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| BIEE-024 |

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)
Term-End Examination
December, 2015

BIEE-024 : POWER ELECTRONICS

Time : 3 hours   *Maximum Marks : 70*

Note : Answer any **five** questions. Each question carries equal marks. Use of scientific calculator is allowed.

1. (a) Two diodes are connected in series, as shown in the figure below, to share a total d.c. reverse voltage of V_D = 5 kV. The reverse leakage currents of the two diodes are I_{s_1} = 30 mA and I_{s_2} = 35 mA. Find (i) the diode voltages, if the voltage sharing resistances are equal, $R_1 = R_2 = R = 100$ kΩ, (ii) the voltage sharing resistances, R_1 and R_2, if the diode voltages are equal, $V_{D_1} = V_{D_2} = V_D / 2$.   7
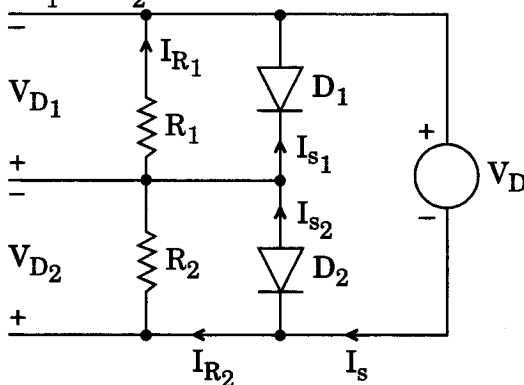

Figure 1

(b) What are the major problems of series and parallel connected diodes ? Discuss the possible solutions of these problems. 7

2. Explain the operation of a single phase full bridge converter with 'RL' load for continuous and discontinuous load currents. *14*

3. Explain the operation of a three-phase full converter. Also derive the expression for its average output voltage. *14*

4. Discuss the working of a three-phase to single phase cycloconverter with neat voltage and current waveforms. *14*

5. (a) With a neat circuit diagram, explain 'anti-saturation' control of base drive for BJT. 7

   (b) Describe the current commutation technique to turn off the SCR with a neat sketch and waveforms. 7

6. Classify the basic topologies of switching regulators and explain the operation of a buck regulator with continuous load current using suitable waveforms. *14*

7. Draw the circuit diagram of a single phase capacitor commutated current source inverter and explain its operation with equivalent circuits for different modes and necessary waveforms. *14*

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