B.E. Computer Science & Engineering Fourth Semester

CS402 - Digital Circuits and Fundamentals of Microprocessor

P. Pages : 2 **GUG/W/18/1540**

Time : Three Hours * 1 2 1 4 * Max. Marks : 80

Notes : 1. All questions carry marks as indicated.
2. Assume suitable data wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Do as directed -

i) $(ABCD.12)_H = (?)_8 = (?)_{BCD}$ **2**

ii) $(4.236)_D = (?)_B = (?)_H = (?)_{excess-3}$ **3**

iii) $(100011101.00010)_2 = (?)_D = (?)_H = (?)_8$ **3**

b) Implement the EX-OR gate using : **8**
i) NOR Gate only
ii) NAND Gate only

OR

2. a) Simplify the following functions using k-map. **8**
i) $f(A, B, C, D) = \sum m\,(0, 1, 4, 5, 7, 8, 9, 11) + d(2, 12, 13)$
ii) $f(A, B, C, D) = \bar{A}\bar{B}\bar{C}D + AB\bar{C} + \bar{A}B\bar{C} + \bar{A}\bar{B} + AC$

b) State and prove Demorgan's theorem. **8**

3. a) Design a combinational circuit such that the 4-bit binary will appears at its input terminal and will generate an output which will be high if the input number is prime number. **8**

b) What is full adder. Design and explain the working with the help of truth table and logie equation. **8**

OR

4. a) Implement the following function using suitable multiplexer. **8**
$f(A, B, C, D) = \sum m(0, 1, 3, 6, 8, 9, 11, 13)$
consider B as a input line and A, C, D as a selection lines to the multiplexer.

b) What is parity generator ? Design a 3-bit odd parity generator and checker. **8**

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

b) Draw the logic diagram of master-slave JK flip-flop and explain the working. How master-slave JK flip-flop overcome from the condition of race around ? Explain. **8**

OR

6. Design a 3 bit Gray code up/down counter. Consider k as a control signal. **16**
If k = 1, counter acts as down counter and
If k = 0, counter acts as up-counter.

7. a) Explain the following instructions of μP 8085. **8**

i) PUSH RP ii) XCHG
iii) SHLD iv) XTHL

b) A block of 50 bytes is present in the memory from location 5000H. Find out the even number and store them in a memory from the location 6000H. Write an assembly language program using 8085. **8**

OR

8. a) Draw and explain the timing diagram of op-code fetch machine cycle. **8**

b) Explain the interrupts of μP 8085. **8**

9. a) Write an ALP to blink the LED's which are connected to PC5 of 8255 PPI having control word address 83H. **8**

b) Interface the following memory IC's with μP 8085. Show all the signal lines properly. **8**

i) EPROM 4K Byte
ii) RAM 4K Byte
iii) ROM 4K Byte

OR

10. a) Explain the mode 3 of 8253 PIT in detail. **8**

b) Explain the interfacing of 8253 with μP 8085. Show all the signal lines. **8**

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