UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2022

GE2-P1-COMPUTER SCIENCE (34)

Time Allotted: 2 Hours   Full Marks: 60

The figures in the margin indicate full marks.

The question paper contains GE3A and GE3B.
The candidates are required to answer any *one* from *two* courses.
Candidates should mention it clearly on the Answer Book.

GE3A
OPERATING SYSTEMS

GROUP-A

Answer any *four* questions   3×4 = 12

1. Define Operating Systems and discuss its role from different perspectives.

2. Differentiate between N/W OS and Distributed OS.

3. Discuss different categories of system programs.

4. Explain the concept of virtual machines.

5. Discuss the distinguishing features of Real time system.

6. What is the purpose of command interpreter?

GROUP-B

Answer any *four* questions   6×4 = 24

7. Define spooling and the need for it. Explain its working with necessary diagrams.

8. Explain the following terms and their working with diagram:
    (a) Buffering
    (b) Time sharing.

9. Compare and contrast tightly coupled systems with loosely coupled systems.

10. Describe differences between symmetric and asymmetric multiprocessing. What are three advantages and one disadvantage of multiprocessor systems?

11. What do you mean by PCB? Where is it used? What are its contents? Explain.

12. Explain the difference between long term and short term and medium term schedulers.

GROUP-C

Answer any *two* questions   12×2 = 24

13. Explain common ways of establishing relationship between user and kernel thread. Explain multithreading models.

14. Explain the layered approach of the operating system. Describe process states with the help of process transition diagram.

15. What are semaphores? Explain two primitive semaphore operations. What are its advantages?

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

    i> SJF   ii> Priority scheduling

Process	Burst time	Priority
p1	10	3
p2	1	1
p3	2	3
p4	1	4
p5	5	2

The process has arrived in the order p1, p2, p3, p4, p5 all at time 0.

(a) Draw Gantt charts for the execution of these processes using
FCFS, SJF, a non-preemptive priority and RR (quantum=1) scheduling.

(b) What is the turnaround time and waiting time of each process for each of the Scheduling algorithm?

GE3B
DATABASE MANAGEMENT SYSTEMS

GROUP-A

Answer any *four* questions from the following   3×4 = 12

1. What is functional Dependency? Explain it briefly.

2. What is the objective of Normalization?

3. Differentiate between 'Where' Clause and 'Group by' Clause.

4. What is multilevel indexing?

5. Describe lossless join decomposition.

6. State and explain two-phase locking protocol.

GROUP-B

Answer any *four* questions from the following   6×4 = 24

7.   What is a trigger? How to create it? Explain with example.   2+2+2

8.   What is a view? How to specify a view? Write about view implementation   2+2+2
     techniques.

9.   Distinguish between centralized and client-server architectures of a database   6
     system.

10. Describe 3-tire architecture of DBMS.   6

11. How to perform rollback, commit, check pointing operations on transactions.   6

12. What is transaction? Mention the desirable properties of transaction.   2+4

GROUP-C

Answer any *two* questions from the following   12×2 = 24

13.(a) Explain insertion, deletion and Modification anomalies with suitable examples.   6+6

   (b) State BCNF. How does it differ from 3NF?

14.   Write short notes on: 4+4+4
      (a) DDL
      (b) DML
      (c) Database Schema.

15.(a) Draw an ER diagram for Hospital Management System.   6+6

   (b) Distinguish between:
      (i)   Primary and secondary indexing
      (ii) Ordered indexing and hashing.

16.   Explain view serializability with an example. How is it different from conflict   8+4
      serializability?

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