

Total No. of Questions : 10]

SEAT No. :

P3513

[4858]-1058

[Total No. of Pages : 3

T.E. (Electronics) (Semester - II)
POWER ELECTRONICS AND APPLICATIONS
(2012 Pattern)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data, if necessary.*

- Q1)** a) What do you mean by commutation of SCR? Explain types of commutation. [4]
- b) Draw the circuit diagram of 3 Φ Full converter operating with highly inductive load and draw the following waveform for $\alpha = 30^\circ$. [6]
- i) Load voltage
 - ii) Voltage across SCR
 - iii) Load current

OR

- Q2)** a) Explain the effect of source inductance on the performance of 1 Φ full converter with waveform. [4]
- b) A single phase controlled thyristor bridge supplies an inductive load. Assuming that the output current is virtually constant equal to I_0 determine the following if supply voltage is 220 V & $\alpha = 60^\circ$. [6]
- i) Average output voltage
 - ii) Supply RMS Current
 - iii) Supply fundamental current
 - iv) DF (Displacement Factor)

- Q3)** a) i) Power MOSFET is best switch in PWM Inverter. Justify. [4]
- ii) Explain Cross Conduction in Inverter.
- b) Explain Quasi square wave inverter for inductive load. Also derive an expression for rms value of n^{th} harmonic of output voltage and n^{th} harmonic distortion factor. [6]

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OR

- Q4)** a) For a 1Φ bridge inverter DC input voltage is 200V and feeds resistive load of 5Ω . Determine : [6]
- i) RMS output voltage
 - ii) The average current of each power MOSFET.
 - iii) 3^{rd} and 5^{th} harmonic rms content at output.
- b) Compare 180° mode and 120° mode of the Inverter. [4]

- Q5)** a) What is need of resonant converters? Explain the operation of zero current switching (ZCS) resonant dc-dc converter with the help of equivalent diagrams and waveforms. [8]
- b) What is power Quality? Why it is required? Explain different type of power line disturbance. [6]
- c) What are the advantages of resonant converters over switched-mode converters? [4]

OR

- Q6)** a) Explain series loaded resonant (SLR) DC to DC converter. [6]
- b) What is ZVS? Explain with the circuit diagram & waveforms working of ZVS. State its advantages & disadvantages. [8]
- c) Explain active filters for power conditioning. [4]
- Q7)** a) A UPS is driving a 600W rating load which as a lagging PF of 0.8. The efficiency of the inverter is 80%. The battery voltage is 24V dc. Assume that there is separate charger for the battery. Determine : [8]
- i) KVA rating of the inverter
 - ii) Wattage of the rectifier
 - iii) A-H rating of the battery back-up time of 30 minutes.
- b) Explain Electronic Ballast and Power electronics in capacitor charging applications. [8]

OR

- Q8)** Write short note on (any two) : [16]
- a) UPS
 - b) HVDC transmission line
 - c) Universal motor

- Q9)** a) Explain in brief Photo-voltaic energy conversion systems. [8]
b) Explain grid connected wind energy systems. [8]

OR

- Q10)** a) Explain the need of renewable energy sources. Explain the role of DC to DC converter in variable Wind energy conversion system. [8]
b) Compare Stand alone PV system and Grid connected PV system. [4]
c) Explain following terms of UPS : [4]
i) Efficiency of the battery
ii) Capacity of the battery

