

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [BATCH 2016-19]

B.A./B.Sc. SECOND SEMESTER (January – June) 2017

Mid-Semester Examination, March 2017

Date : 16/03/2017

COMPUTER SCIENCE (General)

Time : 12 noon– 1 pm

Paper : II

Full Marks : 25

[Use a separate Answer Book for each group]

Group – A

Answer any one question from Question Nos. 1 & 2 : [1×2.5]

1. a) What is the purpose of a Data structure? [1]
b) What do you mean by the notations Big-Omega, Big-Theta and Big-Oh for calculating the complexity? [0.5+0.5+0.5]
2. Convert the expression $A + (B * C - (D / E^F) * G) * H$ into postfix expression. [2.5]

Answer any two questions from Question Nos. 3 - 5 : [2×5]

3. a) Compare and contrast between Singly-Linked List and Doubly-Linked-List. [2.5]
b) Write a function to perform reverse operation in a Singly-Linked-List. [2.5]
4. Write function to implement following operations :
a) Enqueue operation in a queue using Doubly-Linked-List. [2.5]
b) Pop operation in a stack using Singly-Linked-List. [2.5]
5. Write function to implement following operations :
a) Insert a node after a specified position in Doubly-Linked-List. [2.5]
b) Delete a node before specified value in Singly-Linked-List. [2.5]

Group – B

Answer any one question from Question Nos. 6 & 7 : [1×2.5]

6. Write differences between multiprogramming and multiprocessing. [2.5]
7. Define the following terms :
a) Batch system [1]
b) Real-time system [1.5]

Answer any two questions from Question Nos. 8 - 10 : [2×5]

8. Consider the following page-reference string :
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
How many page faults would occur for the following page replacement algorithms, assuming 3 frames : (i) Optimal (ii) LRU [2.5+2.5]
9. Write short notes on the following :
a) Virtual memory [2.5]
b) Demand paging [2.5]

10. Consider the following set of processes :

Process	Burst Time (ms)	Arrival Time (ms)
P0	75	0
P1	40	10
P2	25	10
P3	20	80
P4	45	85

Suppose a system uses Round-Robin scheduling with $q = 15$ ms.

- Create a GANTT chart illustrating the execution of these processes.
- What is the average waiting time and average turnaround time for these processes?

[1]

[2+2]

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