Course Code: 23EE0221 **R23**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: Utilization of Electrical Energy(**23EE0221**) **Course & Branch**: B.Tech - EEE

Year & Sem: III-B.Tech &I-Sem **Regulation:** R23

UNIT –I
ELECTRIC DRIVES
Part A

1	Define an electric drive.	**[L1][CO1][2M]**
2	List two advantages of electric drives over non-electric drives	**[L2][CO1][2M]**
3	Define continuous duty in electric drives	**[L1][CO1][2M]**
4	What are the main types of electric drives .	**[L2][CO1][2M]**
5	Mention two industrial applications of electric drives.	**[L2][CO1][2M]**

Part B

1	What is an electric drive? What are the different types of electric drives? Explain.	[L1][CO1]	**[10M]**
2	What are the factors influencing the choice of electrical drives?	[L1][CO1]	**[10M]**
3	a) What is the Classification of Electrical Drives?	[L2][CO1]	**[5M]**
	b) What are the advantages and disadvantages of Electric drives?	[L1][CO1]	**[5M]**
4	a) How do you select a motor for an industrial application?	[L2][CO1]	**[5M]**
	b) What are the different Industrial motor load types? Explain.	[L1][CO1]	**[5M]**
5	What are the starting and running characteristics of electric drives?	[L2][CO1]	**[10M]**
6	What are the different Types of Industrial Loads? Explain in detail.	[L1][CO1]	**[10M]**
7	What are the applications of Electric drives in day-to-day life?	[L2][CO1]	**[10M]**
8	Write short notes on: (a) Continuous load operation (b) Intermittent load operation (c) Variable load operation	[L1][CO1]	**[10M]**
9	Explain the advantages and limitations of using AC drives over DC drives.	[L2][CO1]	**[10M]**
10	Compare individual drive, group drive, and multi-motor drive with neat diagrams.	[L1][CO1]	**[10M]**

UNIT –II
ELECTRIC HEATING &WELDING
Part-A

1	List any four advantages of electric heating over conventional methods.	**[L1][CO2][2M]**
2	State two applications of resistance heating	**[L1][CO2][2M]**
3	Define electric welding.	**[L1][CO2][2M]**
4	List any four advantages of electric welding over gas welding.	**[L1][CO2][2M]**
5	Write two differences between AC welding and DC welding.	**[L1][CO2][2M]**

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Part-B

1	Elaborate the meritorious advantages of electrical heating process over conventional methods.	[L1][CO2]	**[10M]**
2	Define electric heating and Explain different types of electrical heating methods	[L2][CO2]	**[10M]**
3	Describe the construction, working, and applications of direct and indirect resistance heating systems with neat diagrams.	[L2][CO2]	**[10M]**
4	a) Briefly discuss the method of Dielectric heating used in the electric heating.	[L2][CO2]	**[5M]**
	b) Briefly discuss the applications of resistance heating.	[L2][CO2]	**[5M]**
5	a) Describe direct and indirect core type furnace with neat sketches	[L2][CO2]	**[5M]**
	b) Explain application of induction heating	[L2][CO2]	**[5M]**
6	Explain the different methods of electric welding and their relative advantages	[L2][CO2]	**[10M]**
7	Describe with a neat sketch the various methods of electric resistance welding	[L2][CO2]	**[10M]**
8	Explain briefly the types of electric arc welding.	[L2][CO2]	**[10M]**
9	a) Compare resistance and arc welding	[L2][CO2]	**[5M]**
	b) Briefly discuss the types of welding electrodes	[L2][CO2]	**[5M]**
10	a) write about various types of equipment used for electric welding	[L2][CO2]	**[5M]**
	b) Differentiate between A.C and D.C welding.	[L2][CO2]	**[5M]**

UNIT –III
ILLUMINATION
Part-A

1	Define any two terms used in illumination	**[L1][CO3][2M]**
2	Define illumination	**[L1][CO3][2M]**
3	State the laws of illumination	**[L1][CO3][2M]**
4	Give any two examples of sources of light	**[L1][CO3][2M]**
5	Mention any two applications of flood lighting.	**[L1][CO3][2M]**

Part-B

1	a) Define luminous flux, luminous intensity, and illumination. Explain their units with examples.	[L1] [CO3]	**[5M]**
	b) A lamp having a uniform cp of 100 in all directions provided with a reflector which directs 60% of the light uniformly on to a circular area of 10m diameter. The lamp is hung 5m above the area. Calculate the illumination at the center.	[L2] [CO3]	**[5M]**
2	a) State and derive the inverse square law and Lambert's cosine law of illumination	[L1] [CO3]	**[5M]**
	b) Six lamps are used to illuminate a certain room. If the luminous efficiency of each lamp is 12lumens/watt and the lamps have to emit a total lux of 10,000 lumens, calculate (i)Theme a spherical luminous intensity (ii)The cost of energy consumed in 3hours if the charge for electrical energy is 50 paisa per unit.	[L3] [CO3]	**[5M]**
3	Explain the construction, working principle, and applications of a mercury vapor lamp with a neat diagram.	[L3] [CO3]	**[10M]**
4	Explain the construction, working principle, and applications of a sodium vapor lamp with a neat diagram	[L2] [CO3]	**[10M]**
6	a) Compare tungsten filament lamps and fluorescent tubes	[L1] [CO3]	**[5M]**
	b) A filament lamp of 500W is suspended at a height of 4.5 m above the working	[L3] [CO3]	**[5M]**

	plane and gives uniform illumination over an area of 6 m diameter. Assuming an efficiency of the reflector as 70% and efficiency of lamp as 0.8 watt per candle power, determine the illumination on the working plane		
7	Explain the construction and working of a compact fluorescent lamp (CFL) with advantages and disadvantages.	[L1] [CO3]	**[10M]**
8	A room measuring 30m×15m is to be illuminated by 10 lamps and the average illumination is to be 85 lux. Determine the MSCP of each lamp if the utilization and depreciation factors are 0.5 and 0.8 respectively	[L3] [CO3]	**[10M]**
9	What are the design considerations of a good lighting system? Explain in detail	[L1] [CO3]	**[10M]**
10	Explain the principle of operation of LED lamps and list their advantages	[L1] [CO3]	**[10M]**

UNIT –IV
ELECTRIC TRACTION
Part A

1	Define electric traction	**[L1][CO4][2M]**
2	What is a speed-time curve	**[L1][CO4][2M]**
3	List any two existing electric traction systems in India	**[L1][CO4][2M]**
4	List any two disadvantages of plugging	**[L1][CO4][2M]**
5	What is meant by magnetic levitation	**[L1][CO4][2M]**

Part B

1	a) Compare A.C traction with D.C traction with necessary examples.	[L2][CO4]	**[5M]**
	b) Describe the electrical traction and track electrification	[L2][CO4]	**[5M]**
2	Discuss the characteristic features of a traction motor for effective traction systems	[L1][CO4]	**[10M]**
3	a) What are the special features of traction motors?	[L1][CO4]	**[5M]**
	b) A goods trains weighing 300 tonnes is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1 kmph/s. Coefficient of adhesion is 20%. Track resistance = 45 W/Ton and effect of rotational masses is 15% of dead weight. If axle load is not to exceed by 20 tonnes, determine the weight of locomotive and number of axles.	[L3][CO4]	**[5M]**
4	a) How the electric traction system is classified? Briefly discuss.	[L1][CO4]	**[5M]**
	b) A train has schedule speed of 30 km/hr over a level track distance between stations being 1 km. Duration of stop is 20 sec. Assuming braking retardation of 3 km/hr/sec and maximum speed 25% greater than average speed, calculate acceleration required to run the service.	[L3][CO4]	**[5M]**
5	A train is to run between two stations 1.6 km apart at an average speed of 40 kmph, the run is to be made to a quadrilateral N-T curve. Maximum speed is to be limited to 64 kmph, acceleration, to 2 kmph/s, coasting retardation to 0.16, and braking retardation to 3.2, Determine the duration of a acceleration, coasting and braking periods.	[L3][CO4]	**[10M]**
6	a) Discuss the speed-time curves for urban service.	[L2][CO4]	**[5M]**
	b) A sub urban electric train has a maximum speed of 70 km/hr. The schedule speed including a station stop of 30 sec in 45 km/hr. If the acceleration is 1.5 km/hr/sec. Find the value of retardation when the average distance between stops is 600 m.	[L2][CO4]	**[5M]**
7	Describe how Plugging, Rheostatic braking and Regenerative braking are employed with DC series motor	[L2][CO4]	**[10M]**
8	a) Discuss the speed-time curves for main line services.	[L1][CO4]	**[5M]**
	b) A train has schedule speed of 60 km/hr between the stops which are 6 km apart.	[L3][CO4]	**[5M]**

	Determine the crest speed over the run assuming trapezoidal speed time curve. The train accelerates at 2 km/hr/sec and retards at 3 km/hr/sec. Duration of stops is 60s.		
9	An electric train is to have acceleration and breaking retardation of 0.8 km/hr/sec and 3.2 km/hr/sec respectively. If the ratio of maximum to average speed is 1.3 and time for stop is 26 sec, find the schedule speed for a run of 1.5 km. Assume simplified trapezoidal speed time curve.	[L3][CO4]	**[10M]**
10	With the help of Speed-Time curve, define and explain the importance of following factors in a traction system. a. Notching period. b. Free running period. c. Coasting period. d. Braking period.	[L2][CO4]	**[10M]**

UNIT –V
Electrolytic Process
Part A

1	Define electrolysis	**[L1][CO5][2M]**
2	State Faraday's First Law of Electrolysis.	**[L1][CO5][2M]**
3	Mention two applications of electrodeposition.	**[L1][CO5][2M]**
4	Differentiate between extraction and refining of metals.	**[L1][CO6][2M]**
5	Write the overall cell reaction of a hydrogen–oxygen fuel cell.	**[L1][CO6][2M]**

Part B

1	a) What is electrolysis? Give advantages of using this processing method.	[L2][CO5]	**[5M]**
	b) Explain the widely used areas of electrolysis.	[L2][CO5]	**[5M]**
2	Discuss the various applications of electrolysis in detail.	[L2][CO5]	**[10M]**
3	a) Discuss about the process of electro plating.	[L2][CO5]	**[5M]**
	b) Discuss about Faraday's laws of electrolytic process.	[L2][CO5]	**[5M]**
4	Describe briefly the process of electrolysis and power supply for electrolysis.	[L1][CO5]	**[10M]**
5	Ii is required, to repair a worn out circular shaft 15 cm in diameter and 32 cm long bv coating it with a layer of 1.6 mm of nickel. Determine the theoretical quantity of electricity required and the time taken if the current density used is210 A/m^2. Electrochemical equivalent of nickel is $30.4x10^{-8}$ Kg/C of electricity and density of nickel is $8.9 x10^3$ Kg/m^3.	[L3][CO5]	**[10M]**
6	a) Explain the factors on which quality of electro deposition depends.	[L2][CO5]	**[5M]**
	b) Explain the terms used in electrolytic processes: (i) Current efficiency (ii) Energy efficiency	[L2][CO5]	**[5M]**
7	Calculate the thickness of copper deposited on a plate area of 2.2 cm^2 during electrolysis if a current of 1 A is passed. for 90 minutes. E.C.E. of copper = $32.95 x 10^{-8}$ kg/C and density of copper is 8900 Kg/m^3.	[L3][CO5]	**[10M]**
8	explain briefly extraction and refining of metal by electrolysis	[L2][CO6]	**[5M]**
9	a) Explain about Electro-polishing.	[L1][CO4]	**[5M]**
	b)What are the objectives of electroplating.	[L1][CO4]	**[5M]**
10	Explain the construction, working, reactions, advantages and disadvantages of a hydrogen–oxygen fuel cell.	[L1][CO4]	**[5M]**

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