



C14-EE-502

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BOARD DIPLOMA EXAMINATION, (C-14)
MARCH/APRIL—2018
DEEE—FIFTH 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 synchronous condenser?
2. Draw the vector diagram of synchronous motor on load at leading power factor.
3. Compare three-phase induction motor with synchronous motor.
4. Draw the power flow diagram of a three-phase induction motor.
5. State any four applications of three-phase induction motor.
6. Explain how the direction of the rotation of split-phase single-phase induction motor can be reversed.
7. What is the difference between capacitor start and capacitor start and run single-phase induction motor?

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1

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8. List the applications of shaded-pole induction motor.
9. List the types of Stepper motors.
10. List the applications of universal 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) What are the different methods of starting of a synchronous motor and explain any one starting method. 5
12. A 3-phase, 400 V, 50 Hz star-connected synchronous motor has a full-load input current of 68 Amps. The synchronous impedance of the motor $1.61 + j8.2$ per phase. The motor is working at a leading power factor of 0.9. Find (a) the back e.m.f., (b) the total mechanical power developed. Take armature resistance per phase as 0.2 ohm.
- * 13. (a) Derive an expression for the torque of a 3-phase induction motor under running conditions. 5
 (b) A 4-pole, 50 Hz, 10 Hp induction motor has at rated voltage and frequency, a starting torque of 160% and a maximum torque of 200% of full-load torque. Determine (a) full-load speed and (b) speed at maximum torque. 5
14. Explain the working operation of (a) DOL starter and (b) star-delta starter of a 3-phase induction motor with neat diagram. 5+5

- 15.** A 400 volts, 20 Hp, 50 Hz, 6-pole, three-phase induction motor gave the following test results :

No load test : 400 V, 11 A, p.f. = 0.2

Blocked rotor test : 100 V, 25 A, p.f. = 0.4

Rotor copper loss at stand still is half the total copper loss.

Draw the circle diagram and determine line current, power factor and efficiency at full load.

- 16.** A 4-pole, 400 V, 3-phase, 50 Hz induction motor runs at 1440 r.p.m. at 0.8 p.f. and develops an output of 10.8 kW. The stator loss is 1060 watts, friction and windage losses are 390 watts. Calculate (a) slip, (b) rotor copper loss, (c) rotor efficiency, (d) stator input and (e) line current.
- 17.** Explain the construction and working of a single-phase capacitor start induction motor and mention its applications.
- 18.** State important features and explain construction and working of a permanent magnet brushless DC motor.
