

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-I (NEW) EXAMINATION – WINTER 2023

Subject Code:3110005

Date:06-02-2024

Subject Name:Basic Electrical Engineering

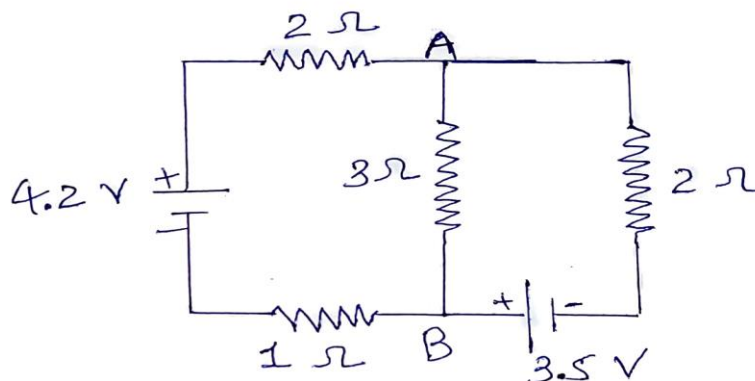
Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- | | Marks |
|---|-----------|
| Q.1 (a) Compare resistive series and parallel circuits. | 03 |
| (b) State the Thevenin's theorem with suitable example. | 04 |
| (c) Derive an expression for equivalent resistances of a star connected network to transform into a Delta connected network. | 07 |
| | |
| Q.2 (a) Define Amplitude, Frequency and Time period for alternating quantities. | 03 |
| (b) Two coils are connected in parallel and a voltage of 200V is applied between the terminals. The total current taken by the circuit is 25 A and power dissipated in one of the coils is 1500 W. Calculate the resistance of each coil. | 04 |
| (c) Obtain the relationship between line and phase values of current in a three phase, balanced, delta connected system. | 07 |
| OR | |
| (c) Prove that the current in purely inductive circuit lags its voltage by 90° and average power consumption in pure inductor is zero. | 07 |
| | |
| Q.3 (a) Draw power triangle and define active power, reactive power and apparent power. | 03 |
| (b) If the waveform of a voltage has a form factor of 1.15 and peak factor of 1.5 and if the maximum value of a voltage is 4500 volts. Calculate the average and r.m.s. values of the voltage. | 04 |
| (c) Use the superposition theorem to calculate the current in branch AB of the circuit shown in below figure. | 07 |



OR

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|--|-----------|
| Q.3 (a) Explain working principle of synchronous motor. | 03 |
| (b) Classify and compare various types of D.C. motors. | 04 |

- (c) Explain construction of DC Machine. **07**
- Q.4** (a) Derive the EMF equation of single-phase transformer. **03**
 (b) Compare core type and shell type single phase transformers. **04**
 (c) Explain various connections of three phase transformer with diagram. **07**
- OR**
- Q.4** (a) Give a comparison between squirrel cage induction motor and wound rotor induction motor. **03**
 (b) Explain in brief working principle of Three Phase Induction Motor. **04**
 (c) Explain construction of synchronous generator with diagram. **07**
- Q.5** (a) Compute the energy charges for an air conditioner having consumption of 2 kW for the month of April. Daily usage of the air conditioner is 12 hours. Energy charges are Rs 9 per unit. **03**
 (b) Write safety precautions for electrical Applications. **04**
 (c) Explain different methods of Power factor Improvement. **07**
- OR**
- Q.5** (a) Write advantages and disadvantages of ELCB. **03**
 (b) Give comparison between MCB and Fuse. **04**
 (c) Classify different types of Earthing and explain Plate Earthing with diagram. **07**
