

17331

16172

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 current. State its unit.
 - (b) State the formula to find equivalent resistance when three resistance are connected in parallel.
 - (c) Define peak factor for sine wave and state its value.
 - (d) Write formula for inductive reactance and capacitive reactance.
 - (e) List the types of induced emf.
 - (f) Draw waveform of voltage of 3 phase AC supply.
 - (g) List out the losses occurring in transformer.
 - (h) State the need of earthing in electrical systems.

(B) Attempt any TWO of the following :

08

- Write the equations of Instantaneous values of voltage and current through a pure inductor. Draw the wave form and phasor diagram of voltage and current.
- Compare Auto transformer with two winding transformer based on construction working principle, application and cost.
- Draw a neat labelled diagram of pipe earthing.

2. Attempt any FOUR of the following :

16

- Find the value of current flowing through $10\ \Omega$ resistor using Kirchoff's voltage law as shown in fig. no. 1

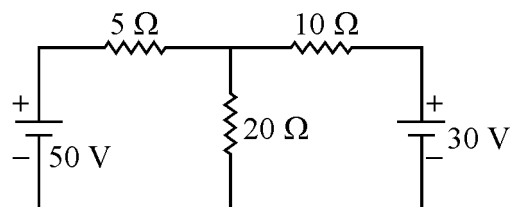


Fig. no. 1

- Find the value of equivalent resistance between points A and B for circuit shown in fig. no.2

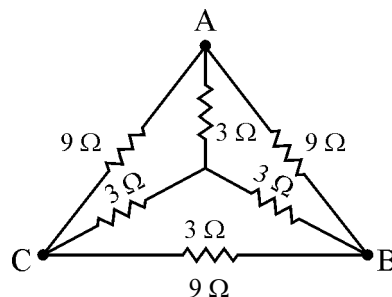


Fig. no. 2

- State Kirchoff's current law and explain it with simple circuit.
- Define –
 - Frequency
 - Cycle
 - Time period
 - Amplitude

- (e) When sinusoidal voltage is applied to a circuit containing capacitance only.
- Draw circuit diagram
 - Write equation for voltage and current
 - Draw waveform of voltage and current
 - Draw phasor diagram
- (f) Draw series RC circuit, write its expression for impedance and show it on impedance triangle.

3. Attempt any FOUR of the following :

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- (a) Find the value of equivalent resistance and current flowing through each resistance as shown in fig. No. 3.

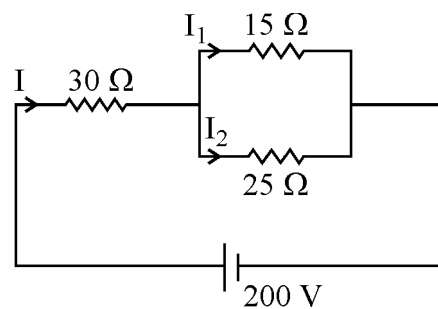


Fig. no. 3

- (b) State Faraday's first and second law of electromagnetic induction.
- (c) An alternating current is given by equation $i = 25 \sin 628 t$. Find
- Average value
 - RMS value
 - Frequency
 - Time period
- (d) Draw waveform and phasor representation for lagging and leading AC quantities.

P.T.O.

- (e) A coil having 25Ω resistance and 0.1H inductance is connected across 100 V , 50 Hz supply. Calculate :
- Impedance of coil
 - Current
 - Power factor
 - Active power
- (f) Draw circuit diagram for measurement of single phase power, using dynamometer type wattmeter.

4. Attempt any FOUR of the following :

16

- (a) Define and write expression for (a) RMS value (b) AVG value of an AC.
- (b) Define :—
- Active power
 - Reactive power
 - Power factor
 - Apparent power
- (c) For the circuit shown in fig. no. 4, find the value of
- X_L
 - X_C
 - Z
 - Current

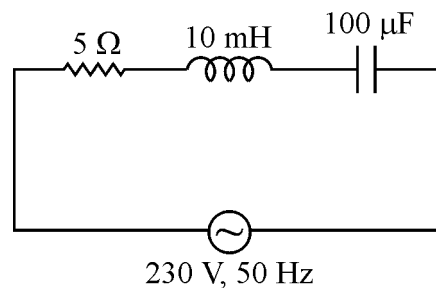


Fig. no. 4

- (d) State any four advantages of 3 phase over single phase circuits.
- (e) Calculate :
- Line current
 - Phase current
 - Power factor
 - Total power for circuit in fig no. 5

Delta Connected Balanced System.

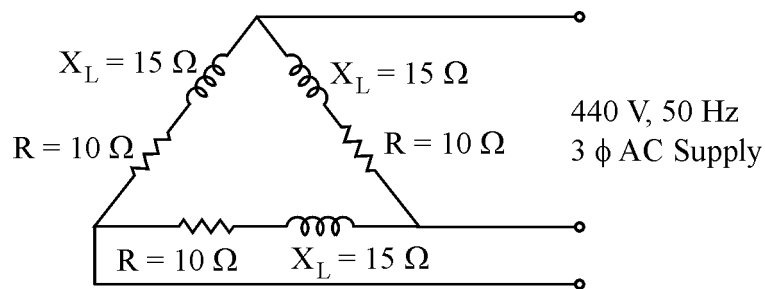


Fig. no. 5

- (f) Explain construction and working principle of single phase transformer.

5. Attempt any FOUR of the following :

16

- A 230 V, 50 Hz supply is applied to a pure capacitor of $26.5 \mu\text{F}$. Calculate
 - X_C
 - Write equation for voltage and current
 - Draw voltage and current waveforms
- A circuit draws a current of 10 A at a voltage of 200 V with power factor of 0.8 (lag). Calculate
 - Active power
 - Reactive power
 - Apparent power.
 Draw power triangle.
- Draw Balanced star system. Show all voltages and current. write the relation for voltage and current.

- (d) Write emf equation of a transformer, state meaning of each term and write their units.
- (e) Define :-
- (i) Voltage ratio
 - (ii) Current ratio
 - (iii) Transformation ratio
 - (iv) Efficiency of transformer
- (f) State two applications of
- (i) shaded pole motor
 - (ii) universal motor

6. Attempt any FOUR of the following :

16

- (a) A RLC series circuit having $R = 10 \Omega$, $L = 0.1\text{H}$ and $C = 150 \mu\text{F}$ is supplied by 1 phase 200V, 50 Hz supply, find
- (i) Impedance
 - (ii) Current
 - (iii) Power factor
 - (iv) Power absorbed
- (b) For a Balanced three phase star connected load for which line voltage is 230V and per phase resistance and reactance is 6Ω and 8Ω respectively. Calculate
- (i) Phase voltage
 - (ii) Line current
 - (iii) Power factor
 - (iv) Total power absorbed

- (c) Define for polyphase circuit
 - (i) Balanced load
 - (ii) Unbalanced load. Draw one example circuit for each type of load
 - (d) Explain why 1ϕ induction motor is not self-starting.
 - (e) Explain construction and working of single phase Auto transformer.
 - (f) Suggest various safety precautions which should be taken while working with electricity.
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