

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.