

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.

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

- (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 synchronous 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

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

(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