

17331

16117

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any SIX from the following :

12

- (a) State Ohm's law with equation.
- (b) State Kirchoff's current law with an example.
- (c) Write formula for conversion of star to delta conversion.
- (d) State Faraday's law of electromagnetic induction.
- (e) Compare between statically & dynamically induced emf. (any two points)
- (f) Write the relation between
 - (i) phase and line current
 - (ii) phase and line voltage for star and delta connection.
- (g) Classify fuses and also draw the characteristics of fuse.
- (h) Explain need of earthing.

(B) Attempt any TWO from the following :

8

- Compare auto transformer with two winding transformer.
- Explain principle of working of induction motor (single phase) with its operation.
- Explain pipe earthing with neat diagram.

2. Attempt any FOUR from the following :

16

- Compare series and parallel circuit with four points.
- Find current through $2\ \Omega$ resistor using mesh loop. (fig. 1)

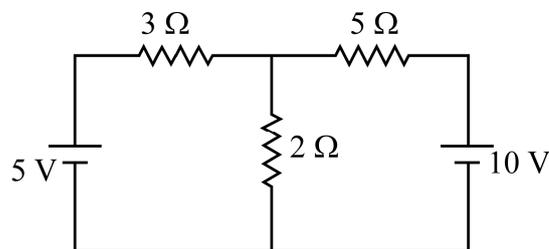


Figure-1

- Simplify given circuit using star-delta conversion and find resistance across AB (fig. 2)

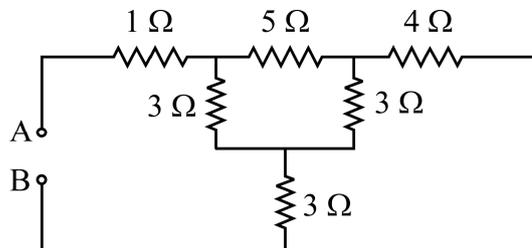


Figure-2

- Draw phasor representation for
 - In phase current
 - Lagging current
 - Leading current with respect to sinusoidal voltage. Define phase difference.
- Define power triangle with active, reactive and apparent power formulas.
- Explain measurement of single phase power measurement using dynamometer type wattmeter.

3. Attempt any FOUR from the following : 16

- (a) Draw (i) Waveform of voltage and current for AC circuits containing
 - (i) resistance only
 - (ii) capacitance only
 - (iii) inductance only
 - (iv) capacitance and resistance
- (b) Sinusoidal waveform completes a cycle within 0.02 sec time period. Find cycles completed in 1 minute and frequency of AC supply.
- (c) Define RMS value and Average value.
- (d) Explain dynamically induced emf with its diagram. Write applications of dynamically induced emf.
- (e) A capacitor of $100 \mu\text{f}$ is connected across a 200 V, 50 Hz single phase supply. Calculate : (i) the reactance of the capacitor, (ii) rms value of current and (iii) the maximum current.
- (f) Explain power factor with its significance.

4. Attempt any FOUR from the following : 16

- (a) Simplify following circuit using node voltage method and find out voltage across 5Ω resistor. (fig. 3)

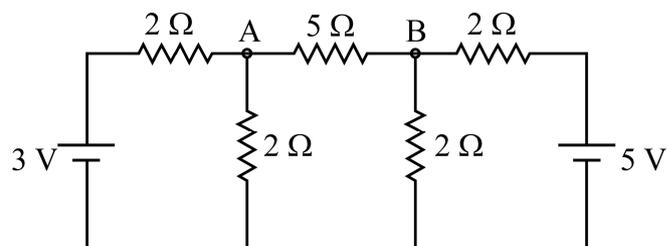


Figure-3

- (b) Compare electric circuit and magnetic circuit.
- (c) Explain RLC series circuit and series resonance with phasor diagram.
- (d) How reactive power can be minimized in inductive circuit to make unity power factor ?
- (e) Explain working principle of shaded pole motor.
- (f) Explain construction and working principle of transformer.

5. Attempt any FOUR from the following : 16

- (a) A capacitor of $10 \mu\text{F}$ is connected across a 200 V 25 Hz single phase supply. Calculate : (i) the reactance of capacitor (ii) rms value of current (iii) maximum current (iv) maximum power for one complete cycle.
- (b) State advantages of three phase circuits over single phase circuits.
- (c) Define phase sequence in 3 ϕ supply with waveform. What is correct phase sequence ?
- (d) Define :
 - (i) Balanced load
 - (ii) Balanced supply
 - (iii) Unbalanced load
 - (iv) Unbalanced supply
- (e) Explain : "How current in 3 ϕ load can be limit using different connections".
- (f) Compare autotransformer with two winding transformer (any four points)

6. Attempt any FOUR from the following : 16

- (a) A 3 ϕ 200 kW, 50 Hz, delta connected induction motor is supplied from 3 phase 440 V, 50 Hz ac supply. The efficiency and p.f. is 91% & 0.86 respectively. Calculate : (i) current in each phase (ii) the line current (iii) active and reactive components of phase current (iv) phasor diagram.
 - (b) Explain RLC series resonance with frequency and current, voltage characteristics.
 - (c) Show that the power intake by a three phase circuit can be measured by two wattmeters connected properly in the circuit.
 - (d) Explain working of universal motor. State its applications.
 - (e) Classify transformer w.r.t. (1) voltage level (2) construction (3) supply used (4) applications.
 - (f)
 - (i) Classify fuses
 - (ii) Compare fuse and MCB
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