

MODEL QUESTION PAPER

MFE2

I Semester M.TECH Examination, August 2011 POWER ELECTRONIC CONVERTER

Time: 3 Hours

Max. Marks: 75

GROUP A : Answer any three questions

- Q.1 What are the types of HVDC link ? Explain Bipolar HVDC Link?
- Q.2 Draw and explain Switching characteristics of IGBT.
- Q.3 What is a dual converter? Draw two full converter circuits.
- Q.4 Explain the V-1 Characteristic of Thyristor with its various parameters.
- Q.5 What is a dual converter? Explain. Draw two dual converter circuits.

GROUP B : Answer any three questions.

- Q.6 Explain the various types of Commutation.
- Q.7 The thyristor is connected with input source inductance and RL load and a RC Snubber circuit is connected with parallel with it. When input voltage of circuit is $V_s = 200$ V with load resistance of $R = 5 \Omega$. The load and stray inductance are negligible and the thyristor is operated at a frequency of $f_s = 2$ kHz. If the required dv/dt is 100 V/microsec. and the discharge current is to be limited to 100A, determine the value of R_s and C_s , Snubber loss and the power rating of Snubber resistance. (10)
- Q.8 Explain a Gate drive circuit for IGBT.
- Q.9 A single phase full bridge inverter uses a uniform PWM with seven pulses per half cycle for voltage control. Plot the distortion factor, fundamental component and lower order harmonics against the modulation index.
- Q.10 What is the cause of load side transient voltages?

GROUP C: All Questions are Compulsory.

Q.11 Fill in the blanks

- (i) When device turn off due to the natural behavior it is called as _____.
- (ii) The minimum forward current of an SCR before Gate firing is removed which must maintain thyristor in conduction is called _____.
- (iii) UJT is used for _____ the SCR.
- (iv) The ripple factor in full wave rectifier is _____.
- (v) An IGBT has _____ input impedance.

Q.12 Multiple choice question.

- (i) The reverse power flow from the load to the supply is called _____.
(a) Transition mode (b) Reverse mode
(c) Inversion mode (d) None of these
- (ii) The application of thyristor to convert ac into ac at variable frequency is called as _____.
(a) Rectifier (b) Inverter
(c) chopper (d) Cycloconverter
- (iii) Commutation is the process of _____.
(a) Turning OFF a thyristor (b) Turning ON a thyristor
(c) Both (d) None
- (iv) The device that can be turned on by direct light radiation on silicon wafer and used for high current and high voltage application is called _____.
(a) SIT (b) IGBT
(c) GTO (d) LASCR
- (v) The selenium diodes may be used for protection against _____.
(a) Transient over voltages (b) Transient over current
(c) Both (d) None.

Q.13 True or false

- (i) The purpose of parallel operation of diode is to decrease current handling Capability.
- (ii) A transistor switch is much simpler than a forced commutated thyristor.
- (iii) If V_{GS} is greater than or equal to a value threshold voltage in MOSFET.
- (iv) The purpose of parallel operation of diode is to Increase current handling capability .
- (v) Latching Current is always greater than Holding current.
