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Total No. of Pages : 02

Total No. of Questions : 09

# 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.

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- 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

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- 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	0.88	1.65	2.20	2.585	2.86
(kV)					
Short circuit current (A)	200	400			

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The effective resistance of the phase winding is 0.22  $\Omega$ /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.