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BIEE-024

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

00443

Term-End Examination

December, 2018

BIEE-024 : POWER ELECTRONICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume suitable data, wherever not provided.*

1. Discuss the turn-on and turn-off techniques of thyristor. *10*

2. Describe the working of a single-phase half converter with RL load. Draw the waveform of supply voltage, load voltage, load current and voltage across the thyristor. *10*

3. With suitable waveforms, discuss UJT triggering circuit for thyristor. *10*

4. Describe a step-up chopper with relevant current and voltage waveforms as a function of time. *10*

5. A step-down chopper, fed from 220 V dc is connected to RL load with R = 10 Ω and L = 150 mH. Chopper frequency is 1250 Hz and duty cycle is 0·5. Calculate *10*

   (a) Maximum and minimum voltage of load current,

   (b) Maximum value of ripple current,

   (c) Average and RMS values of load current,

   (d) RMS value of chopper current.

6. With a neat circuit diagram, explain the working of voltage source inverter. *10*

7. Discuss the working principle of single-phase to single-phase step-down cycloconverter with the help of bridge type configurations. *10*

8. What is commutation ? Discuss the operation of complementary commutation with the help of neat circuit and relevant waveforms. *10*

9. Explain the working of three-phase inverter for 120° mode of conduction. Draw the corresponding waveforms. *10*

10. Write short notes on any ***two*** of the following : *2×5=10*

(a) VI characteristics of MOS controlled thyristor

(b) GTO

(c) Scrubber circuit for the protection of SCR

(d) Switching characteristics of power transistor