SEAT No. :

P210

[4117]-22
F.Y. B.Sc.
ELECTRONIC SCIENCE
EL1-T2: Principles of Digital Electronics
(Paper - II) (2008 Pattern) (42220)

Time :3 Hours]   *[Max. Marks :80*

Instructions to the candidates:

    1)   *All questions are compulsory.*

    2)   *Neat labelled diagrams must be drawn wherever necessary.*

    3)   *Use of calculator & log table is allowed.*

    4)   *Figures to the right indicate full marks.*

Q1) Answer the following questions in brief :   **[16]**

   a)   Convert
     $(123.746)_{10} = (?)_8$.

   b)   What is positive and negative logic level?

   c)   Simplify the following equation using laws of Boolean algebra.
     $Y = ABCD + ABC + AB + A\overline{B}$

   d)   State the difference between half adder circuit and full adder circuit?

   e)   What is the function of strobe in Multiplexer?

   f)   Draw logic diagram and write truth for T flip-flop.

   g)   State the difference between Bipolar logic families and saturated Bipolar logic families.

   h)   Define the following term associated with memory:

     i)   Address line.

     ii)   Data line.

Q2) Answer any four of the following :   **[16]**

   a)   i)   Convert decimal number 37.2 into binary number.

     ii)   Convert
       $(E4)_{16} = (?)_8$.

b) Explain with neat diagram, how Ex-OR gate can be used as parity generator?

c) Construct OR gate and NOT gate using NAND gates.

d) Draw logic diagram for 4 bit universal adder. Explain the action with suitable example.

e) What is decoder? Write short note on BCD to seven segment decoder?

f) How will you get D and T flip flops from J.K flip flop? Draw logic diagram and truth table of each.

Q3) Answer any Four of the following : [16]

a) Minimise the following expression using K-map

$$ABC + \overline{A}B\overline{C} + B$$

and draw its simplified logic diagram.

b) Draw logic diagram of half sub tractor. Write its truth table, explain.

c) What do you mean by code converter? Explain encoder and decoder with suitable example.

d) What is a decade counter? Which IC's can be used as decode counter?

e) Draw the circuit of CMOS- NOR gate, explain its action.

f) Explain the working of dynamic memory cell. Write the advantage and disadvantages of dynamic memory cell over static memory cell.

Q4) Answer any four of the following : [16]

a) Construct logic circuit using AND, OR and NOT gate for the following Boolean expressions

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

ii) $Y = (A + B) \cdot (\overline{C} + \overline{D}) \cdot (\overline{A} + C)$

b) Explain Keyboard encoder with suitable diagram.

c) Explain the working of parallel in serial out shift register?

d) Define the terms the noise immunity and noise margin, Explain in brief.

e) List the performance characteristics of digital integrated circuit. Explain worst case input output voltages.

f) Explain the structural organization of memory chip with suitable example.

Q5) Answer any four of the following : [16]

   a)   i)   What is excess-3 code?

       ii)   Draw logic diagram of 2 input OR gate using diode.

   b)   i)   State any two applications of shift register.

       ii)   Draw circuit of S-R flip-flop using two input logic gate. What are limitations of S-R flip-flop.

   c)   i)   Give the relation between number of output and select lines in multiplexer. Explain with example.

       ii)   What are types of seven segment display? Show internal connections of them?

   d)   i)   Why synchronous counters are faster in operation?

       ii)   State the function of IC's

           A)   IC 7447

           B)   IC 74153.

   e)   i)   CMOS logic family is better than bipolar family-comment.

       ii)   State the advantage of schottky TTL over TTL.

   f)   i)   Define terms Fan In and Fan Out.

       ii)   What is unipolar logic family? What are drawbacks of CMOS family?

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