Total No. of Questions : 8] SEAT No. :

P1317 [Total No. of Pages : 2

[4858] - 1051
T.E. (Electronics)
ELECTRICAL MACHINES & POWER DEVICES (Theory)
(2012 Pattern) (End Semester)

Time : 2 Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2. Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Explain switching characteristics of power diode. **[6]**

b) Explain the two transistor analogy for SCR and derive an expression for anode current IA. **[7]**

c) Why snubber circuits are required? Also explain the protection of power devices by snubber circuit. **[7]**

OR

Q2) a) Draw and explain switching characteristics of IGBT. **[6]**

b) Explain the need for protection of power devices and State different types of protections required to ensure safety of power devices. **[7]**

c) Write note on triggering circuit of TRIAC using DIAC. **[7]**

Q3) a) Explain the basic action of a commutator with the help of neat sketches. **[6]**

b) Write a short note on permanent magnet DC motor. State advantages, disadvantages and applications. **[6]**

c) A 25kW, 250V, d.c. generator has armature and field resistance of 0.6Ω and 100Ω respectively. Determine the total armature power developed when working as a motor taking 25 kW input. **[4]**

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OR

Q4) a) Why starter is necessary for a DC motor? Explain the working of three-point starter with the help of neat diagram. **[6]**

b) Distinguish between self excited and separately excited DC generator. **[6]**

c) A 4 pole, 250V, d.c. series motor has a wave connected armature with 200 conductors. The flux per pole is 25m Wb when motor is drawing 60A from the supply. Armature resistance is 0.15Ω while series field winding resistance is 0.2Ω. Calculate the speed under this condition. **[4]**

Q5) a) Explain the principle of operation of a 3-phase induction motor in detail. **[8]**

b) Explain the procedure for no load test and blocked rotor test on a three phase induction motor. How are the parameters of equivalent circuit determined from test results? **[10]**

OR

Q6) a) Explain the complete torque-slip characteristics of a three phase induction motor including motoring, generating and breaking regions. **[8]**

b) A 6 pole, 50 Hz, 3-phase induction motor running on full load develops a useful torque of 160 Nm when the rotor EMF makes 120 complete cycles per minute. Calculate the shaft power output. If the mechanical torque lost in friction and that for core loss is 10Nm. Compute (a) the copper loss in the rotor winding (b) the input to the motor (c) the efficiency. The total stator loss is given to be 800W. **[10]**

Q7) a) Compare variable reluctance motor with permanent magnet stepper motor. **[8]**

b) Explain the principle of operation of capacitor start and capacitor run single phase induction motor along with the torque slip characteristics and the applications. **[8]**

OR

Q8) a) Write a short note on: d.c. servomotor. **[8]**

b) Explain the operation of a variable reluctance motor. **[8]**