SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : DIGITAL ELECTRONICS(18EC0444)   **Course & Branch**: B.Tech - EEE

Year & Sem: II-B.Tech & II-Sem   **Regulation:** R18

UNIT –I

BINARY SYSTEMS

1. Convert the given decimal number 234 to binary, octal, hexadecimal and BCD equivalent.
   (10M)L1, CO.1

2. Perform the following
   a) Subtraction by using 1's complement for the given 10101 - 11011.   **(5M)L3, CO.1**
   b) Subtraction by using 2's complement for the given 111001-1010.   **(5M)L3, CO.1**

3. A) Convert the following to Decimal and then to Octal. (i) $(4234)_{16}$ (ii) $(10010011)_2$.
   (5M)L1, CO.1
   b) Convert the following to Decimal and then to Hexadecimal. (i) 12348 (ii) 110011112
   (5M)L1, CO.1

4. Simplify the following Boolean expression:
   (a) F = (A+B)(A'+C)(B+C).   **(5M)L3, CO.1**
   (b) F = XY+XYZ+XYZ'+X'YZ   **(5M)L3, CO.1**

5. A) Explain Different Types of binary codes and give the examples
   (5M)L3, CO.1
   b) Simplify the following Boolean functions to minimum number of literals   **(5M)L3, CO.1**
   (i)   xyz + x'y + xyz'.   (ii) xz + x'yz.

6. Convert the following to Decimal and then to Octal   **(10M)L1, CO.1**
   (A) 1234_{16} (b) $12EF_{16}$ (c) 10110011_2 (d) 10001111_2 (e) 352_{10}
   (f) 999_{10}

7. Express the function Y=A+B'C in (i)Canonical SOP form (ii) Canonical POS form**(10M)L3, CO.1**

8. (A)What is Switching Functions? Explain switching functions.   **(5M)L1, CO.1**
   (B) Simplify the following Boolean functions to minimum number of literals: **(5M)L3, CO.1**
   F = ABC + ABC' + A'B

9. Explain about canonical SOP and POS forms.   **(10M)** L3,CO.2

10. Convert the following to binary and then to gray code.   **(10M)L1, CO.1**
   (A) $(1AD5)_{16}$ (b) $(BC54)_{16}$ (c) $(237)_8$ (d) $(164)_{10}$ (e) $(323)_8$

<u>UNIT –II</u>

GATE–LEVELMINIMIZATION AND COMBINATIONALLOGIC

1. A) Minimize the following Boolean function using K-Map   **(5M)L2, CO.1**
    $F(A, B, C, D) = \Sigma m(0, 2, 4, 6, 8, 10, 12, 14)$.

    B) What is Decoder ?design3:8 decoder   **(5M)L2, CO.1**

2. Minimize the given Boolean function $F(A,B,C,D) = \Sigma m(0,1,2,3,6,7,13,15)$ using tabulation method and implement using basic gates   **(10M)L2, CO.1**

3. Simplify the following Boolean expressions using K-map   **(10M)L3, CO.1**
    $F(W,X,Y,Z) = XZ+W'XY'+WXY+W'YZ+WY'Z$

4. Design 2 bit comparator with Logic diagram.   **(5M)L3, CO.1**

5. A) Simplify the following expression using the K-map for the 3-variable.   **(5M)L3, CO.1**
    $Y = AB'C+A'BC+A'B'C+A'B'C'+AB'C'$

    B) Simplify the Boolean function $F(A,B,C,D)=\sum m(1,3,7,11,15)+d(0,2,5)$ **(5M)L3, CO.1**

6. Minimize the given Boolean function $F(A,B,C,D) = \Sigma m(0,2,3,6,7,8,10,12,13)$ using tabulation method and implement using basic gates   **(10M)L2, CO.1**

7   Design 32:1 Mux using two 16:1 Muxs and one 2:1 Mux.   **(10M) L5 CO.2**

8. Design & implement Half Adder and Full Adder with truth table.   **(10M)L1, L3 CO.2**

9. A)Implement the fallowing Boolean function with 8:1 multiplexer.
    $F(A,B,C,D)=\sum m(0,2,6,10,12,13)+d(3,8,14)$ **(5M)L2, CO.2**

    B)Implement the fallowing Boolean function with 8:1 multiplexer.

    $F(A,B,C,D)=\pi M(0,3,5,6,8,9,10,12,14)$ **(5M)L2, CO.2**

10. What is Demultiplexer? Desingn1:8 Demultiplexer using 1:4 Demultiplexers.   **(10M)L3, CO.2**

UNIT –III

SEQUENTIAL LOGIC DESIGN

1. A) Design D Flip Flop by using SR Flip Flop Explain the operation with truth table.

    (6M)L1, CO.3

    b) Write the differences between combinational and sequential circuits.   **(4M)L5, CO.2**

2.   A) Explain working of Master Slave Flip flop with neat diagram.   **(5M)L3, CO.2**

    b) Design T Flip Flop by using JK Flip Flop and draw the timing diagram.   **(5M)L1, CO.2**

3. Draw the circuit of JK flip flop using NAND gates and explain its operation.   **(10M)L3, CO.3**

4. A) Convert S-R flip flop into JK-flip flop. Draw and explain the logic diagram.   **(5M)L1, CO.3**

    b) Convert D flip flop into JK-flip flop. Draw and explain the logic diagram.   **(5M)L3, CO.2**

5. What is Register Explain i) Parallel in Parallel out   Register   **(10M)L3, CO.3**

    ii) Series in Parallel out Register

6. Design and implement 3-bit ripple counter using J-K flip flop. Draw the state diagram, logic diagram and timing diagram for the same.   **(10M)L1,L3, CO.3**

7.   With a neat sketch explain MOD 6 Johnson counter using D FF. **IES 2015**

    (10M)L3, CO.2

8. Implement 6-bit ring counter using suitable shift register. Briefly describe its operation.

    (10M)L3, CO.2

9. Design D Flip Flop by using SR Flip Flop Explain the operation with truth table.

    (10M)L3, CO.3

10. Design MOD-10 Asynchronous counter by using T-Flip flop   **(10M)L3, CO.3**

UNIT-IV
LOGIC FAMILIES

1. Perform the analysis of standard TTL NAND gate and give its characteristics.

[10M][L4][CO3]

2. Give the classification of integrated circuits and compare the various logic families.

[10M][L2][CO2]

3. What is meant by Tristate logic? Draw the circuit of Tristate TTL logic and explain the functions.

[10M][L4][CO4]

4. Explain the following specifications   **[10M][L2][CO2]**

      (i) Fan out

      (ii)Fan out

5. What is meant by ECL? Draw the circuit of Tristate ECL logic and explain the functions.

[10M][L2][CO2]

6. Explain about TTL to CMOS interfacing   **[10M][L4][CO2]**

7. Compare TTL, ECL and CMOS   **[10M][L1][CO2]**

8 .Explain the following specifications   **[10M][L2][CO2]**

      (i) Propagation delay.

      (ii)Noise margin.

9.Explaine about CMOS families.   **[10M][L2][CO2]**

10. Explain about Logic gates. with symbols and truth tables.   **[10M][L2][CO2]**

UNIT –V
SEMICONDUCTOR MEMORIES AND PROGRAMMABLE LOGIC DEVICES

1. Implement the following Boolean function using PLA **(10M)L3, CO.4**

   (i)$F(w,x,y,z) = \Sigma m(0,1,3,5,9,13)$ (ii)$F(w,x,y,z)) = \Sigma m(0,2,4,5,7,9,11,15)$

2. Implement the following Boolean function using PAL. **(10M)L3, CO.4**

   (i)$A(w,x,y,z) = \Sigma m(0,2,6,7,8,9,12,13)$ (ii)$B(w,x,y,z)) = \Sigma m(0,2,6,7,8,9,12,13,14)$

   (iii)$C(w,x,y,z) = \Sigma m(1,3,4,6,10,12,13)$ (iv)$D(w,x,y,z)) = \Sigma m(1,3,4,6,9,12,14)$

3. Explain About Content Addressable Memory (CAM) charge de coupled devicememory (CCD)

   (10M)L3, CO.4

4. Implement PLA circuit for the following functions $F1(A,B,C)= \Sigma m(3,5,6,7)$,

   $F2(A,B,C)= \Sigma m(0,2,4,7)$. **(10M)L3, CO.4**

5. Differentiate among ROM, PROM ,DROM ,EPROM, EEPROM, RAM. (5M)L3, CO.3 **(10M)L1, CO.4**

6. Explain the minimization procedure for determining the set of equivalent state of a

   specified machine M. **(10M)L2, CO.4**

7. A) What is ROM organization? Explain about Different types of ROM. **(10M)L3, CO.4**

8. Compare three combinational circuits: PLA, PAL and PROM **(10M)L3, CO.3**

9. Give the logic implementation of a 32x4 bit ROM using a decoder of a suitable figure.

   (10M)L3, CO.4

10. What is RAM organization? Explain about Different types of RAM. **(10M)L3, CO.4**

P MUNISEKHAR