SREE VIDYANIKETHAN ENGINEERING COLLEGE
(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

III B.Tech I Semester (SVEC-16) Regular/Supplementary Examinations February - 2021
POWER ELECTRONICS
[Electrical and Electronics Engineering]

Time: 3 hours   **Max. Marks: 70**

Answer One Question from each Unit
All questions carry equal marks

UNIT-I

1 a) Draw and explain switching or dynamic characteristics of a thyristor during its turn-on and turn-off processes.   CO1   7 Marks

   b) Explain the different turn-on methods of SCR.   CO1   7 Marks

(OR)

2 a) A thyristor is made up of a number of SCRs connected in series and parallel. The string has voltage and current ratings of 12KV and 5KA respectively. The voltage and current ratings of available SCRs are 1900Vand 1200A respectively. For a string efficiency of 95%, calculate the number of series and parallel connected SCRs.   CO1, CO4   7 Marks

   b) Explain what are the methods used to protect an SCR from di/dt and over current.   CO1   7 Marks

UNIT-II

3 a) Explain the operation of single phase fully controlled bridge type rectifier with R- load and derive for average output voltage.   CO2, CO4   7 Marks

   b) Explain effects of freewheeling diode.   CO2   7 Marks

(OR)

4 a) What is the effect of source inductance on the performance of 1-Φ fully controlled converter? Discuss with neat sketches.   CO2   7 Marks

   b) Explain the operation of three phase half controlled bridge converter with RL- load with neat sketches.   CO2   7 Marks

UNIT-III

5 a) Explain the different modes of operation of 3-Φ dual converter.   CO2   7 Marks

   b) With neat sketch, explain single phase AC voltage controller for R-load. Derive RMS load voltage and current.   CO2   7 Marks

(OR)

6 a) Explain the working of a single phase bridge type cyclo-converter for RL- load of frequency $f_0 = \frac{1}{4} f_s$ with continuous conduction mode.   CO2   10 Marks

   b) What are the applications of cyclo-converters?   CO2, CO5   4 Marks

UNIT-IV

7 a) Explain about step-down chopper and derive the output voltage equation. CO2 7 Marks

   b) A step up chopper has input voltage of 220V and output voltage of 660V. CO2, 7 Marks
       If the non-conducting time of thyristor is 100μs, compute the pulse width CO4
       of the output voltage.

(OR)

8 a) Discuss the differences between natural and forced commutation CO3 6 Marks
       techniques.

   b) Describe Morgan Chopper with associated waveforms. CO2 8 Marks

UNIT-V

9 a) Explain the operation of single phase half bridge inverter with aid of CO2, 7 Marks
       relevant waveforms CO3

   b) Explain the operation of basic series inverter. CO2, 7 Marks
       CO3

(OR)

10 Explain the principle of operation of three phase inverter with 120^0 CO3 14 Marks
    conduction mode with necessary wave forms and circuit.

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