Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 80031

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2025
Sixth Semester
Electrical and Electronics Engineering
U19EEV16 - UTILIZATION OF ELECTRICAL ENERGY
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Classify electric heating methods.	2	K1	CO1
2.	List out the requirements of heating element.	2	K1	CO1
3.	Define illumination.	2	K1	CO2
4.	Define solid angle.	2	K1	CO2
5.	Compare linear and non linear loads.	2	K1	CO3
6.	Why earthing is important?	2	K1	CO3
7.	What are the advantages of electrical drives?	2	K1	CO4
8.	Compare AC traction with DC traction.	2	K4	CO4
9.	Define Co-efficient of performance.	2	K1	CO5
10.	Round the clock cooling of an apartment having a load of 300 MJ/day. Calculate the air conditioning plant capacity.	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain in detail about the different types of electric welding methods with necessary diagrams.	13	K2	CO1
		(OR)			
	b)	A 20KW single phase, 220V resistance oven with circular nichrome wire for heating element. If the wire temperature is not to exceed 1127° C and the temperature of charge is 427° C. Calculate the size and wire required. Assume e = 0.9 and radiation efficiency of K=0.6. What would be the temperature of the wire when charge is cold?	13	K3	CO1
12.	a)	State the laws of illumination. Explain the laws with the help of suitable diagrams and derive an equation of the same.	13	K2	CO2
		(OR)			
	b)	Explain the various factors governing the design of street lighting and flood lighting.	13	K2	CO2
13.	a)	Explain the different earthing techniques adopted in industry and substations.	13	K2	CO3
		(OR)			
	b)	With neat sketches explain the working of online and offline UPS.	13	K2	CO3
14.	a)	i. Illustrate the speed time characteristics of train movement with neat diagrams.	8	K2	CO4
		ii. A locomotive exerts a tractive effort of 34 kN in hauling a train at 45 kmph on the level track. If the locomotive has haul the same train on a gradient and the effort required is 54 kn, determine the HP delivered by the locomotive when the motor are used are DC series motor.	5	K3	
		(OR)			
	b)	i. With neat block diagram explain the construction and working principle of AC locomotive.	7	K2	CO4
		ii. Discuss the suitability of DC series motor for traction applications.	6	K2	
15.	a)	Analyze the working principle of domestic refrigerator with a neat electrical circuit.	13	K2	CO5
		(OR)			
	b)	Compare the various methods of air conditioning system used in industries.	13	K2	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	What are the linear and non linear loads used in domestic and industrial buildings and analyze the influence of these loads on power quality.	8	K4	CO3
	ii.	A small assembly shop 16 m long, 10 m wide and 3m up to trusses to be illuminated to a level of 200 lux. The utilization and maintenance factors are 0.74 and 0.8 respectively. Calculate the number of lamps required to illuminate the whole area if the lumen output of lamp selected is 3000 lumens.	7	K4	CO2
		(OR)			
b)	i.	A machine shop 40m×20m is to have an illumination of 160 lux on working plane. The lamps are mounted on 6 m above the working plane. Assume necessary data and develop the layout of a suitable installation. a. Using filament lamp. b. Using 50 watts fluorescent lamp.	8	K5	CO2
	ii.	Compare the performance parameters of any two electric heating methods.	7	K4	CO1