

Code: 20EE4501A

**III B.Tech - I Semester – Supplementary Examinations  
NOVEMBER 2024**

**UTILIZATION OF ELECTRICAL ENERGY  
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.

2. All parts of Question must be answered in one place.

BL – Blooms Level

CO – Course Outcome

<b><u>UNIT – I</u></b>			
1.	a)	Write important factors on which the selection of electric drive depends.	7 M
	b)	Analyze the characteristics of DC series motor and 3-phase induction motor.	7 M
<b>OR</b>			
2.	a)	Classify the different types of electric drives and explain in detail.	7 M
	b)	How are the electrical loads classified according to their duty? and Analyze.	7 M
<b><u>UNIT – II</u></b>			
3.	a)	Write different types of electrical heating's and Explain indirect resistance heating.	7 M
	b)	Explain dielectric heating and write its merits and demerits.	7 M
<b>OR</b>			

4.	a)	Analyze various methods of electric resistance welding's with neat sketches. Give its merits and demerits with respect to arc welding.	8 M
	b)	Write comparison between DC and AC welding.	6 M

### UNIT-III

5.	a)	Clearly explain the construction and working of sodium vapor lamp with neat diagram.	7 M
	b)	Explain different types of lighting schemes.	7 M

OR

6.	a)	Describe laws of illuminations?	6 M
	b)	A 400 CP lamp is suspended 4m above the center of a circular area of 6m diameter. Calculate the illumination (i) at center of surface (ii) at corner points of the surface (iii) average of illumination on the surface (iv) What will be the average of illumination if reflector of 60% efficiency is used?	8 M

### UNIT – IV

7.	a)	Explain clearly what do you meant by regenerative braking and how to apply regenerative braking for a DC shunt motor.	8 M
	b)	Write comparison between AC and DC traction system.	6 M

OR

8.	a)	Derive an expression for the distance traveled by an electric train using trapezoidal Speed-Time curve.	8 M
	b)	The average speed of a train is 50KMPH. Determine its maximum speed assuming trapezoidal Speed-Time	6 M

		curve, if the distance between the stops is 2.5 KM, acceleration 1.8 KMPHPS and retardation 3 KMPHPS.	
<b><u>UNIT – V</u></b>			
9.	a)	Determine Tractive effort for propulsion of a train?	7 M
	b)	Determine specific energy output using simplified speed time curve?	7 M
<b>OR</b>			
10.	<p>An electric train weighing 100 tonnes has a rotational inertia of 10%. This train running between two stations which are 2.5KM apart and have an average speed of 50KMPH. The acceleration and retardation during breaking are respectively 1KMPHPS and 2KMPHPS. The up gradient between these two stations is 1%. The track resistance is 40N/Tonne. If the combined efficiency of electric train is 60%, assume simplified trapezoidal speed time curve, determine,</p> <p>i) Maximum power at driving axle.  ii) Total energy consumption.  iii) Specific energy consumption</p>		14 M