Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: 150906 **Date: 24-06-2014**

Subject Name: Electrical Power Utilization and Traction

Time: 10.30 am - 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.**

Q.1	**(a)**	Classify electric drives and state the factors affecting selection of drive.	**07**
	(b)	State speed control methods of DC Shunt motor and explain field current control with suitable diagram.	**07**
Q.2	**(a)**	Explain starting methods for synchronous motor.	**07**
	(b)	Explain regenerative braking of DC motor.	**07**
		OR	
	(b)	Compare slip ring induction motor with squirrel cage induction motor. Why double cage induction motor is used?	**07**
Q.3	**(a)**	Explain the terms ‘dead weight’, ‘accelerating weight’ and ‘adhesive weight’. Explain the factors affecting specific energy consumption.	**07**
	(b)	400 tonne goods train is to be hauled by a locomotive up a gradient of 2% with acceleration of 1 kmphps. Coefficient of adhesion is 20%, track resistance 40 N/tone and effective rotating masses 10% of dead weight. Find the weight of the locomotive & number of axles if the axle load is not to increase beyond 22 tonnes.	**07**
		OR	
Q.3	**(a)**	Drive on expression for specific energy output and specific energy consumption using a simplified speed-time curve and discuss the factors affecting specific energy consumption.	**07**
	(b)	An electric train has quadrilateral speed-time curve as follows: i. Uniform acceleration from rest at 2 kmphps for 30 seconds ii. Coasting for 50 seconds iii. Breaking period of 20 seconds. The train is moving a uniform up gradient of 1%, tractive resistance is 40 newton per tonne, rotational inertia effect 10% of dead weight, duration of station stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate the value of its schedule speed and specific energy consumption of run.	**07**
Q.4	**(a)**	List various methods used for speed control of dc series motors. Explain series – parallel control method for speed control of dc series motors.	**07**
	(b)	Explain high frequency eddy current heating.	**07**
		OR	
Q.4	**(a)**	Explain dielectric heating and give its applications.	**07**
	(b)	Explain vertical core type induction furnace.	**07**
Q.5	**(a)**	Explain basic principle of electrolysis and Faraday’s laws of electrolysis.	**07**
	(b)	Explain sodium- vapour discharge lamp.	**07**
		OR	
Q.5	**(a)**	Explain power supply requirements for electrolyte processes	**07**
	(b)	State and explain laws of illumination.	**07**

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