Total No. of Questions : 8]

SEAT No. :

PB-3839

[Total No. of Pages : 2

[6262]-101
T.E. (E& TC Engineering)
POWER DEVICES & CIRCUITS
(2019 Pattern) (Semester - II) (304194)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 or Q8.***
2) ***Neat diagrams and waveforms must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of non programmable calculator is allowed.***
5) ***Assume Suitable data if necessary.***

Q1) a) Explain working of single phase full bridge inverter for R load with input & output waveforms. Derive an expression for rms o/p voltage. **[7]**

b) The single-phase half-bridge inverter has a resistive load of $R = 2.4\ \Omega$ and the dc input voltage is $Vs = 48V$. Determine (a) the rms output voltage at the fundamental frequency $Vo1$, (b) the output power Po, (c) the average and peak currents of each transistor. **[6]**

c) Explain effect of Cross conduction in inverter. **[4]**

OR

Q2) a) Draw a three phase inverter for balanced star R load. Explain its operation of 180° mode with gate signals & output waveforms. **[12]**

b) Compare 120° mode with 180° mode in three phase bridge inverter. **[5]**

Q3) a) Give classification of choppers? Explain operation of two quadrant chopper with circuit diagram. **[6]**

b) Explain various control strategies in DC chopper. **[6]**

c) Explain with block schematic working of SMPS. **[6]**

OR

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Q4) a) Explain with neat diagram the operation of 4 quadrant chopper with dc motor as a load. **[8]**

b) The step down dc chopper has a resistive load of $R = 10\,\Omega$ and the input voltage is Vs = 220 V. When the converter switch remains on, its voltage drop is Vch = 2 V and the chopping frequency is f = 1 kHz. If the duty cycle is 50%, determine (a) the average output voltage Va, (b) the rms output voltage Vo, (c) the converter efficiency. **[6]**

c) Compare step up & step down choppers. **[4]**

Q5) a) Explain with neat diagram working of snubber circuit used in power devices protection. **[7]**

b) Explain with neat diagram working of isolation transformer. **[4]**

c) What is EMI? Explain various sources & minimizing techniques of EMI **[6]**

OR

Q6) a) What is the need of resonant converter? Explain ZCS resonant converter with circuit & waveforms. **[8]**

b) Explain the role of heat sink? Draw its thermal equivalent circuit. **[5]**

c) Compare resonant converters: ZVS with ZCS. **[4]**

Q7) a) Explain single phase full converter drive for single phase separately excited dc motor. **[6]**

b) Explain operation of On-line UPS with block schematic. **[6]**

c) Explain with neat diagram variable voltage type three phase induction motor drive. **[6]**

OR

Q8) a) Draw & explain single phase full wave ac voltage controller for resistive load with o/p voltage waveforms. **[6]**

b) Explain with diagram architecture of EVs battery charger. **[6]**

c) Explain working of electronic ballast with block schematic. **[6]**