NTK/KW/15 – 7336

Third Semester B. E. (Computer Engg.) (CBS) Examination

DIGITAL ELECTRONICS

Time : Three Hours] [Max. Marks : 80

N. B. : (1) All questions carry marks as indicated.
(2) Answer **Six** questions.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Show that :—

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

(ii) $(A+\bar{B}+A\bar{B})\,(AB+\bar{A}C+BC) = AB + \bar{A}\bar{B}C$ 4

(b) Convert the following function to standard SOP form. F(A, B, C, D) = AB + AC + C + AD 4

(c) Explain how transistor acts as a switch. 5

OR

2. (a) Perform the following conversions :—

(i) $(275.625)_{10} = (?)_2$

(ii) $(A72E)_{16} = (?)_8$

(iii) $(1100110.1001)_2 = (?)_{16}$

(iv) $(111000)\text{gray} = (?)_{\text{binary}}$ 8

(b) Define :—

(i) Fan-in

(ii) Fan-out

(iii) Propagation delay. 5

3. (a) Design an Excess -3 to BCD code converter using minimum number of NAND gates only. 7

(b) Design 5:32 decoder by using 3:8 decoder and 2:4 decoder. 7

OR

4. (a) Design BCD to seven segment display code converter. 7

(b) Implement the following function using 8:1 MUX : $F(A, B, C, D) = \Sigma m\ (2, 4, 6, 7, 9, 10, 11, 12, 15)$ 7

5. Minimize the following function using k-map and realize using logic gates.

(i) $f(A, B, C, D, E) = \Sigma m(1, 4, 6, 10, 20, 22, 24, 26) + \Sigma d\ (0, 11, 16, 17)$ 7

(ii) $F(A, B, C, D) = \pi m\ (0, 3, 4, 5, 6, 7, 11, 13, 14, 15)$ 6

OR

6. (a) Design NOR gate circuit for the function F where.

$F(A, B, C, D, E) = \pi M\ (1, 2, 4, 9, 10, 13, 17, 23, 27)$ $d\ (6, 12, 15, 20, 25, 30)$ 7

(b) $F(A, B, C, D) = \Sigma M (2, 3, 5, 7, 9, 11, 12, 13, 14, 15)$ design using NAND gates. 6

7. (a) What is race-around condition in JK flip-flop ? Also explain how it is overcome. 7

(b) Convert the following :—

(i) Jk flip-flop to D flip-flop.

(ii) SR flip-flop to T flip-flop. 7

OR

8. (a) Explain in brief ROM, PROM, EPROM and E^2PROM. 8

(b) Discuss in brief semiconductor memory organization and its operation. 6

9. (a) Design a MOD-5 synchronous counter using T flip-flop. 7

(b) Explain the working of twisted ring counter with suitable example. 6

OR

10. (a) Write a note on Johnson counter. 5

(b) What do you understand by parallel and serial shifting in case of shift register ? Explain with proper diagram. 8

11. (a) Explain full adder circuit using two half adder circuit. 7

(b) Write short note on ALU. 6

OR

12. (a) Design astable multivibrator using logic gates. Explain its operations. 7

(b) Design 4 bit adder using single bit full adders. 6