22221

23124

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

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

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

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

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

(a) Define permeability and give its unit.

(b) Define the term power factor. State its value for purely resistive circuit.

(c) Define impedance and state its unit.

(d) Write two possible phase sequences for a 3ϕ system.

(e) State the material used for winding and brushes in DC motor.

(f) List any two applications of brushless DC motor.

(g) State function of limit switch and proximity switch.

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

(a) Write formula for self and mutual inductance. Write meaning of each term in it.

(b)

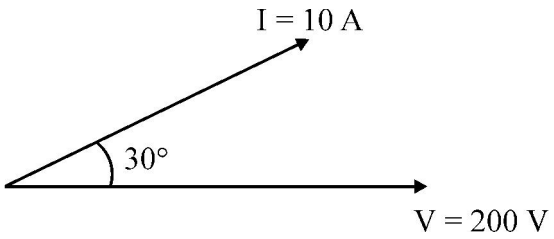

Fig. 1

Find :

(i) impedance

(ii) power factor

(iii) nature of pf

(iv) power; from the phasor diagram shown in Fig. 1.

(c) A 1ϕ, 230/115 V, 1 kVA transformer has 100 turns on secondary. Find

(i) Number of turns on primary

(ii) I_1 & I_2

(d) List four applications each of

(i) DC shunt motor

(ii) DC series motor

3. Attempt any THREE of the following : 12

(a) Draw a neat circuit for –

(i) series magnetic circuit

(ii) parallel magnetic circuit

(b) Draw a circuit diagram of 3ϕ star connected load. Label I_ph, I_L, V_ph, V_L on it.

(c) For a 3ϕ Induction Motor write –

(i) two main parts

(ii) two types

(iii) two starters

(iv) two applications

(d) For a MCB, state –

purpose, rating, one advantage and one application.

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

(a) Find current through 6Ω resistor of Fig. 2 using Kirchhoff's laws.

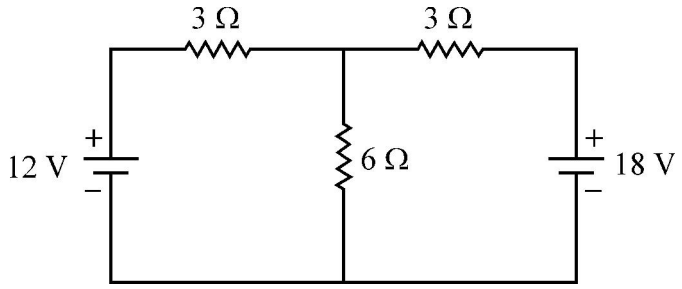

Fig. 2

(b) With neat sketch explain speed control of DC shunt motor by flux control method.

(c) Draw schematic diagram of 3ϕ Induction motor. Explain its principle of operation.

(d) Write major four steps of maintenance procedure for FHP motors.

(e) List any four methods of reducing earthing resistance.

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

(a) For a purely capacitive circuit, draw –

(i) circuit diagram

(ii) waveform for V, I

(iii) phasor diagram for V, I

(iv) write equation of current

(v) state nature of pf; and

(vi) give value of power consumed

(b) For a transformer, write –

(i) any two types;

(ii) any two losses;

(iii) any two applications.

(c) With neat sketch explain principle of operation of a universal motor. Give two applications of the same.

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

(a) A resistance of 12Ω is connected in series with an inductance of 0.1 H. A 200 V, 50 Hz, 1ϕ supply is connected across the combination. Draw the circuit diagram and find –

(i) X_L

(ii) Z

(iii) I

(iv) pf; and

(v) P

(b) For a shaded pole induction motor

(i) Draw the schematic diagram

(ii) Write principle of operation; and

(iii) give any two applications.

(c) State purpose of earthing. State any two types of earthing. Write major four points about construction of plate earthing.

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