Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2160907 **Date: 27/10/2016**

Subject Name: Utilization of Electrical Energy and Traction

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)**	What do you mean by electric drive? What are the various factors which decide the choice of an electric drive for industrial application? Explain with example.	**07**
	(b)	Draw and explain typical speed time curve for electric traction. Explain what do you understand by Crest speed, Average speed and Scheduled speed.	**07**
Q.2	**(a)**	Explain the method of series-parallel starting of DC series motors. What are its advantages?	**07**
	(b)	A 500 tonnes goods train is to be hauled by a locomotive up a gradient of 1 in 40 with acceleration of 1.5 kmphps. Determine the weight of locomotive and number of axles, if axle load should not exceed 24 tonnes. Coefficient of adhesion is 0.31, track resistance is 45 N/ton and effective rotational mass is 10% of dead weight	**07**
		OR	
	(b	What do you understand by tractive effort? Derive the expression for the same.	**07**
Q.3	**(a)**	State the methods of speed control of three phase induction motor and explain any two methods.	**07**
	(b)	Enlist different types of electric braking. Explain in brief along with an application the regenerative braking of induction motor.	**07**
		OR	
Q.3	**(a)**	Explain running characteristics of three phase induction motor.	**07**
	(b)	Explain different ways of current collection in Electric traction.	**07**
Q.4	**(a)**	State and explain inverse square law and Lambart's cosine law for illumination.	**07**
	(b)	Define the following terms with its range w.r. to illumination. (a) Co-efficient of utilization, (b) Depreciation factor, (c) Waste light factor, (d) Space-height ratio	**07**
		OR	
Q.4	**(a)**	State different methods of electrical heating and explain resistance heating.	**07**
	(b)	Explain dielectric heating with its applications.	**07**
Q.5	**(a)**	Describe the construction and working of an induction furnace suitable for melting and refining of nonferrous metals.	**07**
	(b)	Compare resistance welding and arc welding.	**07**
		OR	
Q.5	**(a)**	State and explain Faraday's Laws of electrolysis.	**07**
	(b)	Explain principle of air conditioning.	**07**

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