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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2022

Fourth Semester

Vocational Course—Computer Science

DATABASE MANAGEMENT SYSTEMS

(For B.Sc. Mathematics—Model II)

(2013—2016 Admissions)

Time : Three Hours Maximum Marks : 80

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. What is database ?
2. What is DML ?
3. Define the term Attribute.
4. Define the term relation schema.
5. What is the difference between primary and foreign key.
6. What is the use of CREATE statement in SQL.
7. What are the uses of 'Struct' constructor ?
8. What is the difference between an array and a list ?
9. What is external hashing ?
10. Define the term Querry language.

(10 × 1 = 10)

Part B

Answer any **eight** *questions.*
Each question carries 2 *marks.*

11. What is program-operation independence ?
12. What is the difference between an attribute and a value set ?

Turn over

13. What is a fact table ?

14. Why are tuples in a relation not ordered ?

15. Let R = (A, B, C) and let r_1 and r_2 both be relations on schema R. Give an expression in SGL that is equivalent to $r_1 \cup r_2$.

16. Define the concept of aggregation.

17. Consider a system that provides persistant objects. Is such a system necessarily a database system. Explain your answer.

18. What is static hashing ?

19. When is it preferable to use a deuse index rather than a sparse index ?

20. Write two disadvantages of storing multiple relations in one file.

21. What is unordered storage ?

22. What are the disadvantages of hash indices relative to B^+-tree indices.

(8 × 2 = 16)

Part C

Answer any **six** *questions.*
Each question carries 4 *marks.*

23. What are the five main functions of a database administrator ?

24. Explain the distribution among the terms primary key, candidate key and super key.

25. Explain the distribution between total and partial constraints.

26. Let R = (A, B) and S = (A, C), and let r (R) and s (S) be relations. Write relational algebra expressions equivalent to the following domain-relational calculus expressions :

    a) $\{< a > | \exists b (< a, b) \in r \wedge b = 17\}$

    b) $\{< a, b, c > | < a, b > \in r < a, c > \in s\}$.

27. Show that in SQL, < > all is identical to 'not in'.

28. How does the concept of an object in object oriented model differ from the concept of an entity in the entity relationship model ?

29. Is it possible in general to have two primary indices on the same relation for different search keys. Explain your answer.

30. Explain the distinction between closed and open hashing.

31. Explain degree-two consistency and its usage.

(6 × 4 = 24)

Part D

Answer any **two** *questions.*
Each question carries 15 *marks.*

32. Design an E-R diagram for keeping track of the exploits of your favourite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statistics for each match. Summary statistics should be modeled as derived attributes.

33. Explain transaction servers in detail.

34. Construct a B^+-tree for the following set of key values.

    (2, 3, 5, 7, 11, 19, 23, 29, 31)

    Assume that the tree is initially empty and values are added in ascending order. Construct B^+-trees for the case where the number of pointers that will fit in one node is :

    a) Four.

    b) Six.

    c) Eight.

35. Explain the three steps in query processing.

(2 × 15 = 30)