

22523

11920

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) 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. Attempt any FIVE of the following:** **10**
- a) State the function of following parts in Induction motor.
 - (i) Stator
 - (ii) Seiprings
 - b) State suitable single phase motor for following applications:
 - (i) Table fan
 - (ii) Mixers and Grinders
 - c) State advantages of short pitch winding over full pitch winding in alternators.
 - d) List different torques in synchronous motor.
 - e) State advantages of rotating field type alternators. (any four)
 - f) List applications of stepper motor.
 - g) List applications of servomotor.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Derive the condition for maximum torque under running condition of a 3 phase induction motor.
 - b) A 16 pole, 3 phase star connected alternator armature has 12 slots with 24 conductors per slot and flux per pole is 0.1 wb. sinusoidally distributed. Calculate line emf generated at 50 Hz.
 - c) Explain the effect of variable excitation on the behaviour of synchronous motor under constant load condition.
 - d) Prove that for a 3ϕ induction motor.
Rotor copper loss = S. Rotor input.
- 3. Attempt any THREE of the following:** **12**
- a) The power input to a 500V 50Hz 6Pole 3ϕ induction motor running at 975 rpm is 40 kW. The stator losses are 1kW and friction and windage losses are 2kW. Calculate :
 - (i) Seip
 - (ii) Rotor copper loss
 - (iii) Shaft power
 - (iv) Efficiency
 - b) Prove that $K_d = \frac{\sin(m\beta/2)}{m \sin(\beta/2)}$ in an alternator.
 - c) Explain working of resistance split phase single phase induction motor with vector diagram.
 - d) A 400V, 50Hz seipring type three phase induction motor is star connected and has per phase rotor resistance and standstill reactance of 0.5 and 1.5 ohm respectively. Calculate resistance to be added per phase to achieve maximum torque at starting.

- 4. Attempt any THREE of the following:** **12**
- a) Explain working of autotransformer starter for a 3 phase induction motor with neat diagram.
 - b) Explain phase shifting (production of rotating magnetic field) in shaded pole induction motor with neat diagram.
 - c) Explain the construction and working of permanent magnet stepper motor.
 - d) Describe with neat sketch working of hysteresis motor.
 - e) Explain construction and working of AC servomotor.
- 5. Attempt any TWO of the following:** **12**
- a) Explain the activities carried out during weekly maintenance of 3 ph. Induction motor.
 - b) Define voltage regulation of an alternator. Explain synchronous impedance method for finding regulation of alternator.
 - c) State the modifications to be done in dc series motor to work satisfactorily as ac series motor. State applications of ac series motor.
- 6. Attempt any TWO of the following:** **12**
- a) Define armature reaction in an alternator. Explain the effect of armature reaction at various P.F. of loads of alternator.
 - b) Draw and explain 'V' and 'inverted V curves' for synchronous motor.
 - c) List different starting methods of three phase synchronous motor. Explain any one of them.
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