

**DIPLOMA IN ELECTRICAL ENGINEERING
(DELVI) / ADVANCED LEVEL CERTIFICATE
COURSE IN ELECTRICAL ENGINEERING
(ACELVI)**

Term-End Examination

December, 2015

BIEE-028 : ELECTRICAL MACHINES THEORY – II

Time : 2 hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Use of scientific calculators is permitted.

1. Write short notes on any *two* of the following : 2×7=14
 - (a) Universal Motor
 - (b) Slip ring 3- ϕ Induction Motor
 - (c) Synchronous Condenser

2. (a) Explain Brushless Excitation system for synchronous motor. 7
(b) Discuss the power-angle characteristics of salient pole synchronous machines. 7

3. (a) Explain the phenomenon of rotor hunting in a synchronous motor. Illustrate, using relevant phasor diagram. 7
- (b) A 40 kVA, 400 V, Y-connected synchronous machine has short-circuit load loss of 1.5 kW at rated armature current at 30°C. At this temperature, the dc resistance of the armature is 0.118 Ω per phase. Determine the ratio of ac to dc resistance. 7
4. (a) Derive the expressions for air gap power and electromagnetic torque developed from the equivalent circuit of an induction motor. 7
- (b) An induction motor has an efficiency of 90%, when the load is 45 kW. At this load, stator copper loss and rotor copper loss each is equal to the iron loss. The mechanical loss is one-third of the no load losses. Neglect copper loss at no load. Determine the slip. 7
5. (a) Explain Torque-Slip characteristics of 3- ϕ Induction Motor. 7
- (b) Derive the expression for induction motor electromagnetic torque in terms of maximum electromagnetic torque. 7
6. (a) Explain that a single-phase induction motor is not a self-starting machine, with the help of double revolving field theory. 7

- (b) Explain the working principle of 1- ϕ capacitor start capacitor run induction motor. Draw a neat connection diagram and torque-speed characteristic. 7
7. (a) Discuss the working principle of Linear Induction motor. 7
- (b) Explain Star-Delta starter for 3- ϕ induction motors. 7
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