S.Y.B.E. (Electronics Engineering) Sem. – IV : EN 402

Digital Circuits & Fundamentals of Microprocessors

P. Pages : 4

Time : Three Hours   Max. Marks : 80

Notes : 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) What is K-map ? What are the limitations of K-map ? Simplify the following logic function using K-map. **8**

   i) $F(A, B, C, D) = \Sigma m(0,2,3,5,9,11,13,15) + d(8,10)$

   ii) $F(w, x, y, z) = wxyz + wx\bar{y}z + \bar{w}xy + w\bar{y} + \bar{w}$

   b) Design a combinational circuit that will accept BCD at its input terminals and generate Excess-3 code at its output terminals. **8**

OR

2. a) What is full subtractor ? Design full **8**
subtractor using suitable logic gates.

b) A combinational circuit accept 4-bits at its **8**
input terminal and will generate the signal
for the prime numbers. Design the circuit.

3. a) Design a 2-bit magnitude comparator. **8**

b) What is parity generator ? Design Even **8**
parity generator and checker.

OR

4. a) Design a priority Encoder with D_3 having **8**
highest priority followed by D_2, D_0, D_1.

b) Implement the following logic function using **8**
suitable MUX.
$f(A,B,C,D) = \Sigma m(0,1,3,5,6,9,11,14)$.

5. a) Convert SR flip-flop to D flip-flop. **8**

b) Design a 3-bit binary down counter. **8**

OR

6. a) What is the race around condition in JK flip- **8**
flop ? How will you overcome it ? Explain its
working with suitable logic diagram.

b) Explain the operation of the bi-directional **8** shift register.

7. a) Explain addressing modes of μp 8085 with **8** suitable example.

b) Draw and explain the timing diagram of **8** MOV B, M.

OR

8. a) Explain in detail status flags of μp 8085. **8**

b) Explain the following instructions of **8** μp 8085.

    1) SPHL   2) PCHL

    3) DAD B   4) XTHL

9. a) What are interrupts in μp 8085 ? Explain **8** hardware and software interrupts in detail.

b) Draw and explain pin diagram of **8** programmable peripheral Interface IC 8255.

OR

10. a) Explain SIM instructions of μp 8085.   **4**

    b) Write a program to generate a continuous **12** square wave with the period of 500 μs. Assume the system clock period of 325ns, using port A of 8255 PPI. Assume port addresses as – 20H, 21H, 22H, 23H.

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