



WEST BENGAL STATE UNIVERSITY

B.Sc. Honours Part-II Examination, 2019

COMPUTER SCIENCE

PAPER: CMSA-IV-A

Time Allotted: 2 Hours

Full Marks: 50

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

Answer Question No. 1 and any *three* from the rest taking at least *one* from each group

1. Answer any **four** questions from the following: 2×4 = 8
- (a) What is a lower triangular matrix? Give example.
 - (b) Define 2-tree and exemplify.
 - (c) What is a BST (Binary Search Tree)? State its usefulness.
 - (d) What is a self-referential structure? Give example.
 - (e) What is the advantage of using postfix or prefix notations in computers?
 - (f) Breadth First traversal of a graph produces a unique sequence of nodes. – True or False? Justify.
 - (g) What is the minimum number of comparisons required to find the largest element of an unsorted array? Justify your answer.
 - (h) What is an ‘external’ sorting algorithm? Name one such algorithm.

GROUP-A

2. (a) Distinguish between External and Internal sorting. 4
- (b) Critically compare between Quick sort and Merge sort. 5
- (c) How refinements could be made to increase efficiency of the Bubble Sort Method? 5
3. (a) Construct a BST for the following sequence of keys {5, 2, 9, 1, 10, 12, 11, 3, 4, 7, 8, 6}. Traverse the BST in inorder, preorder and post order. 3+3
- (b) Write an algorithm to delete a node from a BST. 5
- (c) Explain why AVL tree is better than BST. 3

4. (a) Write the drawback of closed hashing and describe its remedies. 1+4
(b) Write the recursive algorithm of inorder and preorder traversal of a binary tree. 2+2
(c) Write an algorithm for merging of two heaps. 5

GROUP-B

5. (a) What is semaphore? Explain how the producer and consumer problem can be handled with semaphore. 2+5
(b) What is safe state? Give an example. 1+3
(c) What is inter-process communication (IPC)? Discuss any one IPC mechanism. 1+2
6. (a) Mention the similarities and dissimilarities of Paging and Segmentation. 3
(b) Can the Optimal Page Replacement strategy be implemented practically? – Justify. 3
(c) What are the merits and demerits of Local and Global Page replacement strategies? 3
(d) What is Thrashing? How to get recovered from this problem? 2+3
7. (a) (i) Differentiate between Deadlock and Livelock. 3+2
(ii) How the problem of Livelock is solved?
(b) Conceptually distinguish the terms “Deadlock Prevention” and “Deadlock Avoidance”. 3
(c) Does an unsafe state always point to a Deadlock? 2
(d) What are the drawbacks of Banker’s Algorithm, in connection with Deadlock Avoidance? 4

—————x—————