

22431

23124

3 Hours / 70 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) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following :

10

- (a) Give any two applications of DC shunt motor.
- (b) State the various parts of an induction motor.
- (c) Name the different methods of synchronizing the alternator.
- (d) Compare shell type and core type transformer (any two points).
- (e) State the function of following parts of DC motor (i) Yoke (ii) Pole.
- (f) Define the terms : (i) Synchronous speed (ii) Rotor induced current.
- (g) State the different types of braking used in electrical machines.

2. Attempt any THREE of the following :

12

- (a) Explain with neat sketch the working principle of synchronous motor.
- (b) Explain the procedure to find voltage regulation of 3 phase alternator for a leading power factor by direct loading method.
- (c) Explain the torque slip characteristic of 3 phase induction motor with neat sketch.
- (d) Suggest the suitable starter for the following motors with justification :
 - (i) 10 Hp, 415 V, 50 Hz 3 phase, squirrel cage induction motor.
 - (ii) 5 Hp, 415 V, 50 Hz 3 phase slip ring induction motor.
- (e) Explain the role of damper winding in synchronous motor.



- 3. Attempt any THREE of the following : 12**
- (a) Explain the construction and working of AC Servo motor.
 - (b) Explain in detail the construction and working of isolation transformer.
 - (c) Describe with neat sketch, the construction of variable reluctance stepper motor.
 - (d) Explain the V. curve and inverted V. curve for synchronous motor.
 - (e) Draw the experimental set up for O.C. and S.C. test on single phase transformer.
- 4. Attempt any THREE of the following : 12**
- (a) Explain with neat sketch, the working principle of brushless DC motor.
 - (b) Explain the procedure to carry out the polarity test on single phase transformer.
 - (c) Explain with circuit diagram the procedure to conduct brake test on a dc shunt motor.
 - (d) Explain the working principle of 3ϕ induction motor.
- 5. Attempt any TWO of the following : 12**
- (a) Explain with sketches the speed control of 3 phase induction motor by
 - (i) Stator voltage control (ii) Rotor resistance control method.
 - (b) A 3 phase star connected alternator is rated at 1500 kVA, 13.5 kV. The armature resistance and synchronous reactance are 1.6Ω and 30Ω respectively per phase. Calculate voltage regulation for a load of 1300 kw at 0.8 leading power factor.
 - (c) Explain in detail the construction and working of permanent magnet synchronous motor.
- 6. Attempt any TWO of the following : 12**
- (a) Write the conditions to be satisfied for the parallel operation of alternators. Also state its advantages.
 - (b) A 10 kVA, single phase 50 Hz 500/250 V transformer has following results.
 - o.c. test – (L.V. side) 250 V, 3A, 200 W
 - s.c. test – (H.V. side) 15V, 20A, 300 WCalculate efficiency and regulation at full load 0.8 p.f. lagging.
 - (c) State the necessity of starter and explain in detail star-delta starter.
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