

III B.Tech I Semester Supplementary Examinations, May 2005
DIGITAL ELECTRONICS
(Mechatronics)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain the principle of clamping. Discuss the effects of Source impedance, Load resistance and cut in voltage on the clamping circuit.
(b) Explain how a sine wave may be converted into square wave by using two diodes.
2. (a) Explain the Operation of an Astable multivibrator and Derive expressions for period of oscillation.
(b) Find the pulse width and period of output of an Astable multivibrator where $R_1=R_2=30K\Omega$, $C_1=C_2=0.2 \mu F$ and take necessary assumptions.
3. (a) Explain how transistor will act as a switch and explain the switching characteristics of a transistor.
(b) Draw the characteristics of CE configuration and explain how $V_{CE(sat)}$ varies with respect to different load resistances.
4. Explain the properties of EX-OR gates and prove the following
 - (a) If $A \oplus B = 0$ then $A=B$.
 - (b) if $A \oplus C = B \oplus C$ then $A=B$
 - (c) $A \oplus B = A' \oplus B'$.
5. (a) Implement a Full Adder with two 4x1 Multiplexers
(b) Construct a 16x1 Multiplexer with two 8x1 Multiplexers and one 2x1 Multiplexer.
6. (a) Why preset and clear inputs are required by a FF. Explain the operation of a clocked RS-FF with preset and clear inputs with the help of complete truth table and output waveforms?
(b) What is the basic sequential circuit that stores 1-bit of memory. Draw its diagram and truth table. mention some applications of it?
7. (a) Explain in detail about the operations involved in an universal shift register with timing diagrams?
(b) What is modulus related to counters. Draw and explain the operation of a MOD-8 counter with the help of timing diagrams?
8. (a) What is a demultiplexer explain the circuit for conversion of decoder into a demultiplexer.

(b) Explain briefly about dot matrix display.
