



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Honours 5th Semester Examination, 2020, held in 2021

**ELSADSE01T-ELECTRONICS (DSE1/2)**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.  
Candidates are required to give their answers in their own words as far as practicable.  
All symbols are of usual significance.*

**GROUP-A**

1. Answer any **five** questions from the following: 2×5 = 10
- (a) What is the need of commutation in thyristor circuit?
  - (b) Why is a vertical orientation preferred for power transistors?
  - (c) Why forced commutation requires a pre-charged capacitor?
  - (d) How TRIACs are different from DIACs in terms of controllability of power?
  - (e) What is the main advantage of SCR based rectifiers over normal diode rectifiers?
  - (f) Define Power Factor of an ac power system with corresponding phasor diagram.
  - (g) State a popular use of Chopper circuit.
  - (h) Define holding current and holding voltage for SCR .

**GROUP-B**

**Answer any six questions from the following**

**5×6 = 30**

2. Draw and explain working principle of IGBT. 5
3. Draw and explain the input output characteristics of IGBT. Write down some applications of IGBT. 4+1
4. (a) Write short note on various triggering method of SCR. 3+2  
(b) Why  $\frac{dv}{dt}$  protection is necessary in SCR ?
5. How are  $\frac{di}{dt}$  and  $\frac{dv}{dt}$  protections achieved in SCR ? 5

6. What is resonant pulse commutation? Discuss the operation of class-B commutation in dc chopper circuit. 1+4
7. Distinguish between step-up and step-down chopper in terms of their configuration and working principle. 5
8. (a) With a relevant figure, describe the reverse recovery characteristics of a power diode. 4+1  
(b) Hence define the reverse blocking capacity.
9. How Hard Saturation and Quasi-Saturation regions occur in the characteristics of a power transistor? 5
10. What is meant by SOA of a device? Explain cause of second breakdown in a transistor. 2+3
11. What is the difference in the working of series and parallel inverter? 5

**N.B. :** *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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