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BIEEE-003

B.Tech. DEGREE PROGRAMES

00841

Term-End Examination

June, 2013

BIEEE-003 : SPECIAL ELECTRICAL MACHINES

Time : 3 hours *Maximum Marks : 70*

Note : (i) *Answer **any seven** questions out of total **10** questions.*

(ii) *Use of Scientific non programable calculator are **permitted.***

1. What is the effect of injecting a voltage in the rotor circuit of a 3-phase induction motor ? What practical use can be derived from this method ? 10

2. Discuss the method of speed control for static slip power recovery to wound rotor induction motor with help of rectifier and Inverter bridges. Also state the advantages and disadvantages. 10

3. Analyse the single phase induction motor using : 10

   (a) double revolving field theory

   (b) cross-field theory

4. What is a two-phase servo motor ? Where is it used ? Show its connection diagram. Draw and explain its torque-speed curve. **10**

5. A dc stepper motor has 20 poles and two sets of control windings (phases). Calculate : **10**
   (a) step angle of the motor
   (b) the pulse repetition rate to obtain a motor speed of 60 rpm
   (c) the switching rate to obtain a motor speed of 60 rpm.

6. Discuss the principle of operation of Switched Reluctance Motor (SRM) and torque production with help of neat diagram. **10**

7. A 24 V PMDC motor develops a torque of 1.5 N. m at rated voltage. The magnetic flux in the motor is 2 mwb. Determine the operating speed of the motor if the armature resistance is 0.75 Ω and motor constant is 80. **10**

8. A fractional horse power universal motor has an armature resistance of 20 Ω and inductance of 0.4 H. On being connected to 220 V dc supply, it draws 1.0 A from the mains and runs at 2000 rpm. Estimate the speed and power factor (pf) of the motor when connected to a 230 V, 50 Hz supply drawing the same armature current. Draw the relevant phasor diagram. **10**

9. Explain the principle of operation of Linear Induction Motor (LIM) by the modes of : 10

(a) Conventional motor

(b) Linear motor

(c) Tubular motor and

write any three applications of LIM.

10. Answer the following with reasons to support of your answers : 5x2=10

(a) Can a shaded pole motor be reversed in direction ?

(b) Hysteresis loss is useful in producing torque in the hysteresis motor - The higher the retentivity, the higher the torque

(c) Why has a single phase induction motor no starting torque ?

(d) The direction of rotation of single phase induction motor can be changed by interchanging the supply terminals.

(e) In a shaded pole motor, the motor runs from the shaded to unshaded side/the unshaded to shaded side.