## 2005 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

## III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS DIGITAL ELECTRONICS (MECHATRONICS)

NOVEMBER 2005

TIME – 3 HOUR
MARK – 80

## Answer any FIVE Questions All Questions carry equal marks

1. Explain the response of RC high pass circuit to a symmetrical square wave input and derive the expression for the % tilt.

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- 2. (a) Design an Astable circuit for output amplitude of 15V and square wave frequency of 500Hz. Assume hFE(min) = 50, IC(sat) = 5mA, VCE(sat) = 0V.
- (b) Design a Collector coupled monostable multivibrator using npn Si transistors to produce a pulse of 200  $\mu$  sec width and of amplitude 10V. Assume: IC(sat) = 10mA, VBE(cutoff) = -1V, BVEBO = 6V, VCE(sat) = 0.3V, VBE(sat) = 0.7V, and hFE(min) = 30. Show the circuit diagram with all the component values. [9+7]
- 3. (a) Explain the operation of current sweep circuit. List the applications of current sweep circuits.
- (b) Explain about the exponential sweep circuit.

[8+8]

- 4. Explain the properties of EX-OR gates and prove the following
- (a) If A = B = 0 then A=B.
- (b) if A C = B C then A=B
- (c) A B = A0 B0.

*[5+5+6]* 

- 5. (a) Implement a Full Subtractor with NOR gates only. Give the expressions for Difference and Borrow with the help of truth table?
- (b) Design a combinational circuit that gives sum of two 2-bit numbers x1x0 and y1y0 whose outputs are Carry, Sum1, Sum0 by using two Full Adders .Also derive expressions for outputs from truth table? [8+8]
- 6. (a) Discuss briefly about any four applications of flip-flops?
- (b) What is the difference between a latch and a Flip Flop? Draw the diagram of JK-FF its truth table and timing diagrams? [8+8]
- 7. (a) Give the difference between synchronous and asynchronous counters.
- (b) Draw and design a 3-bit synchronous counter using JK-FFs with the help of K-maps. also give timing diagrams? [8+8]
- 8. (a) Distinguish between LED and LCD displays.
- (b) Explain why driver circuits are needed with reference to LED displays.

[8+8]