

PART – B

- 5 a. Describe the operation of single phase semi-controlled rectifier feeding resistive load. Obtain the expression for the average DC output voltage. (06 Marks)
- b. Evaluate the form factor, ripple factor, transformer utilization factor and P/V of thyristor for the circuit shown in Fig. Q5(b). Also find the rectification efficiency. Assume triggering angle = 90° . $V_S = V_m \sin \omega t$. (08 Marks)

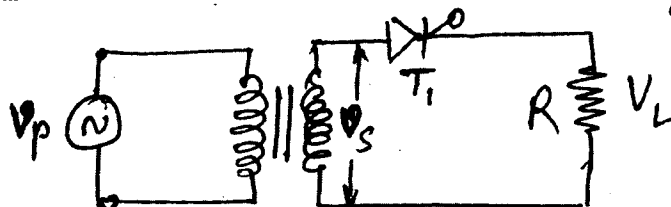


Fig. Q5(b)

- c. Draw the schematic of three phase half wave controlled rectifier feeding resistive load. Also draw the waveforms of input voltages and output voltage for any triggering angle (No explanation required). (06 Marks)
- 6 a. With the help of a circuit schematic describe principle of step up chopper. Obtain the expression for average output voltage in terms of duty ratio. (06 Marks)
- b. A step down chopper with resistive load has a resistive load of 10Ω and the input voltage is $V_S = 220 \text{ V}$. When the converter switch remains on, its voltage drop is 2 V and the chopping frequency is $F = 1 \text{ KHz}$. If the duty cycle is 50% determine :
- Average output voltage
 - rms output voltage
 - Chopper efficiency
 - The effective input resistance of chopper. (08 Marks)
- c. Mention the various performance parameters of the stepup and stepdown choppers. (06 Marks)
- 7 a. With the help of circuit schematic and waveforms describe full bridge single phase inverter. (06 Marks)
- b. The single phase full bridge inverter has a resistive load of $R = 2.4 \Omega$ and the DC input voltage is $V_S = 48 \text{ V}$. Determine :
- The rms output voltage at the fundamental frequency and
 - The output power. (04 Marks)
- c. With the help of neat sketches of circuit schematic and waveforms explain the operation of three phase inverters in 180° conduction mode. (10 Marks)
- 8 a. With the help of a circuit schematic and waveforms explain the principle of on-off control. State the equation of output voltage. (08 Marks)
- b. A single phase fullwave AC voltage controller has a resistive load of $R = 10 \Omega$ and the input voltage is $V_S = 120 \text{ V (rms)}$, 60 Hz . The delay angles of the thyristors T_1 and T_2 are equal and 90° . Determine :
- The rms output voltage and
 - The input power factor. (04 Marks)
- c. Describe how the power electronic converters produce electromagnetic interference. How is this interference minimized? (08 Marks)

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