Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, December 2022

Course: Power Electronics & Drives

Semester: VII

Program: B. Tech (MECHATRONICS)

Time : 03 hrs.

Course Code: EPEG3002 Max. Marks: 100

Instructions:

SECTION A (5Qx4M=20Marks)

S. No.		Marks	СО
Q 1	What is the difference between power diode and signal diode?	4	CO1
Q 2	Compare Power MOSFET with BJT.	4	CO1
Q 3	What is the function of freewheeling diodes in controlled rectifier? What are the advantages of freewheeling diodes in a controlled in a controlled rectifier?	4	CO 2
Q 4	What are the different types of chopper configuration?	4	CO 3
Q 5	What is the main classification of inverter? Write two advantages of CSI.	4	CO 5
	SECTION B (4Qx10M= 40 Marks)		
Q 1	Explain basic principles and different operation of step-down chopper. Show that current ripple is maximum when $D=0.5$, in step down chopper.	10	CO3
Q 2	Derive the output voltage of the boost converter with proper waveforms.	10	CO 3
Q 3	A single phase halfwave controlled rectifier is used to supply power to 10 ohm load from 230V, 50 Hz supply at a firing angle of 30 ⁰ . Calculate	10	CO 4

erage output voltage, (b) Effective output voltage, (c) Average load		
s meant by inverter? What are the applications of an inverter? s the main drawback of a single-phase half bridge inverter?	10	CO 5
SECTION-C (2Qx20M=40 Marks)		
charging which type of input is required at battery end? Discuss ble automatic battery charger operation with trickle charging ement.	20	
which type of application switched mode power supplies (SMPS) ired? Discuss switched mode power supplies (SMPS) operation cample.		CO5
ite two applications of dc chopper? What is meant by step-up and		
own chopper? Derive the output voltage of step-down chopper.		
nat are the applications of dc chopper? What is meant by step-up		
ep-down chopper? A chopper working on 100V DC has a load		
nce of 4 ohm and average output current of 15A. If the operating		
ncy is 100 Hz compute T _{ON} , T _{OFF} , and Duty (D) cycle.		CO3
OR		
ele-phase full wave ac voltage controller working on ON-OFF technique has supply voltage of 230V RMS, 50Hz, Load=50 the controller is ON for 30 cycles and OFF for 40 cycles. Calculate	20	
ON & OFF time intervals		
RMS output voltage		CO4
Input PF		
Average and RMS thyristor currents.		
Ave	erage and RMS thyristor currents.	erage and RMS thyristor currents.