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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DEEE – FIFTH SEMESTER EXAMINATION

ELECTRICAL MACHINES—III (AC MOTORS AND DRIVES)

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. Why are rotor slots of a 3-phase induction motor skewed?

2. List at least six applications of three-phase induction motor.

3. What are the applications of stepper motor?

4. Classify the different types of single-phase motors.

5. Draw the phasor diagram of synchronous motor for lagging power factor.

6. What are the methods to prevent hunting?

7. What are the applications of synchronous motor?

8. Define an electric drive and list various components of it.

9. State the need of load equalization.

10. What is plugging method of electrical braking?

PART—B

8×5=40

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

(2) Each question has its choice and carries **eight** marks.

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

11. *(a)* Describe the construction of squirrel cage and slip ring rotors in 3-phase induction motor with neat diagrams.

(OR)

(b) Derive the condition to get a maximum torque developed in a 3-phase induction motor.

12. *(a)* Explain the working of DOL starter with the help of a neat diagram.

(OR)

(b) Compare the induction motor with synchronous motor in any eight aspects.

13. *(a)* Explain construction and working of a split-phase induction motor with a neat diagram.

(OR)

(b) Explain the working principle of an AC series motor with a neat diagram.

14. *(a)* Explain about the following electric drives and also state their advantages and disadvantages :

(i) Group drive

(ii) Individual drive

(OR)

(b) A motor operates continuously on the following cycle :

(i) Load rising from 0 to 40 kW for 6 seconds

(ii) Constant load of 120 kW for 6 seconds

(iii) Constant load of 80 kW for 10 seconds

(iv) Idle for 14 seconds

Draw the load cycle and suggest a suitable continuous rated motor. Assume any missing data.

15. *(a)* What is regenerative braking? Explain regenerative braking applied to DC shut motor.

(OR)

(b) A 40 hp, 440 V DC shunt motor is braked by plugging. Calculate the value of the resistance to be placed in series with the armature circuit to limit the initial braking current to 120 A. Calculate the braking torque so obtained. Assume armature resistance is 0·2 Ω, full load armature current is 80 A, full load speed is 600 r.p.m. Assume any missing data.

PART—C

10×1=10

Instructions : (1) Answer the following question.

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

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

16. What are the appropriate motors available for pumpset? Give your reasons for selecting them and also mention their characteristics.

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