Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE –SEMESTER 1&2(NEW SYLLABUS)EXAMINATION- WINTER 2018

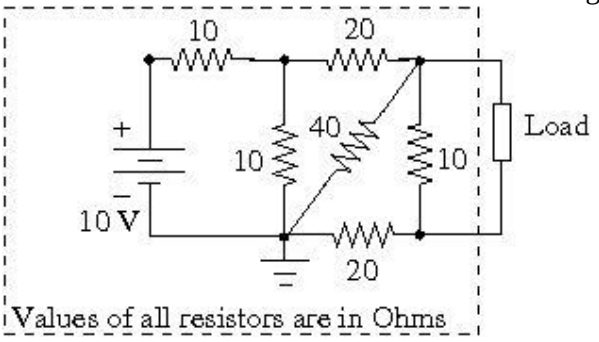
Subject Code: 3110005 Date: 18-01-2019

Subject Name: Basic Electrical Engineering

Time: 10:30 am to 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.**

			Marks
Q.1	**(a)**	Define Amplitude, Frequency and Time period for alternating quantities.	**03**
	(b)	Briefly describe the operating principle of a transformer.	**04**
	(c)	Obtain the value of Norton's equivalent current and Norton's equivalent resistance for the network shown in the following figure. 	**07**
Q.2	**(a)**	Prepare a list of parts of a DC machine. Explain any one part in detail.	**03**
	(b)	Briefly describe the auto transformer and its applications.	**04**
	(c)	The maximum values of voltage and current in a circuit are 400 V and 20 A respectively. Both the quantities are sinusoidal with 50 Hz frequency. The instantaneous values of voltage and current at time t=0 second are 283 V and 10 A respectively (both increasing and positive). Obtain the equations of voltage and current in this circuit at time 't' second. Also find out the active power consumption in the circuit.	**07**
		OR	
	(c)	In a series R-L circuit, a voltage of 10 V at 50 Hz frequency produces a current of 750 mA. In the same circuit with same magnitude of applied voltage with a frequency of 75 Hz produces a current of 500 mA. Find out the values of R and L in the circuit.	**07**
Q.3	**(a)**	Briefly describe pipe earthing.	**03**
	(b)	Mention the types of single phase induction motor. Explain any one of them.	**04**
	(c)	Derive the equations of active, reactive and apparent powers in a series R-L circuit with sinusoidal AC supply.	**07**
		OR	

Q.3	**(a)**	Give a list of safety devices used for home appliances.	**03**
	(b)	Give a comparison between squirrel cage induction motor and wound rotor induction motor.	**04**
	(c)	Derive the equations of capacitor voltage and circuit current in a series R-C circuit connected to a DC supply through a switch. Assume that switch is initially open and it is closed at time t=0 second.	**07**
Q.4	**(a)**	Discuss the difference between MCB and Fuse.	**03**
	(b)	Why the consumers should improve their power factor?	**04**
	(c)	Explain Thevenin's theorem. Take suitable example and explain the steps to apply Thevenin's theorem for a resistive circuit with a constant DC voltage source.	**07**

OR

Q.4	**(a)**	What is MCCB? Where is it used?	**03**
	(b)	Compute the monthly energy charges for an air conditioner having consumption of 2 kW. Daily usage of the air conditioner is 10 hours. Energy charges are Rs 8 per unit.	**04**
	(c)	Explain the term power factor. Explain the steps to obtain power factor of an AC circuit with parallel connection of R, L and C elements.	**07**
Q.5	**(a)**	Describe the stator construction of a single phase induction motor.	**03**
	(b)	Write a short note on Miniature Circuit Breaker (MCB)	**04**
	(c)	Explain the term rotating magnetic field with proper diagrams in case of a three phase induction motor.	**07**

OR

Q.5	**(a)**	Describe the construction of rotor for a slip ring type three phase induction motor.	**03**
	(b)	Write a short note on Earth Leakage Circuit Breaker (ELCB).	**04**
	(c)	Explain the working principles of a synchronous generator and a synchronous motor.	**07**

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