



Paper ID : 261311

Printed Page: 1

Subject Code:BEE603

Roll No:

BTECH

(SEM. VI) THEORY EXAMINATION 2025-26

POWER ELECTRONICS

TIME: 3 HRS

M.MARKS: 70

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief.

02 x 7 = 14

Q no.	Question	CO	Level
a.	Explain the difference between ideal switch and practical switch with neat sketch.	CO1	K2
b.	Write five application of phase controlled rectifier.	CO3	K1
c.	Draw buck-boost Converter.	CO2	K2
d.	Define latching current and holding current in a SCR.	CO1	K2
e.	Name various SCR commutation method. Explain load commutation.	CO1	K1
f.	Draw VI characteristic of TRIAC.	CO1	K2
g.	List any two advantages of PWM technique.	CO5	K2

SECTION B

2. Attempt any *three* of the following:

07 x 3 = 21

Q no.	Question	CO	Level
a.	Compare MOSFET and BJT with neat sketch.	CO1	K2
b.	SCRs with a rating of 1000 V and 200 A are available to be used in a string to handle 6 KV and 1 KA. Calculate the number of series and parallel units required in case derating factor is 0.2.	CO1	K3
c.	A single-phase voltage controller has input voltage of 230 V, 50 Hz and a load of R=15 ohm For 6 cycles on and 4 cycles off, determine, (i) rms output voltage (ii) input power factor (iii) average and rms thyristor current.	CO4	K4
d.	A step up /step down chopper has input voltage of 220 V and output voltage of 660 V . If the conduction time of thyristor chopper is 120 μ sec. Compute the pulse width of load voltage. In case the pulse width of the load voltage is increase to three times its previous width for constant frequency operation, Calculate the new value of average output voltage.	CO2	K4
e.	Explain the static V-I characteristic of a thyristor with different modes of operation.	CO1	K2

SECTION C

3. Attempt any *one* part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Derive voltage gain expression and ripple current expression of Buck converter.	CO2	K3
b.	Explain the different methods used for the protection of a SCR. Also, describe the working of a snubber circuit.	CO1	K2



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4. Attempt any one part of the following:**07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain three phase full wave controlled bridge rectifier and draw the output voltage waveform for R-L load with firing angle $\alpha = 60^\circ$ and $\alpha = 90^\circ$.	CO3	K3
b.	A single-phase full-bridge inverter is connected to a resistive load of $R = 10 \text{ ohm}$. The dc input voltage is $V_{dc} = 100 \text{ V}$ and the switching frequency is 50 Hz . Determine, (i) The RMS value of the total output voltage (ii) The RMS value of the fundamental component of the output voltage (iii) The average power absorbed by the load (iv) The Peak Inverse Voltage (PIV) of each switch	CO5	K4

5. Attempt any one part of the following:**07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain the basic principle of single phase to single phase step down bridge cyclo-converter and draw the waveform.	CO4	K2
b.	Latching current for an SCR inserted in between a DC voltage source of 200 V and the load is 100 m A . Compute the minimum width of Gate Pulse current required to turn on this SCR in the case of load $R = 150 \text{ } \Omega$ in series with $L = 0.25 \text{ H}$.	CO1	K4

6. Attempt any one part of the following:**07 x 1 = 07**

Q no.	Question	CO	Level
a.	Explain single phase full wave controlled bridge rectifier and derive the expression of average load voltage.	CO3	K2
b.	Deduce to show that the energy loss during turn-on of a power transistor is given by $(VI/6)T$ joules, where $V =$ off state voltage, $I =$ on-state current and $T =$ turn-on time. Assume the change of V and I to be liner over T .	CO1	K4

7. Attempt any one part of the following:**07 x 1 = 07**

Q no.	Question	CO	Level
a.	Describe the working principle of a three-phase bridge inverter operating in 180° mode of operation	CO5	K2
b.	Write a short note on (i) Voltage source inverter (ii) Current source inverter (iii) Multi-level inverter	CO5	K2