

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2017****Subject Code: 2160907****Date: 28/11/2017****Subject Name: Utilization of Electrical Energy and Traction****Time: 02:30 PM TO 05:00PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Distinguish between individual drive & group drive.	03
	(b) Explain the DC series traction motor control system	04
	(c) A 220 V D C shunt motor has an armature resistance of 0.062 ohms and with full field has an emf of 215V at the speed of 960 rpm. The motor is driving an over hauling load with torque of 172 N-m. Calculate the minimum speed at which the motor can hold the load by means of regenerative braking.	07
Q.2	(a) What is the requirement of an ideal traction system	03
	(b) Compare AC and Dc arc welding	04
	(c) Explain the different factors to be considered for selection of electrical drives for specific application.	07
OR		
	(c) The illumination in a drawing office 30 m x 10 m is to have a value of 250 lux and is to be provided by a number of 300-Watts filament lamps. If the coefficient of utilization is 0.4 and depreciation factor is 0.9, determine the number of lamps required. The luminous efficiency of each lamp is 14 lm/W.	07
Q.3	(a) Write a short note on polar curves.	03
	(b) List out the drawback of discharge lamps	04
	(c) Explain the working of low pressure mercury vapour lamp with necessary circuit diagrams.	07
OR		
Q.3	(a) Draw and explain Speed–time curve for suburban service	03
	(b) Briefly explain the factors affecting the schedule speed of a train	04
	(c) Determine the diameter and length of the wire, if a 17-kW, 220-V, and 1- Φ resistance oven employs nickel-chrome wire for its heating elements. The temperature is not exceeding to 1,100°C and the temperature of the charge is to be 500°C. Assume the radiating efficiency as 0.5 and the emissivity as 0.9, respectively	07
Q.4	(a) Comparison between resistance and arc welding	03
	(b) Define the mainly three types of services used in traction system	04
	(c) A high-frequency induction furnace that takes 20 min to melt 1.9 kg of aluminum, the input to the furnace being 3 kW, and the initial temperature is 25°C. Then, determine the efficiency of the furnace. The specific heat of aluminum = 0.212., Melting point = 660°C., The latent heat of the fusion of aluminum = 76.8 kcal/kg.	07
OR		
Q.4	(a) List out the different types of electrodes used in the arc furnaces.	03

- (b) What are the essential requirements of good heating element **04**
- (c) The distance between two stops is 1.2 km. A schedule speed of 40 kmph is required to cover that distance. The stop is of 18-s duration. The values of the acceleration and retardation are 2 kmphp and 3 kmphp, respectively. Then, determine the maximum speed over the run. Assume a simplified trapezoidal speed–time curve. **07**
- Q.5** (a) Explain the faraday’s first law of electrolysis **03**
- (b) Six resistances, each of 60 ohms, are used in a resistance; how much power is drawn for the following connections. With Supply is 400 V, AC, and single phase and the connections are: **04**
1. Three groups in parallel, each of two resistance units in series.
 2. Six groups are in parallel, each of one resistance unit.
 3. With the same three-phase supply, they are connected in delta .
- (c) Write and explain the various accessories used for electroplating plant **07**
- OR
- Q.5** (a) Write short not on anodizing. **03**
- (b) With the help of schematic diagram explain the working principle of air conditioner. **04**
- (c) Calculate the ampere hours required to deposit a coating of silver 0.05 mm thick on sphere of 5 cm radius. Assume electrochemical equivalent of silver = 0.001118 and density of silver to be 10.5. **07**
