O.P.Code: 20EE0243 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. IV Year I Semester Regular & Supplementary Examinations October/November-2025
APPLICATION OF ELECTRICAL POWER
(Open Elective-IV)

Time: 3 Hours **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Write short notes on: i) Define luminous flux. ii) Define Mean spherical candle power iii) Define lamp efficiency .	CO1	L2	6M
	b	A filament lamp of 450W is suspended at a height of 5.5 m above the working plane and gives uniform illumination over an area of 6.5 m diameter. Assuming an efficiency of the reflector as 60% and efficiency of lamp as 0.85 watt per candle power, determine the illumination on the working plane.	CO1	L3	6M
		OR			
2	a	Explain the various factors to be taken into account for designing schemes for (i) Factory lighting (ii) Street lighting	CO1	L2	6M
	b	Four lamps are used to illuminate a certain room. If the luminous efficiency of each lamp is 10 lumens/watt and the lamps have to emit a total lux of 8,000 lumens, calculate (i) The mean spherical luminous intensity (ii) The cost of energy consumed in 5 hours if the charge for electrical energy is 75 paise per unit.	CO1	L3	6M

UNIT-II

3	a	Describe direct core type furnace with neat sketch.	CO2	L2	6M
	b	Determine the amount of energy required to melt brass at the rate of one ton per hour in a single phase Ajax Wyatt furnace. Specific heat of brass is 0.096 Kcal/ Kg/°C. Latent heat of fusion is 50 Kcal/Kg, initial temperature is 22°C, melting point of brass is 940°C. Assume efficiency to be 70 %.	CO2	L3	6M
		OR			
4	a	Write short notes on: i) Infrared heating ii) pinch effect in induction heating. iii) various modes of heat transfer.	CO2	L2	6M
	b	A low frequency induction furnace whose secondary voltage is maintained constant at 15 volts, takes 450 kW at 0.7 pf, when the hearth is full. Assuming the resistance of the secondary to vary inversely as the height of the charge and reactance to remain constant, height up to which the hearth should be filled to obtain maximum heat.	CO2	L3	6M

UNIT-III

5	a	Write short notes on: i) Welding transformer characteristics. ii) Spot welding. iii) arc stability	CO3	L2	6M
	b	Explain about metal arc welding, carbon arc welding methods with n ecessary illustrations.	CO3	L2	6M
		OR			
6	a	What type of electric supply is suitable for electric arc welding?	CO3	L2	6M
	b	Differentiate between A.C and D.C welding.	CO3	L2	6M

UNIT-IV

7	a	What are the objectives of electroplating.	CO4	L2	6M
	b	Ii is required, to repair a worn out circular shaft 20 cm in diameter and 35 cm long bv coating it with a layer of 1.8 mm of nickel. Determine the theoretical quantity of electricity required and the time taken if the current density used is 220 A/m^2. Electrochemical equivalent of nickel is $30.5x10^{-8}$ Kg/C of electricity and density of nickel is 7.9 $x10^3$ Kg/m3.	CO4	L3	6M
		OR			
8	a	Discuss about Faraday's laws of electrolytic process.	CO4	L2	6M
	b	Explain the factors on which quality of electrodeposition depends.	CO4	L2	6M

UNIT-V

9		An electric train is to have acceleration and breaking retardation of 0.7 km/hr/sec and 3.3 km/hr/sec respectively. If the ratio of maximum to average speed is 1.5 and time for stop is 28 sec, find the schedule speed for a run of 1.6 km. Assume simplified trapezoidal speed time curve.	CO5	L3	12M
		OR			
10	a	With the help of Speed-Time curve, define and explain the importance of following factors in a traction system. i) Notching period. ii) Free running period. iii) Coasting period.	CO5	L2	6M
	b	A train has schedule speed of 65 km/hr between the stops which are 5 km apart. Determine the crest speed over the run assuming trapezoidal speed time curve. The train accelerates at 3 km/hr/sec and retards at 4 km/hr/sec. Duration of stops is 65s.	CO5	L3	6M

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