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Roll No. :

328833(28)

B. E. (Eighth Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Electronics & Telecommunication Engg. Branch)

POWER ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d).

Unit-I

1. (a) Write important feature of SCR. 2

(b) Derive an expression for anode current for a thyristor from two transistors analogy. 7

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- (c) Explain the static characteristics of power BJT. 7
- (d) Write short notes on : 7
- (i) Enhancement type MOSFET
 - (ii) Gate turn OFF Thyristor

Unit-II

2. (a) Define the reverse recovery time of thyristor. 2
- (b) Explain the different methods employed for turning ON of the thyristor. 7
- (c) For a single phase one pulse controlled converter system during discontinuous conduction derives an expression for all. Relevant parameter for RL load. 7
- (d) A single phase full wave bridge is operated with a resistive load $R = 10 \text{ ohm}$.
The input voltage to the bridge is 230 calculate the following : 7
- (i) Average load voltage
 - (ii) RMS load voltage
 - (iii) Form factor

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Unit-III

3. (a) Write advantages and disadvantages of semi-converter. 2
- (b) Describe the operation of a single-phase half controlled rectifier with active load and deduce and expression for average output current and voltage. 7
- (c) Explain in details the three phase half wave controlled converter. 7
- (d) Explain single phase dual converter. 7

Unit-IV

4. (a) Write the application of inverter. 2
- (b) Explain the basic working principle of single phase half bridge inverter for R Load. 7
- (c) For a 3 phase bridge inverter with Y connected resistive load, plot the line to line to phase voltage for 180 conduction mode. 7
- (d) A step up chopper has a supply voltage of 250V, while the. Output voltage is 500 V, if the "ON"

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period of the chopper be 100 usec, determine the pulse width of output voltage. If the pulse width is reduced to one third for constant frequency operation. Find the output voltage. 7

Unit-V

5. (a) What is ac controller? 2
- (b) Discuss single-phase to single-phase mid-point cycloconverter for step down operation to obtain output frequency $1/3$ time the input frequency. 7
- (c) Explain briefly the principle of ON-OFF control in AC voltage controllers. 7
- (d) A single-phase voltage controller has input voltage of 230 V, 50 Hz and a load of $R = 15$ ohm for 6 cycles and 4 cycles off, determine 7
- (i) RMS output voltage
 - (ii) input pf and
 - (iii) average and rms thyristor currents