Q.P.Code: 23EE0221   R23   H.T.No. ☐☐☐☐☐☐☐☐☐☐

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year I Semester Regular Examinations December-2025
UTILIZATION OF ELECTRICAL ENERGY
(Electrical & Electronics Engineering)

Time: 3 Hours　　　　　　　　　　　　　　　　　　　Max. Marks: 70

PART-A
(Answer all the Questions 10 x 2 = 20 Marks)

1	a	Define an electric drive.	CO1	L1	2M
	b	Mention two industrial applications of electric drives.	CO1	L2	2M
	c	State two applications of resistance heating.	CO2	L1	2M
	d	Write two differences between AC welding and DC welding.	CO2	L1	2M
	e	Define any two terms used in illumination.	CO3	L1	2M
	f	Mention any two applications of flood lighting.	CO3	L1	2M
	g	Define electric traction.	CO4	L1	2M
	h	List any two existing electric traction systems in India.	CO4	L1	2M
	i	State Faraday's First Law of Electrolysis.	CO5	L1	2M
	j	Write the overall cell reaction of a hydrogen–oxygen fuel cell.	CO6	L1	2M

PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2　What is an electric drive? What are the different types of electric drives? Explain.　CO1　L2　10M

OR

3　a　How do you select a motor for an industrial application?　CO1　L2　5M
　b　What are the different Industrial motor load types? Explain.　CO1　L2　5M

UNIT-II

4　a　Describe direct and indirect core type furnace with neat sketches.　CO2　L2　5M
　b　Explain application of induction heating.　CO2　L2　5M

OR

5　a　Write about various types of equipment used for electric welding.　CO2　L2　5M
　b　Differentiate between A.C and D.C welding.　CO2　L2　5M

UNIT-III

6　a　State and derive the inverse square law and Lambert's cosine law of illumination.　CO3　L2　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.　CO3　L2　5M

OR

7　Explain the principle of operation of LED lamps and list their advantages.　CO3　L2　10M

UNIT-IV

8　a　How the electric traction system is classified? Briefly discuss.　CO4　L1
　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.　CO4　L3

OR

9　a　Discuss the speed-time curves for main line services.　CO4　L1
　b　A train has schedule speed of 60 km/hr between the stops which are 6 km apart. 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.　CO4　L1

UNIT-V

10　a　Discuss about the process of electro plating.　CO5　L2
　　b　Discuss about Faraday's laws of electrolytic process.　CO5　L2

OR

11　a　Explain about Electro-polishing.　CO5　L2
　　b　What are the objectives of electroplating.　CO5　L2

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