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C16-EE-502

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BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DEEE - FIFTH SEMESTER EXAMINATION

AC MACHINES - II

Time : 3 hours ]

[ Total Marks : 80

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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. Draw V-curve and inverted V-curve of a synchronous motor on no load and full load.
2. List any three applications of synchronous motor.
3. Compare squirrelcage rotor with slip ring rotor in any three aspects.
4. Draw the power-flow diagram of 3-phase induction motor.
5. Classify single phase induction motors based on starting methods.
6. State any three applications of Universal motor.
7. Compare AC drive and DC drive in any three aspects.
8. State the need of load equalization.
9. Write any three advantages of electric braking over other forms of braking.
10. What is the plugging method of electric braking?

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## PART—B

**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 3-phase, 400 V star-connected synchronous motor has a back e.m.f. of 350 V, leading 150 electrical degrees over the applied voltage. The resistance and reactance per phase are 0.25  $\Omega$  and 3.2  $\Omega$ , respectively. Find (a) the armature current and (b) the p.f. at which the motor is operating. 10
12. (a) Explain the starting of synchronous motor by damper winding. 5  
(b) Explain the working principle of 3-phase induction motor. 5
13. Explain with neat sketch the speed control methods of three-phase induction motor. 5+5  
(a) By changing the supply frequency  
(b) By cascade connection
14. Draw the circle diagram from No load and Short circuit test of a 3-phase, 14.92 kW, 400 V, 6-pole induction motor from the following test results( line values) :  
No load : 400 V, 11 A, p.f. = 0.2  
Short circuit : 100 V, 25 A, p.f. = 0.4  
Rotor copper loss at standstill is half the total copper loss.  
From the diagram, find (a) line current, slip, efficiency and p.f. at full load and (b) the maximum torque. 10
15. Explain the construction and working of a split phase induction motor with a neat diagram. 10
16. Explain the construction and working of shaded pole motor with neat diagram. 10

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17. A motor operates continuously on the following cycle. Load rising from 0 to 40 kW for 6 seconds, constant load of 120 kW for 6 seconds, constant load of 80 kW for 10 seconds and idle for 14 seconds. Draw the load cycle and suggest a suitable continuous rated motor. 10
18. 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  $0.2 \Omega$ , full load armature current is 80 A, full load speed is 600 rpm. 10

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