?	U	2	
	d)	Write an assembly language program to multiply two 8 bit numbers located at 40H and 41H and store the result at 50H and 51H.	A	3	
	e)	Classify the instruction set of 8051 with suitable example of each.	U	3	
	f)	Write an assembly language program to find two's complement of a number 55H and store the result in external memory location 3000H.	A	3	

P.T.O.

QN	SQN	SECTION –II	R/U/A	Co EEF 504	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Indicate which mode and which timer are selected for each of the following. i) MOV TMOD, #01H ii) MOV TMOD, # 20H.	U	4	
	b)	List the different modes for serial communication for 8051 µc.	U	4	
	c)	State the difference between the RET & RET1 instructions.	R	4	
	d)	Identify and write the number of address lines required to interface 2KB and 4KB of memory to 8051.	A	5	
	e)	Name the driver IC used to interface relay to 8051. Also state its features.	R	5	
	f)	List the applications of stepper motor.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Write a program to generate square wave of 2KHz on P3.7 using timer 1 model, XTAL = 11.0592 MHz.	A	4	
	b)	Write a assembly language program to check P2.3. If it is high send 55H to P1 else send AAH TO P3.	A	4	
	c)	Explain any two modes used in serial communication.	U	4	
	d)	Interface a LED to port pin 1.5 and toggle the pin after 250usec. Assume XTAL= 12MHz.	R	5	
	e)	Draw interfacing diagram of stepper motor with 89C51 µc.	R	6	
	f)	Explain function of following pins of ADC i) SOC ii) EOC iii) OE iv) Clock	R	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Write assembly language program to send message " GPK" serially at 9600 baud rate continuously. Assume XTAL = 11.0592MHz.	A	4	
	b)	Draw interfacing diagrams of 4KB EPROM and 4 KB RAM of 8051. Draw memory map.	U	5	
	c)	A 230V AC bulb is connected through a relay at P2.2. A light sensor is connected at P3.4. A light sensor produces a logic high in dark condition. Write a program to switch 'ON' bulb in Dark condition and switch it 'off' in Light condition.	A	5	
	d)	Draw interfacing diagram of 7-segment LED display with 8051 µc.	U	5	
	e)	Explain any four commands used for LCD initialization.	U	6	
	f)	Draw the interfacing diagram of 4 X 4 Matrix keyboard with 8051 µc.	U	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG309**

COURSE NAME **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **06/ 12 / 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 types of amplifiers.	R	1	
	b)	Give classification of power amplifiers.	U	1	
	c)	State Barkhausen's criteria for oscillator.	R	2	
	d)	Give classification of oscillators.	U	2	
	e)	Draw block diagram of IC555.	R	2	
	f)	Define Line Regulation.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain circuit diagram of RC coupled amplifier.	U	1	
	b)	Explain class A power amplifier with diagram.	U	1	
	c)	Identify diagram and explain its working with frequency formula.	A	2	
	d)	Explain operation with circuit diagram and relevant formula for IC 555 as monostable multivibrator.	A	1	
	e)	Draw and explain block diagram of regulated power supply with waveform across each block.	A	3	
	f)	Draw and explain IC 723 as a Low voltage regulator.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw pin configuration of IC 78XX voltage regulator, also write any four features of IC 78XX voltage regulator.	U	3	
	b)	List four applications of IC 723 voltage regulator.	R	3	
	c)	Draw and explain pin diagram of IC 723.	U	3	
	d)	Draw and explain crystal oscillator with frequency formula.	S	2	
	e)	Draw and explain transformer coupled amplifier.	U	1	
	f)	Draw and explain frequency response of RC coupled amplifier.	U	1	

P.T.O

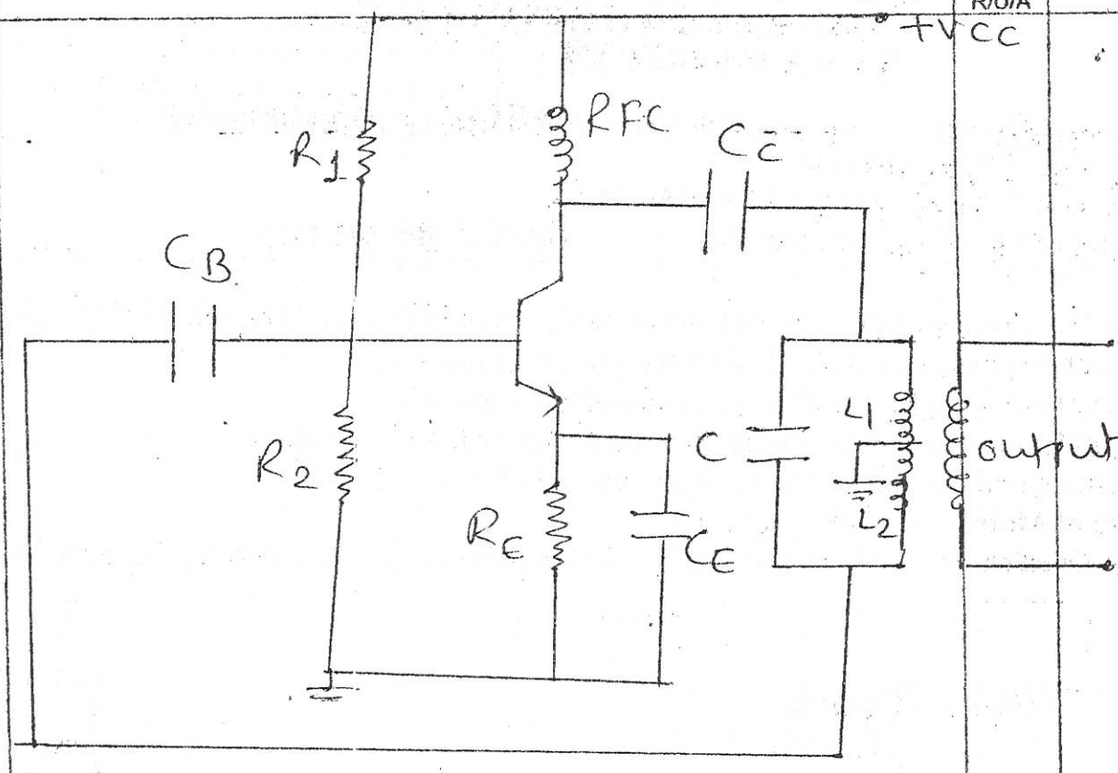
Q. N.	S.Q .N.	Question text	Cognition Level R/U/A	CO Code	Marks out of
Q2	c)				

Fig (1)

QN	SQN	Question Text	R/U/A	Co EEG 309	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw circuit diagram of basic differentiator using OP-amp.	R	5	
	b)	State any four Boolean laws and its equations.	R	6	
	c)	State any four ideal characteristics of OP-Amp	R	4	
	d)	Draw neat diagram of Inverting amplifier.	R	5	
	e)	Explain virtual ground concept.	R	5	
	f)	Define i) SVRR ii) slew rate for OP-Amp IC-741.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain Practical integrator circuit with neat diagram.	U	5	
	b)	Perform following operations i) $(1011)_2 + (0111)_2$ ii) $(11110)_2 + (01101)_2$.	U	6	
	c)	Draw diagram of voltage follower. Why it is called voltage follower? State its one application.	U	5	
	d)	Draw the block diagram of OP-amp. State the function of each block.	R/U	4	
	e)	State and prove any one De'Morgan Theorem with neat diagram and truth table.	A	6	
	f)	Draw the transfer characteristics curve of OP-amp and explain.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw the circuit of basic differentiator. Draw output waveforms for Sine and Square wave input.	A	5	
	b)	Draw the pin diagram of IC-741. State the function of each pin.	U	4	
	c)	Draw and explain working of R-2R ladder with neat circuit diagram.	U/A	6	
	d)	Explain the summing amplifier and derive the expression for its output with neat diagram.	A	5	
	e)	Draw and explain working principle of successive approximation ADC.	U/A	6	
	f)	Define the following parameters of OP-amp. i) Input bias current ii) Input offset current iii) CMRR IV) Output Resistance.	U/A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG309**

COURSE NAME **APPLIED ELECTRONICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **06/ 12 / 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 types of amplifiers.	R	1	
	b)	Give classification of power amplifiers.	U	1	
	c)	State Barkhausen's criteria for oscillator.	R	2	
	d)	Give classification of oscillators.	U	2	
	e)	Draw block diagram of IC555.	R	2	
	f)	Define Line Regulation.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw and explain circuit diagram of RC coupled amplifier.	U	1	
	b)	Explain class A power amplifier with diagram.	U	1	
	c)	Identify diagram and explain its working with frequency formula.	A	2	
	d)	Explain operation with circuit diagram and relevant formula for IC 555 as monostable multivibrator.	A	1	
	e)	Draw and explain block diagram of regulated power supply with waveform across each block.	A	3	
	f)	Draw and explain IC 723 as a Low voltage regulator.	U	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw pin configuration of IC 78XX voltage regulator, also write any four features of IC 78XX voltage regulator.	U	3	
	b)	List four applications of IC 723 voltage regulator.	R	3	
	c)	Draw and explain pin diagram of IC 723.	U	3	
	d)	Draw and explain crystal oscillator with frequency formula.	S	2	
	e)	Draw and explain transformer coupled amplifier.	U	1	
	f)	Draw and explain frequency response of RC coupled amplifier.	U	1	

P.T.O

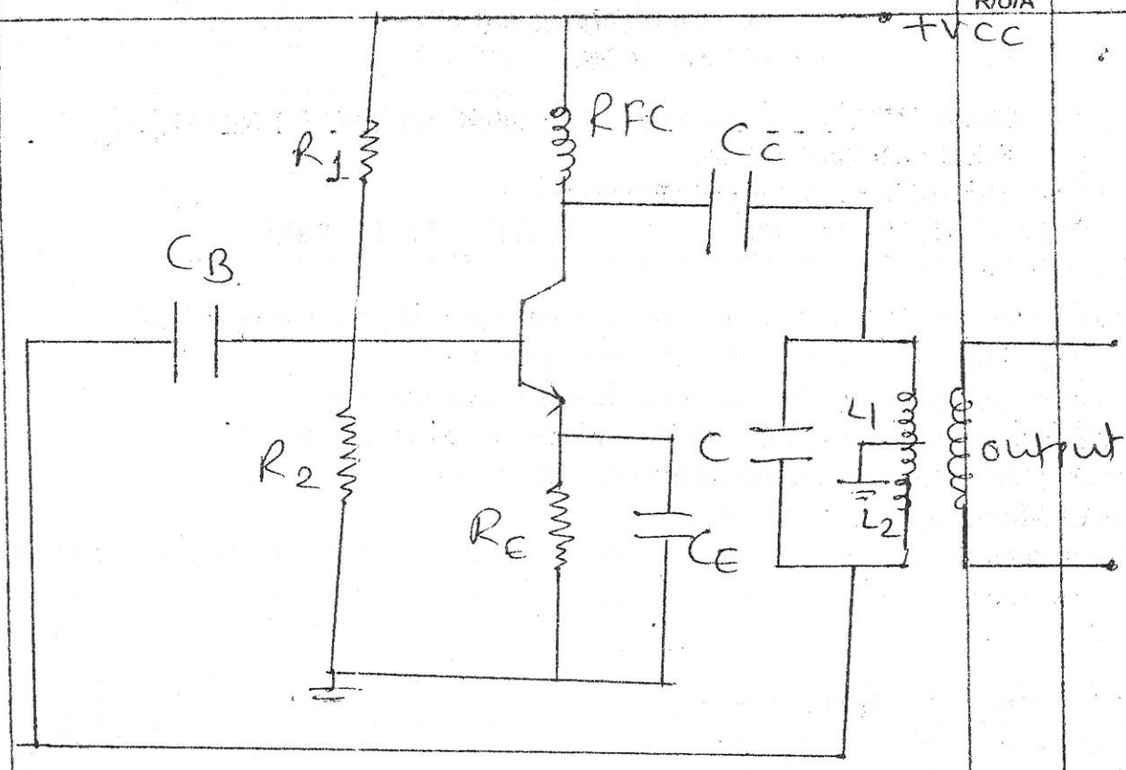
Q. N.	S.Q .N.	Question text	Cognition Level R/U/A	CO Code	Marks out of
Q2	c)				

Fig (1)

QN	SQN	Question Text	R/U/A	Co EEG 309	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Draw circuit diagram of basic differentiator using OP-amp.	R	5	
	b)	State any four Boolean laws and its equations.	R	6	
	c)	State any four ideal characteristics of OP-Amp	R	4	
	d)	Draw neat diagram of Inverting amplifier.	R	5	
	e)	Explain virtual ground concept.	R	5	
	f)	Define i) SVRR ii) slew rate for OP-Amp IC-741.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain Practical integrator circuit with neat diagram.	U	5	
	b)	Perform following operations i) $(1011)_2 + (0111)_2$ ii) $(11110)_2 + (01101)_2$.	U	6	
	c)	Draw diagram of voltage follower. Why it is called voltage follower? State its one application.	U	5	
	d)	Draw the block diagram of OP-amp. State the function of each block.	R/U	4	
	e)	State and prove any one De'Morgan Theorem with neat diagram and truth table.	A	6	
	f)	Draw the transfer characteristics curve of OP-amp and explain.	A	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw the circuit of basic differentiator. Draw output waveforms for Sine and Square wave input.	A	5	
	b)	Draw the pin diagram of IC-741. State the function of each pin.	U	4	
	c)	Draw and explain working of R-2R ladder with neat circuit diagram.	U/A	6	
	d)	Explain the summing amplifier and derive the expression for its output with neat diagram.	A	5	
	e)	Draw and explain working principle of successive approximation ADC.	U/A	6	
	f)	Define the following parameters of OP-amp. i) Input bias current ii) Input offset current iii) CMRR IV) Output Resistance.	U/A	4	

********** 3

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - THIRD PROGRAM : ELECTRICAL ENGG

COURSE CODE :- EEG304

COURSE NAME :- ELECTRICAL & ELECTRONICS MEASUREMENT

MAX. MARKS :80 TIME : **03 Hrs** DATE :-06 /12/ 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 **EEG304**	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define accuracy & precision	R	CO-1	02
	b)	State the function of control spring.	U	CO-1	02
	c)	Draw the circuit diagram of kelvin double bridge to measure the low resistance.	U	CO-2	02
	d)	State two advantages of two wattmeter method	A	CO-3	02
	e)	Give the classification of Watt-meters.	R	CO-3	02
	f)	Give ranges of low and high resistances.	A	CO-2	02
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare PMMC and MI instrument (any four points)	A	CO-1	**04**
	b)	Give detailed classification of errors occurring in electrical measuring instrument.	U	CO-1	04
	c)	Draw neat labelled sketch of megger.	R	CO-2	04
	d)	Write working of digital voltmeter with suitable sketch	U	CO-1	04
	e)	Explain the error occurred due to pressure coil inductance of electrodynamometer type wattmeter How this error is compensated?	U	CO-3	04
	f)	Draw the circuit diagram for:- (i) Measurement of active power in 3-phase balanced load circuit using two wattmeter. (ii) Measurement of reactive power in 3-phase balanced load circuit using one wattmeter	R	CO-3	04
					04
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw neat labelled diagram of PMMC instrument	R	CO-1	04
	b)	Compare analog ammeter and voltmeter on: (i) Connection in circuit (ii) Resistance value (iii) Circuit symbol (iv) Power consumption	A	CO-1	04
	c)	Write working of L-C-R meter with suitable sketch	A	CO-2	04
	d)	Explain the schering bridge in detail.	U	CO-2	04

	e)	Two wattmeters are connected in circuit for measurement of 3 phase power. One wattmeter reads 2500 W & other reads 1500 W. Find P.F. of circuit when (i) Both readings are positive. (ii) When reading of 1500 W is obtained after reversing current coil of wattmeter	A	CO-3	**04**
	f)	Explain the maximum demand indicator in detail.	A	CO-3	**04**

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : ELECTRICAL ENGINERING
COURSE CODE :- EEG304
COURSE NAME :- ELECTRICAL & ELECTRONICS MEASUREMENT
MAX. MARKS : **80** TIME : **03 Hrs** DATE :-06/12/2023

QN	SQN	SECTION –II	R/ U/ A	CO EEG 304	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State any two benefits of Digital Energy meter.	R	4	
	b)	State the working principal of Piezoelectric transducer.	R	5	
	c)	Draw a neat labelled block diagram of single beam CRO.	R	6	
	d)	Calculate the resistance of shunt required to make a milliammeter which gives maximum deflection for a current of 15 mA and which has a resistance of 5 ohm, to read up to 10 Amp.	R	4	
	e)	Give classification of transducer on any two factors	R	5	
	f)	State the use of 1.Frequency meter 2. C.R.O.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with block diagram the construction and working principle of single phase electronic energy meter?	U	4	
	b)	I) State Seebeck Effect & Peltier effect. II) Give the materials used in K type and R type thermocouple.	U	5	
	c)	Describe with suitable example; frequency measurement by Lissajous patterns on CRO.	A	6	
	d)	Draw the block diagram of trivector meter. State the various measurements possible from trivector meter	U	4	
	e)	I) Explain with neat diagram how range of D.C. Ammeters can be extended?	A	4	
	f)	Describe with block diagram, the working of function generator.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	What is meant by C.T. and P.T. Explain their use and working.	A	4	
	b)	Draw constructional details of C-type Bourdon tube and explain its working.	U	5	
	c)	Draw and explain block diagram of AC & DC signal conditioning systems in instrumentation.	U	6	
	d)	Describe the construction and working of Weston type frequency meter with labeled diagram.	U	4	
	e)	Explain with neat diagram construction and working of LVDT.	U	5	
	f)	Describe with neat diagram working of rotating disc type phase sequence indicator.	U	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - THIRD PROGRAM : ELECTRICAL ENGG

COURSE CODE :- EEG304

COURSE NAME :- ELECTRICAL & ELECTRONICS MEASUREMENT

MAX. MARKS : 80 TIME : **03 Hrs** DATE :-06 /12/ 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 **EEG304**	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Define accuracy & precision	R	CO-1	02
	b)	State the function of control spring.	U	CO-1	02
	c)	Draw the circuit diagram of kelvin double bridge to measure the low resistance.	U	CO-2	02
	d)	State two advantages of two wattmeter method	A	CO-3	02
	e)	Give the classification of Watt-meters.	R	CO-3	02
	f)	Give ranges of low and high resistances.	A	CO-2	02
Q.2		Attempt any **FOUR:**			**16**
	a)	Compare PMMC and MI instrument (any four points)	A	CO-1	**04**
	b)	Give detailed classification of errors occurring in electrical measuring instrument.	U	CO-1	04
	c)	Draw neat labelled sketch of megger.	R	CO-2	04
	d)	Write working of digital voltmeter with suitable sketch	U	CO-1	04
	e)	Explain the error occurred due to pressure coil inductance of electrodynamometer type wattmeter How this error is compensated?	U	CO-3	04
	f)	Draw the circuit diagram for:- (i) Measurement of active power in 3-phase balanced load circuit using two wattmeter. (ii) Measurement of reactive power in 3-phase balanced load circuit using one wattmeter	R	CO-3	04
					04
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw neat labelled diagram of PMMC instrument	R	CO-1	04
	b)	Compare analog ammeter and voltmeter on: (i) Connection in circuit (ii) Resistance value (iii) Circuit symbol (iv) Power consumption	A	CO-1	04
	c)	Write working of L-C-R meter with suitable sketch	A	CO-2	04
	d)	Explain the schering bridge in detail.	U	CO-2	04

	e)	Two wattmeters are connected in circuit for measurement of 3 phase power. One wattmeter reads 2500 W & other reads 1500 W. Find P.F. of circuit when (i) Both readings are positive. (ii) When reading of 1500 W is obtained after reversing current coil of wattmeter	A	CO-3	**04**
	f)	Explain the maximum demand indicator in detail.	A	CO-3	**04**

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL : - 3 PROGRAM : ELECTRICAL ENGINERING

COURSE CODE :- EEG304

COURSE NAME :- ELECTRICAL & ELECTRONICS MEASUREMENT

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-06/12/2023

QN	SQN	SECTION –II	R/ U/ A	CO EEG 304	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State any two benefits of Digital Energy meter.	R	4	
	b)	State the working principal of Piezoelectric transducer.	R	5	
	c)	Draw a neat labelled block diagram of single beam CRO.	R	6	
	d)	Calculate the resistance of shunt required to make a milliammeter which gives maximum deflection for a current of 15 mA and which has a resistance of 5 ohm, to read up to 10 Amp.	R	4	
	e)	Give classification of transducer on any two factors	R	5	
	f)	State the use of 1.Frequency meter 2. C.R.O.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain with block diagram the construction and working principle of single phase electronic energy meter?	U	4	
	b)	I) State Seebeck Effect & Peltier effect. II) Give the materials used in K type and R type thermocouple.	U	5	
	c)	Describe with suitable example; frequency measurement by Lissajous patterns on CRO.	A	6	
	d)	Draw the block diagram of trivector meter. State the various measurements possible from trivector meter	U	4	
	e)	I) Explain with neat diagram how range of D.C. Ammeters can be extended?	A	4	
	f)	Describe with block diagram, the working of function generator.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	What is meant by C.T. and P.T. Explain their use and working.	A	4	
	b)	Draw constructional details of C-type Bourdon tube and explain its working.	U	5	
	c)	Draw and explain block diagram of AC & DC signal conditioning systems in instrumentation.	U	6	
	d)	Describe the construction and working of Weston type frequency meter with labeled diagram.	U	4	
	e)	Explain with neat diagram construction and working of LVDT.	U	5	
	f)	Describe with neat diagram working of rotating disc type phase sequence indicator.	U	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 23

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG501 / EEF501

COURSE NAME :- ELECTRICAL TESTING & COMMISSIONING

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 07/12/2023

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 EEG 501	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List out any four factors influencing severity of electric shock	R	1	
	b)	List out any four precautions to be taken to avoid fire caused by Electrical reason.	R	1	
	c)	Define: Routine and Preventive maintenance	R	2	
	d)	State the concept of predictive maintenance.	U	2	
	e)	State the meaning of special test. Give one example of special test.	U	2	
	f)	List any two advantages of indirect testing of electrical machine	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Write the requirements of foundation of a transformer installation	A	1	
	b)	Write Do's and Don'ts to achieve safety for electrical supervisor while working in substation (any four points).	A	1	
	c)	List the different causes of electrical accidents.	U	1	
	d)	Enlist routine test and type test performed on three phase alternator.	R	3	
	e)	Describe with neat diagram open circuit voltage ratio test conducted on three phase slip ring induction motor.	U	3	
	f)	Prepare the preventive maintenance schedule for three phase induction motor over one year.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	State factors involved in designing a machine foundation.	U	1	
	b)	Distinguish between routine and break down maintenance of electrical equipment.	A	2	
	c)	Describe the various factors affecting preventive maintenance schedule.	A	2	
	d)	Explain the steps involved to conduct no load test and blocked rotor test on 3 phase induction motor with neat circuit diagram.	A	3	
	e)	Compare direct, Indirect & Regenerative methods of testing.	A	3	
	f)	Discuss momentary overload test conducted on rotating electrical machines.	A	3	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER - 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: 07/12/2023**

Instruction:-

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

QN	SQN	SECTION –II	R/ U/ A	Co-EEG501	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the purpose of measurement of winding resistance of transformer	A	4	
	b)	Enlist the methods used for detection & recording temperature of electric machines	A	5	
	c)	Give the external causes of failure of electrical equipment	U/R	6	
	d)	State the objective of testing of transformer	U/A	4	
	e)	List the types of faults in electrical machines	U/R	6	
	f)	State the various methods of varnishing	A	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Give the four reasons for developing electrical & magnetic faults.	U/R	6	
	b)	With neat diagram explain short circuit test conducted on transformer.	A	4	
	c)	Explain any eight methods of cleaning of insulation of electrical machines.	R/U	5	
	d)	State the properties of good transformer oil.	U	5	
	e)	Enlist any four tests to be carried out on transformer under routine tests & special tests.	A/R	4	
	f)	Enlist any four internal & external causes of faults.	R	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Give the use of following equipment's in electrical maintenance. a)Bearing puller, b) filler gauge, c) dial indicator, d) spirit level	A	6	
	b)	State any four troubles in batteries. Suggest any two remedies for each trouble.	A	6	
	c)	Explain the care (protection) to be taken electrical equipment during the period of inactivity.	A/U	4	
	d)	Discuss the polarity test conducted on transformer	A/U	4	
	e)	Describe the impulse voltage withstand test on transformers.	A/U	4	
	f)	Describe with neat diagram the crackle test to be carried out on transformer.	A/U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 23

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : ELECTRICAL ENGINEERING

COURSE CODE :- EEG501 /EEF501

COURSE NAME :- ELECTRICAL TESTING & COMMISSIONING

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 07/12/2023

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co EEG 501	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List out any four factors influencing severity of electric shock	R	1	
	b)	List out any four precautions to be taken to avoid fire caused by Electrical reason.	R	1	
	c)	Define: Routine and Preventive maintenance	R	2	
	d)	State the concept of predictive maintenance.	U	2	
	e)	State the meaning of special test. Give one example of special test.	U	2	
	f)	List any two advantages of indirect testing of electrical machine	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Write the requirements of foundation of a transformer installation	A	1	
	b)	Write Do's and Don'ts to achieve safety for electrical supervisor while working in substation (any four points).	A	1	
	c)	List the different causes of electrical accidents.	U	1	
	d)	Enlist routine test and type test performed on three phase alternator.	R	3	
	e)	Describe with neat diagram open circuit voltage ratio test conducted on three phase slip ring induction motor.	U	3	
	f)	Prepare the preventive maintenance schedule for three phase induction motor over one year.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	State factors involved in designing a machine foundation.	U	1	
	b)	Distinguish between routine and break down maintenance of electrical equipment.	A	2	
	c)	Describe the various factors affecting preventive maintenance schedule.	A	2	
	d)	Explain the steps involved to conduct no load test and blocked rotor test on 3 phase induction motor with neat circuit diagram.	A	3	
	e)	Compare direct, Indirect & Regenerative methods of testing.	A	3	
	f)	Discuss momentary overload test conducted on rotating electrical machines.	A	3	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER - 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: 07/12/2023**

Instruction:-

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

QN	SQN	SECTION –II	R/ U/ A	Co-EEG501	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	State the purpose of measurement of winding resistance of transformer	A	4	
	b)	Enlist the methods used for detection & recording temperature of electric machines	A	5	
	c)	Give the external causes of failure of electrical equipment	U/R	6	
	d)	State the objective of testing of transformer	U/A	4	
	e)	List the types of faults in electrical machines	U/R	6	
	f)	State the various methods of varnishing	A	5	
Q.5		Attempt any **FOUR:**			**16**
	a)	Give the four reasons for developing electrical & magnetic faults.	U/R	6	
	b)	With neat diagram explain short circuit test conducted on transformer.	A	4	
	c)	Explain any eight methods of cleaning of insulation of electrical machines.	R/U	5	
	d)	State the properties of good transformer oil.	U	5	
	e)	Enlist any four tests to be carried out on transformer under routine tests & special tests.	A/R	4	
	f)	Enlist any four internal & external causes of faults.	R	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Give the use of following equipment's in electrical maintenance. a)Bearing puller, b) filler gauge, c) dial indicator, d) spirit level	A	6	
	b)	State any four troubles in batteries. Suggest any two remedies for each trouble.	A	6	
	c)	Explain the care (protection) to be taken electrical equipment during the period of inactivity.	A/U	4	
	d)	Discuss the polarity test conducted on transformer	A/U	4	
	e)	Describe the impulse voltage withstand test on transformers.	A/U	4	
	f)	Describe with neat diagram the crackle test to be carried out on transformer.	A/U	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : EE

COURSE CODE :- EEG505 / EEF505

COURSE NAME :- Electric Drives

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 07 /12/2023

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List any four basic components used in variable speed AC motor drive	R	01	
	b)	State any one application of group drive and individual drive each.	R	01	
	c)	List any four factors to be considered while selecting the drive system.	R	02	
	d)	Compare star-delta starter and DOL starter. (Any two points)	A	02	
	e)	Draw the circuit diagram for static Kramer drive.	U	03	
	f)	Explain in brief, any two advantages of power electronic starters of electric motors.	U	03	
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe any four requirements of variable speed AC drive.	A	01	
	b)	Explain with graph, V curves of synchronous motor.	U	02	
	c)	Draw neat labeled, speed Vs torque characteristics of the following motors: i) DC shunt motor ii) DC series motor	U	02	
	d)	Explain starting of synchronous motor using induction motor or pony motor.	A	02	
	e)	Explain with diagram, working principle of Static Scherbius Drive.	R	03	
	f)	Explain working of pole changing method for speed control of induction motor.	U	03	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain in detail, the speed Vs torque characteristics of single phase induction motor.	A	02	
	b)	Illustrate plugging of three phase induction motor.	U	02	
	c)	Compare AC drive system and DC drive system based on their advantages and disadvantages. (any four points)	A	01	
	d)	Explain flux weakening speed control method of three phase induction motor.	A	03	
	e)	Explain with diagram, working of liquid starter.	A	03	
	f)	Compare with proper explanation, between induction motor and synchronous motor on following two points, i) Starting methods ii) Power factor	A	03	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM : Electrical Engineering

COURSE CODE :- EEG 505 / EEF 505

COURSE NAME :- Electric Drives

MAX. MARKS : **80** TIME : **03 Hrs** DATE : 07 /12/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:** any two applications of in electric drives			**08**
	a)	Specify ~~the function of Depletion Layer in~~ Semiconductor devices ^	U	CO4	
	b)	Elaborate the significance of firing angle in power control ckts.	U	CO4	
	c)	Specify the function of Inverter Circuit.	R	CO4	
	d)	Specify the function of Chopper Circuit.	R	CO5	
	e)	Define Duty Cycle related to Power control circuits	R	CO4	
	f)	List advantages offered by Microprocessor controlled circuits	U	CO6	
Q.5		Attempt any **FOUR:** importance			**16**
	a)	~~Draw~~ and Explain the ~~working~~ of Firing circuit used for Triggering SCR in Power control circuits.	U	CO4	
	b)	Draw and Explain with waveforms the working of Single phase full wave full controlled converter circuit.	U	CO5	
	c)	What are the advantages of using Converter ckts over conventional methods of Power Control.	A	CO5	
	d)	State the features of MOSFET which makes it suitable for low and medium power operations.	R	CO4	
	e)	State the difference between a Chopper and a Rectifier circuit.	A	CO5	
	f)	With help of Output voltage waveforms illustrate the difference between Single phase Half converter and single phase Full converter circuits	A	CO5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and Explain with waveforms the working of Three phase full wave full controlled converter circuit.	R	CO6	
	b)	Explain with Waveform the function of Free Wheeling Diode and where and how it is connected in Circuits	U	CO4	
	c)	Elaborate the concept of Phase Locked Loop control.	U	CO6	
	d)	Draw a neat Diagram and elaborate the working of Microcomputer based DC Drive.	A	CO6	
	e)	Draw and Explain with waveforms the working of Single phase Dual Converter Drive circuit.	A	CO5	
	f)	With help of neat diagram illustrate the operation of First Quadrant Chopper circuit.	U	CO6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - V PROGRAM : EE

COURSE CODE :- EEG505 / EEF505

COURSE NAME :- Electric Drives

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 07 /12/2023

Instruction :-

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

QN	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	List any four basic components used in variable speed AC motor drive	R	01	
	b)	State any one application of group drive and individual drive each.	R	01	
	c)	List any four factors to be considered while selecting the drive system.	R	02	
	d)	Compare star-delta starter and DOL starter. (Any two points)	A	02	
	e)	Draw the circuit diagram for static Kramer drive.	U	03	
	f)	Explain in brief, any two advantages of power electronic starters of electric motors.	U	03	
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe any four requirements of variable speed AC drive.	A	01	
	b)	Explain with graph, V curves of synchronous motor.	U	02	
	c)	Draw neat labeled, speed Vs torque characteristics of the following motors: i) DC shunt motor ii) DC series motor	U	02	
	d)	Explain starting of synchronous motor using induction motor or pony motor.	A	02	
	e)	Explain with diagram, working principle of Static Scherbius Drive.	R	03	
	f)	Explain working of pole changing method for speed control of induction motor.	U	03	
Q.3		Attempt any **FOUR:**			**16**
	a)	Explain in detail, the speed Vs torque characteristics of single phase induction motor.	A	02	
	b)	Illustrate plugging of three phase induction motor.	U	02	
	c)	Compare AC drive system and DC drive system based on their advantages and disadvantages. (any four points)	A	01	
	d)	Explain flux weakening speed control method of three phase induction motor.	A	03	
	e)	Explain with diagram, working of liquid starter.	A	03	
	f)	Compare with proper explanation, between induction motor and synchronous motor on following two points, i) Starting methods ii) Power factor	A	03	

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/SUMMER- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 5 PROGRAM : Electrical Engineering

COURSE CODE :- EEG 505 / EEF 505

COURSE NAME :- Electric Drives

MAX. MARKS : **80** TIME : **03 Hrs** DATE : 07 /12/23

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.4		Attempt any **FOUR:** any two applications of in electric drive			**08**
	a)	Specify ~~the function of Depletion Layer in~~ Semiconductor devices	U	CO4	
	b)	Elaborate the significance of firing angle in power control ckts.	U	CO4	
	c)	Specify the function of Inverter Circuit.	R	CO4	
	d)	Specify the function of Chopper Circuit.	R	CO5	
	e)	Define Duty Cycle related to Power control circuits	R	CO4	
	f)	List advantages offered by Microprocessor controlled circuits	U	CO6	
Q.5		Attempt any **FOUR:** importance			**16**
	a)	~~Draw and~~ Explain the ~~working of~~ Firing circuit used for Triggering SCR in Power control circuits.	U	CO4	
	b)	Draw and Explain with waveforms the working of Single phase full wave full controlled converter circuit.	U	CO5	
	c)	What are the advantages of using Converter ckts over conventional methods of Power Control.	A	CO5	
	d)	State the features of MOSFET which makes it suitable for low and medium power operations.	R	CO4	
	e)	State the difference between a Chopper and a Rectifier circuit.	A	CO5	
	f)	With help of Output voltage waveforms illustrate the difference between Single phase Half converter and single phase Full converter circuits	A	CO5	
Q.6		Attempt any **FOUR:**			**16**
	a)	Draw and Explain with waveforms the working of Three phase full wave full controlled converter circuit.	R	CO6	
	b)	Explain with Waveform the function of Free Wheeling Diode and where and how it is connected in Circuits	U	CO4	
	c)	Elaborate the concept of Phase Locked Loop control.	U	CO6	
	d)	Draw a neat Diagram and elaborate the working of Microcomputer based DC Drive.	A	CO6	
	e)	Draw and Explain with waveforms the working of Single phase Dual Converter Drive circuit.	A	CO5	
	f)	With help of neat diagram illustrate the operation of First Quadrant Chopper circuit.	U	CO6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG303**

COURSE NAME **ELECTRIC CIRCUITS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **08/ 12 / 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 303	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State superposition theorem for DC circuit.		1	
	b)	An alternating voltage is having maximum value 230volt. What is the average value and EMS value?		2	
	c)	Define waveform and peak factor.		2	
	d)	If maximum value of sine wave is 25A. Calculate its average value.		2	
	e)	Draw impedance trangle of R-C series circuit.		3	
	f)	Define impedance and reactance related to single phase AC series circuit.		3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Derive formula for star to delta transformation of resistances.		1	
	b)	Derive expression for resonant frequency for a RLC series circuit.		2	
	c)	With neat diagram, explain the generation of alternating current.		2	
	d)	A series R-L-C circuit has R= 5Ω, L=10mH & C- 15μF. Calculate i) Resonant frequency ii) Q factor of the circuit iii) Bandwidth iv) Voltage Magnification.		2	
	e)	Define i) Frequency ii) cycle iii) Average value iv) Peak factor for alternating sinusoidal supply.		3	
	f)	A resistance of 100Ω and 50μF capacitor are connected in series across a 230V, 50Hz supply. Find : i) Impedance ii) Current Flowing iii) Voltage across R and iv) Power factor.		3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Calculate the node voltage V_B using the nodal analysis Refer following figure (A)		1	
	b)	If $Z_1 = 3 + j7$ and $Z_2 = 12 - j16$ are connected in series, find the equivalent impedance of combination.		1	
	c)	Using superposition theorem calculate current through 10Ω resistor. Use circuit shown fig (B).		2	
	d)	Two phasors are $V_1 = 7 + j\,9$, $V_2 = 3 - j5$. Find *a)* $\overline{V_1} + \overline{V_2}$ *b)* $\overline{V_1} - \overline{V_2}$ in rectangular form.		2	

	e)	Two sinusoidal voltages are expressed by the following Mathematical expressions: $V_1 = 10\sin\left(200\pi t + \frac{\pi}{3}\right)$ $V_2 = 15\sin\left(200\pi t - \frac{\pi}{2}\right)$ Draw the phasor diagram for the same and calculate the phase difference between them in radians and also in degrees.		3	
	f)	A resistance of 10Ω inductance of 0.1 H and capacitance of 100μF are connected in series across 100 volts, 50Hz AC supply. Find i) Current ii) Power factor ii) Power iv) Draw vector diagram.		2	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER 23

EXAM SEAT NO.

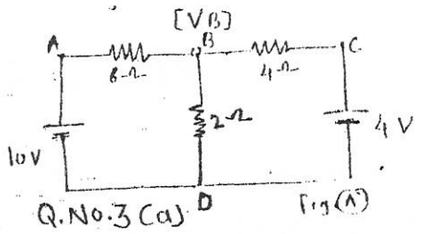
LEVEL : - THIRD. PROGRAM : ELECTRICAL ENGG.

COURSE CODE :- GECT-EEG-303

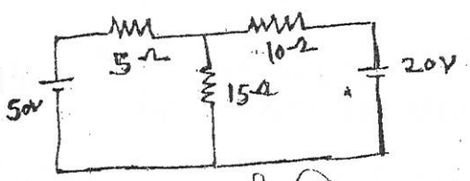
COURSE NAME :- ELECTRICAL CIRCUITS

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08 /12 /23

QN	SQN		R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Elaborate Impedance connected in parallel connection supplied by AC supply.	R	CO4	02
	b)	Define maximum power transfer theorem for AC circuits with simple example & circuit.	R	CO4	02
	c)	Explain steps of applying super position theorem for AC circuits.	R	CO5	02
	d)	Using suitable circuit diagram state Thevenin's theorem for AC circuits.	R	CO5	02
	e)	Explain resonance in AC parallel impedance circuits with simple example.	R	CO5	02
	f)	State various lower & higher units of different types of power in 3 phase AC circuits.	R	CO6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	As given in fig no Two impedances connected in parallel Z1= 30+j20 ohms, & Z2= 20+j30 ohms across the 1 phase 230 volt 50 Hz AC supply, determine current in each branch & total current supplied to circuit.	A	CO4	04
	b)	Solve the given AC circuit shown in fig. no-04 to find current flowing through Z_L using Thevenin's theorem.	A	CO5	04
	c)	Explain Maximum power transfer theorem applied to AC circuit of two loop only as shown in fig no-05.	A	CO5	04
	d)	Explain superposition theorem applied to AC circuit of two loops only to find current flowing through load Z3 as shown in fig no-06.	U	CO5	04
	e)	Explain with suitable labeled sketch generation of 3 phase supply system.	U	CO6	04
	f)	Explain with suitable labeled sketch 3 phase 3 wire & 3 phases 4 wire supply system.	A	CO6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	In a AC parallel circuit first branch of R=20 ohms in series with L=15 mH, & second branch of R=30 ohms in series with C=85 Microfarads connected across source of 1 phase 230 volt 50 Hz AC supply, calculate the total impedance of the parallel circuit.	A	CO4	04
	b)	Derive an expression Y=Y1+Y2 of admittances of two impedances which are connected in parallel across 1 phase AC supply.	A	CO4	04
	c)	Solve the given AC circuit in fig no-07 to find current flowing through the load Z_L using Thevenin's theorem.	A	CO5	04
	d)	Explain the differences in 3 phase active & reactive power in an AC circuit.	U	CO6	04
	e)	A 3 phase star connected load having impedances 4+j6 ohms in each phase connected to 3 phase 400V 50 Hz AC supply, Calculate Line & phase currents, Active, reactive & Apparent power drawn by the load.	A	CO6	04
	f)	A 3 phase delta connected load having impedances 6+j8 ohms in each phase connected to 3 phase 230V 50 Hz AC supply, Calculate Line & phase currents, Active, reactive & Apparent power drawn by the load.	A	CO6	04

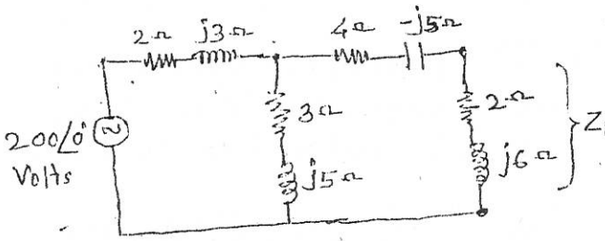


Q.No.3 (a) Fig (A)



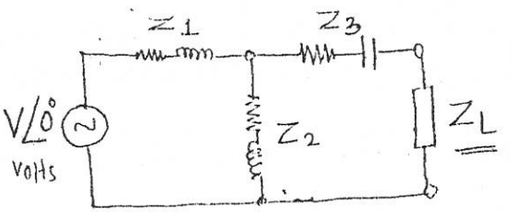
Q.No.3 (c) Fig (B)

Fig No 04
Q.5-b)



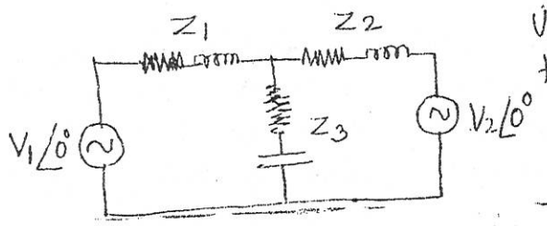
Using Thevenin's theorem Find current through Z_L

Fig No 05
Q 5-c)



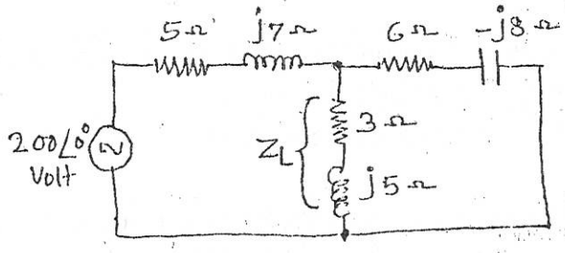
Find P_{max} absorbed by Z_L using Max Power transfer theorem.

Fig No 06
Q 5-d)



Using superposition theorem find current flowing through Z_3

Fig No-07
Que-6-c)



Using Thevenin's theorem find Current flow through Load Z_L

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG303**

COURSE NAME **ELECTRIC CIRCUITS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **08/ 12 / 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 303	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State superposition theorem for DC circuit.		1	
	b)	An alternating voltage is having maximum value 230volt. What is the average value and EMS value?		2	
	c)	Define waveform and peak factor.		2	
	d)	If maximum value of sine wave is 25A. Calculate its average value.		2	
	e)	Draw impedance trangle of R-C series circuit.		3	
	f)	Define impedance and reactance related to single phase AC series circuit.		3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Derive formula for star to delta transformation of resistances.		1	
	b)	Derive expression for resonant frequency for a RLC series circuit.		2	
	c)	With neat diagram, explain the generation of alternating current.		2	
	d)	A series R-L-C circuit has R= 5Ω, L=10mH & C- 15μF. Calculate i) Resonant frequency ii) Q factor of the circuit iii) Bandwidth iv) Voltage Magnification.		2	
	e)	Define i) Frequency ii) cycle iii) Average value iv) Peak factor for alternating sinusoidal supply.		3	
	f)	A resistance of 100Ω and 50μF capacitor are connected in series across a 230V, 50Hz supply. Find : i) Impedance ii) Current Flowing iii) Voltage across R and iv) Power factor.		3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Calculate the node voltage V_B using the nodal analysis Refer following figure (A)		1	
	b)	If $Z_1 = 3 + j7$ and $Z_2 = 12 - j16$ are connected in series, find the equivalent impedance of combination.		1	
	c)	Using superposition theorem calculate current through 10Ω resistor. Use circuit shown fig (B).		2	
	d)	Two phasors are $V_1 = 7 + j\,9$, $V_2 = 3 - j5$. Find *a)* $\overline{V_1} + \overline{V_2}$ *b)* $\overline{V_1} - \overline{V_2}$ in rectangular form.		2	

	e)	Two sinusoidal voltages are expressed by the following Mathematical expressions: $V_1 = 10\sin\left(200\pi t + \frac{\pi}{3}\right)$ $V_2 = 15\sin\left(200\pi t - \frac{\pi}{2}\right)$ Draw the phasor diagram for the same and calculate the phase difference between them in radians and also in degrees.		3	
	f)	A resistance of 10Ω inductance of 0.1 H and capacitance of 100μF are connected in series across 100 volts, 50Hz AC supply. Find i) Current ii) Power factor ii) Power iv) Draw vector diagram.		2	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER 23

EXAM SEAT NO.

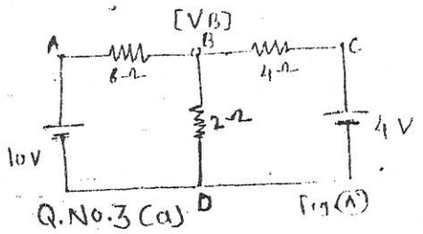
LEVEL : - THIRD. PROGRAM : ELECTRICAL ENGG.

COURSE CODE :- GECT-EEG-303

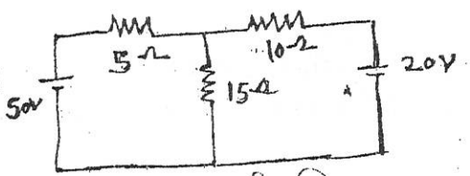
COURSE NAME :- ELECTRICAL CIRCUITS

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08 /12 /23

QN	SQN		R/U/A	Co	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Elaborate Impedance connected in parallel connection supplied by AC supply.	R	CO4	02
	b)	Define maximum power transfer theorem for AC circuits with simple example & circuit.	R	CO4	02
	c)	Explain steps of applying super position theorem for AC circuits.	R	CO5	02
	d)	Using suitable circuit diagram state Thevenin's theorem for AC circuits.	R	CO5	02
	e)	Explain resonance in AC parallel impedance circuits with simple example.	R	CO5	02
	f)	State various lower & higher units of different types of power in 3 phase AC circuits.	R	CO6	02
Q.5		Attempt any **FOUR:**			**16**
	a)	As given in fig no Two impedances connected in parallel Z1= 30+j20 ohms, & Z2= 20+j30 ohms across the 1 phase 230 volt 50 Hz AC supply, determine current in each branch & total current supplied to circuit.	A	CO4	04
	b)	Solve the given AC circuit shown in fig. no-04 to find current flowing through Z_L using Thevenin's theorem.	A	CO5	04
	c)	Explain Maximum power transfer theorem applied to AC circuit of two loop only as shown in fig no-05.	A	CO5	04
	d)	Explain superposition theorem applied to AC circuit of two loops only to find current flowing through load Z3 as shown in fig no-06.	U	CO5	04
	e)	Explain with suitable labeled sketch generation of 3 phase supply system.	U	CO6	04
	f)	Explain with suitable labeled sketch 3 phase 3 wire & 3 phases 4 wire supply system.	A	CO6	04
Q.6		Attempt any **FOUR:**			**16**
	a)	In a AC parallel circuit first branch of R=20 ohms in series with L=15 mH, & second branch of R=30 ohms in series with C=85 Microfarads connected across source of 1 phase 230 volt 50 Hz AC supply, calculate the total impedance of the parallel circuit.	A	CO4	04
	b)	Derive an expression Y=Y1+Y2 of admittances of two impedances which are connected in parallel across 1 phase AC supply.	A	CO4	04
	c)	Solve the given AC circuit in fig no-07 to find current flowing through the load Z_L using Thevenin's theorem.	A	CO5	04
	d)	Explain the differences in 3 phase active & reactive power in an AC circuit.	U	CO6	04
	e)	A 3 phase star connected load having impedances 4+j6 ohms in each phase connected to 3 phase 400V 50 Hz AC supply, Calculate Line & phase currents, Active, reactive & Apparent power drawn by the load.	A	CO6	04
	f)	A 3 phase delta connected load having impedances 6+j8 ohms in each phase connected to 3 phase 230V 50 Hz AC supply, Calculate Line & phase currents, Active, reactive & Apparent power drawn by the load.	A	CO6	04

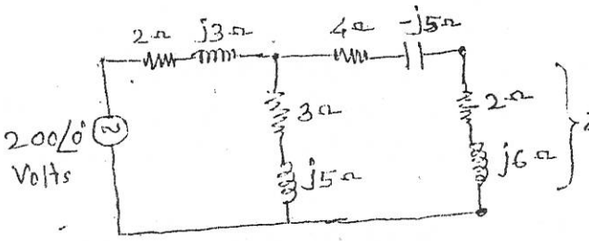


Q.No.3 (a) Fig (A)



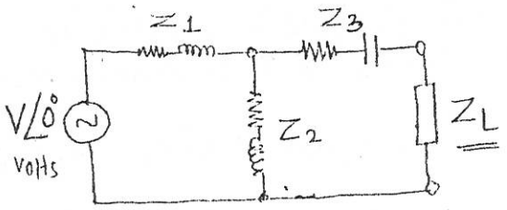
Q.No.3 (c) Fig (B)

Fig No 04
Q.5-b)



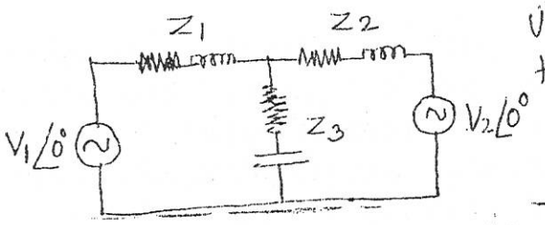
Using Thevenin's theorem Find current through Z_L

Fig No 05
Q 5-c)



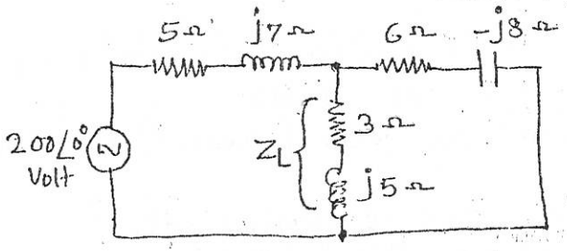
Find P_{max} absorbed by Z_L using Max Power transfer theorem.

fig No 06
Q 5-d)



Using superposition theorem find current flowing through Z_3

fig No-07
Que-6-c)



Using Thevenin's theorem find Current flow through Load Z_L

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/~~SUMMER~~- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : Electrical Engineering

COURSE CODE :- EEG311

COURSE NAME :- Electrical Estimation and contracting.

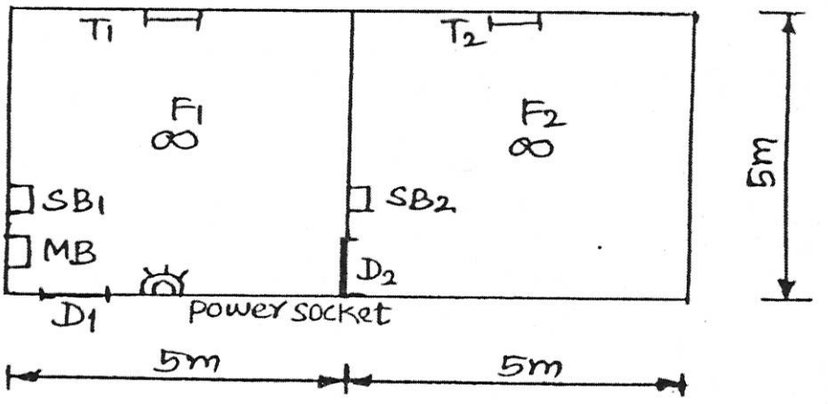
MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08/12/23

Instruction :-

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

QN	SQN		R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State any four IE rules for electrical installation.	R	1	02
	b)	State the purpose of estimating and costing.	R	1	02
	c)	State the classification of electrical drawings.	R	2	02
	d)	Draw the symbol for i) Exhaust fan ii) intermediate switch	U	2	02
	e)	List out various requirements of electrical installation for commercial building.	R	3	02
	f)	State two factors for selection of layout of commercial installation.	U	3	02
Q.2		Attempt any **FOUR:**			**16**
	a)	State the general requirements of electrical installation.	R	1	04
	b)	Describe step by step procedure of Estimation and costing of residential Installation with suitable example.	U	2	04
	c)	A domestic installation is having following load. i) 4 light points of 60 W. ii) 3 light points of 100 W. iii) 4 Fan points of 60 W. iv) 4 Sockets of 6 Amp having 60 W. v) 2 Sockets of 16 Amp having 2 KW. Find the number of lighting and power sub circuit.	A	2	04
	d)	Which provisions are done in commercial wiring installation design?	R	3	04
	e)	Compare residential installation and commercial installation on the basis of load capacity, type of supply, initial cost and type of load used.	U	3	04
	f)	Explain the design consideration and guidelines for the electrical installation in commercial building.	A	3	04
Q.3		Attempt any **TWO:**			**16**
	a)	i. Draw wiring diagram and Schematic diagram for two lamp points, one ceiling fan and one 5A socket to be controlled by individual switches. ii. Describe various qualities of a good estimator.	R A	2 1	04 04

	b)	Calculate the length of phase wire and neutral wire for the residential installation as shown in Fig. No. 1.	A	2	08



T_1-T_2 → Tube
F_1-F_2 → Fan
SB_1-SB_2 → Switch Board
D_1-D_2 → Door
MB → Main board

Assume one 5 A socket on each switch board. Assume height of rooms as 3 m.

	c)	A commercial hall of dimensions 16m x 8m having R.C.C. ceiling at a height of 4m is to be provided with following electric fittings.	A	3	08

Fluorescent tube 40W → 9 Nos.
Ceiling Fans 50W → 4 Nos.
Plug points 100W→ 2 Nos.

Draw single line diagram showing the position of switches and fittings. Estimate the quantity of material required.

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL: -3 PROGRAM: Electrical Engineering

COURSE CODE: - EEG 311

COURSE NAME: - ELECTRICAL ESTIMATION AND CONTRACTING

MAX. MARKS: **80** TIME: **03 Hrs** DATE: - 08/12/23

Instruction:-

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

QN	SQN		R/U/A	Co	Marks
Q.4		Attempt any FOUR of following:			**08**
	a)	State how fuse rating and starter are decided in factory unit.	A	4	2
	b)	State the types of earthing used in domestic wiring installation.	R	5	2
	c)	State the equipment used for testing of any installation.	A	5	2
	d)	Define Tender and Tender Notice.	R	6	2
	e)	State any four characteristics of valid contract.	U	6	2
	f)	Enlist the types of contract.	U	6	2
Q.5		Attempt any FOUR of following:			**16**
	a)	Explain the procedure for deciding the rating of cables having industrial motor loads of 1HP,3HP and 5 HP capacity.	U	4	4
	b)	Prepare a schedule of estimation of material of approximate cost for 12 HP, 3 phase 415v, 50 Hz AC motor in saw mill of working area 7m x16m size.	A	4	4
	c)	State the types of starter required for following motors: i. Induction motor of fractional KW rating ii. Induction motor of medium rating (upto 15 kW) iii. Induction motor with high rating iv. Slip ring Induction motor of high rating.	A	4	4
	d)	State testing equipment used for measurement of high resistance and explain any one in detail.	U	5	4
	e)	Differentiate between administrative approval and technical sanction of a certain work.	A	6	4
	f)	Explain the procedure for submission and opening of tender's.	U	6	4
Q.6		Attempt any FOUR of following:			**16**
	a)	Draw single line diagram of motor wiring circuit and Enlist the components used.	U	4	4
	b)	State and explain how size of conduit is decided in factory installation.	A	4	4
	c)	State the types of cables and installation methods for factory electrical installation.	U	4	4
	d)	With neat diagram, explain in detail how insulation test is carried out for wiring.	U	5	4
	e)	Draw a wiring diagram of 3 phase main switch board.	A	4	4
	f)	Explain the criteria for selection of contractor and supplier.	U	6	4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/~~SUMMER~~- 2023

EXAM SEAT NO. | | | | | | | |

LEVEL : - Third PROGRAM : Electrical Engineering

COURSE CODE :- EEG311

COURSE NAME :- Electrical Estimation and contracting.

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-08/12/23

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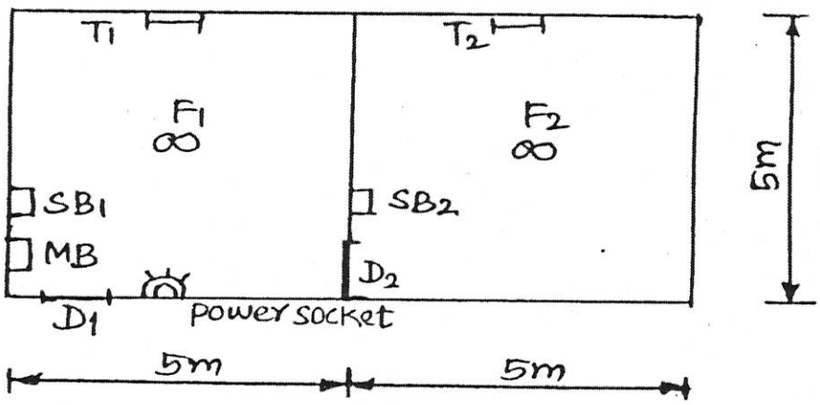
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN		R/U/A	Co	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State any four IE rules for electrical installation.	R	1	02
	b)	State the purpose of estimating and costing.	R	1	02
	c)	State the classification of electrical drawings.	R	2	02
	d)	Draw the symbol for i) Exhaust fan ii) intermediate switch	U	2	02
	e)	List out various requirements of electrical installation for commercial building.	R	3	02
	f)	State two factors for selection of layout of commercial installation.	U	3	02
Q.2		Attempt any **FOUR:**			**16**
	a)	State the general requirements of electrical installation.	R	1	04
	b)	Describe step by step procedure of Estimation and costing of residential Installation with suitable example.	U	2	04
	c)	A domestic installation is having following load. i) 4 light points of 60 W. ii) 3 light points of 100 W. iii) 4 Fan points of 60 W. iv) 4 Sockets of 6 Amp having 60 W. v) 2 Sockets of 16 Amp having 2 KW. Each Find the number of lighting and power sub circuit.	A	2	04
	d)	Which provisions are done in commercial wiring installation design?	R	3	04
	e)	Compare residential installation and commercial installation on the basis of load capacity, type of supply, initial cost and type of load used.	U	3	04
	f)	Explain the design consideration and guidelines for the electrical installation in commercial building.	A	3	04
Q.3		Attempt any **TWO:**			**16**
	a)	i. Draw wiring diagram and Schematic diagram for two lamp points, one ceiling fan and one 5A socket to be controlled by individual switches.	R	2	04
		ii. Describe various qualities of a good estimator.	A	1	04

	b)	Calculate the length of phase wire and neutral wire for the residential installation as shown in Fig. No. 1.  T_1-T_2 → Tube F_1-F_2 → Fan SB_1-SB_2 → Switch Board D_1-D_2 → Door MB → Main board Assume one 5 A socket on each switch board. Assume height of rooms as 3 m.	A	2	08
	c)	A commercial hall of dimensions 16m x 8m having R.C.C. ceiling at a height of 4m is to be provided with following electric fittings. Fluorescent tube 40W → 9 Nos. Ceiling Fans 50W → 4 Nos. Plug points 100W→ 2 Nos. Draw single line diagram showing the position of switches and fittings. Estimate the quantity of material required.	A	3	08

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-

EXAM SEAT NO. | | | | | | |

LEVEL: -3 PROGRAM: Electrical Engineering

COURSE CODE: - EEG 311

COURSE NAME: - ELECTRICAL ESTIMATION AND CONTRACTING

MAX. MARKS: **80** TIME: **03 Hrs** DATE: - 08/12/23

Instruction:-

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

QN	SQN		R/U/A	Co	Marks
Q.4		Attempt any FOUR of following:			**08**
	a)	State how fuse rating and starter are decided in factory unit.	A	4	2
	b)	State the types of earthing used in domestic wiring installation.	R	5	2
	c)	State the equipment used for testing of any installation.	A	5	2
	d)	Define Tender and Tender Notice.	R	6	2
	e)	State any four characteristics of valid contract.	U	6	2
	f)	Enlist the types of contract.	U	6	2
Q.5		Attempt any FOUR of following:			**16**
	a)	Explain the procedure for deciding the rating of cables having industrial motor loads of 1HP,3HP and 5 HP capacity.	U	4	4
	b)	Prepare a schedule of estimation of material of approximate cost for 12 HP, 3 phase 415v, 50 Hz AC motor in saw mill of working area 7m x16m size.	A	4	4
	c)	State the types of starter required for following motors: i. Induction motor of fractional KW rating ii. Induction motor of medium rating (upto 15 kW) iii. Induction motor with high rating iv. Slip ring Induction motor of high rating.	A	4	4
	d)	State testing equipment used for measurement of high resistance and explain any one in detail.	U	5	4
	e)	Differentiate between administrative approval and technical sanction of a certain work.	A	6	4
	f)	Explain the procedure for submission and opening of tender's.	U	6	4
Q.6		Attempt any FOUR of following:			**16**
	a)	Draw single line diagram of motor wiring circuit and Enlist the components used.	U	4	4
	b)	State and explain how size of conduit is decided in factory installation.	A	4	4
	c)	State the types of cables and installation methods for factory electrical installation.	U	4	4
	d)	With neat diagram, explain in detail how insulation test is carried out for wiring.	U	5	4
	e)	Draw a wiring diagram of 3 phase main switch board.	A	4	4
	f)	Explain the criteria for selection of contractor and supplier.	U	6	4

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

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 :-11 /12/2023

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	Question Text	R/U/A	Co EEG 310	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist any four types of conductors with their trade names.	U	1	2
	b)	Describe any two methods for improving string efficiency.	U	1	2
	c)	Define skin effect and proximity effect in transmission system.	R	2	2
	d)	Draw bipolar hvdc link.	R	4	2
	e)	State any two advantages and disadvantages of corona.	R	2	2
	f)	Classify overhead lines based on voltage level and length.	R	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe the classification of underground cables.	U	1	**4**
	b)	Explain with diagram, suspension insulator.	A	1	4
	c)	A transmission line with a cross-sectional area of 2 cm^2 has a span of 150 m between level supports and specific gravity of 9.9 gm/cm^3. The tension in the conductor is 2000 kg. Calculate the sag on transmission line.	A	1	4
	d)	Describe the necessity of transposition applicable in transmission line.	U	2	4
	e)	Explain the effects of constants R, L, C on performance of transmission line.	U	2	4
	f)	Compare HVDC with HVAC power transmission. (any four points)	U	4	4
Q.3		Attempt any **FOUR:**			**16**
	a)	Define corona and explain factors influencing corona.	U	2	4
	b)	Draw representation of i) Short, ii) Medium, iii) Long transmission lines with their lengths in Kilometers.	A	2	4
	c)	Illustrate working of wireless power transmission system.	U	3	4
	d)	Draw single line diagram for ring main distribution system for voltages 11 kV to 400 kV.	U	3	4
	e)	Explain the advantages of HVAC and state its applications.	A	4	4
	f)	A 220-kV, 150 MVA, 60-Hz, three-phase transmission line is 140 km long. The characteristic parameters of the transmission line are: r = 0.09 Ω/km; x = 0.88 Ω/km; y =4.1×10-6 S/km where, r is the resistance/km, x is the reactance/km, y is the shunt admittance/km. Consider it is modelled as short transmission line for calculation. Calculate series impedance of the transmission line and the efficiency of the transmission line when it is supplying rated apparent power at 0.85 PF lagging, with receiving end voltage of 210kV.	A	3	4

P.T.O.

QN	SQN	Question Text	R/U/A	Co EEG 310	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define the following term :- i) Feeder ii) Distributor.	R	5	
	b)	Define i) flat rate tariff ii) Fixed rate tariff.	R	6	
	c)	State types of distribution schemes.	R	5	
	d)	Define tariff.	R	6	
	e)	State two disadvantages of radial connection scheme of distribution system.	U	5	
	f)	Enlist method used for correction of power factor.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw ring main connection scheme of distribution system and also state any two advantages.	U	5	
	b)	Explain block rate tariff and stat its two advantages.	U	6	
	c)	Draw a single line diagram of B3KV/11 KV substation.	A	5	
	d)	Compare indoor substation with outdoor substation.	A	5	
	e)	Explain in brief four factors to be considered while designing feeder.	U	5	
	f)	A consumer has a maximum demand of 200 KW at 40% load factor. If the tariff is as Rs. 100 per KW of maximum demand plus 10 paise per kWh. Find the overall cost per KWh.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Compare A.C. distribution with D.C. distribution on four points.	A	5	
	b)	State function of following equipment used in substation. i) Transformer ii) Isolators iii) Circuit Breaker iv) Lighting Arrester	U	5	
	c)	State selection and location factor for substation. (any four)	U	5	
	d)	State causes and drawbacks of low power factor. (any two each)	U	6	
	e)	State and explain desirable characteristics of tariff.	U	6	
	f)	A three phase 6KW induction motor has a power factor of 0.8 lagging. A bank of capacitors is connected in delta across supply terminals and the p.f. raised to 0.9 lagging. Determine the kVAR rating of capacitors connected in each phase.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

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 :-11 /12/2023

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	Question Text	R/U/A	Co EEG 310	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Enlist any four types of conductors with their trade names.	U	1	2
	b)	Describe any two methods for improving string efficiency.	U	1	2
	c)	Define skin effect and proximity effect in transmission system.	R	2	2
	d)	Draw bipolar hvdc link.	R	4	2
	e)	State any two advantages and disadvantages of corona.	R	2	2
	f)	Classify overhead lines based on voltage level and length.	R	3	2
Q.2		Attempt any **FOUR:**			**16**
	a)	Describe the classification of underground cables.	U	1	**4**
	b)	Explain with diagram, suspension insulator.	A	1	4
	c)	A transmission line with a cross-sectional area of 2 cm^2 has a span of 150 m between level supports and specific gravity of 9.9 gm/cm^3. The tension in the conductor is 2000 kg. Calculate the sag on transmission line.	A	1	4
	d)	Describe the necessity of transposition applicable in transmission line.	U	2	4
	e)	Explain the effects of constants R, L, C on performance of transmission line.	U	2	4
	f)	Compare HVDC with HVAC power transmission. (any four points)	U	4	4
Q.3		Attempt any **FOUR:**			**16**
	a)	Define corona and explain factors influencing corona.	U	2	4
	b)	Draw representation of i) Short, ii) Medium, iii) Long transmission lines with their lengths in Kilometers.	A	2	4
	c)	Illustrate working of wireless power transmission system.	U	3	4
	d)	Draw single line diagram for ring main distribution system for voltages 11 kV to 400 kV.	U	3	4
	e)	Explain the advantages of HVAC and state its applications.	A	4	4
	f)	A 220-kV, 150 MVA, 60-Hz, three-phase transmission line is 140 km long. The characteristic parameters of the transmission line are: r = 0.09 Ω/km; x = 0.88 Ω/km; y =4.1×10-6 S/km where, r is the resistance/km, x is the reactance/km, y is the shunt admittance/km. Consider it is modelled as short transmission line for calculation. Calculate series impedance of the transmission line and the efficiency of the transmission line when it is supplying rated apparent power at 0.85 PF lagging, with receiving end voltage of 210kV.	A	3	4

P.T.O.

QN	SQN	Question Text	R/U/A	Co EEG 310	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define the following term :- i) Feeder ii) Distributor.	R	5	
	b)	Define i) flat rate tariff ii) Fixed rate tariff.	R	6	
	c)	State types of distribution schemes.	R	5	
	d)	Define tariff.	R	6	
	e)	State two disadvantages of radial connection scheme of distribution system.	U	5	
	f)	Enlist method used for correction of power factor.	U	6	
Q.5		Attempt any **FOUR:**			**16**
	a)	Draw ring main connection scheme of distribution system and also state any two advantages.	U	5	
	b)	Explain block rate tariff and stat its two advantages.	U	6	
	c)	Draw a single line diagram of B3KV/11 KV substation.	A	5	
	d)	Compare indoor substation with outdoor substation.	A	5	
	e)	Explain in brief four factors to be considered while designing feeder.	U	5	
	f)	A consumer has a maximum demand of 200 KW at 40% load factor. If the tariff is as Rs. 100 per KW of maximum demand plus 10 paise per kWh. Find the overall cost per KWh.	A	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	Compare A.C. distribution with D.C. distribution on four points.	A	5	
	b)	State function of following equipment used in substation. i) Transformer ii) Isolators iii) Circuit Breaker iv) Lighting Arrester	U	5	
	c)	State selection and location factor for substation. (any four)	U	5	
	d)	State causes and drawbacks of low power factor. (any two each)	U	6	
	e)	State and explain desirable characteristics of tariff.	U	6	
	f)	A three phase 6KW induction motor has a power factor of 0.8 lagging. A bank of capacitors is connected in delta across supply terminals and the p.f. raised to 0.9 lagging. Determine the kVAR rating of capacitors connected in each phase.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG102**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **15/ 12 / 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)	Define conductor and insulator.	R	1	
	b)	Define i) Peak Inverse Voltage (PIV) ii) Transformer Utilization Factor (TUF)	R	2	
	c)	State the need of rectification.	R	2	
	d)	Define α (alpha) and β (beta)	R	3	
	e)	Draw symbol, Truth table and logic equation of AND gate.	R	4	
	f)	Enlist the types of BJT and draw the symbol of any one of it.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Differentiate between Intrinsic and extrinsic semiconductors.	U	1	
	b)	Draw and explain VI characteristics of zener diode in forward and reverse bias mode.	U	1	
	c)	Compare Half wave Rectifier (HWR) and center tap full wave rectifier (FWR) (any four points)	U	2	
	d)	State the need of filter and explain C type filter with respect to full wave bride rectifier with neat diagram and waveforms.	U	2	
	e)	i) Explain Decimal and Hexa decimal number systems. ii) Convert decimal to hexadecimal number system $(640)_{10} = (?)_{16}$	U	4	
	f)	Explain the operating principle of NPN transistor.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Describe the process of obtaining N type and P type extrinsic semiconductor.	A	1	
	b)	Enlist the applications of PN Junction diode (any four)	A	1	
	c)	Give the following parameter values corresponding to full wave center tap rectifier. i) Average dc output voltage ii) Ripple factor iii) Rectifier efficiency iv) Peak Inverse Voltage.	A	2	
	d)	Compare C,LC,CLC filters (any four points)	A	2	
	e)	Draw and explain transistor output characteristics of CB configuration.	A	3	
	f)	Convert Decimal to octal number system $(35)_{10} = (?)_8$. Convert Decimal to hexadecimal number system $(45)_{10} = (?)_2$.	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG102**

COURSE NAME **BASIC ELECTRONICS**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **15/ 12 / 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)	Define conductor and insulator.	R	1	
	b)	Define i) Peak Inverse Voltage (PIV) ii) Transformer Utilization Factor (TUF)	R	2	
	c)	State the need of rectification.	R	2	
	d)	Define α (alpha) and β (beta)	R	3	
	e)	Draw symbol, Truth table and logic equation of AND gate.	R	4	
	f)	Enlist the types of BJT and draw the symbol of any one of it.	U	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Differentiate between Intrinsic and extrinsic semiconductors.	U	1	
	b)	Draw and explain VI characteristics of zener diode in forward and reverse bias mode.	U	1	
	c)	Compare Half wave Rectifier (HWR) and center tap full wave rectifier (FWR) (any four points)	U	2	
	d)	State the need of filter and explain C type filter with respect to full wave bride rectifier with neat diagram and waveforms.	U	2	
	e)	i) Explain Decimal and Hexa decimal number systems. ii) Convert decimal to hexadecimal number system $(640)_{10} = (?)_{16}$	U	4	
	f)	Explain the operating principle of NPN transistor.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Describe the process of obtaining N type and P type extrinsic semiconductor.	A	1	
	b)	Enlist the applications of PN Junction diode (any four)	A	1	
	c)	Give the following parameter values corresponding to full wave center tap rectifier. i) Average dc output voltage ii) Ripple factor iii) Rectifier efficiency iv) Peak Inverse Voltage.	A	2	
	d)	Compare C,LC,CLC filters (any four points)	A	2	
	e)	Draw and explain transistor output characteristics of CB configuration.	A	3	
	f)	Convert Decimal to octal number system $(35)_{10} = (?)_8$. Convert Decimal to hexadecimal number system $(45)_{10} = (?)_2$.	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG101**

COURSE NAME **FUNDAMENTALS OF ELECTRICITY & MAGNETISM**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **18/ 12 / 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 101	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Write any two differences between direct current and alternating current.	R	1	
	b)	Define electric current and state its unit.	R	1	
	c)	Define the term resistance and state its unit.	R	2	
	d)	Derive expression for current division in two different parallel connected resistances R_1 & R_2.	A	2	
	e)	Explain the term dielectric strength for capacitor and state its unit.	U	3	
	f)	Define capacitance and state its unit.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw the symbol and characteristics of ideal voltage source and practical voltage source.	R	1	
	b)	Compare series circuit and parallel circuit (any four points)	U	2	
	c)	Calculate equivalent resistance between point A & D in the Fig. No.1	A	2	
	d)	List any two effects of electric current. Give one example of each.	R	1	
	e)	Derive the expression for the development of capacitance between two parallel plates.	U	3	
	f)	Calculate the equivalent capacitance, when three capacitors 15μf, 18μf and 12μf are connected in series circuit	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	The field coil of generator has 14.1Ω at 25^0C and 18.2Ω at 32^0C. Find temperature coefficient of resistance at 0^0C & resistance at 0^0C.	A	1	
	b)	State and explain electric line of forces. Draw useful sketches.	U	1	
	c)	Explain how current source can be converted into equivalent voltage source with neat example.	U	1	
	d)	State the expression to convert resistive star connected network into an equivalent resistive delta connected network.	R	2	
	e)	State and explain any two factors affecting the capacitance of capacitor.	R	3	
	f)	Calculate the capacitance, charge, electric flux density and energy stored in parallel plate capacitor of two metal plates 60cm X 60cm separated by dielectric from 1.5mm and relative permittivity is 3.5. The potential difference of 100V is applied across it.	A	3	

P.T.O

QN	SQN	Question Text	R/U/A	Co EEG 101	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define magnetic flux density and state its unit.	R	4	
	b)	Define the 'leakage coefficient'. What is its practical value?	R	5	
	c)	Calculate the MMF if the current of 10A is passing through the coil of 200Turns.	A	5	
	d)	Give the expression for energy stored in magnetic field.	R	6	
	e)	Define mutual inductance and state its unit.	R	6	
	f)	State the cork screw rule.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain what is Hysteresis Loss and explain how it depends upon hysteresis loop?	R	5	
	b)	Explain mutually induced emf in detail with its diagram.	R	6	
	c)	Explain Flemming's right hand rule and Lenz's law for finding direction of induced emf.	R	4	
	d)	Two coils A of 1000 turns and B of 800 turns are such that 50% of flux produced by A links with B. A current of 2A in coil A produces flux of 50 mWb and in coil B of 75 mWb. Find i) L_1 ii)L_2 iii)M iv) K (coupling coefficient)	A	6	
	e)	Define solenoid. Explain in detail with neat diagram the magnetic field due to current carrying solenoid. Also state its application.	A	4	
	f)	Define self inductance and prove that $L=\frac{N^2}{R}$ where N= Number of turns S= reluctance.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	A coli of 500 turns and resistance of 20Ω is uniformly wound on an iron ring of mean circumference 50cm and cross sectional area $6cm^2$. If it is connected to 48V DC supply. Assume relative permeability of material is 400 find: i) MMF ii) Magnetizing force iii) Reluctance iv) Flux.	A	5	
	b)	Explain BH curve in details.	U	5	
	c)	Give the properties of magnetic field line.	R	4	
	d)	Define the following terms related to the alternating quantity i) Cycle ii) Time period iii) Frequency iv) Amplitude.	R	6	
	e)	Consider a conductor of length 10cm moving with uniform velocity of 2cm/s in magnetic field of 10T with the conductor making angle of 30^0 with field. Calculate the dynamically induced emf. Also calculate emf for same conductor if conductor is placed perpendicular to field.	U	6	
	f)	Two coils of 600 and 400 turns are wound on common magnetic circuit having reluctance of $16 * 10^3$ AT/Wb. Determine i) Mutual inductance ii) The emf induced in first coil when current is changed in second coil at rate of 500 A/S.	U	5	

Q.2. C.

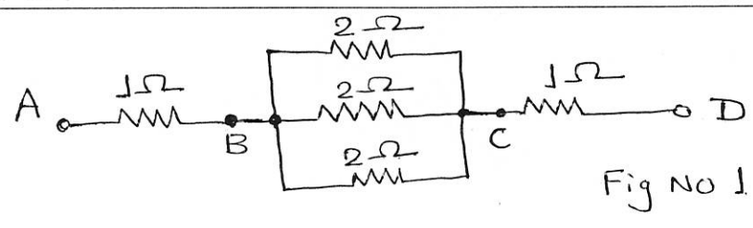

Fig No 1

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG101**

COURSE NAME **FUNDAMENTALS OF ELECTRICITY & MAGNETISM**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **18/ 12 / 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 101	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	Write any two differences between direct current and alternating current.	R	1	
	b)	Define electric current and state its unit.	R	1	
	c)	Define the term resistance and state its unit.	R	2	
	d)	Derive expression for current division in two different parallel connected resistances R_1 & R_2.	A	2	
	e)	Explain the term dielectric strength for capacitor and state its unit.	U	3	
	f)	Define capacitance and state its unit.	R	3	
Q.2		Attempt any **FOUR:**			**16**
	a)	Draw the symbol and characteristics of ideal voltage source and practical voltage source.	R	1	
	b)	Compare series circuit and parallel circuit (any four points)	U	2	
	c)	Calculate equivalent resistance between point A & D in the Fig. No.1	A	2	
	d)	List any two effects of electric current. Give one example of each.	R	1	
	e)	Derive the expression for the development of capacitance between two parallel plates.	U	3	
	f)	Calculate the equivalent capacitance, when three capacitors 15μf, 18μf and 12μf are connected in series circuit	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	The field coil of generator has 14.1Ω at 25^0C and 18.2Ω at 32^0C. Find temperature coefficient of resistance at 0^0C & resistance at 0^0C.	A	1	
	b)	State and explain electric line of forces. Draw useful sketches.	U	1	
	c)	Explain how current source can be converted into equivalent voltage source with neat example.	U	1	
	d)	State the expression to convert resistive star connected network into an equivalent resistive delta connected network.	R	2	
	e)	State and explain any two factors affecting the capacitance of capacitor.	R	3	
	f)	Calculate the capacitance, charge, electric flux density and energy stored in parallel plate capacitor of two metal plates 60cm X 60cm separated by dielectric from 1.5mm and relative permittivity is 3.5. The potential difference of 100V is applied across it.	A	3	

P.T.O

QN	SQN	Question Text	R/U/A	Co EEG 101	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define magnetic flux density and state its unit.	R	4	
	b)	Define the 'leakage coefficient'. What is its practical value?	R	5	
	c)	Calculate the MMF if the current of 10A is passing through the coil of 200Turns.	A	5	
	d)	Give the expression for energy stored in magnetic field.	R	6	
	e)	Define mutual inductance and state its unit.	R	6	
	f)	State the cork screw rule.	R	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain what is Hysteresis Loss and explain how it depends upon hysteresis loop?	R	5	
	b)	Explain mutually induced emf in detail with its diagram.	R	6	
	c)	Explain Flemming's right hand rule and Lenz's law for finding direction of induced emf.	R	4	
	d)	Two coils A of 1000 turns and B of 800 turns are such that 50% of flux produced by A links with B. A current of 2A in coil A produces flux of 50 mWb and in coil B of 75 mWb. Find i) L_1 ii)L_2 iii)M iv) K (coupling coefficient)	A	6	
	e)	Define solenoid. Explain in detail with neat diagram the magnetic field due to current carrying solenoid. Also state its application.	A	4	
	f)	Define self inductance and prove that $L=\frac{N^2}{R}$ where N= Number of turns S= reluctance.	U	6	
Q.6		Attempt any **FOUR:**			**16**
	a)	A coli of 500 turns and resistance of 20Ω is uniformly wound on an iron ring of mean circumference 50cm and cross sectional area $6cm^2$. If it is connected to 48V DC supply. Assume relative permeability of material is 400 find: i) MMF ii) Magnetizing force iii) Reluctance iv) Flux.	A	5	
	b)	Explain BH curve in details.	U	5	
	c)	Give the properties of magnetic field line.	R	4	
	d)	Define the following terms related to the alternating quantity i) Cycle ii) Time period iii) Frequency iv) Amplitude.	R	6	
	e)	Consider a conductor of length 10cm moving with uniform velocity of 2cm/s in magnetic field of 10T with the conductor making angle of 30^0 with field. Calculate the dynamically induced emf. Also calculate emf for same conductor if conductor is placed perpendicular to field.	U	6	
	f)	Two coils of 600 and 400 turns are wound on common magnetic circuit having reluctance of $16 * 10^3$ AT/Wb. Determine i) Mutual inductance ii) The emf induced in first coil when current is changed in second coil at rate of 500 A/S.	U	5	

Q.2. C.

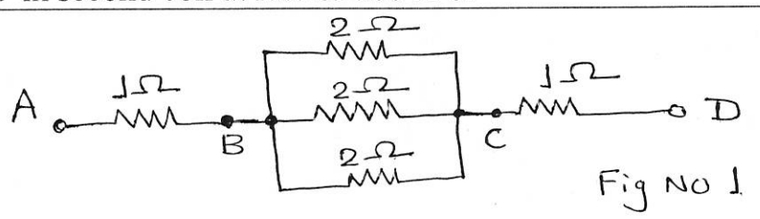

Fig No 1

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG301**

COURSE NAME **BASIC MECHANICAL AND CIVIL ENGINEERING**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **19/ 12 / 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	SECTION - I	R/U/A	Co EEG 301	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State any four uses of bearing.	R	1	
	b)	Define i) Velocity ratio ii) Gear ratio.	R	2	
	c)	Enlist types of keys.	R	1	
	d)	List any four energy conservation devices.	R	2	
	e)	State any four applications of compressed air	R	3	
	f)	State any four uses of condenser in steam power plant.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain any four applications of shaft.	A	1	
	b)	The tension in two sides of belt is 400N and 250N. If radius of pulley is 90mm. Calculate torque transmitted by open belt.	A	2	
	c)	Classify gear and explain any one gear with neat sketch.	R+U	2	
	d)	Explain with neat sketch mutt coupling.	U	1	
	e)	Explain working principle of steam turbine and boiler.	U	2	
	f)	Describe construction and working of centrifugal pump with neat diagram.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw a neat sketch of thread profile of nut show various profile parameters.	R	1	
	b)	Enumerate various types of gears and state their applications on detail.	U+A	2	
	c)	State various types of hydraulic turbines and explain any one of it with diagram.	R	2	
	d)	Draw and explain use of universal joint.	U+A	1	
	e)	Differentiate between petrol and diesel engine.	U	2	
	f)	Explain any one compressor with neat sketch.	U	3	

P.T.O

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - THREE PROGRAM :ELECTRICAL ENGINEERING

COURSE CODE :- EEG301

COURSE NAME :- Mechanical and Civil engg.

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-13 /12/23

QN	SQN	**SECTION –II**	R/U/A	Co EEG 301	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define i) FSI and ii) Built up Area	R	4	
	b)	State any two types of foundations of the buildings.	U	4	
	c)	Enlist the various types of irrigation projects.	U	6	
	d)	State any four different materials of tapes used for survey works.	U	5	
	e)	Define irrigation.	R	6	
	f)	State the necessity of plastering.	U	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain various types of roofs with any one type with a neat sketch.	A	4	
	b)	Explain the components parts of the building with a neat sketch.	U	4	
	c)	State the use of i) total station, ii) chains, iii) planimeter & iv) levels.	U	5	
	d)	Explain in brief the role of transportation in the development of country.	R	6	
	e)	Explain the components of water treatment plant.	U	6	
	f)	States the types of bonds in brick work and explain any one.	R	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	State various accessories required for plumbing works.	U	4	
	b)	Define bearing capacity and state its importance.	R	4	
	c)	Sketch the schematic diagram of waste water treatment plant.	U	6	
	d)	Explain the use of theodolite with a neat sketch.	U	5	
	e)	State the advantages of irrigation projects.	U	6	
	f)	State the types of flooring and explain any one.	R	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

ODD TERM END EXAM WINTER -2023

EXAM SEAT NO. | | | | | | |

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

COURSE CODE :- **EEG301**

COURSE NAME **BASIC MECHANICAL AND CIVIL ENGINEERING**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **19/ 12 / 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	SECTION - I	R/U/A	Co EEG 301	Marks
Q.1		Attempt any **FOUR:**			**08**
	a)	State any four uses of bearing.	R	1	
	b)	Define i) Velocity ratio ii) Gear ratio.	R	2	
	c)	Enlist types of keys.	R	1	
	d)	List any four energy conservation devices.	R	2	
	e)	State any four applications of compressed air	R	3	
	f)	State any four uses of condenser in steam power plant.	R	2	
Q.2		Attempt any **FOUR:**			**16**
	a)	Explain any four applications of shaft.	A	1	
	b)	The tension in two sides of belt is 400N and 250N. If radius of pulley is 90mm. Calculate torque transmitted by open belt.	A	2	
	c)	Classify gear and explain any one gear with neat sketch.	R+U	2	
	d)	Explain with neat sketch mutt coupling.	U	1	
	e)	Explain working principle of steam turbine and boiler.	U	2	
	f)	Describe construction and working of centrifugal pump with neat diagram.	A	3	
Q.3		Attempt any **FOUR:**			**16**
	a)	Draw a neat sketch of thread profile of nut show various profile parameters.	R	1	
	b)	Enumerate various types of gears and state their applications on detail.	U+A	2	
	c)	State various types of hydraulic turbines and explain any one of it with diagram.	R	2	
	d)	Draw and explain use of universal joint.	U+A	1	
	e)	Differentiate between petrol and diesel engine.	U	2	
	f)	Explain any one compressor with neat sketch.	U	3	

P.T.O

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER

EXAM SEAT NO. | | | | | | |

LEVEL : - THREE PROGRAM :ELECTRICAL ENGINEERING

COURSE CODE :- EEG301

COURSE NAME :- Mechanical and Civil engg.

MAX. MARKS : **80** TIME : **03 Hrs** DATE :-13 /12/23

QN	SQN	**SECTION –II**	R/U/A	Co EEG 301	Marks
Q.4		Attempt any **FOUR:**			**08**
	a)	Define i) FSI and ii) Built up Area	R	4	
	b)	State any two types of foundations of the buildings.	U	4	
	c)	Enlist the various types of irrigation projects.	U	6	
	d)	State any four different materials of tapes used for survey works.	U	5	
	e)	Define irrigation.	R	6	
	f)	State the necessity of plastering.	U	4	
Q.5		Attempt any **FOUR:**			**16**
	a)	Explain various types of roofs with any one type with a neat sketch.	A	4	
	b)	Explain the components parts of the building with a neat sketch.	U	4	
	c)	State the use of i) total station, ii) chains, iii) planimeter & iv) levels.	U	5	
	d)	Explain in brief the role of transportation in the development of country.	R	6	
	e)	Explain the components of water treatment plant.	U	6	
	f)	States the types of bonds in brick work and explain any one.	R	4	
Q.6		Attempt any **FOUR:**			**16**
	a)	State various accessories required for plumbing works.	U	4	
	b)	Define bearing capacity and state its importance.	R	4	
	c)	Sketch the schematic diagram of waste water treatment plant.	U	6	
	d)	Explain the use of theodolite with a neat sketch.	U	5	
	e)	State the advantages of irrigation projects.	U	6	
	f)	State the types of flooring and explain any one.	R	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/ SUMMER 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : DEE

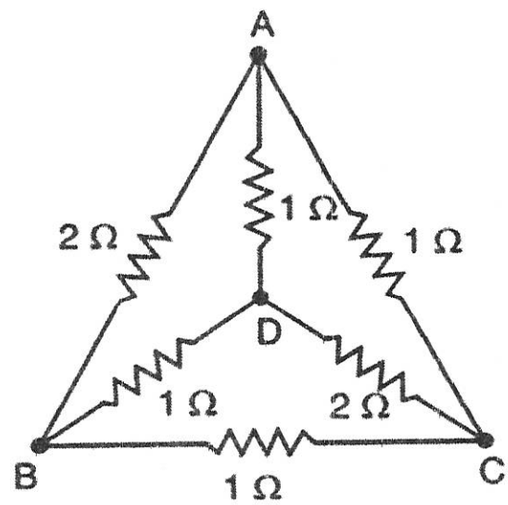
COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTALS OF ELECTRICAL ENGINEERING

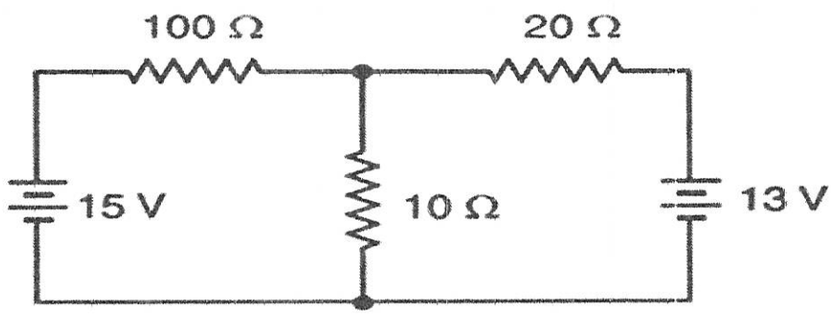
MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 19/12/23

Instruction :-

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

QN	SQN		R/U/A	Co EEH101	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	State Ohm's Law for electric circuit.	R	CO-2	
	b)	Define Electric Potential and give its unit.	R	CO-1	
	c)	State the Kirchoff's current law.	U	CO-2	
	d)	Define Electric flux density and and state its unit .	U	CO-3	
	e)	Calculate the power dissipated across 4 ohm resistance when current of 5A is passed through it.	A	CO-1	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Find the resistance between terminals B and C using star/delta transformation. 	U	CO-2	
	b)	State the law of effect of temperature on resistance of the conductor with relevant sketch and derive its mathematical expression.	R	CO-1	
	c)	Calculate the capacitance, charge in a parallel plate capacitor of two metal plates 40cm × 40 cm separated by a dielectric of 2mm and relative permittivity is 4. The potential difference of 100V is applied across it	U	CO-3	

P.T.O.

	d)	Derive expression for division of voltage in series connected resistors (2 resistors only)	R	CO-2	
	e)	The following are the details of load on a circuit connected through a supply metre : (i) Two flourescent tubes 125 watts each working for 2 hours per day (ii) One 1000 watt heater working for 3 hours per day. If each unit of energy costs Rs.1 , what will be the electricity bill for the month of June.	A	CO-1	
	f)	Derive the equation for capacitance developed between two parallel plate.	U	CO-3	
Q.3		Attempt any **TWO: (6 X 2)**			12
	a)	i)Define resistance and give its unit. ii) State the laws of resistance of conductor in detail and derive its mathematical equation	R	CO-1	
	b)	State the Kirchoff's Current Law(KCL). Calculate the current through 10 Ω resistance. 	A	CO-2	
	c)	Three capacitors have capacitances of 2μF, 6μF and 8μF respectively. What is the effective capacitance when they are connected in I) Series II) Parallel. If 180V is applied across the series combination, what is the charge on each capacitor ?	A	CO-3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-2023

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : Electrical Engineering

COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTALS OF ELECTRICAL ENGINEERING

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 19/12/23

QN	SQN		R/U/A	Co EEH101	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	State the values of absolute permeability of free space and relative permeability of air.	R	4	02
	b)	Define the term magnetic hysteresis.	R	5	02
	c)	Define the term – Dynamically induced emf.	R	6	02
	d)	With neat diagram show the generation of magnetic field due to current flowing through a straight conductor.	U	4	02
	e)	Define the term MMF and give its unit.	U	5	02
	f)	State Faraday's laws of electromagnetic induction.	U	6	02
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Describe the concept of Toroid and state its applications.	A	4	04
	b)	What are the factors affecting Hysteresis loss? How will you Minimize this loss?	R	5	04
	c)	State the following laws for finding direction of induced emf. i. Lenz's law ii. Flemming's Right hand rule	R	6	04
	d)	Compare electric circuit with magnetic circuit on any four Important points.	U	5	04
	e)	Explain the term self-induced emf with a neat diagram.	U	6	04
	f)	With reference to alternating current define - amplitude, cycle Frequency and Time Period	R	6	04
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Define – i. Magnetic field strength ii. Magnetic flux density iii. Permeability Give relation between them.	R	4	06
	b)	What is magnetic fringing? What are the effects of magnetic Fringing? How will you reduce its effects?	A	5	06
	c)	Two coils, A of 1500 turns and B of 1200 turns are such that 70% of flux produced by coil A links with coil B. A current of 5 Ampere in coil A produces flux of 0.04 Wb in coil A and 0.085 Wb in coil B. Find : i. L1 ii. L2 iii. M iv. K	A	6	06

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/ SUMMER 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : DEE

COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTALS OF ELECTRICAL ENGINEERING

MAX. MARKS :70 TIME : **03 Hrs** DATE :-19/12/23

Instruction :-

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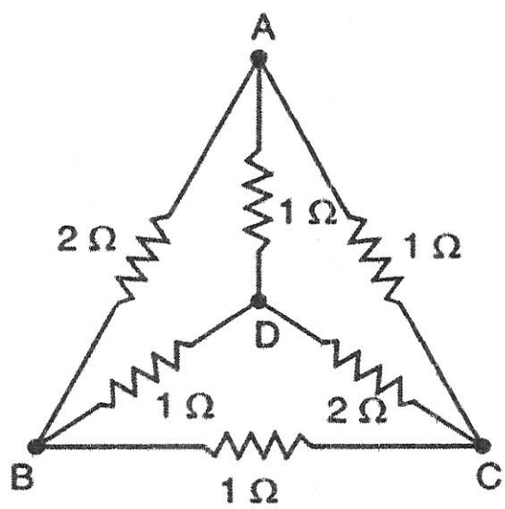
	a)	Find the resistance between terminals B and C using star/delta transformation. 	U	CO-2	
	b)	State the law of effect of temperature on resistance of the conductor with relevant sketch and derive its mathematical expression.	R	CO-1	
	c)	Calculate the capacitance, charge in a parallel plate capacitor of two metal plates 40cm × 40 cm separated by a dielectric of 2mm and relative permittivity is 4. The potential difference of 100V is applied across it	U	CO-3	

P.T.O.

	d)	Derive expression for division of voltage in series connected resistors (2 resistors only)	R	CO-2	
	e)	The following are the details of load on a circuit connected through a supply metre : (i) Two flourescent tubes 125 watts each working for 2 hours per day (ii) One 1000 watt heater working for 3 hours per day. If each unit of energy costs Rs.1 , what will be the electricity bill for the month of June.	A	CO-1	
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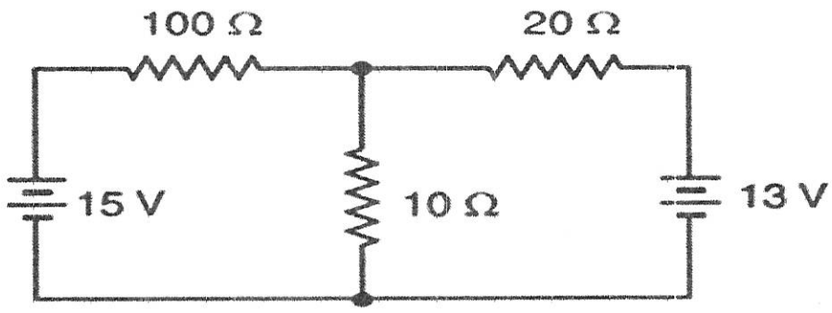
	b)	State the Kirchoff's Current Law(KCL). Calculate the current through 10 Ω resistance. 	A	CO-2	
	c)	Three capacitors have capacitances of 2μF, 6μF and 8μF respectively. What is the effective capacitance when they are connected in I) Series II) Parallel. If 180V is applied across the series combination, what is the charge on each capacitor ?	A	CO-3	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER / SUMMER-2023

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : Electrical Engineering

COURSE CODE :- EEH101

COURSE NAME :- FUNDAMENTALS OF ELECTRICAL ENGINEERING

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 19/12/23

QN	SQN		R/U/A	Co EEH101	Marks
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	c)	State the following laws for finding direction of induced emf. i. Lenz's law ii. Flemming's Right hand rule	R	6	04
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	a)	Define – i. Magnetic field strength ii. Magnetic flux density iii. Permeability Give relation between them.	R	4	06
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