23124

3 Hours / 70 Marks   Seat No. ☐☐☐☐☐☐☐☐

Instructions : (1) All Questions are *compulsory*.

(2) Answer each Section on separate answer sheet.

(3) Answer each next main Question on a new page.

(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) Preferably, write the answers sequentially.

Marks

SECTION – I

1. Attempt any SIX of the following :   **12**

(a) State the term (i) Power (ii) Energy.

(b) State (i) Cycle (ii) Frequency of AC supply.

(c) State (i) Form factor (ii) Peak factor of AC supply.

(d) Draw phasor diagram for R.L. series circuit.

(e) State the working principle of transformer.

(f) Classify transformer on the basis of transformation ratio.

(g) State two applications of Autotransformer.

2. Attempt any THREE of the following : **12**

(a) State Faraday's (i) First law (ii) Second law of electromagnetic induction.

(b) Draw circuit diagram, waveform and phasor diagram for R-C series circuit. Write equation for V and I.

(c) Explain construction of Core type single phase transformer, write formula for transformation ratio.

(d) Derive emf equation of transformer.

3. Attempt any TWO of the following : **12**

(a) Compare Magnetic and Electrical circuit with any six similarities.

(b) State (i) Active power (ii) Reactive power (iii) Apparent power in AC circuit. Draw power triangle showing angle and powers.

(c) Draw constructional details of single phase AC motor. Explain Production of rotating magnetic field' in single phase AC motor.

SECTION – II

4. Attempt any FIVE of the following : **10**

(a) State (i) active and (ii) passive components.

(b) (1) Draw symbol of (i) Resistor (ii) Capacitor.

(2) Identify resistance on the basis of colour code : Black Red Brown Gold.

(c) Draw symbol of (i) P.N. junction diode (ii) Zener diode.

(d) Draw 'π' filter.

(e) Draw symbol and constructional diagram of NPN transistor.

(f) Draw a triangular waveform with 20 V peak voltage and 1 KHz frequency.

5. **Attempt any THREE of the following :** **12**

    (a) Explain ideal and practical voltage source with suitable diagram.

    (b) Explain Zener diode as voltage regulator with V-I characteristics.

    (c) Explain operation of transistor as an amplifier with neat circuit diagram.

    (d) State biasing of Base emitter and collector base junction for (i) Cut off (ii) Active (iii) Saturation region of operation of transistor with tabular format.

6. **Attempt any TWO of the following :** **12**

    (a) (i) List different types of capacitors and resistors.

        (ii) Differentiate between analog and digital IC's.

    (b) (i) Draw diagram of bridge rectifier.

        (ii) Compare Half wave and Full wave rectifier on the basis of PIV, ripple factor, efficiency, no of diodes used.

    (c) Related to CE configuration of BJT –

        (i) Draw input and output characteristics.

        (ii) Indicate different regions of operations on them.

        (iii) State applications w.r.t. operating region.

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