RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2018-21]

B.A./B.Sc. FIRST SEMESTER (July – December) 2018

Mid-Semester Examination, September 2018

Date : 25/09/2018 — **COMPUTER SCIENCE (General)**

Time : 12 noon – 1pm — Paper: I — Full Marks : 25

[Use a separate Answer Book for each group]

GROUP – A

Answer **any one** from question nos. 1 & 2 : (1 × 2½)

1. Write down the characteristics of the 2's complement numbers.
2. Convert $(1199)_{12}$ to decimal and binary.

Answer **any two** from question no. 3 to 6 : (2 × 5)

3. Determine the possible bases in the following operations:
   a) $1234+5432 = 6666$ 2½
   b) $\frac{302}{20} = 12.1$ 2½
4. a) Convert the following octal numbers to hexadecimal.
      (i) 1762.46 2
      (ii) 6054.263 2
   b) Subtract $(1011)_2$ from $(10110)_2$. 1
5. a) Define BCD. 1
   b) Define weighted and non-weighted codes. 1+1
   c) Define reflective code with a suitable example. 2
6. a) Convert $(101010110101)_2$ into Gray Code. 2
   b) Prove $A \oplus \bar{A} = 1$ 1
   c) State De Morgan's theorem. 2

GROUP – B

Answer **any one** from question nos. 7 & 8: (1 × 2½)

7. "A decoder with an enable input is called a demultiplexer" – justify.
8. Differentiate between combinational logic circuit and sequential logic circuit.

Answer **any two** from question nos. 9 to 12: (2 × 5)

9. a) Derive the characteristic equation of J–K flip-flop. 4
   b) Differentiate between latch and flip-flop. 1
10. Design a 4-bit BCD-to-Excess3 code converter circuit.
11. Design a 4-input priority encoder with four inputs and three outputs including the valid output but with the truth table representing input D_0 has the highest priority and input D_3 has the lowest priority.
12. Implement a three input exclusive OR gate using a suitable multiplexer.

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