

**B. Tech. - VIEP - ELECTRICAL ENGINEERING
(BTELVI)****Term-End Examination****December, 2015****BIEE-011 : ELECTRICAL MACHINES - II***Time : 3 hours**Maximum Marks : 70*

Note : *Attempt any seven questions. Each question carries equal marks.*

1. Explain the constructional details of rotor of both salient pole and cylindrical rotor synchronous machines. 10

2. Derive the expression for power developed in a cylindrical rotor alternator in terms of power angle and synchronous impedance. 10

3. A 3-phase star connected 400 V synchronous motor takes a power input of 5472 watts at rated voltage. Its synchronous reactance is 10Ω per phase and resistance is negligible. If its excitation voltage is adjusted equal to the rated voltage of 400 V, compute the load angle, power factor, and armature current. 10

4. (a) Explain the term synchronous impedance and explain how it affects the value of the load angle for maximum power delivered, when the machine acts as a motor. 5
- (b) State and explain the difference between the damper winding of an alternator and induction start synchronous motor. 5
5. Sketch the typical torque-speed characteristics of an Induction Motor. How is this characteristic modified 10
- (i) if its rotor circuit resistance is increased ?
- (ii) if its rotor circuit reactance is increased ?
6. What is the procedure for drawing the circle diagram of an induction motor ? What information can be taken or obtained from it ? Also derive the current-locus for the rotor circuit of a polyphase induction motor. 10
7. Blocked rotor test on 3-phase 40 kW, 400 V, 50 Hz 6 pole, star connected induction motor gave the following data :
- 200 V, 110 A, PF = 0.4
- Determine the starting torque for a 3-phase voltage of 380 V at 45 Hz. Neglect magnetizing current and assume stator and rotor ohmic losses equal. 10

8. Why are starting methods required for synchronous motors ? Also explain any two methods. 10
9. Sketch and explain the open circuit and short circuit characteristics of synchronous machines. How can voltage regulation be calculated by the use of their result ? 10
10. Write short notes on any *two* of the following : $2 \times 5 = 10$
- (a) Repulsion Motor
 - (b) Variable Reluctance Motor
 - (c) Switched Reluctance Motor
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