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B.Tech. DEGREE PROGRAMES

Term-End Examination

December, 2013

BIEEE-003 : SPECIAL ELECTRICAL MACHINES

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt **any seven** questions.*
*(ii) **All** questions carry **equal** marks.*

1. Discuss in detail how double-cage rotors are different from deep-bar rotor constructions ? 10

2. In a double cage induction motor, if the outer cage has an impedance at standstill of (2 + j1.2) ohm, determine the slip at which the two cage develop equal torques, if the inner cage has an impedance of (0.5 + j3.5) ohm at standstill. 10

3. Draw and explain the static Scherbius scheme for slip power recovery in wound rotor induction motors. 10

4. Why single-phase induction motors are not self starting ? Discuss various methods to make such motors self starting. 4+6=10

5. Discuss the construction and explain the principle of operation of permanent magnet stepper motor with the help of neatly labelled diagrams. 10

6. What is the step angle of a five-phase Switch Reluctance Motor and commutation frequency in each phase for the speed of 600 rpm ? (SRM have 10 stator poles and 4 rotor poles). 10

7. Derive the epression for power input and torque of a PMSM. 10

8. Discuss the construction, principle of operation and characteristics of universal motors. 10

9. Derive the expressions for the brush emf produced by rotating field in case of AC commutator machines. How can the same emf expressions be obtained by resolving the rotating field into its pulsating field components ? 10

10. Write short notes on **any two** of the following : 5+5=10

(a) Hysteresis motors

(b) Linear induction motors

(c) Shaded pole motors