Code No.: 10049

FACULTY OF ENGINEERING

B.E. II/IV Year (ECE) II Semester (Main) Examination, April 2006

PULSE, DIGITAL AND SWITCHING CIRCUITS

Time : 3 *Hours*] [*Max. Marks* : 75

Answer **all** *questions of* Part A *and any* **five** *questions from* Part B.

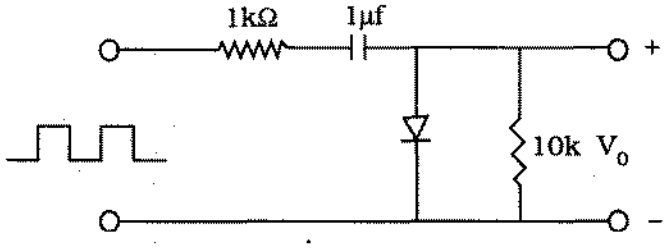
Part A – (Marks : 25)

1. Show the circuit for the compensated attenuator and state the condition for perfect attenuation. 3
2. State Clamping theorem. What is its significance? 2
3. What is the role of commuting capacitors in a binary circuit? 2
4. State the applications of UJT relaxation oscillator. 3
5. What is meant by essential prime implicant? 1
6. Prove the following Boolean algebra theorem.
   $A + BC = (A + B)(A + C)$ 2
7. Make a K-map for the following function.
   $f = AB + A\overline{C} + C + AD + A\overline{B}C + ABC$. 4
8. Draw the logic diagram of Binary to BCD code converter using 4 bit MS1 adder and other hardware. 3
9. Realize T Flip-flop using D Flip-flop. 2
10. What is the maximum frequency of operation of a 4 bit asynchronous binary counter, if the propagation delay of each flip-flop is 25 ns? 3

Part B – (Marks : 5 × 10 = 50)

11. (a) Draw a circuit for clipping at two independent levels and explain its operation with the help of its transfer characteristics. 4

    (b) A symmetrical 10 kHz square wave of amplitude ±10V is impressed upon a diode clamping circuit, shown below. Calculate and plot the output under steady state conditions. Assume for the diode V_{BE} = 0V, r_f = 100 ohms and $r_r = \infty$. 6



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12. Design a Schmitt trigger circuit for VTP = 6V and LTP = 3V. Assume V_{CC} = 15V. Use NPN transistors, having $I_{C(max)}$ = 100mA, $h_{fe\ (min)}$ = 50, $V_{CE(sat)}$ = 0V, $V_{BE(sat)}$ = 0.7V, $V_{BE\ (active)}$ = 0.6 V. Show the circuit diagram with all component values and explain its operation with the help of its transfer characteristic. 10

13. (a) Determine the canonical sum of products representation of the function :

$f(x, y, z) = x + (\overline{\overline{x}\,\overline{y} + \overline{x}\,z})$. 3

(b) Using K map, determine minimum sum of products for the following function.

$f(v,w,x,y,z) = \Sigma m\,(0, 2, 3, 4, 5, 11, 18, 19, 20, 23, 24, 28, 29, 31)$ 7

14. (a) Write about identification of symmetric functions. 6

(b) Realize full adder using minimum number of NAND gates. 4

15. Design a decade up counter using D Flip-flops. 10

16. (a) Design a binary to gray code converter. 7

(b) Prove that for any periodic input, the average value of output of a RC high pars circuit is equal to zero. 3

17. Write any **two** of the following : 2 × 5 =10

(a) Quine-Mc Cluskey method

(b) Turn off-methods of SCR

(c) Hazard free logic design

(d) Draw and explain the operation of astable multivibrator circuit using NPN transistors.