B.E. Fourth Semester (Electronics Engineering / Electronics Communication Engineering / Electronics Telecommunication Engineering) (C.B.S.)

Power Devices and Machines Paper - II

P. Pages : 2

Time : Three Hours

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Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Describe the construction and operating modes of SCR. **7**

   b) Explain the two transistor analogy of SCR. **7**

OR

2. a) Illustrate various layers of TRIAC and also explain its operation in 4 modes. **7**

   b) Write short note on AC regulator employing TRIAC-DIAC arrangement. **7**

3. a) What are different types of POWER MOSFET ? Explain any one in detail. **6**

   b) Draw the layer diagram of IGBT. Also state its advantages and applications. **7**

OR

4. a) Draw and explain the output characteristics of power MOSFET. **7**

   b) Explain the construction and operation of GTO. **6**

5. a) Explain with waveform single phase half wave rectifier with R-L load also give the significance of free wheeling diode. **6**

   b) A single phase fully controlled bridge rectifier with R L load is used for obtaining a regulated dc output voltage. The RMS value of ac input voltage is 230V and firing angle is maintained at $\frac{\pi}{3}$, with load current 4A. (1) calculate the dc output voltage (2) Assuming load resistance remains some. Calculate the dc output voltage if a free wheeling diode is used at a same firing angle. (3) If SCR_3 is damaged and gets open circuited calculate average DC output with free wheeling diode. **7**

OR

6.	a)	Explain with waveform 3-phase half wave controlled rectifier with resistive load.	**8**
	b)	Explain single phase AC voltage controller with resistive load.	**5**
7.	a)	Give the classificator of chopper and Explain class 'B' chopper in detail.	**7**
	b)	State and explain control strategies of chopper.	**6**

OR

8.	a)	Explain single phase half bridge inverter with R-L load.	**6**
	b)	Explain 3ϕ bridge inverter 180º Mode conduction with wave forms.	**7**
9.	a)	Draw and explain in detail (1) star-star connection (2) star-Delta connection of 3 phase transformer.	**6**
	b)	A 3ϕ, 50Hz transformer has a delta corrected primary and star corrected secondary the line voltages bring 22000V & 400V respectively. The secondary has a star connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5A. Determine the current in each coil of primary and secondary line. What is the output of the transformer in KW?	**8**

OR

10.	a)	Explain working principle of 3ϕ induction motor.	**6**
	b)	State different speed control technique in induction motor and explain speed control by charging rotor circuit resistance	**8**
11.	a)	State different types of DC motors. Explain armature controlled method of speed control in dc series motor.	**7**
	b)	A dc series motor operates at 800rpm with a line current of 100A from 230V mains. Its armature circuit resistance is 0.15Ω & its field resistance is 0.1Ω. Find the speed at which motor runs at a line current of 25A. assuming flux at this current is 45% of flux at 100A.	**6**

OR

12.	a)	Explain working principle of universal motor & its application.	**7**
	b)	Write applications of DC series motors, DC shunt motors & DC compound motors.	**6**

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