Use Separate Answer Script for each Module

B.Sc. (Honours) Examination 2018
Semester-III (Allied)
Computer Science
Course : BCSA-31 (Old)
(Data and System)

Time : 3 Hours **Full Marks : 40**

Questions are of value as indicated in the margin

Module-A (Database Management System
Answer Question No. **1** and **any two** from the rest.

1. Answer **any four** from the following questions. 1×4=4
   a) Explain the difference between a weak and a strong entity set.
   b) What is a view?
   c) Write down the differences between super key and candidate key.
   d) What is the use of group by clause?
   e) Which data types can be used to store large objects (photos, videos, CAD files, etc.)?
2. Suppose you are given the following requirements for a simple database for the National Hokey League (NHL)
   - The NHL has many teams.
   - Each team has a name, a city, a coach, a captain, and a set of players.
   - Each player belongs to only one team.
   - Each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records.
   - A team captain is also a player.
   - A game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2).

   Construct a clean and concise ER diagram for the NHL database. 8
3. Consider the following database schema of a company:
   Employee (person-name, street, city)
   Works (person-name, company-name, salary)
   Company (company-name, city)
   Managees (person-name, manager-name)
   The primary keys are underlined. Express following queries in relational algebra and SQL:
   a) Find the names of all employees who work for *First Bank Corporation*.
   b) Find the unique cities of residence of all employees who work for *First Bank Corporation* and earn more than Rs.1, 50,000 per annum.
   c) Find the names of all employees who live in the same city and on the same street as do their managers.
   d) Assume the companies may be located in several cities. Find all companies located in every city in which *Small Bank Corporation* is located. (1+1)×4=8
4. a) With examples define DDL and DML.
   b) What is a recursive relationship? Give an example.
   c) Disuss the advantages and disadvantages of normalization. 3+2+3=8
5. Write short notes on following topics (**any two**) : 2×4=8
   a) BCNF b) XML c) Query Processor d) Index

P.T.O.

Group – B (Operating System)

Answer Question No.**1** and **any three** from the rest.

1. a) What is system call?
   b) What is context switching?
   c) What do you mean by virtual memory?
   d) Differentiate between a program and a process?
   e) Why page size is always power of two? 1×5=5
2. a) What is semaphore?
   b) State and solve the classial producer-consumer synchronization problem using semaphore. 2+3=5
3. a) Briefly explain short-term scheduling.
   b) Consider the following set of process with length of the CPU burst given in milliseconds.

Process	Burst Time
P_1	7
P_2	4
P_3	6
P_4	3
P_5	5

   Draw the CPU Gantt chart and calculate the average waiting time and turnaround time for the shortest job first scheduling algorithm. 2+3=5
4. a) Briefly explain segmentation.
   b) Consider the following page-reference string: 1, 5, 7, 2, 1, 7, 5, 3, 3, 5, 4, 2, 1, 3, 2.
   Find the number of page faults using LRU page replacement algorithm for 4 frames. 2+3=5
5. Write short notes on **any two** : 2.5×2=5
   a) Process control block
   b) Threading
   c) Deadlocks
   d) SCAN

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