# MCA 1$^{st}$ Sem -2019

**Time: 3 Hours** **Full Mark: 70**

**(Answer all questions. Figures in the right hand margin indicates marks)**

**Q1. (a)** Explain in detail the structure and functions of the computer with a neat labelled diagram. **[8]**

**(b)** Find the value of 'x' if $(125)_{10} = (325)_x$ **[4]**

**(c)** $(1001001100)_2 = ($ $)_{16}$ **[2]**

**OR**

Find the value of the following:- **[4 x 3.5 = 14]**

**(a)** $(345.3125)_{10} = ($_____$)_2 = ($_____$)_{16}$

**(b)** $(1000.111)_2 = ($_____$)_{10} = ($_____$)_8$

**(c)** $(17A.AB)_{16} = ($_____$)_{10} = ($_____$)_2$

**(d)** $(654.25)_8 = ($_____$)_{10} = ($_____$)_{16}$

**Q2.** Consider two floating-point numbers, $0.3 \times 10^2$ and $0.2 \times 10^3$. Perform the following operations, addition, subtraction, multiplication and division on the given floating-point numbers. Also, draw the flowchart for floating-point addition and subtraction. **[14]**

**OR**

Explain the Booth Multiplication for 2's complement multiplication of Integers with a flowchart. Multiply (-7) and 3 using booth multiplication. **[14]**

**Q3.** Explain in detail the different generation of computers with suitable examples for each generation. **[14]**

**OR**

What are Embedded Systems? Explain the architecture of Embedded Systems with a neat labelled diagram. What are GPGPUs and what are different methods used by GPGPUs. **[14]**

**Q4.** Why NAND and NOR gates are called Universal gates? Realize the XOR, XNOR, NOR Boolean functions using NAND gates only. Also, realize the XOR, XNOR, NAND Boolean functions using NOR gates only. **[14]**

**OR**

Reduce the following using K-map:- **[4 X 3.5 =14]**

**(a)** F(P,Q,R,S) = π M (0,1,2,3,4,5,6,7,8,9,12,13)

**(b)** F(A,B,C,D) = ∑ m (0,2,4,5,7,8,10,11,12,15)

**(c)** F(X,Y,Z) = π M (0,1,3,4,5,6,7)

**(d)** F(D,E,F) =∑ m (1,2,3,5,7)

**Q5.** What do you mean by PCIe? Explain in detail the different layers of PCIe. **[14]**

**OR**

What do you mean by Interrupts? Explain in detail the instruction cycle with interrupts with a neat labelled diagram. **[14]**