Sample Question Paper – I

9037

Course Name :- Computer Engineering Group
Course code :- CO/CM/CD/IF
Semester :- Third
Subject :- Digital Techniques
Duration :- 3 hours Marks: 80

Instructions: 1. All questions are compulsory.
2. Figures to the right indicates full marks.
3. Use of non-programmable calculator is permissible.

Q 1: Attempt any Eight of the following: (8 x 2 = 16)

a) Define Fan-out & Noise margin.
b) Represent timing diagram of digital signal for positive & negative logic in TTL.
c) Compare TTL & CMOS logic families(any four points).
d) Draw logic symbol & truth-table for EX-OR gate.
e) Simplify using Boolean algebra-

$$A.B + \bar{A}.B + \bar{A}.\bar{B}$$

f) Draw block diagram of 4:1 MUX and give its truth table.
g) Draw Full Adder using two Half adders.
h) Draw neat diagram of clocked S-R flip-flop & write its truth-table.
i) Differentiate between static & dynamic RAM
j) Give the classification of different types of semiconductor memories.

Q 2: Attempt any Three of the following: (4 x 3 = 12)

a) Draw circuit for i) AND using NOR ii) OR using NAND.
b) State & prove De Morgan's Theorems.
c) Prove using De Morgan's Theorem –

i) $\overline{(A + B) + (C + D)} = \overline{(A + B)}\ \overline{(C + D)}$

ii) $\overline{A.B + C.D} = \overline{AB} \cdot \overline{CD}$

d) Realize the following Boolean expression using basic gates.

i) $Y = \overline{(A + C)}\,(B + C)$

ii) $Y = \bar{A}.B + B.\bar{C}$

Q 3: Attempt any Three of the following: (4 x 3 = 12)

a) Draw 9-bit odd parity generator using IC 74180.
b) Draw & explain half subtractor.
c) Implement the following function using 8:1 MUX.

$Y = \sum m\,(0, 2, 3, 6)$.

d) Implement following expression using NAND gates only.

$Y = A.B + \bar{B}.C + C.\bar{A}$

Q 4: Attempt any Four of the following: (4 x 4 = 16)

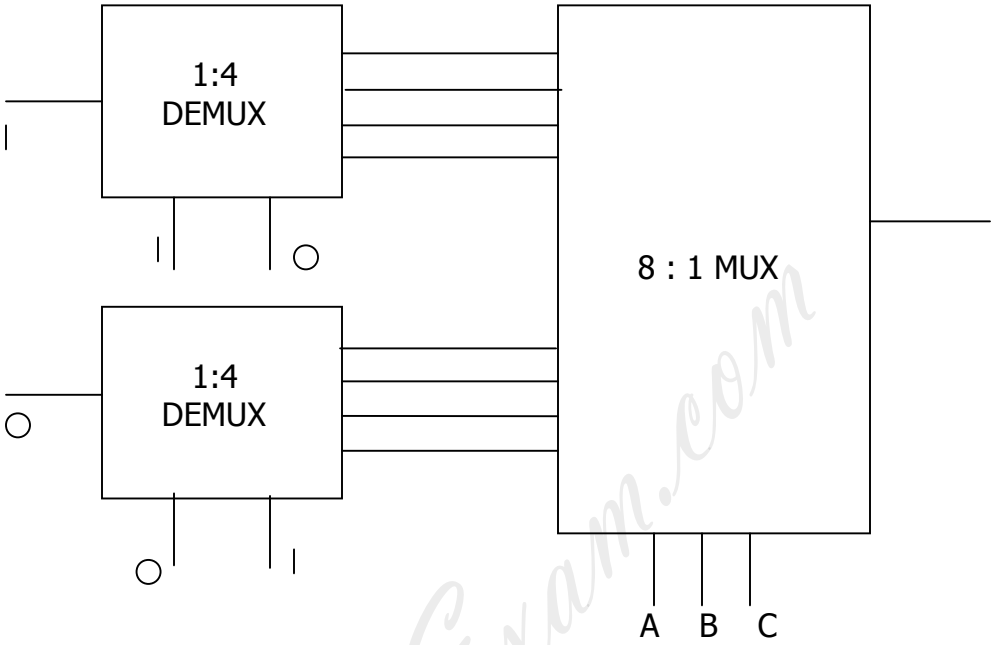
a) Describe the function of 4-bit SISO shift register with the help of block diagram , truth-table, timing diagram.
b) State four applications of counters.
c) What is race around condition? How it can be avoided?
d) Compare RAM & ROM.
e) Design Asynchronous MOD-10 Counter.
f) Draw neat diagram of R/2R ladder type DAC. Find its output expression.

Q 5: Attempt any Three of the following: (4 x 3 = 12)

a) List advantages & disadvantages of Ramp type ADC.
b) Draw block diagram of Digital Comparator IC 7485 & write its function table.
c) Describe four specifications of DAC.
d) An 8-bit converter is driven by 500 KHz clock. Find –
   i) Maximum conversion time
   ii) Average conversion time.

Q 6: Attempt any Three of the following: (4 x 3 = 12)

a) Determine 8:1 MUX output as select inputs A,B,C change from 000 to 111.



b) Describe edge triggering & level triggering with respect to flip-flop.

c) An 8 MHz square wave clocks a 5-bit ripple counter. What will be the frequency at output of last flip-flop & the duty cycle of this counter.

d) Differentiate Synchronous & Asynchronous Counter (any four points).