R09

Code No: C4207, C4307, C5407

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I - SEMESTER EXAMINATIONS APRIL/MAY-2012
MODERN POWER ELECTRONICS
(COMMON TO POWER AND INDUSTRIAL DRIVES, POWER ELECTRONICS, POWER ELECTRONICS AND ELECTRIC DRIVES)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks

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1. Explain the operation of MOS-Controlled thyristors using its schematic and equivalent circuits.

2.a) With a neat circuit diagram and related waveforms, explain the operation of class E resonant inverter.
b) What are the advantages and limitations of class E resonant inverters?

3. Explain the operation of Diode clamped multilevel inverter and also mention its main features.

4. What is a Forward convertor? Explain its modes of operation using a neat circuit diagram and related waveforms.

5. Explain the operation of bidirectional AC power supplier.

6. The average output voltage of a push-pull converter is $V_o = 2\mu V$ at a resistance load of $R = 0.8\Omega$. The on-state voltage drops of transistors and diodes are $V_t = 1.2V$ and $V_d = 0.7V$ respectively. The turns ratio of transformer is $a = \mu_s/\mu_p = 0.25$. Determine
   a) The average input current
   b) Efficiency 'η'
   c) The average transistor current
   d) The peak transistor current
   e) The RMS transistor current I_R
   f) The open circuit transistor voltage V_{oc}.
   Assume duty cycle k = 0.5.

7.a) Compare ZCS and ZVS Resonant converters.
b) What are the advantages and disadvantages of resonant power supplier?

8. Write short notes on the following:
   a) DC link capacitor voltage balancing in multilevel inverters.
   b) Emitter turn-off thyristors.
   c) Series resonant inverters.

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