



C09-EE-603

3764

BOARD DIPLOMA EXAMINATION, (C-09)
MARCH/APRIL—2018
DEEE—SIXTH SEMESTER EXAMINATION

AC MACHINES—II

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. What is meant by hunting in a synchronous motor and how can it be prevented?
2. Draw the phasor diagram of synchronous motor on load at leading power factor and label the parts.
3. Explain any starting method of synchronous motor.
4. Compare induction motors with synchronous motors in any three aspects.
5. Draw and label the parts of a rotor resistance starter.
6. Explain the power stages in a 3-phase induction motor.

7. Write any four ^{*} applications of single-phase split-phase induction motor.
8. How do you reverse the direction of rotation of single-phase capacitor start induction motor?
9. Explain why single-phase induction motor should be provided with an auxiliary winding on stator.
10. State any four applications of stepper motor.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. (a) Explain the principle of working of synchronous motor. 5
(b) A 10-HP, 400-V, 3-phase star-connected synchronous motor has synchronous impedance per phase of $(0.35 + j2.8)$ ohms. Find the angle of retard and voltage to which motor must be excited to give a full-load output at 0.866 leading power factor. Assume efficiency of 88%. 5
12. A 400-V, 3- , star-connected synchronous motor has a resistance of 0.3 per phase and synchronous reactance of 2.4 of per phase. The motor is operating at 0.8 p.f. leading taking a line current of 80 A. Determine the value of generated e.m.f. per phase and also its line value. 10
13. (a) Derive the relation between starting torque and maximum torque in 3-phase induction motor. 5
(b) Distinguish between squirrel-cage rotor and slip-ring rotor. 5

- 14.** Draw the circle diagram of 33.6 kW, 400 V, 50 Hz, 6-pole, 3-phase star-connected induction motor from the following test data (line values) :

No load test : 400 V, 20 A, p.f. 0.15

Blocked rotor test : 133 V, 100 A, p.f. 0.35

Construct the circle diagram and find (a) line current, (b) power factor, (c) slip and (d) efficiency at full load. Assume stator and rotor copper losses equal at standstill.

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- 15.** (a) Explain the constructional features of double-cage induction motor.

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(b) Explain the speed control of induction motor by using method 'changing stator poles'.

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- 16.** A 6-pole, 3-phase, 50-Hz induction motor has a rotor resistance and reactance of 0.02 ohm and 0.1 ohm respectively. What speed gives maximum torque? What external resistance is necessary in the rotor circuit to give half maximum starting torque?

- 17.** Explain the working and construction of shaded pole induction motor with neat diagrams.

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- 18.** (a) List the features/advantages of brushless d.c. motor.

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(b) Explain the methods used for speed control of universal motor.

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