

SH-V/Electronics-503DSE-1(T)/19

**B.Sc. 5th Semester (Honours) Examination, 2019****ELECTRONICS****Course ID : 51716****Course Code : SH/ELC/503/DSE-1(T)****Course Title : Power Electronics****Time 1 Hour 15 Minutes****Full Marks: 25***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer *any three* of the following: 1×3=3
  - (a) What is power electronics?
  - (b) IGBT is a voltage controlled device. Why?
  - (c) What is phase controlled rectifier?
  - (d) How can a thyristor be turned off?
  - (e) What do you mean by delay angle?
  - (f) What is meant by commutation?
  
2. Answer *any three* of the following: 2×3=6
  - (a) What is the difference between power diode and signal diode?
  - (b) Define latching current and holding current.
  - (c) What is a snubber circuit? Why it is used?
  - (d) What is a thyristor? How has this term been coined?
  - (e) Give the full form of the following: SUS, LASCR, GTO, MCT.
  - (f) What is the turn-off time for converter grade SCRs and inverter grade SCRs?
  
3. Answer *any two* of the following: 5×2=10
  - (a) Show that reverse recovery time and peak inverse current of a power diode are dependent upon storage charge and rate of change of current. 2½+2½=5
  - (b) Explain the switching performance of BJT with relevant waveforms. Indicate clearly turn-on and turn-off times and their components. 2½+2½=5
  - (c) What are the different methods to turn on thyristor? Describe any two methods of turn-on mechanism of SCR. 1+2+2=5
  - (d) What is IGBT? What are its other names? Give its basic structure and working. 1+1+3=5

**4.** Answer *any one* of the followings:

6×1=6

- (a) Explain the constructional details and switching characteristics of power MOSFET. 2+4=6
- (b) Draw and explain the single phase half controlled converter operation with RL load and derive the average and rms value of output voltage. 2+4=6
- (c) Draw a circuit diagram illustrating the protection of both anode and gate circuits of an SCR. Describe briefly the function of any two components used. 2+2+2=6

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