

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.Sc. SECOND SEMESTER EXAMINATION, MAY 2015

FIRST YEAR

COMPUTER SCIENCE (General)

Date : 29/05/2015

Time : 11 am – 1 pm

Paper : II

Full Marks : 50

[Use a separate Answer Book for each group]

Group – A

Answer **any one** question of the following :

(1 × 5)

1. a) Consider $f(n) = \lg(\lg n)$ and $g(n) = 10^{10^{10}}$. Then $f(n)$ is in $O(g(n))$. Is it true or false? Give your justification. (2)
- b) State what would be the advantage if there were no data types. (3)
2. a) "Binary search can only be performed on a sorted sequence of elements" – Justify. (3)
- b) How the polynomial $4x^3 - 15x^2 + 8$ can be represented using a linked list? (2)

Answer **any two** questions of the following :

(2 × 10)

3. a) State the advantages and dis-advantages of recursion in programming. (2)
- b) Differentiate between linear and non-linear data structure. (2)
- c) Write the advantages of circular queue over linear queue. (2)
- d) Consider the array $a[10][10]$ of int type and base address 3000. Then calculate the address of the array $a[2][3]$ in the row major and column major order. (2 + 2)
4. a) In respect of complexity, compare among insertion, selection & bubble sort algorithm. (5)
- b) $ABC + *CBA - + *$ is a post fix expression with the assumption $A=1$, $B=2$ and $C=3$. Compute the final value obtained if the expression is evaluated. (3)
- c) Show the different binary trees are possible using 7 nodes. (2)
5. a) Given a sequence of elements :
3, 0, 2, 4, 5, 8, 7, 6, 9
Apply suitable sorting algorithm to sort the above sequence. Give proper illustration. (7)
- b) "If the same sequence of nodes are inserted in a BST, always the BST will be of same pattern" – Justify. (3)
6. a) Construct a binary search tree using the list below :
12, 11, 13, 10, 9, 15, 14, 18, 7 (2)
- b) Construct a binary tree using the in-order and post-order traversal of the node given below :
In-order : D B F E A G C L J H K
Post-order : D F E B G L J K H C A (3)
- c) Explain how insertion and deletion operations can be performed in $O(1)$ time on circular linked list? (5)

Group – B

Answer **any one** question of the following :

(1 × 5)

- 7. Explain the functionalities of optical disk.
- 8. Briefly explain the instruction cycle.

(5)

(5)

Answer **any two** questions of the following :

(2 × 10)

- 9. a) Draw the flow chart for floating point multiplication in computer arithmetic.
- b) Calculate $(-4) \times 3$ using Booth's multiplication algorithm.
- c) What is Hit-ratio?
- 10. a) Compare and contrast between RISC and CISC architecture.
- b) Describe Implied addressing mode and Displacement addressing mode with example.
- 11. a) Distinguish between SRAM & DRAM.
- b) What do you mean by seek time & latency time?
- c) Draw and describe CPU Block diagram.
- 12. a) Differentiate between two types of write policies in cache memory.
- b) Evaluate $A = B + C$ using one address instruction.
- c) State advantages and disadvantages of 3-address instruction.

(3)

(5)

(2)

(4)

(6)

(3)

(2)

(5)

(5)

(2)

(3)

