

**B.Tech DEGREE PROGRAMES**

**Term-End Examination**

**December, 2012**

**BIEEE-003 : SPECIAL ELECTRICAL MACHINES**

*Time : 3 hours*

*Maximum Marks : 70*

- 
- Note :**
- (i) *Attempt any 7 questions out of total 10 questions.*
  - (ii) *Use of Scientific non programable calculator are permitted.*
- 
- 

1. Discuss the construction and working of 10
  - (a) deeprotor bar induction motor
  - (b) double cage induction motor with help of neat diagrams.
  
2. Discuss the method of speed control for static slip 10  
power recovery to wound rotor induction motor with help of rectifier and Inverter bridges. And also state the advantages and disadvantages.
  
3. Analyse the single phase induction motor using 10  
symmetrical component theory.

4. Derive the transfer function of a two-phase servomotor. What is the advantage of drag cup rotor ? 10
5. A three - phase PM stepper motor required for one particular application must be capable of controlling the position of shaft in steps of  $7.5^\circ$  and it must be capable of running at speeds of up to 300 rpm. 10
- (a) How many poles must this motor have ?
  - (b) At what rate must control pulses be received in this motors control unit if it is to be driven at 300 rpm ?
6. Discuss the principle of operation of Switched Reluctance Motor (SRM) and torque production with help of neat diagram. 10
7. A small permanent magnet dc motor runs at a no-load speed of 10,600 rpm and takes 10 mA when fed from 6 V dc source. Its armature circuit resistance is  $6 \Omega$ .. Calculate 10
- (a) no-load rotational losses
  - (b) stall torque
  - (c) armature current to achieve a shaft power of 1 W.

8. What is universal motor ? Draw its phasor diagram and discuss its operation. Bring out the effects of various emf induced in its armature. 10
9. A linear induction motor (LIM) with a pole pitch of 50 cm is used on a trolley that travels a distance of 10 km. The resistance and current of the secondary side as referred to the primary are  $4 \Omega$  and 500 A respectively. Determine the development thrust by the motor when the slip is 25% while operating at 50 Hz. 10
10. Write short notes on *any two* of the following : 2x5=10
- (a) BL DC motor
  - (b) Shaded pole motor
  - (c) Hysteresis motor
-