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BOARD DIPLOMA EXAMINATION, (C-16S)

JUNE / JULY - 2020

DEEE - V SEMESTER EXAMINATION

AC MACHINES - II

Time : 3 Hours}

[Total Marks : 30

PART - A

3x10=30

- Instructions :
- (1) Answer ALL questions.
 - (2) Each question carries THREE marks.
 - (3) Answer should be brief and straight to the point.

- ✓ What is a synchronous condenser ?
- ✓ Draw V and inverted V curves of synchronous motor.
- ✓ Draw the vector diagram of synchronous motor on load at leading power factor.
- 4 A 6-pole, 50-Hz induction motor has a slip 2.5%. Find its actual speed and slip speed.
- ✓ Draw the power flow diagram of a three-phase induction motor.
- ✓ State any three applications of 3-phase induction motors.

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PART - B

- Instructions :
- (1) Answer any FIVE questions.
 - (2) Each question carries TEN marks.
 - (3) Answer should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11 (a) What are the different methods of starting of a synchronous motor.
- (b) A 11KV, 3- Φ , star connected synchronous motor draws a current of 60A. The effective resistance and reactance per phase are 1Ω and 30Ω respectively. Find the power supplied to the motor and the induced emf for a power factor of 0.8 lead and lag. <http://www.sbtetonline.com>
- 12 A 3- Φ , 400 V, 50 Hz star-connected synchronous motor has a full-load input current of 68 Amps. The synchronous impedance of the motor $1.61\angle 82^\circ$ 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 0.2Ω .

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- 13 (a) Distinguish between induction motor and synchronous motor in any five aspects. 5
(b) Explain the working principle of 3- Φ induction motor. 5
- 14 (a) Define the following : 4
(i) Slip
(ii) Slip speed
(b) A 4-pole, 3- Φ , 50Hz induction motor has a full load slip of 5%. Each rotor phase has a resistance of $0.3\ \Omega$ and stand still reactance of $1.2\ \Omega$. Find the ratio of maximum torque to full load torque and the speed at which maximum torque occurs. 6
- 15 A 400 volts, 14.92 kW, 50 Hz, 6-pole, 3- Φ star connected induction motor gave the following test results : 10
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, slip, power factor, efficiency at full load and the maximum torque.
- 16 A 4-pole, 400 V, 3- Φ , 50 Hz star connected 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. 10
Calculate (a) slip, (b) rotor copper loss, (c) rotor efficiency, (d) stator input and (e) line current.
- 17 (a) Explain the working of a split-phase induction motor with neat sketch. 7
(b) List any three applications of split-phase induction motor. 3
- 18 (a) Explain the construction and working of universal motor. 7
(b) List any three applications of stepper motor. 3