

**BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)**

**B.Tech.Sem - V ELECTRONIC : : SUMMER - 2022**

**SUBJECT : POWER DEVICES & MACHINES**

Day : Thursday  
Date : 2/6/2022

**S-13386-2022**

Time : 10:00 AM-01:00 PM  
Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

**Q.1** Describe protection circuits of power devices. [10]

**OR**

Describe the construction and operation of TRIAC. List advantages, disadvantages and applications of TRIAC.

**Q.2** Describe the operation of single phase full converter for resistive load with relevant waveforms. Derive for output voltage. [10]

**OR**

A single phase fully controlled bridge is operated with resistive load  $R = 10 \Omega$ , the input to the bridge is 230 CV. The firing angle is  $60^\circ$ . Determine:

- |                                 |                         |
|---------------------------------|-------------------------|
| a) Average load voltage         | d) ripple factor        |
| b) Average and rms load current | e) average output power |
| c) Form factor                  | f) thyristor current    |

**Q.3** Describe the working of 3  $\phi$  semi-converter with resistive load. Obtain equation for o/p voltage. [10]

**OR**

A 3  $\phi$  half wave converter is operated from a 3  $\phi$  Y-connected 220 V, 50 Hz supply and load resistance.  $R = 10\Omega$ . If the average output voltage is 25% of maximum possible average voltage, determine:

- |                                 |                                       |
|---------------------------------|---------------------------------------|
| a) Delay angle                  | c) Average and rms thyristor currents |
| b) Rms and average o/p currents | d) Rectification efficiency           |

**Q.4** The single phase full bridge inverter has the DC input of 48 V. The load resistance is  $R = 2.4\Omega$ . Determine: [10]

- |                                |                                       |
|--------------------------------|---------------------------------------|
| a) rms value of output voltage | b) rms value of fundamental component |
| c) output power                | d) peak reverse blocking voltage      |
| e) THD.                        |                                       |

**OR**

Describe  $120^\circ$  mode of 3 $\phi$  inverter with the help of waveform.

**Q.5** Describe the working of step down chopper for resistive load. Obtain expression for output voltage. [10]

**OR**

A chopper circuit is operating on TRC principle at a frequency of 1KHz on a 220 V dc supply. If the load voltage is 180 V, calculate the conducting and blocking period of thyristor in each cycle.

**Q.6** Describe the construction and working principle of DC motor. [10]

**OR**

Describe HVDC transmission with 12 pulse converter diagram. List its advantages over HVAC transmission.

\* \* \* \*