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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (AE/AI ML/DS/CE/CSE/ME/IT/FT/EEE/AI/(Robotics & Artificial Intelligence/EE/ECE/Internet of Things and Cyber Security including Block Chain Technology) (Sem.-1,2)

Subject Code : BTEE-101-18

M.Code : 75339

Date of Examination: 30-12-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. **SECTION - B & C** have FOUR questions each.
3. **Attempt any FIVE questions from SECTION B & C** carrying EIGHT marks each.
4. **Select atleast TWO questions from SECTION - B & C.**

SECTION-A

1. Answer following questions in brief :

- a) When the entire current flow (let's say I) and connected voltage source (let's say V) are split into two parallel routes with resistors (let's say R_1 and R_2), how do you get the equation for two currents (I_1 and I_2).
- b) Define the resonant frequency.
- c) What is the relation between bandwidth and quality factor in RLC series resonant circuit?
- d) Compare active and reactive power use in AC machines.
- e) What is an ideal transformer?
- f) State and explain Ohm's law.
- g) Enumerate the applications of single-phase induction motor.
- h) What is a fuse? Discuss the advantages and disadvantages of a fuse.
- i) Discuss the concept of power factor.
- j) Distinguish the average value from the r.m.s. value.

SECTION-B

2. With respect to DC circuit, state and explain Kirchhoffs voltage and current law with the help of a suitable diagram.
3. A coil has a resistance of $5\ \Omega$ and an inductance of 31.8 mH . Calculate the current taken by the coil, power factor and average power when connected to 200V , 50 Hz supply.
4. Explain the construction and working principle of a single-phase induction motor.
5. Describe the efficiency of a transformer and how it can be calculated. Deduce a condition for maximum efficiency.

SECTION-C

6. **Write a short note on :**
 - a) Switch Fuse Unit (SFU), and
 - b) Miniature Circuit Breaker (MCB).
7. Explain the principle of operation of transformer. Derive an expression for the e.m.f. of an ideal transformer winding.
8. State and explain Thevenin's theorem. In figure 1, Find the current through the load resistance (R_L) using Thevenin's theorem.

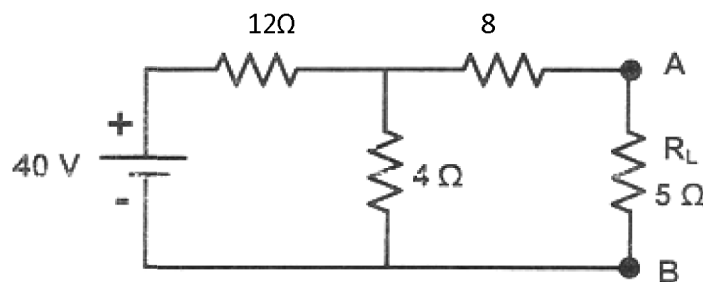


Figure 1

9. Derive an expression for power in a 3-phase star-connected system in term of
 - a) Phase values and
 - b) Line values of voltage and current

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.