

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM**  
**III B. Tech I Semester Regular/Supplementary Examinations, April/May -2025**  
**FUNDAMENTALS OF UTILIZATION OF ELECTRICAL ENERGY**  
**(ELECTRICAL AND ELECTRONICS ENGINEERING)**

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

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		<b><u>UNIT-I</u></b>	
1.	a)	Explain the functionality of a Lux Meter?	[7M]
	b)	A corridor is lighted by lamps spaced 9.15 cm and suspended at a height of 4.575m above centre line of the floor. If each lamp gives 100 candle power in all directions below the horizontal, find the maximum and the minimum illumination on the floor along the centre line	[7M]
		(OR)	
2.	a)	Discuss about various lighting schemes with neat diagrams	[7M]
	b)	A room of dimensions 12mx16m is to be lighted by 24 lamps of uniform illumination of around 100lm/m <sup>2</sup> . If the output of each lamp is around 1600lumens, what will be the utilization factor of the room?	[7M]
		<b><u>UNIT-II</u></b>	
3.	a)	What are the factors to be considered for inductor design in induction heating?	[7M]
	b)	Six resistances each of 40 ohms are used as heating elements in furnace. Find the power of the furnace for various connections to a three phase 230V supply.	[7M]
		(OR)	
4.	a)	Explain the different methods of Electric heating and give an example of each type	[7M]
	b)	Explain the basic principle of Induction heating along with the characteristics and its applications in Industry	[7M]
		<b><u>UNIT-III</u></b>	
5.	a)	Describe with neat sketches various methods of electric resistance welding. Give its merits and demerits with respect to arc welding	[7M]
	b)	What are the advantages of using coated welding electrodes?	[7M]
		(OR)	
6.	a)	Differentiate between AC welding and DC welding	[7M]
	b)	Explain the various methods of electric resistance welding with neat sketches	[7M]
		<b><u>UNIT-IV</u></b>	

7.	a)	For a trapezoidal speed-time curve of an electric train, derive expression for maximum speed and distance between stops.	[8M]
	b)	A train is to be run between two stations 5kms apart at an average speed of 50km/hr. If the maximum speed is to be limited to 70km/hr, acceleration to 2km/hr/sec, braking retardation to 4km/hr/sec and coasting retardation to 0.1km/hr/sec, determine the speed at the end of coasting, duration of coasting period and braking period.	[6M]
		(OR)	
8.	a)	Show that if the speed-time curves are similar, Specific Energy Consumption are equal.	[7M]
	b)	Obtain the expression for tractive effort required in an electric train.	[7M]
		<b><u>UNIT-V</u></b>	
9.	a)	Discuss about the need for energy storage	[7M]
	b)	Explain chemical storage system in detail	[7M]
		(OR)	
10.	a)	Differentiate the types of energy storage technologies	[7M]
	b)	What is energy storage system and give its applications	[7M]

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