No. of Printed Pages : 3

BIEL-019

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

00933

December, 2016

BIEL-019 : POWER ELECTRONICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any* ***seven*** *questions. Draw neat waveforms and circuit diagrams. Use of scientific calculator is allowed. Missing data, if any, may be suitably assumed.*

---

1. Explain the two-transistor analogy of a thyristor. Explain any one of the turn-on methods. *10*

2. What is meant by commutation of SCR ? Draw the circuits and explain any two methods of forced commutation of thyristors. *10*

3. A full wave rectifier with centre tapped transformer, is feeling a resistive load of resistance R. Assuming that diode has zero forward resistance and infinite reverse resistance,

(a) find the expressions for V_{dc}, I_{dc}, V_{rms}, I_{rms} and efficiency.

(b) If the peak value of transformer secondary voltage from mid-point to each end is 100 V and R = 5 Ω, find V_{dc}, I_{dc}, V_{rms}, I_{rms} and efficiency. *10*

4. Draw and explain the wave shapes of supply voltage, output voltage, load current, current through SCR, current through freewheeling diode and voltage across SCR of a single-phase half wave controlled rectifier feeding R-L load. *10*

5. Draw the circuit diagram of a single-phase dual converter and explain its working for both modes of operation. *10*

6. What is McMurray full bridge 1-ϕ inverter ? Draw its diagram and discuss its operation. *10*

7. (a) Draw and explain the characteristics of IGBT. *5*

   (b) A parallel inverter has input d.c. voltage of 40 V. It is desired that the output voltage be 230 V, 50 Hz and peak load current 2 A. Design a parallel inverter. Choose the correct ratings of thyristor. *5*

8. Why is forced commutation necessary for choppers ? Discuss the operation of an auxiliary commutated chopper. Draw the circuits showing the different modes of operation. *10*

9. What is an a.c. regulator ? Give some of its applications. Draw a circuit diagram and explain the working of static on load tap changer for transformers. *10*

10. Draw and explain the operation of speed control of a d.c. series motor by a single-phase full converter for the continuous motor current. Also draw the associated voltage and current waveforms. *10*