[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2125)

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B. Tech 5th Semester Examination

Electrical Machine-II (NS)

EE-311

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C & D. Section-E is compulsory.

SECTION - A

1. (a) Explain production of rotating field in a three phase squirrel cage induction motor. (7)

   (b) Explain relationship between rotor copper loss and rotor input in case of a three phase induction motors. (10)

   (c) Draw torque slip curves for induction motor. (3)

OR

2. (a) A 3 phase 6 pole 50Hz induction motor develops 3.73 kilowatt at 960 rpm. What will be stator input if stator loss is 280 Watts. (12)

   (b) Draw various power flow diagram components for a poly phase induction motor. (8)

SECTION - B

3. (a) Compare performance of single cage and double cage induction motors. (10)

[P.T.O.]

   (b) What do you mean by blocked rotor test? Why it is conducted for induction motors? (10)

OR

4. (a) What do you mean by equivalent circuit of a single phase induction motor? State its practical significance. (10)

   (b) Explain principle, construction and operation of a permanent magnet and stepper motor. (5×2=10)

SECTION - C

5. (a) Explain briefly about working, construction, operation and phasor diagram of a synchronous generator. (15)

   (b) What is armature leakage reactance? (5)

OR

6. (a) Explain parallel operation of alternators. Why it is necessary in power utilities? (10)

   (b) Why cooling of synchronous generators is important? How it is carried out? (10)

SECTION - D

7. (a) Discuss salient points of operation of a three phase synchronous motor. How equivalent circuit and phasor diagram play role in determining performance? (15)

   (b) Why various electric torque components exist in 3-phase synchronous motor? (5)

OR

8. A one MVA, 11000 Volt, 3-phase star connected synchronous motor has armature resistance per phase as 3.5 ohm and armature reactance per phase as 40 ohm. Determine induced emf and angular retardation of rotor when fully loaded at (i) unity p.f. (ii) 0.8 p.f. lagging. (20)

SECTION - E

9. Give answer in short.

(i) What are V curves of synchronous motors?

(ii) How hunting is caused in synchronous machines?

(iii) Is poly phase induction motor capable to have any stand still emf?

(iv) What is pull out torque?

(v) Define synchronous watt.

(vi) Is magnetic locking created due to arbitrary design considerations of electrical machine?

(vii) What is practical use of circle diagrams of induction motor?

(viii) What is step angle in context of fractional horse power stepper motor?

(ix) How rotor power factor of induction motor can be improved?

(x) What is synchronous condenser? (2×10=20)