

22221

21718

3 Hours / 70 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.
 - (8) Use of steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. Attempt any FIVE :

10

- (a) Define reluctance and flux density.
- (b) Define frequency and time period.
- (c) State units for active power, relative power, apparent power.
- (d) Define phase sequence in three phase system.
- (e) List different types of DC motors.
- (f) Select suitable single phase motor for each of the following :
 - (i) Fan
 - (ii) Home Mixer
- (g) State main difference between ELCB and MCB.

2. Attempt any THREE :**12**

- (a) Explain dynamically induced EMF and statically induced EMF.
- (b)
 - (i) Differentiate AC and DC quantity w.r.t. time varying waveform.
 - (ii) Explain impedance triangle.
- (c) Write any two difference between each of the following :
 - (i) Step up transformer and step down transformer.
 - (ii) Balanced load and unbalanced load in three phase system.
- (d) Explain working principle of three phase induction motor.

3. Attempt any THREE :**12**

- (a) Describe Fleming's right hand rule and left hand rule.
- (b) Describe working principle of a transformer.
- (c) Classify three phase induction motor and compare them on any four points.
- (d) Explain concept of Limit switch and float switch.

4. Attempt any THREE :**12**

- (a) Compare electric circuit and magnetic circuit on any four points.
- (b) Identify material used for each of the following parts of DC motor :
Winding, Armature, Brush, Pole
- (c) Explain with diagram field control method of speed of DC shunt motor.
- (d) Explain basic principle of working of stepper motor.
- (e) Explain need of earthing of electrical equipments or machines.

5. Attempt any TWO :**12**

(a) Calculate each of the following for a sinusoidal voltage source having

$$v = 400 \sin \left(314t - \frac{\pi}{6} \right) \text{ volt.}$$

(i) Maximum value

(ii) Frequency

(iii) Time period

(iv) Phase

(v) RMS voltage

(vi) Form factor.

(b) Calculate current per phase, total active power, total reactive power for a circuit shown in fig. 1.

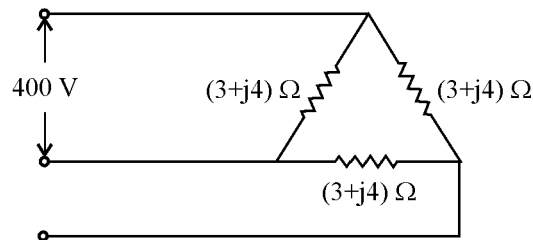


Fig. 1

(c) Sketch schematic diagram for each of the following :

(i) Shaded pole motor

(ii) Split phase motor

(iii) Universal motor

(iv) Capacitor start induction run

(v) Capacitor start capacitor run

(vi) Permanent capacitor

P.T.O.

6. Attempt any TWO :

12

- (a) Calculate power factor, Impedance, current, Active power, Reactive power, Apparent power for the circuit shown in fig. 2.

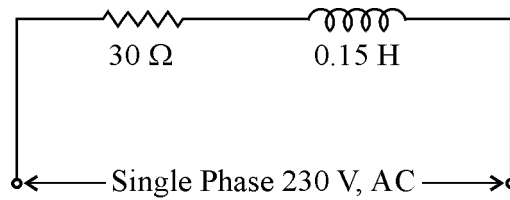


Fig. 2

- (b) Write any **two** applications for each of the following :
- (i) Servo-motor
 - (ii) Brushless DC motor
 - (iii) Stepper motor
- (c) Prepare a table showing difference between fuse and MCB on following points :
- cost, size, ratings available, switching operation after fault, maintenance, application.
