Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII • EXAMINATION – SUMMER • 2015

Subject code:180902 **Date: 11/05/2015**

Subject Name: Electrical Power Utilization

Time:10.30AM-01.00PM **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)**	State various methods of starting of 3 phase induction motor. Explain any one of them.	**07**
	(b)	A 220V d.c. series motor runs at 1000 r.p.m. and takes 20 A. Combined resistance of armature and series field is 0.4 ohms. Calculate the resistance to be inserted so as to reduce the speed to 800 r.p.m. assuming torque to vary as square of the speed and linear magnetization curve.	**07**
Q.2	**(a)**	Draw a diagram of AC electric locomotive and explain function of each part in it.	**07**
	(b)	An 8 pole, 50 Hz,3 phase cage induction motor equipped with a flywheel is driving a mill, which requires a load torque of 1400 kg-m during the rolling operation lasting 10 seconds. The torque then drops to 200 Kg-m for 30 seconds, the cycle being repeated. The motor is capable delivering a maximum torque of 1050 Kg-m running at a slip of 10%. The moment of inertia of moving parts is 50,000 Kg-m^2. Determine the speed of the motor after 5 seconds during the rolling operation.	**07**
		OR	
	(b)	In a certain machine the temperature rise is 25^0 C after 1 hour and 37.5^0C after two hours starting from cold conditions.Calculate its final steady temperature rise and the heating time constant. If the machine temperature falls from the final steady value to 40^0C in 1.5 hour when disconnected, calculate its cooling time constant. The ambient temperature is 30^0C.	**07**
Q.3	**(a)**	What is co-efficient of adhesion? What are the factors affecting the co-efficient of adhesion?	**07**
	(b)	An electric train accelerates uniformly from rest to a speed of 50 km-ph in 25 seconds. If then coasts for 1 minute 10 seconds against a constant resistance of 70 N per tonne and is braked to rest at 4 kmphps in 10 seconds. Calculate the schedule speed, if the station stops are of 15 second duration.	**07**
		OR	
Q.3	**(a)**	State various types of current collectors in common use for over head contact system. Describe with a neat diagram the pantograph collector.	**07**
	(b)	A train weighing 500 tonnes is going a gradient of 20 in 1000. It is desired to maintain train speed at 40kmph by regenerative braking. Calculate the power fed into the line. Tractive resistance is 40 N per tonne and allow rotational inertia of 10% and efficiency of conversion	**07**

of 75 %

Q.4	**(a)**	What are the advantages of electric heating? Give classification of electric heating.	**07**
	(b)	With a neat diagram, explain Ajax-Wyatt furnace. State advantages of it.	**07**

OR

Q.4	**(a)**	Name and explain various types of welding methods.	**07**
	(b)	What is electro plating? Describe it in detail.	**07**
Q.5	**(a)**	Define the terms: (1) Luminous intensity (2) Luminous efficiency (3) Utilization factor (4) Reduction factor (5) Reflection factor (6) candle power (7) Glare	**07**
	(b)	What is flood lighting? Where is it used?	**07**

OR

Q.5	**(a)**	Explain with the help of circuit diagram, the working of a fluorescent lamp.	**07**
	(b)	A workshop 30m*15m is to have an illumination of 150 lux on its working place; the lamps are hung 5m above it. Give the lay out of a suitable installation using 80 watt fluorescent lamp. Assume suitable data.	**07**

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