Code No. : **6125**

FACULTY OF ENGINEERING
B.E. 2/4 (ECE) II Semester (Main) Examination, June 2010
PULSE, DIGITAL AND SWITCHING CIRCUITS

Time: 3 Hours] [Max. Marks: 75

*Note : Answer **all** questions from Part **A**. Answer any five questions from Part **B**.*

PART – A **(25 Marks)**

1. Show the circuit of a compensating attenuator and give the relation for proper compensation. **3**

2. _____ multivibrator can be used as a voltage to frequency converter. (Astable/Monostable/Bistable) **2**

3. Compare the performance of series clipper with shunt clipper. **2**

4. What is the principle of Miller sweep circuits ? **2**

5. Prove that NAND gate is an universal gate. **2**

6. Show a prime implicant chart and comment on the reduction procedure. **2**

7. Discuss the procedure adopted for testing a function for symmetry. **3**

8. Design half subtractor with NAND gates only. **3**

9. Convert 'D' flip flop to 'T' flip flop. **3**

10. Write the truth table of SR, JK, T and D flip flop. **3**

PART – B **(50 Marks)**

11. a) Why a High Pass RC circuit is called a differentiator ? **3**

    b) A symmetrical square wave whose average value is zero has a peak to peak amplitude of 20 volts and a period of 2 micro second. This waveform is applied to a low-pass circuit whose upper 3dB frequency is $\frac{1}{2}\pi$ MHz. Calculate and sketch the steady state output waveform. In particular, what is the peak-to-peak output amplitude ? **7**

12. a) With references the binary circuit, explain the role of the commutating capacitors. **3**

    b) Design an Astable multivibrator to generate a 5 KHz square wave with a duty cycle equal to 60% amplitude 10 volts. Use NPN transistor having

    $h_{FE\ (min)} = 60\ I_{C\ (max)} = 50$ mA, $V_{BE\ (sat)} = 0.7$ volt, $V_{CE\ (sat)} = 0.2$ volt.

    Show the circuit diagram and all the waveforms. **7**

13. a) Discuss the various methods of improving sweep linearity in voltage time base generators and derive the expression for sweep speed error in each case. **5**

    b) Draw the circuit diagram of a Boot strap voltage time base generators and explain its operation with waveforms. Derive the expression for its sweep amplitude, sweep period, retrace interval and recovery time. **5**

14. a) Using Switching algebra simplify the following expressions :

    i) $f(w, x, y, z) = x + xyz + \overline{x}yz + wx + \overline{w}x + \overline{x}y$

    ii) $f(w, x, y, z) = (w + x + y + z)(x + y + z)(y + z)(z)$. **6**

    b) Find the TT for the following switching function :

    $f(A, B, C, D) = AB\overline{C}D + ABC\overline{D}$. **4**

15. For the function

    $T(w, x, y, z) = \sum m(0, 1, 2, 3, 4, 6, 7, 8, 9, 11, 15) + \sum d(10, 13)$

    a) Find all prime implicants. **5**

    b) Find the essential prime implicants. **5**

16. Design MOD-13 synchronous counter using T-FF. Explain all design steps clearly. Draw its output with respect to clock input. **10**

17. Write short notes on **any two** : **(5×2=10)**

    a) UJT

    b) Clamping theorem

    c) Contact N.W.