

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

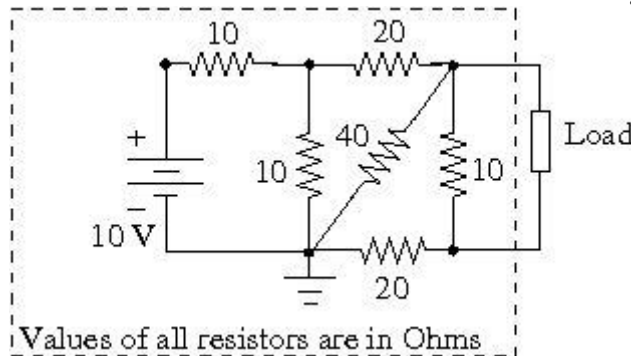
Time: 10:30 am to 01:00 pm

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 |



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| 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
