UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 3rd Semester Examination, 2020

GE3-COMPUTER SCIENCE

Full Marks: 60

ASSIGNMENT

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.

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

Answer any *three* questions from the following 20×3=60

1. (a) What are the various services provided by Operating System? Explain in brief. 10+10
   (b) Compare the Linux and Windows Operating System.

2. Write short note on following: 20
   (a) Time Sharing Systems
   (b) Main Frame Systems
   (c) Batch Systems
   (d) Real Time Systems

3. Write short note on following: 20
   (a) Critical section
   (b) Banker's algorithm
   (c) Thread Vs Process
   (d) Inter-process Communication (IPC)

4. Write short note on following Scheduling: 20
   (a) FCFS (First Come First Serve)
   (b) Preemptive SJF (Shortest Job First)
   (c) Non-Preemptive SJF (Shortest Job First)
   (d) Round Robin

5. (a) What do you understand by process and also write down the process states in detail. 10+10

(b) What is the role of PCB (Process Control Block)? Also explain each component of PCB.

6. (a) What do you understand by Dead Lock? Explain the various conditions which may lead to a Deadlock.   10+10

(b) Explain "Semaphore as a General Synchronization Tool".

GE3B

DATABASE MANAGEMENT SYSTEM

Attempt any *three* questions   20×3 = 60

1. (a) Discuss the advantages of database approach to store data.   10

(b) What are strong and weak entity sets? Explain with examples.   10

2. (a) Draw an Entity-Relationship diagram of a travel agency consisting of the following: 10

Customers, Buses, Drivers, Conductors, Guides, Tickets, Booking, Agents, Conducted tours and Hotels.

(b) Explain left outer, right outer and full outer joins with examples.   10

3. (a) Discuss network and hierarchical data models with examples.   10

(b) Explain the role of a database administrator in database design.   10

4. (a) Explain primary, foreign, alternate and surrogate keys used for database design with appropriate examples.   10

(b) Discuss different types of attributes used with an E-R data model.   10

5. (a) What are physical and logic data independence? Explain.   10

(b) Discuss different constraints encountered in database design.   10

6. (a) Explain the ANSI-SPARC 3-tier architecture of a database.   10

(b) Considering the following relation schema, and give the appropriate relational algebra statements for the queries given below: 10

Employee (empno, name, office, age)

Books (isbn, title, authors, publisher)

Loan (empno, isbn, date)

(i) Find the names of the employees who have borrowed a book published by "NBU PUBLISHERS".

(ii) For each publisher, find the names of the employees who have borrowed more than five books.

(iii) Find the name of employees who have borrowed more than five different books published by "GE3B PUBLICATION".

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