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13MCA13

**First Semester MCA Degree Examination, June/July 2018**  
**Fundamentals of Computer Organization**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions.**

- 1** a. Perform the following number conversion  
 i)  $(225.225)_{10} = ( )_2$       ii)  $(225.225)_{10} = ( )_8$       iii)  $(6\text{ BD})_{16} = ( )_8$   
 iv)  $(1032.2)_4 = ( )_{10}$       v)  $(1111011.001)_2 = ( )_{10}$  (10 Marks)  
 b. Explain  $r$ 's and  $(r-1)$ 's subtraction. (06 Marks)  
 c. State and prove Demorgan's laws. (04 Marks)
- 2** a. Prove the following using Boolean theorems.  
 i)  $(x + x'y')(x' + y') + yz = y' + z$   
 ii)  $w'y'z' + wz + y'z + xyz = w'y' + wz + xz$  (06 Marks)  
 b. Simplify using K-map  
 i)  $f(A, B, C, D) = \sum m(5, 6, 7, 12, 13) + d(4, 9, 14, 15)$   
 ii)  $f(A, B, C, D) = A'B'D + ABC'D' + A'BD + ABCD'$  (10 Marks)  
 c. Explain full adder and give its logic diagram using 2 ex - or gates. (04 Marks)
- 3** a. Explain D-flip flop with logic diagram and truth table. (06 Marks)  
 b. What is a register? Explain shift register with neat diagram. (07 Marks)  
 c. What is a ripple counter? Explain BCD ripple counter. (07 Marks)
- 4** a. Discuss basic operational concepts of system with a neat diagram. (10 Marks)  
 b. What is a bus? Discuss single bus structure. (06 Marks)  
 c. Give the application of mainframe and super computer. (04 Marks)
- 5** a. Explain different addressing modes with examples. (10 Marks)  
 b. Write a program in assembly language to add two variables using one address instructions. (04 Marks)  
 c. Explain branching with example. (06 Marks)
- 6** a. What is bus arbitration? Explain 2 types of bus arbitration. (10 Marks)  
 b. Explain DMA controllers in a computer system with neat diagram. (10 Marks)
- 7** a. Explain read and write operation in  $1K \times 1$  memory chip. (08 Marks)  
 b. Explain internal organization of asynchronous and synchronous DRAM. (12 Marks)
- 8** Write short notes on :  
 a. De-multiplexer  
 b. Big and little Endian assignment  
 c. Booth's Algorithm  
 d. SRAM cell. (20 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg.  $42+8=50$ , will be treated as malpractice.