RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2019-22]

B.A./B.Sc. FIRST SEMESTER (July – December) 2019

Mid-Semester Examination, September 2019

Date : 16/09/2019

Time : 1 pm – 2 pm

COMPUTER SCIENCE (Honours)

Paper : II (CC2)

Full Marks : 25

*Answer **any two** questions of the following:* [2 × 5]

1. a) Draw the simplified NAND-NAND circuit for the following function (3)

$$F = \Sigma(m_1, m_2, m_3, m_5, m_6, m_9, m_{11}, m_{12}, m_{13}, m_{14})$$

   b) What do you mean by ripple – carry adder? (2)

2. Draw the logic diagram of 4- bits Carry-Look-Ahead adder. (5)

3. a) Design a ($^1/_8$) – decoder using three ($^1/_4$) – decoders only. (3)

   b) Which decoder is called as binary-to- hexadecimal decoder and why? (2)

4. Implement a BCD adder using full and half-adders. (5)

*Answer **any one** question of the following:* [1 × 2.5]

5. Implement half – subtractor using all NOR gates. (2.5)

6. Implement a full – subtractor using a full- adder . (2.5)

*Answer **any two** questions of the following:* [2 × 5]

7. a) The following number uses the IEEE – 754 single precision floating point format. What is the equivalent decimal value?

   01100001111000000000000000000000 (3)

   b) What do you mean by underflow ? (2)

8. a) Perform $(7)_{10} \div (2)_2$ using restoring division method. (4)

   b) Show the range of numbers that can be shown using 2's complement representation using n bits. (1)

9. a) Draw a block diagram of a 256×8 RAM with necessary components . (3)

   b) Suppose that the processor has access to two levels of memory. Level 1 has an access time of 0.01 μS and Level 2 has an access time of 0.25 μS . Suppose 90% of the memory accesses are found in Level 1. Find out average memory access time. (2)

10. Explain random access and direct access with proper example. (5)

*Answer **any one** question of the following:* [1 × 2.5]

11. Derive the equation to calculate transfer time for a disk drive. (2.5)

12. Write down characteristics of Von Neumann architecture. (2.5)

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