R22 Regulation *Subject code: 4P6BC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Regular Examinations, May 2025

UTILIZATION OF ELECTRICAL ENERGY

(EEE)

Maximum Marks: 60 Date: 23.06.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	What is an electric drive?	1M	1	1
b)	List two types of industrial loads.	1M	1	1
c)	Name any two methods of electric heating.	1M	2	1
d)	Describe resistance welding?	1M	2	2
e)	What is the purpose of flood lighting?	1M	3	1
f)	What is photometry?	1M	3	1
g)	What is track electrification?	1M	4	1
h)	What is regenerative braking?	1M	4	1
i)	What is tractive effort?	1M	5	1
j)	State the relation between tractive effort and adhesive weight.	1M	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Explain the various types of electric drives with examples	5M	1	2
	b) Describe the starting and running characteristics of a DC series motor and explain where it is used.	5M	1	2
	OR			
3	a) What do you mean by industrial loads? Explain different types of industrial loads.	5M	1	2
	b) List and briefly explain the important factors to be considered for the selection of motor for electric drives.	5M	1	4
4	a) List and explain the advantages of electric heating compared to traditional heating methods.	5M	2	4
	b) Differentiate between induction heating and dielectric heating with suitable examples.	5M	2	3
	OR			
5	a) Explain the working principle of arc welding.	5M	2	2
	b) Explain the Comparison between A.C. and D.C. welding.	5M	2	2

6	a) Define and explain the following terms used in illumination: (i) Luminous flux (ii) Luminous intensity (iii) Luminance (iv) Illumination (v) Solid angle	5M	3	2
	b) Explain the laws of Illumination.	5M	3	2
	OR			
7	a) Explain the working of Mercury vapor lamp with the help of a neat diagram.	5M	3	2
	b) Compare tungsten filament lamps and fluorescent tubes.	5M	3	3
8	a) Explain the different systems of electric traction with neat classification.	5M	4	2
	b) List and explain the special requirements of a traction motor used for electric traction purposes.	5M	4	2
	OR			
9	a) Explain how plugging and rheostatic braking are employed with dc motors.	5M	4	2
	b) An electric train has a scheduled speed of 25 kmph between stations 800m apart. The duration of stop is 20 sec. The maximum speed is 20 percent higher than the average running speed and the braking retardation is 3 kmph. Calculate the acceleration of the service?	5M	4	3
10	a) Derive the expression for tractive effort required in an electric train.	5M	5	3
	b) What is specific energy consumption of train? Explain various factors affecting it?	5M	5	2
	OR			
11	a) Define the term "coefficient of adhesion" and explain the factors on which it depends.	5M	5	2
	b) An electric train has an average speed of 42 km/hr on a level track between stops 1400m apart. It is accelerated at 1.67km/hr/sec and it is baked at 2.9 km/hr/sec. Estimate the energy consumption at the axle of the train per tone-km. Take tractive resistance constant at 50 newtons/tone and allow 10% for rotational inertia.	5M	5	3

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