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**Question Paper Code : 80131**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Fourth Semester

Electrical and Electronics Engineering

EE 8401 — ELECTRICAL MACHINES — II

(Regulation 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish between the 'Synchronous reactance' and the 'Potier reactance' of a synchronous generator.
2. Why the concept of Two reaction theory is applied only to salient pole machines.
3. Name the various torques associated with a synchronous motor.
4. What for damper windings are provided in a synchronous machines?
5. A 3-phase induction motor is wound for 4 poles and is supplied from 50 Hz system. Calculate the speed at which the magnetic field of the stator is rotating.
6. State the merits and demerits of double cage induction machines.
7. List the advantages of rotor resistance starter based induction motor starting.
8. What type of braking is employed during deceleration of an induction motor?
9. What is the role of 'magnetic bridges' in the operation of a shaded pole induction motor?
10. What is the necessity of having laminated yoke in an ac series motor?

PART B — (5 × 13 = 65 marks)

11. (a) A 3-phase, 50 Hz, star-connected alternator with 2-layer winding is running at 600 rpm. It has 12 turns/coil, 4 slots/pole/phase and a coil-pitch of 10 slots. If the flux/pole is 0.035 Wb sinusoidally distributed, find the phase and line emf's induced. Assume that the total turns/phase are series connected. (13)

Or

(b) A 3-phase, star-connected, 1000 kVA, 11 kV alternator has rated current of 52.5 A. The ac resistance of the winding per phase is 0.45 Ω. The test results are given below :

OC test: field current = 12.5 A, voltage between lines = 422 V

SC test; field current = 12.5 A, line current = 52.5 A

Determine the full-load voltage regulation of the alternator at (i). 0.8 p.f. lagging, and (ii). 0.8 p.f. leading. (13)

12. (a) (i) List the various methods used for starting of synchronous motors. Explain any two methods. (8)

(ii) Explain with the help of phasor diagram, the operation of a synchronous condenser. (5)

Or

(b) (i) Explain V curves as applied to synchronous motors. (7)

(ii) With the help of phasor diagram, obtain the expression for mechanical power developed by a synchronous motor. (6)

13. (a) (i) Derive an expression for the torque of a 3-phase induction motor under running condition and obtain the condition for maximum running torque. (8)

(ii) Write short notes on 'Synchronous Induction Motor'. (5)

Or

(b) With neat diagram, explain the constructional details and working principle of a 3-phase induction motor. (13)

14. (a) Describe the working of (i) Auto-Transformer starter and (ii) Star-Delta starter for a 3-phase induction motor with neat diagrams. (13)

Or

(b) Briefly discuss various methods to control the speed of a 3-phase induction motor. (13)

15. (a) Explain the experimental method to determine the equivalent circuit parameters of a single phase induction motor. (13)

Or

(b) Explain the construction and working principle of variable reluctance stepper motor. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the experimental tests to be conducted on an induction motor to draw the circle diagram. How the motor characteristics is determined from the circle diagram? (15)

Or

(b) Explain the operation of a single phase induction motor on the basis of double field revolving theory. (15)

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