

**FACULTY OF ENGINEERING**  
**B.E. <sup>3</sup>/<sub>4</sub> (EEE) II – Semester (Main) Examination, June 2014**

**Subject: Electrical Machinery – III**

**Time: 3 Hours**

**Max.Marks: 75**

**Note: Answer all questions from Part A. Answer any five questions from Part B.**  
**PART – A (25 Marks)**

- 1 Define phase spread and slot ripple. (3)
- 2 Write the effects of change in synchronous impedance of a synchronous machine. (3)
- 3 Write the advantages of parallel connections of synchronous generators. (2)
- 4 Explain why a synchronous motor does not have starting torque. (2)
- 5 What are the effects of change of excitation of a synchronous motor on its power factor? (3)
- 6 Why the value of regulation of an alternator is negative under capacitive loading. (3)
- 7 Explain distribution factor and pitch factors of synchronous machine. (3)
- 8 What is slew range? (2)
- 9 Discuss the speed-torque characteristics of two phase servo motors. (2)
- 10 Write the applications of linear induction motors. (2)

**PART – B (50 Marks)**

- 11 Derive the emf equation for an alternator and the expressions for distribution factor and pitch factor. (10)
- 12 Discuss in detail the methods of synchronization of alternators. (10)
- 13 (a) A 1000 KVA, 11,000 V, 3- $\phi$  star connected synchronous motor has a synchronous impedance of  $3.5\Omega + j40\Omega$  per phase. Find the induced emf and angular retardation of the motor at full load unity power factor. (5)
- (b) Explain the effects of change of excitation of a synchronous motor driving a constant load. (5)
- 14 (a) Discuss in detail different methods of determining regulation of synchronous generator. (5)
- (b) A 3- $\phi$ , 200 KVA, 400 V, 50 Hz alternator has per phase armature resistance and synchronous reactance of  $0.1\Omega$  and  $1.2\Omega$  respectively. Determine the induced emf when the machine is delivering rated current at a load power factor of unity. Draw the phasor diagram also. (5)
- 15 Describe the working principle and applications of
  - a) Variable reluctance motor
  - b) Hysteresis motors
 (5 + 5)
- 16 Write short notes on:
  - a) Two-reaction theory
  - b) Hunting in synchronous machines
 (5 + 5)
- 17 (a) The stator of a 3- $\phi$ , synchronous machine is wound for four poles and has a double layer winding wound in 48 slots. Calculate the distribution factor. (5)
- (b) A turbo generator has no-load terminal voltage equal to 1.0 pu and  $x_d = 1.0$  p.u.,  $x'_d = 0.20$  p.u. When inductive load of  $x_L = 2.0$  pu is suddenly applied then find the load terminal voltage due to sudden change in  $x_L$ . (5)