APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code : PE0820321B-I (Pages: 2)

Name: .....

Reg. No: .....

THIRD SEMESTER M.TECH. DEGREE EXAMINATION FEBRUARY 2021

Branch: Electrical & Electronics Engineering **Specialization: Power Electronics**

08EE7221 (B): Design of Power Electronics System

(Common to PE)

Time: 2 hour 15 minutes **Max. marks: 60**

Answer all six questions.

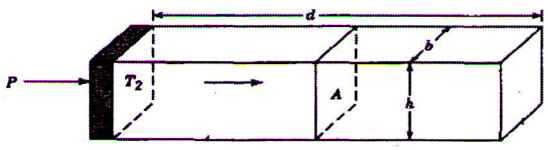
Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	What is the need for electrical isolation in drive circuits	3
	Answer b or c	
b	Explain the design procedure for dc coupled drive circuits with unipolar output with the help of neat diagram	6
c	What are the practical considerations in the design and fabrication of drive circuits for the successful operations	6

Q.no.	Module 2	Marks
2.a	Why snubbers are used with transistors? List out the types of snubber circuits.	3
	Answer b or c	
b	Discuss the design procedure for a turn off snubber circuit for transistor	6
c	Analyse the effect of adding a snubber resistance to capacitor snubber	6

Q.no.	Module 3	Marks
3.a	What are the factors to be considered while designing a snubber circuit for GTO	3
	Answer b or c	
b	Discuss the steps for the design of an overvoltage snubber	6
c	What are the points to be considered while designing a snubber for GTO	6

Q.no.	Module 4	Marks
4.a	Discuss about the heat transfer by conduction	3
	Answer b or c	
b	A transistor module is mounted on an aluminium plate having dimensions h=4cm, b=5cm and d=3mm. A temperature drop of 4°C is allowed from one 4x5 cm^2 surface to the other. Find the maximum power that can be generated in the module. Ignore any heat losses to the surrounding air	6



c	What are the factors to be considered while selecting a proper heat sink. Also write the design equations	6

Q.no.	Module 5	Marks
5.a	Explain about the generation of electromagnetic interference in power converters	4
	Answer b or c	
b	What is a common mode choke and explain its various modes of operation? Discuss about any one application of it	8
c	What is stray capacitance? What is its effect on power electronic circuits?	8

Q.no.	Module 6	Marks
6.a	Discuss about the frequency response of series resonant inverters with figures	4
	Answer b or c	
b	Derive the equation for current through inductor in series resonant circuit with capacitor parallel load	8
c	A series resonance inverter with parallel-loaded delivers a load power of P_L = 1kW at a peak sinusoidal load voltage of Vp = 330V and at resonance. The load resistance is R = 10 Ω. The resonant frequency is f_0 = 20kHz. Determine (a) the dc input voltage V_s ,(b) the frequency ratio u if it is required to reduce the load power to 250 W by frequency control,(c) the inductor L, and (d) the capacitor C.	8