Total No. of Questions : 8]

SEAT No. :

P2863

[Total No. of Pages : 3

[4958]-1051
T.E. (Electronics)
ELECTRICAL MACHINES & POWER DEVICES
(2012 Course) (304201) (End sem)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4 , Q5 or Q6, Q7 or Q8.***
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) Draw and Explain the basic structure and Steady state characteristics of power diode. **[6]**

b) Why SCR is called a latching type device? Derive an expression for anode current IA. **[7]**

c) Write in detail note on protection circuit for power devices. **[7]**

OR

Q2) a) Draw and explain switching characteristics of MOSFET in detail. **[6]**

b) Explain various cooling methods for power devices. Compare liquid cooling and vapour phase cooling. **[7]**

c) With the help of neat diagram explain the turn-off mechanism of GTO. **[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 (PMDC) in detail. **[6]**

c) A 25 kW, 250 V, DC shunt generator has armature and field resistance of 0.6Ω and 100Ω respectively. Determine the total armature power developed when working as a motor taking 2kW input. **[4]**

OR

P.T.O.

Q4) a) What are the drawbacks of three-point starter? Describe four-point starter with neat diagram? **[6]**

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

c) A 4 pole, lap wound dc motor has 540 conductors. Its speed is found to be 1000 rpm when it is made to run light. The flux per pole is 25mWb. It is connected to 230V dcsupply. The armature resistance is 0.8Ω. Calculate **[4]**

i) induced emf

ii) Armature current

iii) Stray losses

iv) Lost torque.

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

b) A 1000V, 50Hz, 3-phase induction motor has star connected stator. the ratio of stator to rotor is 3 : 6. The standstill impedance of rotor per phase is 0.01 + j0.2Ω. Calculate **[10]**

i) Rotor current at start

ii) Rotor P.F. at start

iii) Rotor current at slip of 3%,

iv) External resistance per phase in the rotor to limit starting rotor current to 200A.

OR

Q6) a) Explain the working principle of synchronous generator with the help of neat diagram. **[8]**

b) A 400V, 4 pole, 3 phase, 50Hz star connected induction motor has a rotor resistance and reactance per phase equal to 0.01Ω and 0.1Ω respectively. Determine

i) Starting torque

ii) Slip at which maximum torque will occur

iii) Speed at which maximum torque will occur

iv) Maximum torque

v) Full load torque if full load slip is 4%. Assume ratio of stator to rotor turns as 4. **[10]**

Q7) a) Write a short note on AC servomotor. **[8]**

b) Explain the construction and working principle of SRM in detail. **[8]**

OR

Q8) a) Write a short note on BLDC. **[8]**

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