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BOARD DIPLOMA EXAMINATION, (C-16)

MAY/JUNE—2023

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. List out the characteristic features of synchronous motor.

2. State how hunting can be prevented.

3. Draw the equivalent circuit of an induction motor.

4. A 3-phase induction motor has 2-poles and is connected to 400 V, 50 Hz supply. Determine the actual rotor speed when the slip is 4%.

5. State the method of reversal of rotation of single-phase capacitor start motor.

6. List the applications of stepper motor.

7. Classify the drives based on their application.

8. Compare AC drive and DC drive in any three aspects.

9. List any three advantages of electric braking.

10. What is the plugging method of electrical braking?

PART—B

10×5=50

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

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

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

11. *(a)* Explain why the synchronous motor is **not** self-starting.

(b) State the starting methods of synchronous motor. Explain any one of them in detail.

12. *(a)* A 11 kV, 3-ϕ, star connected synchronous motor takes 60 A current. The effective resistance and synchronous reactance per phase are 1.2Ω and 30Ω respectively. Find the induced emf for a p.f. of 0.8 leading.

(b) The power input to a 3-phase induction motor is 33.23 kW. The stator loss is 0.94 kW. If the motor is running at 4% slip, calculate *(i)* rotor input, *(ii)* gross mechanical power developed and *(iii)* rotor copper loss.

13. Explain with neat sketch the speed control methods of 3-ϕ induction motor

(a) by changing the supply frequency

(b) by cascade connection

14. Derive the condition to get a maximum torque developed in a 3-ϕ induction motor.

15. *(a)* Explain why a single-phase induction motor is **not** self-starting motor.

(b) Explain the working principle of a single-phase induction motor by double revolving theory.

16. Explain the construction and working of a single-phase shaded pole induction motor and mention its applications.

17. A motor has the following duty cycle :
100 HP for 10 minutes
no load for 5 minutes
60 HP for 8 minutes
no load for 4 minutes, which is repeated indefinitely
Determine the suitable size of a continuously rated motor.

18. Explain the method of regenerative braking of 3-phase induction motors.

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