WEST BENGAL STATE UNIVERSITY

B.Sc. General Part-II Examination, 2019

COMPUTER SCIENCE

PAPER: CMSG-III-A

Time Allotted: 2 Hours | Full Marks: 50

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.

1. Answer any ***five*** questions from the following: 2×5=10

   (a) Explain the role of a Software Project Manager.
   (b) What are Software Metrics?
   (c) What do you mean by Software crisis?
   (d) Define Division operation used in Relational Algebra.
   (e) What do you mean by integrity constraints?
   (f) Define Super key with example.
   (g) Distinguish between physical and logical data independence.
   (h) What are the characteristics of Functional Dependency?

GROUP-A

Answer any *one* question from the following 8×1=8

2. (a) What are the differences between Alpha testing and Beta testing? 3+5
   (b) Give a description of prototyping model.

3. (a) Distinguish between Quality assurance and Quality control. 4+4
   (b) What are various types of software maintenance?

GROUP-B

Answer any *four* questions from the following 8×4=32

4. (a) What is the difference between the two-tier and three-tier client/server architecture? 3
   (b) What is the difference between specialization and generalization? Why do we not display this difference in schema diagrams? 2+1
   (c) Define reflexive association and qualified association. 1+1

5. (a) Discuss the various types of inner join operations. Why is theta join required? 3+2
   (b) How are the OUTER JOIN Operations different from the INNER JOIN Operations? 3

6. (a) What are the differences between a primary index and secondary index? 3
   (b) Explain with example nested triggers in SQL. 3
   (c) Define complex attribute. 2

7. (a) Consider the following two tables T1 and T2. 2+2+2+2

T1

P	**Q**	**R**
10	*a*	5
15	*b*	8
25	*a*	6

T2

A	**B**	**C**
10	*b*	6
25	*c*	3
10	*b*	5

Show the results of the following operations :

(i) T1 $\bowtie$ T1.P = T2.A T2,

(ii) T1 $\bowtie$ T1.Q = T2.B T2,

(iii) T1 $\cup$ T2,

(iv) T1 $\rtimes$ T1.P = T2.A T2.

8. (a) What is lossy decomposition? 2+4+2
   (b) Define Boyce-Codd Normal Form (BCNF) with appropriate example.
   (c) When two sets of functional dependencies are said to be equivalent?

9. (a) Consider the following relations for a database that keeps track of auto sales in a car : 1+2+2

   dealership (OPTION refers to some optional equipment installed on an auto) :

   CAR (*Serial_no*, Model, Manufacturer, Price)

   OPTION (*Serial_no*, *Option_name*, Price)

   SALE (*Salesperson_id*, *Serial_no*, Date, Sale_price)

   SALESPERSON (*Salesperson_id*, Name, Phone)

   First, specify the foreign keys for this schema, stating any assumptions you make. Give an example of an insertion in the SALE and SALESPERSON relations that violates the referential integrity constraints and of another insertion that does not.

   (b) Justify "Weak entities do not have their own key attributes". 2
   (c) Define "Derived attribute". 1

10. (a) Given below are two sets of FDs for a relation R(A, B, C, D, E). Are they equivalent? 3

   (i) $A \rightarrow B$, $AB \rightarrow C$, $D \rightarrow AC$, $D \rightarrow E$

   (ii) $A \rightarrow BC$, $D \rightarrow AE$

   (b) A set of FDs for the relation R{A, B, C, D, E, F} is $AB \rightarrow C$, $C \rightarrow A$, $BC \rightarrow D$, $ACD \rightarrow B$, $BE \rightarrow C$, $EC \rightarrow FA$, $CF \rightarrow BD$, $D \rightarrow E$. Find a minimum cover for this set of FDs. 3
   (c) What is the role of a DBA? 2

——×——