

17331

15116

3 Hours / 100 Marks

Seat No.

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

Marks

1. (A) Attempt any SIX of the following : 12

- (a) Define potential difference and current.
- (b) State Kirchhoff's current law.
- (c) Give expression for the following :
 - (i) Delta to star conversion of resistances.
 - (ii) Star to delta conversion of resistances.
- (d) Define the following terms :
 - (i) Electromagnetism.
 - (ii) Magnetic flux.
- (e) What do you understand by the terms lag and lead in relation to alternating quantities ?
- (f) Draw the waveform of 3-phase AC supply.
- (g) State the necessity of fuse.
- (h) Give any two precautions against electric shock.

(B) Attempt any TWO of the following : 8

- (a) Draw a labelled diagram showing constructional details of single phase transformer. State its working principle.
- (b) Draw and explain circuit diagram of shaded pole motor.

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- (c) Write comparison between MCB and fuse on the basis of
- (i) Function
 - (ii) Cost
 - (iii) Operation
 - (iv) Safety

2. Attempt any FOUR of the following :

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- (a) Determine the current through 20 ohm resistance in Fig. No. 1 using node voltage method.

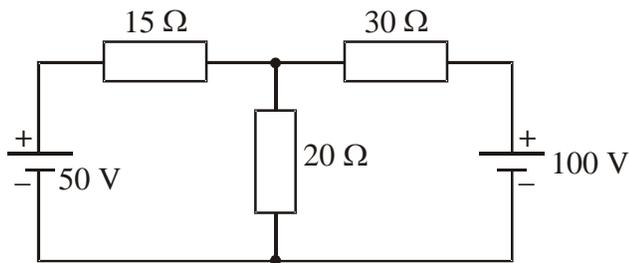


Fig.No.1

- (b) Using Kirchoff's Laws find the current in 6 ohm and hence power consumed by 6 ohm resistance in circuit shown in Fig. No. 2.

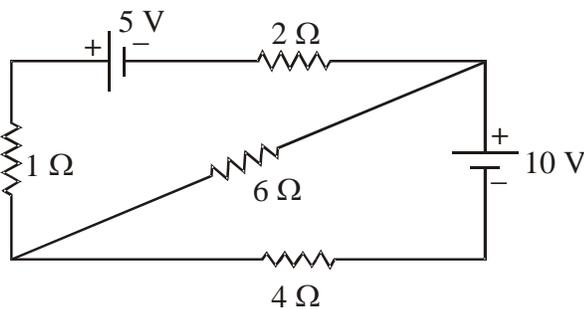


Fig.No.2

- (c) Explain series and parallel circuits with diagram and necessary equations.
- (d) Draw waveform and phasor diagram of a simple resistive circuit when AC is applied across it.
- (e) Define the terms and write their mathematical expression :
- (i) Real Power
 - (ii) Apparent power

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- (f) A coil of resistance 10 ohm and inductance 0.1 H is connected in series with a capacitor of 150 microfarad across 220 V, 50 Hz supply. Calculate
- (i) Inductive reactance
 - (ii) Capacitive reactance
 - (iii) Impedance
 - (iv) Current

3. Attempt any FOUR of the following :

16

- (a) Define the following terms related to a.c.
- (i) Crest factor
 - (ii) Effective value
 - (iii) Angular velocity
 - (iv) Frequency
- (b) Write difference between statically induced emf and dynamically induced emf with example. (any 4 points)
- (c) An alternating voltage is represented by the following equation
 $v = 25 \sin 200 \pi t$
Find the following :
- (i) Amplitude value
 - (ii) Time period
 - (iii) Angular velocity
 - (iv) Form factor
- (d) Draw the phasor diagram for a pure capacitor connected to an ac source. Also show the voltage and current waveforms.
- (e) Explain behaviour of AC circuit containing inductance only with the help of waveform and vector diagram.
- (f) Draw phasor diagram and circuit diagram for a RL series circuit and label it.

4. Attempt any FOUR of the following :

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- (a) State and explain Faraday's Law of electromagnetic induction.

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- (b) Draw circuit diagram for measurement of single-phase power using dynamometer type wattmeter.
- (c) Explain concept of impedance and impedance triangle.
- (d) Compare two winding transformer with autotransformer. (any 4 points)
- (e) Three impedance each of 4 ohm resistance and 10 ohm inductive reactance in series are connected in delta across 3-phase 400 V, 50 Hz ac supply. Find (i) Phase current, (ii) Line current, (iii) Power factor, (iv) Total power.
- (f) Define : (i) Voltage ratio, (ii) Current ratio, (iii) Turns ratio, (iv) KVA rating of a transformer.

5. Attempt any FOUR of the following :

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- (a) State and explain Lenz's Law.
- (b) Explain the construction and working of Single Phase Auto Transformer.
- (c) State four merits of three phase circuits over single phase circuits.
- (d) Explain RLC series circuit with phasor diagram.
- (e) Draw and explain delta connected balanced system.
- (f) Draw neat diagram of plate earthing.

6. Attempt any FOUR of the following :

16

- (a) Define phase and phase difference of alternating quantity.
 - (b) State the concept of power factor and write its significance.
 - (c) Explain the term phase sequence and unbalanced load.
 - (d) Write the expression for emf equation of a transformer and state the meaning of each term in that equation.
 - (e) Draw and explain star connected balanced load.
 - (f) Explain resistance split phase single phase I.M. with diagram.
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