

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021****Subject Code:2160907****Date:07/12/2021****Subject Name:Utilization of Electrical Energy and Traction****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	MARKS
Q.1 (a) List out the advantages of electrical heating.	03
(b) Identify the factors affecting the selection of electric motors.	04
(c) Draw and explain a typical speed-time curve for a main line electric traction system. Also state what do you understand by Crest speed, average speed and schedule speed.	07
 Q.2 (a) Describe type and characteristics of different mechanical loads	03
(b) Identify the drives for following services: 1) Domestic appliances 2) Cranes 3) Air conditioning 4) Belt conveyors	04
(c) Discuss electric drive with four quadrant operation.	07
OR	
(c) What do you understand by electric braking? Explain any one in detail.	07
 Q.3 (a) Why electric heating is preferred over other forms of heating?	03
(b) Define the following terms. 1) Luminous flux 2) Lumen 3) Illumination 4) Lamp efficiency	04
(c) Explain working principle of dielectric heating. Also state advantages and disadvantages with their applications.	07
OR	
Q.3 (a) List out the properties of good heating element.	03
(b) A resistance oven employing nichrome wire is to be operated from 220V single phase supply and is to be rated at 16KW. If the temperature of the element is to be limited to 1170° C and average temperature of the charge is 500°C. Find the diameter and length of the element wire. Radiating efficiency = 0.57, Emissivity= 0.9, Specific resistance of nichrome = $109 \times 10^{-8} \Omega\text{m}$.	04
(c) Explain the method of induction heating and describe coreless type of induction furnace.	07
 Q.4 (a) Explain resistance welding.	03
(b) What do you mean by electro deposition? Also illustrate factors affecting the process of electro deposition.	04
(c) Draw and Explain electrical circuit of domestic refrigerator.	07
OR	
Q.4 (a) State different refrigeration systems. Explain any one.	03
(b) What is electro plating? Describe in detail.	04
(c) Illustrate the following 1) MIG welding 2) TIG welding 3) Electron beam welding\	07

- Q.5** (a) State advantages of electric traction system. **03**
(b) Explain different current collector system **04**
(c) Compare with speed time curve following traction system in detail 1) Urban traction 2) sub urban traction 3) Main line traction. **07**

OR

- Q.5** (a) Discuss difference between Ac and DC traction system. **03**
(b) A train has schedule speed of 30 Kmps over a level track. Distance between stations being 1 Km. Station stopping time is 20 sec. Assuming braking retardation of 3 kmphs and maximum speed 25 % greater than average speed. Calculate acceleration required to run the service. **04**
(c) Explain with a block diagram, functions of each part of an ac electric locomotive **07**
