

(Following Paper ID and Roll No. to be filled in your
Answer Books)

Paper ID : 122661

Roll No.

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B.TECH

Theory Examination (Semester-VI) 2015-16

ELECTRICAL MACHINES

Time : 3 Hours

Max. Marks : 100

Section-A

- 1. Attempt all parts. All parts carry equal marks. Write answer of each part in sort. (2×10 = 20)**

- (a) Explain rotating magnetic field with suitable neat diagram.
- (b) What is back EMF in D.C. motor?
- (c) Name the parts of electrical machines.
- (d) Why an induction motor is called as rotating transformer?
- (e) What kind of motors used in ceiling fan and wet grinders?

- (f) What are the conditions to be fulfilled by for a dc shunt generator to build back emf?
- (g) List out the method for speed control of 3 phase cage type induction motor?
- (h) State advantages of synchronous machines over DC machines.
- (i) State any 4 use of single phase induction motor?
- (j) What is slip and explain how does the frequency of rotor emf change with its speed?

2. Attempt any five questions from this section.

(10×5 = 50)

- (a) Explain with a neat sketch about construction and working principle of D.C. machines.
- (b) Explain with a neat sketch the matching characteristics of electric machines and load.
- (c) Draw the phasor diagram of induction motor with the help of equivalent circuit and explain it.
- (d) Explain with a neat sketch about the Starting of DC motor.

(2)

- (e) A, 3300V, delta-connected motor has a synchronous reactance per phase (delta) of 18 ohm. It operate as a leading power factor of 0.707 when drawing 800 KW from the mains. Calculate its excitation emf.
- (f) Explain with a neat sketch about the parallel operation of synchronous generators.
- (g) Explain with a neat sketch about types of single phase motor.
- (h) A 3-phase, 50 Hz, star-connected alternator with 2 layer winding is running at 600 rpm. It has 12 turns/coil, 4 slots/pole/phase and a coil-pitch of 10 slots. If the flux/pole is 0.035 Wb sinusoidally distributed, find the phase and line emf's induced. Assume that the total turns/phase are series connected.

Section-C

Note : Attempt any two questions in this section. (15×2 = 30)

3. Explain about armature reaction in DC machines and generating mode, motoring mode in DC machines.
4. (a) A 6-pole, 50 hz, 3-phase induction motor running on full load dvelops a useful torque of 160 nm when the rotor emf makes 120 complete cycles per minute. Calculate

the shaft power output. If the mechanical torque lost in friction and that for core-loss is 10Nm , the total stator loss is given to be 800W .

Compute

The copper-loss in the rotor windings, The input to the motor, and the efficiency.

- (b) A cage induction motor has a slip of 4% at full load. Its starting current is five times the full-load current. The stator impedance and magnetizing current may be neglected; the rotor resistance is assumed constant. Calculate the maximum torque and the slip at which it would occur. Calculate the starting torque.
5. Explain pole changing method and frequency control method for speed control.