

SUBJECT : POWER DEVICES AND MACHINES

Day : Thursday
Date : 29/11/2018

W-2018-2410

Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat diagrams **WHEREVER** necessary.

Q.1 Describe two transistor analogy of SCR and derive expression for anode current. (10)

OR

Q.1 Describe the operation of power MOSFET with neat diagram and characteristics. List its advantages and disadvantages. (10)

Q.2 A single phase half wave controlled rectifier is used to supply to 10Ω load from 230V, 50Hz supply at firing angle of 30° (10)

- Calculate :
- i) Average output voltage
 - ii) Average load current
 - iii) Effective output voltage
 - iv) Average power dissipated in the load

OR

Q.2 With the help of neat diagram and waveform describe the operation of single phase semiconverter with RL load. (10)

Q.3 Describe the operation of three phase half wave controlled rectifier with resistive load. (10)

OR

Q.3 A three phase full converter is operated from a three phase Y-connected 208 V, 50 Hz supply and the load resistance $R = 10\Omega$. If it is required to obtain an average output voltage of 50% of maximum possible output voltage, (10)

Determine:

- i) Firing angle α
- ii) RMS and average output currents
- iii) Average and RMS thyristor currents
- iv) Rectification efficiency

Q.4 Describe the operation of three phase inverter in 180° conduction mode. (10)

OR

Q.4 Analyze the operation of quasi-square wave output of inverter using Fourier series. (10)

Q.5 Describe the operation of flyback converter in continuous mode. List its advantages and disadvantages. (10)

OR

Q.5 Describe step-up chopper with R load. List its advantages, disadvantages and applications. (10)

Q.6 Describe HVDC transmission with 12-pulse converter diagram. List its advantages over HVAC transmission. (10)

OR

Q.6 Describe the operation of AC servomotor. List advantages and applications of AC servomotor. (10)