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?

8. List the applications of shaded-pole induction motor.

9. List the types of Stepper motors.

10. List the applications of universal motor.

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PART—B 10×5=50

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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 82 per phase. The motor is working at a leasing 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.

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