(40)

VRK/KS/14/6623/6628

Faculty of Engineering & Technology
Fourth Semester B.E. (Electronics Engineering)/ET/EC
(C.B.S.) Examination
DIGITAL CIRCUITS AND FUNDAMENTAL OF MICROPROCESSOR

Time—Three Hours] [Maximum Marks—80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) Write the canonical form of the following Boolean function and minimize by using K-Map and realize using logic gates.

$$F(A, B, C, D) = AB\overline{C}D + \overline{A}BCD + A\overline{B}\overline{C} + \overline{A}\overline{B}\overline{D} + A\overline{C} + A\overline{B}C + \overline{B}.$$ 7

(b) Convert the given expression in standard POS form and SOP form $f(A, B, C) = (A + B)(B + C)(C + A)$ 7

OR

2. (a) Design 4 bit gray to binary convertor using truth table, K-Map and logic circuits. 8

(b) Show how a full adder is realized from two half adders. Draw the logic circuit and give its truth table. 6

3. (a) Design a 3-bit even parity generator. Implement with NAND gates. 6

(b) Explain static and dynamic hazards with suitable example and also mention how to obtain hazard free circuit. 7

OR

4. (a) Implement the following function using 8:1 multiplexer $f(A, B, C, D) = \sum (0, 3, 5, 7, 11, 13, 14)$. 6

(b) Design 5:32 decoder using two 4:16 decoders. 5

(c) Explain priority encoder. 2

5. (a) Draw the logic diagram of JK flip flop using NAND gate and explain its working. Give the characteristics equation of J-K flip flop ? 6

(b) Write a note on triggering methods for flip flops. 4

(c) Explain how latch can be used as one bit memory cell. 3

OR

6. (a) Convert the following :

(i) JK flip flop to T flip flop

(ii) T flip flop to D flip flop 7

(b) Explain T flip flop in detail. 6

7. (a) What are the different types of registers. Explain in detail along with circuit diagram. 7

(b) Explain the following counters :

(i) Synchronous counter

(ii) Ripple counter 6

OR

8. (a) Explain a synchrous 3 bit gray code up counter. Use T flip flop. 7

(b) Explain the following :

(i) Clock skew

(ii) Lock out condition 6

9. (a) Define the following parameters :

(i) Fan in

(ii) Fan out

(iii) Figure of Merit 6

(b) Write a short note on semi conductor memories. 7

OR

10. (a) Implement the following function using :

(i) PROM

(ii) PLA

(iii) PAL

$F(A, B, C) = \sum m(3, 5, 6, 7)$. 7

(b) Compare the following logic families in terms of power dissipation, fan in, fan out and speed of operation :

(i) TTL

(ii) CMOS

(iii) ECL

(iv) RTL 6

11. (a) Draw and Explain the architecture. 7

(b) Explain the following pins of 8085 :

(i) ALE

(ii) S_0 and S_1

(iii) Ready

(iv) HOLD 7

OR

12. (a) What are the different addressing modes supported by 8085 7

(b) What is an interrupt ? How can the interrupt in 8085 be classified ? 5

(c) Write an assembly language program to add two 8 bit numbers. 2