B.E. Electronics Engineering Fourth Semester

EN 402 - Digital Circuits and Fundamentals of Microprocessors

P. Pages : 2 **GUG/W/18/1555**

Time : Three Hours * 1 2 2 4 * 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 answer wherever necessary with the help of neat sketches.

1. a) Expand $A + B\bar{C} + AB\bar{D} + ABCD$ to minterms and simplify using k-map. **8**

b) Minimize using k-map and reduce using NAND gates only. **8**
F(A, B, C, D) = $\sum$ m (1, 2, 3, 8, 9, 11, 13, 15) + d(4, 5, 6, 14)

OR

2. a) What do you mean by cascading of parallel adder ? Why it is required ? **8**

b) Design 4 bit binary to excess-3 code converter. **8**

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

b) Implement full adder circuit using two 4:1 MUX. **8**

OR

4. a) Draw the circuit for implementing 5:32 decoder using 3:8 and 2:4 decoder combinations. **8**

b) Design a priority encoder with D_2 having highest priority followed by D_0, D_3 and D_1. **8**

5 a) Explain with neat diagram the operation of 4-bit left shift register. Also give the truth table and timing diagram. **8**

b) Draw the logic diagram of a S-R Latch using NOR gates and explain its operation. **8**

OR

6. a) Convert J-K flip flop to - **8**
i) D flip flop
ii) T flip flop

b) Design a type T counter goes through states 0, 3, 5, 6, 0. Is the counter self starting. **8**

7. a) Explain the addressing modes of microprocessor 8085 along with example. **8**

b) Explain the following instructions indicating flags affected, number of T-states, bytes, addressing modes : **8**

i) PCHL ii) IN 73H

iii) CALL 9000H iv) XCHG

OR

8. a) Write an assembly language program to perform multiplication of two 8-bit numbers. **8**

b) Draw and explain the timing diagram of OUT 79 H. **8**

9. a) Draw and explain schematic structure of μp 8085 interrupt. **8**

b) Explain the format of SIM and RIM instruction. **8**

OR

10. a) Draw and explain complete block diagram of 8255 PPI. **8**

b) Write an assembly language program to blink LED's on PCs pin. Initialise 8255 PPI with port A address 95H. **8**

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