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Total No. of Questions : 9] [Total No. of Pages : 3

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B.Tech. (EE) 6th Semester (Supplementary)
Examination, July-2021
(G Scheme)

POWER ELECTRONICS
Paper-PCC-EE-306-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :- Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) Explain the role of Power Electronics.
- (b) Discuss the characteristic features of GTO.
- (c) Explain dv/dt protection of SCR.

- (d) What is meant by Two Pulse Converter ?
- (e) List the function of freewheeling diodes in controlled rectifier.
- (f) Define derating factor of series connected SCRs. $2\frac{1}{2} \times 6 = 15$

Section-A

2. (a) Compare IGBT and Power Transistor.
- (b) Discuss the merits and demerits of Power Electronics System. List some applications of Power Electronics. $7\frac{1}{2}, 7\frac{1}{2}$
3. Explain the construction and characteristics of Power Transistor and discuss important operating regions of power transistor. 15

Section-B

15 each

4. Sketch the V-I characteristics of an SCR and explain latching current, holding current and break over voltage.
5. With a neat circuit diagram and waveforms explain resistor triggering circuit and RC triggering circuit to Turn ON the SCR.

Section-C

6. (a) Draw and explain single phase full wave converter in bridge configuration supplying highly inductive load.
- (b) Compare Fully Controlled and Half Controlled Converters. $7\frac{1}{2}, 7\frac{1}{2}$
7. Draw and explain the three phase fully controlled converter operation with RL load and derive the expression for DC output voltage. 15

Section-D

15 each

8. Explain the operation of 120-degree mode three-phase Voltage Source Inverter (VSI).
9. Explain in detail how choppers are classified.

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Note : Attempt five questions in all, selecting one from each section. Question No. 1 is compulsory.

1. (i) Explain the role of power electronics.
- (ii) Explain brief about Schottky diode.
- (iii) What do you mean by optocoupler ?
- (iv) Explain two pulse converter.
- (v) What are the various power factor improvement technique ? 15

Section-A

2. Write short notes on : 15
 - (i) Power MOSFET
 - (ii) DIAC
3. Explain construction and characteristics of GTO in details. 15

Section-B

4. Explain the various series and parallel connection of SCR. 15
5. Explain various commutation technique used in SCR. 15

Section-C

6. Explain single phase full bridge rectifier with R load. 15
7. Write short notes on : 15
 - (i) Dual Converter
 - (ii) Forced Commutated Converter

Section-D

8. Explain 120 degree mode of conduction scheme in SCR. 15
9. Write short note on : 15
 - (i) Current source inverter
 - (ii) Step up chopper