Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 150906 **Date: 15/05/2017**

Subject Name: Electrical Power Utilization and Traction (Institute Elective - II)

Time: 02:30 PM to 05:00 PM **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)**	Why electrical drive is preferred over mechanical drive? Discuss the factors governing selection of an electric motor for a particular service.	**07**
	(b)	State the methods of speed control of shunt motor. Explain flux control method with circuit diagram.	**07**
Q.2	**(a)**	Suggest suitable A.C. and D.C. drives for following applications. Give reasons for the same. i.) Lifts ii.) Electric Tram iii.) Rolling mills iv.) Lathe machine	**07**
	(b)	What do you understand by load equalization? Derive the expression for motor torque when load increases and decreases.	**07**
		OR	
	(b)	Explain torque – slip curve of 3 phase induction motor.	**07**
Q.3	**(a)**	Using the simplified trapezoidal speed time curve, derive an expression for the maximum speed in kmph in terms of acceleration, retardation, distance between stops and actual time of run between stops.	**07**
	(b)	Explain design procedure of heating element with necessary expressions.	**07**
		OR	
Q.3	**(a)**	Explain briefly different systems of railway track electrification.	**07**
	(b)	Explain regenerative breaking used in traction system.	**07**
Q.4	**(a)**	State and explain advantages of electrically produced heat. Explain methods of transfer of heat.	**07**
	(b)	Define slip. A 3 phase induction motor is wound for 6 poles and supplied from 50 Hz system. Calculate (i) the synchronous speed (ii) the rotor speed when slip is 10% and (iii) rotor frequency when rotor runs at 1000 rpm.	**07**
		OR	
Q.4	**(a)**	Explain eddy current heating and its applications.	**07**
	(b)	Explain the working of fluorescent tube with the help of circuit diagram.	**07**
Q.5	**(a)**	Explain briefly how you will design lighting scheme.	**07**
	(b)	Explain process of electroplating.	**07**
		OR	
Q.5	**(a)**	Explain the principle of operation of a sodium vapor lamp giving its neat sketch.	**07**
	(b)	State Faraday's laws of electrolysis. Explain power supply requirements for electrolyte processes.	**07**

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