SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF

ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK

VIII SEMESTER

1905805- Electric Energy Generation, Utilization and Conservation

Regulation - 2019

Academic Year 2025 - 2026 (EVEN)

Prepared by

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SUBJECT: 1905805- Electric Energy Generation, Utilization and Conservation

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UNIT I - ILLUMINATION

Importance of lighting – properties of good lighting scheme – laws of illumination – photometry - types of lamps – lighting calculations – basic design of illumination schemes for residential, commercial, street lighting, factory lighting and flood lighting – LED lighting and energy efficient lamps.

PART-A

Q.No	Questions	BT Level	Competence	COs
1	Define Light.	1	Remember	CO1
2	Define luminous efficiency.	1	Remember	CO1
3	If the total lumens required are 7200 and coefficient of utilization is 0.3, calculate lamp lumens required.	2	Understand	CO1
4	List the types of lighting system.	1	Remember	CO1
5	What are the two laws of illumination?	2	Understand	CO1
6	State inverse square law.	2	Understand	CO1
7	State Lambert's law.	2	Understand	CO1
8	Define luminous flux	1	Remember	CO1
9	Define Illumination or Illuminance or Degree of Illumination.	1	Remember	CO1
10	Define lumen.	1	Remember	CO1
11	What are the properties of heating materials?	2	Understand	CO1
12	State the different types of electrical lamps used for illumination?	2	Understand	CO1
13	Why tungsten is selected as the filament material?	2	Understand	CO1
14	List the various factors for designing the lightning scheme.	1	Remember	CO1
15	Mention any two uses of flood lighting.	2	Understand	CO1
16	What is flood lighting and where is it generally used?	2	Understand	CO1
17	List the importance of street lighting system	1	Remember	CO1
18	Define the term MSCP and lamp efficiency.	1	Remember	CO1
19	Define solid angle	1	Remember	CO1

20	Generalize plane angle.	2	Understand	CO1
21	What do you understand by polar curves as applied to light source?	2	Understand	CO1
22	Why sodium vapour lamps are not preferred for indoor lighting.	2	Understand	CO1
23	Define Waste Light Factor.	1	Remember	CO1
24	Define Utilization Factor in the design of the lighting scheme.	1	Remember	CO1
	PART-B			
1	(i) Compare the output lumen of LED, CFL and Incandescent wattage. (7) (ii) Discuss in detail about the street or road lighting with neat sketches. (6)	3	Apply	CO1
2	(i) Discuss laws of illumination. (6) (ii)A workshop measuring 5.25m by 36.6m is illuminated by 20lamps of 500W each. The luminous efficacy of each lamp is 15lumens/Watt. Allowing a depreciation factor of 0.7 and the coefficient of utilization of 0.5, determine the illumination on the working plane. (7)	4	Analyze	CO1
3	A hall 30m long and 12m wide is to be illuminated and the illumination required is 50 m candles. Deduce the number of fitting required, taking depreciation factor of 1.3 and utilization factor of 0.5.Given that the outputs of different types of lamp are given below: Watts 100 200 300 500 1000 Lumens 1615 3650 4700 9950 21500 (13)	3	Apply	CO1
4	A hall of 30 × 20 m area with a ceiling height of 6 m is to be provided with a general illumination of 200 lumens/m^2, taking a coefficient of utilization of 0.6 and depreciation factor of 1.6. Determine the number of fluorescent tubes required, their spacing, mounting height, and total wattage. Take luminous efficiency of fluorescent tube as 25 lumens/W for 300- W tube.(13)	4	Analyze	CO1
5	In a street lighting, two lamps are having luminous intensity of 300 candela, which are mounted at a height of 6 and 10 m. The distance between lamp posts is 12 m. Find the illumination, just below the two lamps. (13)	3	Apply	CO1
6	Discuss about photometry in detail. (13)	4	Analyze	CO1
7	What is Arc lamps and explain its types. (13)	4	Analyze	CO1
8	Explain types of incandescent lamp with neat diagram. (13)	4	Analyze	CO1
9	Explain about the following lamps with neat diagram. (i) Mercury Vapour lamp (6) (ii) Sodium Vapour lamp (7)	4	Analyze	CO1
10	(i)Compare tungsten filament lamps and fluorescent lamp. (6) (ii)Discuss trouble shooting of fluorescent tubes. (7)	3	Apply	CO1

11	Explain the operation of fluorescent lamp. (13)	3	Apply	CO1
12	Evaluate the various steps involved in designing of illumination system. (13)	3	Apply	CO1
13	Discuss about the types of lighting schemes. (13)	3	Analyze	CO1
14	Point out the various factors to be taken into account for designing street lighting and flood lighting. (13)	4	Analyze	CO1
15	Illustrate best energy saving practices. (13)	3	Apply	CO1
16	Explain the parts and principle of operation of LED.(13)	3	Apply	CO1
17	In a photometric bench test balance is obtained when a standard lamp of 20 candela in the horizontal direction is 1.5m and the lamp being tested is 1.25m from the photometer screen (a) What is the luminous intensity of the test lamp (b)if the light from the test lamp is reduced by 15% ,What would be the respective distance of lamps from the screens? In this case the lamps are fixed 3.5m apart and the screen moves between them. (13)	3	Apply	CO1
	PART-C			
1	A drawing, with an area of 18 × 12 m, is to be illuminated with an average illumination of about 150 lux. The lamps are to be fitted at 6 m height. Find out the number and size of incandescent lamps required for an efficiency of 20 lumens/W. UF = 0.6, MF = 0.75. (15)	5	Evaluate	CO1
2	Explain about the following and compare its merits. (i) Factory lighting (5) (ii) Flood lighting (5) (iii)Street lighting (5)	4	Analyze	CO1
3	A lamp having a candle power of 300 in all directions is provided with a reflector that directs 70% of total light uniformly on a circular area 40-m diameter. The lamp is hung at 15 m above the area. i) Calculate the illumination. (5) ii). Also calculate the illumination at the center. (5) iii). The illumination at the edge of the surface. (5)	5	Evaluate	CO1
4	Illustrate about photometry and explain different types of photocell used photometry measurement and also describe about distribution photometry. (15)	5	Evaluate	CO1
5	A hall 40-m long and 16-m wide is to be illuminated and illumination required is 70-m candles. Five types of lamps having lumen outputs, as given below are available. Watts 50 100 150 200 250 Lumens 1500 1830 2500 3200 4000 Taking a depreciation factor of 1.5 and a utilization coefficient of 0.7, calculate the number of lamps required in each case to produce required illumination. Out of above five types of lamps, select most suitable type and design, a suitable scheme, and make a sketch showing location of lamps. Assume a suitable mounting height and calculate space to height ratio of lamps. (15)	6	Create	CO1

UNIT II - REFRIGERATION AND AIR CONDITIONING				
Refrigeration-Domestic refrigerator and water coolers - Air-Conditioning-Various types of air-conditioning system and their applications, smart air conditioning units - Energy Efficient motors: Standard motor efficiency, need for efficient motors, Motor life cycle, Direct Savings and payback analysis, efficiency evaluation factor.				
PART-A				
Q.No	**Questions**	**BT Level**	**Competence**	**COs**
1	List out the applications of refrigeration system.	1	Remember	CO2
2	What ate the elements of refrigeration system?	2	Understand	CO2
3	Define coefficient of performance.	1	Remember	CO2
4	List out classification of Air-conditioning system.	2	Understand	CO2
5	What are the two main parts in domestic refrigeration system?	2	Remember	CO2
6	Point out different types of water cooler	1	Remember	CO2
7	What is meant by refrigerant and list out classification?	1	Remember	CO2
8	List out the desirable properties of ideal refrigerant.	2	Understand	CO2
9	Define psychrometry.	1	Remember	CO2
10	What are the factors affecting comfort in air conditioning system?	2	Analyze	CO2
11	Differentiate Direct saving and pay back analysis.	2	Analyze	CO2
12	What is meant by standard motor efficiency?	1	Remember	CO2
13	What is the necessity of energy efficient motors?	1	Remember	CO2
14	List the properties of energy efficient motors.	2	Understand	CO2
15	Mention the factors affecting motor efficiency.	2	Understand	CO2
16	What is meant by NEMA?	1	Remember	CO2
17	What is meant by apparent efficiency.	2	Understand	CO2
18	How energy-efficient motor different than a standard motor?	2	Understand	CO2
19	What is payback period?	1	Remember	CO2
20	Mention the efficiency of an energy efficient motor at different load points.	2	Understand	CO2
21	What is air conditioning?	1	Remember	CO2
22	List the properties of refrigeration.	2	Understand	CO2
23	Write about the refrigeration effect.	2	Understand	CO2
24	Differentiate vapour compression and vapour absorption refrigeration system.	1	Apply	CO2
PART-B				
1	Explain with neat diagram construction and working of domestic refrigerator. (13)	4	Analyze	CO2
2	What is meant by water cooler and explain different types of water cooler with neat diagram. (13)	3	Apply	CO2
3	Discuss the main requirement of good refrigerant and explain various types of refrigerant used for refrigeration system. (13)	4	Analyze	CO2
4	Explain with neat diagram different methods of refrigeration systems. (13)	4	Analyze	CO2

5	What are the components used for air-conditioning systems and briefly explain Air-conditioning cycle. (13)	4	Analyze	CO2
6	What is the working principle of Air-conditioning system and briefly explain classification of Air-conditioning systems. (13)	4	Analyze	CO2
7	Discuss briefly load estimation of Air-conditioning system. (13)	4	Analyze	CO2
8	Explain briefly cost benefit analysis of Energy Efficient motors. (13)	3	Apply	CO2
9	Explain briefly different losses occurred in the conventional motor components. (13)	3	Apply	CO2
10	Explain detail steps to calculate annual energy saving for energy efficient motors over standard motors. (13)	3	Apply	CO2
11	What is energy efficient motors and briefly explain motor efficiency labelling. (13)	4	Analyze	CO2
12	Explain briefly energy efficiency of motors. (13)	3	Apply	CO2
13	Explain briefly selection and application of energy efficient motors. (13)	4	Analyze	CO2
14	A 75 Hp motor operating at 75 percent of full rated load determine kilowatts saved, energy saved,, Annual cost saving and cost effectiveness Standard motor efficiency =91.6% , energy efficient motor efficiency=94,9% Hours of operation=8000 Monthly demand charge=5.35$/kW Energy charge=0.03$/kWh List price premium=1189$ Discount factor=0.75 (13)	3	Apply	CO2
15	Explain the working of Window type air conditioner.(13)	4	Analyze	CO2
16	Explain construction of Vapour compression refrigeration system. (13)	4	Analyze	CO2
17	Explain construction of Vapour Absorption refrigeration system. (13)	4	Analyze	CO2
PART-C				
1	Evaluate briefly with diagram room type air conditioning system and list out advantages of the system. (15)	4	Analyze	CO2
2	Explain briefly power factor and its effects of energy consumption. (15)	4	Analyze	CO2
3	Explain briefly how energy efficient motors superior than standard motors with respect to electrical characteristics. (15)	4	Analyze	CO2
4	A 25-hp poly phase induction motor, 1800-rpm application with an average annual operating time of 4000 hr and a cost of electric power of 5 $/kWh and standard motor efficiency 88% and energy efficient motor efficiency 93%, Typical list price of standard motor $993 and typical list price of energy efficient	3	Apply	CO2

	motor $1226.To find annual power cost saving and time to recover initial cost. (15)			
5	Discuss in detail the different methods of refrigeration systems. (15)	4	Analyze	CO2
UNIT III - HEATING AND WELDING				
Role of electric heating for industrial applications – resistance heating – induction heating – dielectric heating - electric arc furnaces. Brief introduction to electric welding – welding generator, welding transformer and the characteristics. Power supply for radiation welding.				
PART-A				
Q.No	**Questions**	**BT Level**	**Competence**	**COs**
1	What are the advantages of electric heating?	4	Analyze	CO3
2	Classify the methods of electric heating.	3	Apply	CO3
3	List the properties of heating element material.	2	Understand	CO3
4	What is the basic principle of induction heating?	1	Remember	CO3
5	State direct resistance heating.	1	Remember	CO3
6	What is the principle of arc furnace?	2	Understand	CO3
7	Differentiate core type and coreless type induction furnaces	4	Analyze	CO3
8	Point out advantages of electric heating.	4	Analyze	CO3
9	What is meant by welding?	1	Remember	CO3
10	Compare DC welding and AC welding.	4	Analyze	CO3
11	List the different types of welding.	3	Apply	CO3
12	What are the modern welding techniques?	2	Understand	CO3
13	What is LASER welding?	1	Remember	CO3
14	Define quenching.	2	Understand	CO3
15	Evaluate causes of failure of heating element.	5	Evaluate	CO3
16	List the types of arc welding.	2	Understand	CO3
17	What are the methods used to control the current flow in welding transformers?	3	Apply	CO3
18	Discuss power supply requirements for welding equipments.	2	Understand	CO3
19	List the factors for the selection of the welding process.	3	Apply	CO3
20	What are the drawbacks of convention welding methods?	2	Understand	CO3
21	What are the causes of failure of heating elements?	2	Understand	CO3
22	Define electric heating.	1	Remember	CO3
23	State Newton's law of cooling.	1	Remember	CO3
24	List the advantages of coreless induction furnace.	5	Evaluate	CO3
PART-B				

1	What are the modes of heat transfer and explain each. (13)	1	Remember	CO3
2	Explain the resistance heating methods with schematic diagrams. (13)	2	Understand	CO3
3	Explain i)Induction heating (8) ii)Dielectric heating (7)	2	Understand	CO3
4	Define arc. Describe the types of arc furnaces. (13)	1	Remember	CO3
5	Discuss in detail about any two types of resistance welding. (13)	5	Evaluate	CO3
6	With neat diagram describe the different type of arc welding. (13)	1	Remember	CO3
7	Discuss the principle of arc welding and the difference between carbon and metal arc welding and their relative merits and demerits. (13)	3	Apply	CO3
8	Explain the principle, working and characteristics of welding transformer. (13)	2	Understand	CO3
9	What is radiation welding? Explain its types in detail. (13)	1	Remember	CO3
10	Discuss modern welding techniques. (13)	4	Analyze	CO3
11	Estimate the efficiency of a high frequency induction furnace which takes 15 minutes to melt 2kg of Aluminium. The input to the furnace being 5kW and the initial temperature is 15^{o}C.Take specific heat of aluminium is 880J/Kg/^{o}C, melting point of Al is 660^{o}C and latent heat of fusion of Al is 32KJ/Kg. (13)	3	Apply	CO3
12	i) Compare DC welding and AC welding. (8) ii)Compare resistance and arc welding. (7)	4	Analyze	CO3
13	i) Explain the working of coreless induction furnace and list its merits. (8) ii) A 105 kg of tin is to be melt during an hour in a melting furnace. Determine a suitable rating of the furnace if melting temperature of tin is 240^{o} C. Take initial temperature of metal as 35^{o}C. (7)	3	Apply	CO3
14	Explain and compare its benefits i)Projection welding (8) ii)Spot welding (7)	4	Analyze	CO2
15	Explain its operation and compare its merits i)Butt welding (5) ii)Upset welding (4) iii)Flash-Butt welding (4)	4	Analyze	CO2
16	Discuss electric arc welding equipment and Power supply. (13)	4	Analyze	CO2
17	Calculate the energy required to melt one metric ton of brass in a single phase induction furnace. If the time taken is 1.5hr, find the power input to the furnace. Specific heat of brass = 0.094 Latent heat of fusion of brass = 38kcal/kg Melting point of brass = 920^{o} C Temperature of charge=20^{o}C Furnace efficiency =80%. (13)	3	Apply	CO2

PART-C				
1	Explain the types of induction furnaces. (15)	5	Evaluate	CO3
2	A laminated plywood board 40cm * 25cm * 1.8cm is to be heated from 25^{o}C to 160^{o}C in 12 minutes, using 25MHz supply, specific heat of wood is to be taken as 0.32, density is 0.6 g/cm^{3},relative permittivity of wood is 6 and power factor 0.05.Find the supply voltage, power required and current drawn. Take the efficiency of the process as 75%. (15)	3	Apply	CO3
3	A 10 KW 200V single phase resistance oven employs Nickel-chrome strip 0.25mm thick as its heating element .If the strip temperature is not to exceed 1000^{o}C and temperature of charge is to be 600^{o}C, calculate the width and length of the strip. Assume radiating efficiency as 0.6 and emissivity as 0.9.Take resistivity of Nickel-chrome as1.016*10^{-6} ohm-metre. (15)	3	Apply	CO3
4	Discuss the types of resistance welding. (15)	4	Analyze	CO3
5	Explain in detail the types of arc welding. (15)	4	Analyze	CO3

UNIT IV - TRACTION

Merits of electric traction – requirements of electric traction system – supply systems – mechanics of train movement – traction motors and control – braking – recent trends in electric traction. Systems of railway electrification. Traction motors and its characteristics.

PART-A

Q.No	Questions	BT Level	Competence	COs
1	Draw the speed torque characteristics of an ideal traction system drives	1	Remember	CO4
2	Mention the features of electric traction.	2	Understand	CO4
3	Name the type of motor used for electric traction. Why?	2	Understand	CO4
4	List the factors affecting scheduled speed of a train.	1	Remember	CO4
5	Sketch the speed-time curve for a sub-urban railway system.	1	Remember	CO4
6	Discuss the requirements of an ideal traction system.	2	Understand	CO4
7	State the use of speed time curve.	1	Remember	CO4
8	List four advantages of AC series motor used as traction motor.	1	Remember	CO4
9	With respect to traction system, express the term “free running”.	2	Understand	CO4
10	Mention the factor affecting schedule speed.	2	Understand	CO4
11	What are the merits and demerits of D.C. system of track electrification?	2	Understand	CO4
12	List different methods of track electrification.	1	Remember	CO4
13	What are the factors affecting schedule speed in electric traction?	2	Understand	CO4

14	What is meant by coefficient of adhesion?	1	Remember	CO4
15	What is meant by tractive effort?	1	Remember	CO4
16	Mention the factors affecting specific energy consumption of an electric train operation on a given schedules.	2	Understand	CO4
17	Differentiate dead, accelerating and adhesive weight	2	Understand	CO4
18	Why are the ac single phase series motors not suitable for urban and sub urban service?	2	Understand	CO4
19	What are the desirable requirements of braking in electric traction?	1	Remember	CO4
20	Define plugging.	1	Remember	CO4
21	Compare DC and AC traction.	2	Understand	CO4
22	Define scheduled speed.	1	Remember	CO4
23	List the methods for controlling the speed of dc series motor.	2	Understand	CO4
24	Define crest speed.	1	Remember	CO4
	PART-B			
1	Describe the different methods of traction motor control and explain. (13)	4	Analyze	CO4
2	(i)Describe the series- parallel control of electric traction motor. Also specify the advantages. (6) (ii)A train runs with an average speed of 50 kmph. Distance between stations is 2.5 km. Values of acceleration and retardation are 1.8 kmphs and 2.4 kmphps respectively. Calculate the maximum speed of the train assuming a trapezoidal speed time curve. (7)	3	Apply	CO4
3	(i)Explain Buck Boost method in electric traction systems. (6) (ii) A sub urban electric train has a maximum speed of 65kmph.The schedule speed including a station stop of 30seconds is 43.5kmph.If the acceleration is 1.3kmphps, find the value of retardation when the distance between stops is 3km. (7)	3	Apply	CO4
4	(i) Explain about the types of supply system used in traction system. (6) (ii) A 250 tonnes train with 10% rotational inertia effect is started with uniform acceleration and reaches a speed of 50 kmph in 265 seconds on level road. Calculate the specific energy consumption if the journey is to be made according to trapezoidal speed- time curve. Acceleration = 2 kmphps; Tracking retardation = 3 kmphps ; Distance between the stations = 2.4 km ; efficiency = 0.9; Track resistance=5kg/tones. (7)	3	Apply	CO4
5	(i)With the aid of transmission of tractive effort, describe the mechanism of train movement. (6) (ii) Describe clearly regenerative braking when used for Dc series traction motors. Also discuss the requirements for ideal traction. (7)	4	Analyze	CO4
6	(i) A scheduled speed of 45km per hour is required	3	Apply	CO4

	between two stops 1.5km apart. Find the maximum speed over the run, if the stop is of 20 second duration. The values of acceleration and retardation are 2.4 kmphps and 3.2kmphps respectively. Assume a simplified trapezoidal speed-time curve. (7) (ii)Discuss short notes on Trolley bus. (6)			
7	(i) Draw the speed – Time curve of a traction system. Also explain various periods and the action. (6) (ii)A train has a scheduled speed of 50 kmph over a level track, distance between stations being 1.8 kms. Station stopping time is 30 seconds. Assuming braking retardation of 3 kmphps and maximum speed 50% greater than average speed. Estimate acceleration to run the service. (7)	4	Analyze	CO4
8	What are the various types of electric braking used in traction? Discuss any two types in detail. (13)	4	Analyze	CO4
9	A train weighing 203 tonnes accelerates uniforms from the rest to a speed of 45kmph up a gradient of 1 in 500, the time taken being 30 seconds. The power is then cut off the coasts down as uniform gradient of 1 in 1000 for a period of 40 seconds when brakes are applied for period of 15 seconds so as to bring the train uniformly to the rest on this gradient. Estimate (i)The maximum power output from the driving axle. (ii)The energy taken from the conductor rails in Kwh. Assume efficiency of 60%, traction resistance to be 44 Newton/tonne at all speed, rotational inertia is 10%. (13)	3	Apply	CO4
10	(i) Explain and compare the various arrangements of current collection in traction. (6) (ii) The maximum torque of a400v, three phase four pole 60c/s IM is 100NM at a slip of 0.1.If the motor works at 50c/s 400v supply. Evaluate the maximum torque, slip and the speed at which it occurs. Neglect stator impedance. (7)	3	Apply	CO4
11	The distance between two stations is 1 km and the average speed of the train is 30 kmph. Station stopping time is 20 sec.Assume braking retardation 3 kmphps and maximum speed 1.25 times average speed .Calculate acceleration required to run the service if the speed time curve is approximated by a trapezoidal curve. (13)	3	Apply	CO4
12	(i)Compare dc and ac systems of railway electrification from the point of main line and suburban line railway service (7) (ii)What is coefficient of adhesion? How does it affect slipping of driving wheels of the traction unit? (6)	4	Analyze	CO4
13	What is tractive effort of a train and what are its function? Derive an expression for the tractive effort developed by train motion. How does the train	3	Apply	CO4

	resistance play its part in the mechanics of train motion? (13)			
14	(i)Derive crest speed using trapezoidal speed time curve for main line service. (6) (ii)An electric train has an average speed of 42kmph on a level track between stops 1400 rpm apart, It is accelerated at 1.7 kmphs and is braked at 3.3 kmphs. Draw the speed-time curve for run. (7)	4	Analyze	CO4
15	Explain the mechanics of train movement. (13)	4	Analyze	CO4
16	Discuss in detail track equipment and current collecting system. (13)	3	Apply	CO4
17	Explain overhead equipment (OHE). (13)	3	Apply	CO4
PART-C				
1	A train has schedule speed 60 Km/hr between stops which are 6 Kms apart .Determine the crest speed over the run, Assuming trapezoidal speed time curve. The train accelerates at 2 Km/hr/sec. The duration of stop is 60 seconds. (15)	3	Apply	CO4
2	A 200 tonne motor coach train has four motors each developing a shaft torque of 6000 NM during the accelerating period, Calculate the time taken by a train to attain a speed of 50Km/hr, starting from rest on a gradient of 30 in 1000 .The motors have the gear ratio of 4, gear efficiency 90 %, wheel radius 45cm. Assume train resistance 50 Newton per tonne addition of rotational inertia 10%. If the line voltage is 3000V dc and efficiency of motors 85%, find the current during notching period. (15)	3	Apply	CO4
3	Evaluate electric braking in detail. (15)	4	Analyze	CO4
4	(i)Explain briefly sag and tension calculation for trolley wire. (7) (ii) A trolley wire of a tramway is suspended from two poles 40m apart. If the tension applied is 500kg, find the total length of wire required. (8)	4	Analyze	CO4
5	Explain traction motor control. (15)	4	Analyze	CO4
UNIT V - DOMESTIC UTILIZATION OF ELECTRICAL ENERGY				
Domestic utilization of electrical energy – House wiring. Induction based appliances, Online and OFF line UPS, Batteries - Power quality aspects – nonlinear and domestic loads – Eart,hing – Domestic, Industrial and Substation				
PART-A				
Q.No	**Questions**	**BT Level**	**Competence**	**COs**
1	What are the different types of house wiring?	2	Understand	CO5
2	List the advantages of conduit wiring.	1	Remember	CO5
3	What is electric wiring?	1	Remember	CO5
4	How does the induction cooking work?	2	Understand	CO5

5	What is the difference between induction and convention ovens?	2	Understand	CO5
6	List out the advantages and advantages of induction cooktop.	1	Remember	CO5
7	Mention the induction bases appliances used in homes.	1	Remember	CO5
8	Compare online and offline UPS.	2	Understand	CO5
9	Illustrate the advantages of online UPS over offline UPS.	1	Remember	CO5
10	How does online UPS work?	2	Understand	CO5
11	Which types of batteries normally used for UPS.	1	Remember	CO5
12	Mention the main characterises of UPS batteries.	1	Remember	CO5
13	List the power quality problems due to domestic loads.	1	Rememeber	CO5
14	How can improve power quality in distribution system?	2	Understand	CO5
15	Why do non-linear loads cause harmonics?	2	Understand	CO5
16	Write out the difference between linear and nonlinear loads.	2	Understand	CO5
17	What is battery lifespan?	1	Remember	CO5
18	Illustrate the purpose of earthing.	1	Remember	CO5
19	List out the different methods of earthing.	2	Understand	CO5
20	How Earthing system differ from grounding system?	2	Understand	CO5
21	Define Electrical wiring with its General requirements.	1	Remember	CO5
22	What is the concept behind “On-line” and “Off-line” UPS?	1	Remember	CO5
23	List the main types of Lithium -ion Batteries.	2	Understand	CO5
24	Define Earthing.	1	Remember	CO5
	PART-B			
1	Explain with neat diagram different types of the house wiring. (13)	4	Analyze	CO5
2	A 230kV 3 phase 50Hz 200km transmission line has a capacitance to earth of 0.02μF/km per phase. Calculate the inductance and kVA rating of the Peterson coil used for earthing the above system. (13)	3	Apply	CO5
3	Explain briefly with neat diagram working of Online & Offline uninterrupted power supply. (13)	4	Analyze	CO5
4	Compare briefly different types of house of wiring systems. (13)	4	Analyze	CO5

5	Explain briefly different power quality problems due to home appliances. (13)	4	Analyze	CO5
6	Explain suitable methods to mitigate power quality issues in distribution system. (13)	3	Apply	CO5
7	Explain with suitable example the effects of linear and nonlinear loads in power system. (13)	4	Analyze	CO5
8	How power quality of power system affects due to non-linear loads and explain different methods to overcome the power quality issues. (13)	3	Apply	CO5
9	Explain with neat diagram different types of domestic earthing. (13)	3	Apply	CO5
10	Explain briefly equipment and system grounding in substation. (13)	4	Analyze	CO5
11	Explain in detail different types of substation earthing. (13)	3	Apply	CO5
12	What are the advantages of neutral grounding and explain briefly different methods of neutral grounding. (13)	4	Analyze	CO5
13	Explain briefly different types of batteries used for uninterrupted power supply. (13)	3	Apply	CO5
14	Explain in detail design criteria for substation grounding system. (13)	3	Apply	CO5
15	What is UPS? Explain with schematic about Online and Offline Mode. (13)	4	Analyze	CO5
16	Discuss in detail about linear and non-linear loads in domestic utilization. (13)	4	Analyze	CO5
17	Explain about the purpose and types of earthing. (13)	4	Analyze	CO5
	PART-C			
1	Explain briefly how induction heating used for different domestic appliance and mention advantages of induction heating over conventional heating method. (15)	4	Analyze	CO5
2	What is meant by Uninterrupted power supply and explain various uninterrupted power supply used for electrical appliance. (15)	3	Apply	CO5
3	Discuss the design procedure of substation grounding	4	Analyze	CO5

	system to limit the fault current. (15)			
4	Explain in detail Domestic Induction based appliances and its impacts in Power quality. (15)	3	Apply	CO5
5	Narrate in detail about domestic utilization of Energy with source and loading conditions. (15)	4	Analyze	CO5

Course Outcomes:

COs	Course Outcome
CO1	Ability to understand the main aspects of generation, utilization and conservation
CO2	Ability to construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application.
CO3	Ability to identify an appropriate method of heating for any particular industrial application
CO4	Able to understand the concept of electric traction system.
CO5	Ability to handle domestic wiring connection and debug any faults occurred.