Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII EXAMINATION – WINTER 2015

Subject Code:180902 **Date:04/12/2015**

Subject Name: Electrical power utilization

Time: 2:30pm to 5:00pm **Total Marks: 70**

Instructions:

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

Q.1	(a)	Explain electric drives and its classification in detail.	07
	(b)	A 500V DC shunt motor having an efficiency of 80 % operates a hoist having an efficiency of 70 %. Determine the current taken from the supply in order to raise a load of 500 kg at 4 m per sec. if the rheostatic braking is employed, what resistance must be put in the armature circuit in order to lower the same load at same speed?	07
Q.2	(a)	Explain the methods of speed control for DC shunt motor.	07
	(b)	State the types of electric braking. Explain any one in detail.	07
		OR	
	(b)	Derive an expression for temperature rise of an electric motor.	07
Q.3	(a)	Explain the trapezoidal speed – time curve with necessary equations.	07
	(b)	An electric train weighing 200 tonnes has 8 motors geared to driving wheels, each wheel is 90 cm diameters. Determine the torque developed by each motor to accelerate the train to a speed of 48 kmph in 30 seconds up a gradient of 1 in 200. The tractive resistance is of 50 N/Tonne, the effect of rotational inertia is 10% of the train weight, the gear ratio is 4 to 1 and gearing efficiency is 80 %.	07
		OR	
Q.3	(a)	Explain the chief requirement of electric motors used for traction work.	07
	(b)	Explain the tractive effort for propulsion of train.	07
Q.4	(a)	Explain induction heating and direct core type induction furnace.	07
	(b)	Estimate the efficiency of a high frequency induction furnace which takes 10 minutes to melt 1.8 kg of aluminum. The input to the furnace being 5 kw and initial temperature is 15 ^{0} C. Given : specific heat of aluminum = 880 J/Kg/^{0}C Melting point of aluminum = 660^{0}C Latent heat of fusion of aluminum = 32 KJ/Kg 1 J = 2.78 X 10 $^{-7}$ kwh	07
		OR	
Q.4	(a)	Give the classification of welding. Explain resistance welding.	07
Q.4	(b)	Explain the design procedure of heating element.	07
Q.5	(a)	Explain sodium vapour discharge lamp with neat sketch.	07
	(b)	Explain the feature for factory lighting.	07
		OR	
Q.5	(a)	Explain power supply for electrolytic process.	07
	(b)	Explain different factors for designing the lighting schemes.	07