



'সমানো মন্ত্র: সমিতি: সমানী'

UNIVERSITY OF NORTH BENGAL
B.Sc. Programme 5th Semester Examination, 2023

DSE1/2/3-P1-COMPUTER SCIENCE

The figures in the margin indicate full marks.

**The question paper contains DSE-1A and DSE-1B.
The candidates are required to answer any *one* from *two* courses.
Candidates should mention it clearly on the Answer Book.**

DSE-1A

DATABASE MANAGEMENT SYSTEMS

Time Allotted: 2 Hours

Full Marks: 40

GROUP-A

Answer any *five* questions

1×5 = 5

1. What do you mean by data abstraction?
2. Define instance and schema.
3. What are the different types of data models?
4. Define cardinality.
5. What is foreign key? Give an example.
6. Define BCNF.
7. What is trivial dependency?
8. What are the tasks of 'GRANT' and 'REVOKE' command?

GROUP-B

Answer any *three* questions

5×3 = 15

9. What are the needs of normalization? Discuss briefly.
10. Explain three levels of data abstraction.
11. Discuss different types of attributes.
12. Differentiate SCHEMA and INSTANCE in DBMS.
13. Discuss hierarchical model of data base.

GROUP-C

Answer any *two* questions

10×2 = 20

14. Briefly discuss three level architecture of DBMS.
15. Discuss different database query languages of DBMS.
16. What is data model? Briefly describe different data models.
17. Explain different database anomalies.

DSE-1B

OPERATING SYSTEMS

Time Allotted: 2 Hours

Full Marks: 60

GROUP-A

Answer any *four* questions

3×4 = 12

1. What are multiprocessor systems? Give examples.
2. What are system calls? What are the different categories of system calls?
3. What is an operating system? Name some of its functions.
4. What is a page fault? When do page faults occur?
5. Define a scheduler. What are its types?
6. Differentiate between a program and a process.

GROUP-B

Answer any *four* questions

6×4 = 24

7. What are semaphores? Explain two primitive semaphore operations.
8. Why is deadlock state more critical than starvation?
9. Consider the following page reference string
1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6
Find out the number of page faults if there are 4 page frames, using the LRU page replacement algorithm.
10. Write a brief note on the different types of operating systems.
11. What do you mean by PCB? Where is it used? What are its contents?
12. Describe process state with the help of a process transition diagram.

GROUP-C

Answer any *two* questions

12×2 = 24

13. Distinguish between:
 - (a) Preemptive and non preemptive scheduling.
 - (b) Multiprogramming and multiprocessing
 - (c) Job scheduling and CPU scheduling.

14. Consider the following data with burst time given in milliseconds:

Process	Burst time
P1	10
P2	1
P3	2
P4	1
P5	5

The process has arrived in the order P1, P2, P3, P4, P5, all at time 0.

- (a) Draw a Gantt chart for the execution of these processes using FCFS, SJF and RR (quantum =1) scheduling.
 - (b) What is the turnaround time and waiting time of each process for each of the algorithms?
15. What is a deadlock? What are the necessary conditions for a deadlock to occur? How can deadlocks be avoided?
16. The queue of requests in FIFO is 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement needed to satisfy the requests for the following scheduling algorithms:
- (a) FCFS
 - (b) SJF
 - (c) SCAN
 - (d) C-SCAN.

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