Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

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B.Tech.(Electrical & Electronics) (2013 Onwards)/
B.Tech.(Electronics & Electrical) (2013 Batch)
(Sem.–4)
ELECTRICAL MACHINERY-II
Subject Code : BTEEE-401
M.Code : 72385

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

   a. Why does a 3-phase induction motor always run at a speed less than the synchronous speed?

   b. How can the direction of rotation of the 3-phase induction motor be reversed.

   c. Discuss the working principle of hysteresis motor.

   d. What is meant by armature reaction of a synchronous machine?

   e. Why is the voltage regulation of an alternator negative for leading power factor loads?

   f. Why are synchronous motors not self-starting?

   g. Name any two types of starting method for a synchronous motor.

   h. What are the similarities between induction motor and transformer?

   i. What are V and inverted V curves in synchronous motor and their significance?

   j. What is the need of starter for induction motor?

SECTION-B

2. What is meant by slip in an 3-phase induction motor? Derive an expression for the frequency of rotor currents in it.

3. Explain the effect of variation of excitation and mechanical input on the parallel operation of alternators with necessary phasor diagram.

4. What is synchronous condenser? What are the advantages of installing a synchronous condenser in an electrical system?

5. What is the principle of operation of a linear induction motor?

6. What is hunting and discuss briefly various causes for hunting.

SECTION-C

7. Discuss the procedure for determining the parameters of equivalent circuit of a single phase induction motor.

8. A 5 kW, three-phase Y-connected, 50 Hz, 440 V, cylindrical rotor synchronous motor operates at rated condition with 0.8 pf leading. The motor efficiency excluding field and stator losses is 95% and $X_s = 2.5\Omega$. Calculate :

   a) Mechanical power developed

   b) Back emf

   c) Armature Current

   d) Power angle

   e) Maximum or Pull out torque of the motor.

9. A 1.1 MVA, 2.2 kV, 3-phase, star-connected alternator gave the following test results during OC and SC tests :

Field Current (A)	10	20	30	40	50
Open circuit voltage (kV)	0.88	1.65	2.20	2.585	2.86
Short circuit current (A)	200	400	--	--	--

The effective resistance of the phase winding is 0.22 Ω/phase. Estimate the full-load voltage regulation at 0.8 p.f. lagging by :

(a) Potier method

(b) Ampere-turn method.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.