Code No: 115AF **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech III Year I Semester Examinations, February/March - 2016
POWER ELECTRONICS
(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

Part- A

(25 Marks)

1.a) What losses occur in a thyristors during working conditions. [2]
b) What is the difference between power diode and signal diode? [3]
c) What is commutation angle or overlap angle. [2]
d) What is meant by input power factor in controlled rectifier? [3]
e) What is meant by Duty cycle? [2]
f) Write down the expressions for average output voltage for step down chopper and step up chopper. [3]
g) What are the two types of cyclo-converters? [2]
h) What is meant by step-up and step-down cyclo converters and what are the applications of cyclo converter. [3]
i) Write the application of inverter. [2]
j) Draw the circuit diagram of parallel inverter. [3]

Part-B

(50 Marks)

2. Explain the construction of SCR with neat diagram. Draw its V-I charecteristics. [10]

OR

3. Explain the operation of IGBT with VI and switching characteristics. [10]

4. A single phase semi converter delivers to RLE load with R=5Ω, L =10mH and E =80V. The source voltage is 230V, 50Hz. For continuous conduction, Find the average value of output current for firing angle α=50. [10]

OR

5. Discuss the operation of single phase semi converter and derive the output voltage expression. [10]

6. What is chopper and how they are classified. Explain the working of A.C chopper. [10]

OR

7. A dc chopper is supplying a resistive load. If the input and output voltages are 200V and 120V and the chopping frequency is 800Hz, find the periods of conduction and blocking in each cycle. [10]

8. What is an Ac voltage controller? List some of its industrial applications. Enumerate its merits and demerits. [10]

OR

9. A single-phase voltage controller has input voltage of 230 V, 50 Hz and a load of R=15 Ω. For 6 cycles on and 4 cycles off, determine
a) r.m.s output voltage, b) input pf c) average and r.m.s thyristor currents. [3+3+4]

10. Explain the operation of single pulse modulation of inverter with neat diagram. [10]

OR

11. Draw and explain the operation of three-phase series-inverter circuit. [10]

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