RAMAKRISHNA MISSION VIDYAMANDIRA
(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, DECEMBER 2017
THIRD YEAR [BATCH 2015-18]
Date : 14/12/2017   **COMPUTER SCIENCE [Honours]**
Time : 11 am – 1 pm   **Paper : V [Gr-A]**   Full Marks : 40

Group - A

(Answer any four questions) [4×10]

1. a) What do you mean by physical and logical data independence?   2+2
   b) What do you mean by schema? Give example.   1+1
   c) Consider the following relational schema: R(A,B) and S(B,C). Express the 'Right-outer-join' operation using basic Relational Algebra operations.   4

2. a) What do you mean by weak entity set?   2
   b) Given,

R		
A	B	C
a	b	c
d	a	f
c	b	d
a	a	f

S		
D	E	F
b	g	a
d	a	f

T	
B	C
a	f
b	c

Calculate the (i) R÷T and (ii) $\sigma_{D=d}\left(\Pi_{C,B}(R)\times\Pi_D(S)\right)$.   3+3

   c) What do you mean by aggregation?   2

3. a) Consider a relation R(A, B, C, D, E, F) and the set of FD'S $F=\{AB \to C, C \to A, BC \to D, ACD \to B, BE \to C, CE \to FA, CF \to BD, D \to E\}$. Find the normal form of R? If the relation is not in 3NF, obtain a lossless and dependency preserving decomposition of R. Is the 3NF decomposition is also in BCNF?   1+4+2
   b) What do you mean by multivalued dependency?   2
   c) What is referential integrity?   1

4. a) Consider the relation R(A,B,C,D,E) and set of FD'S $F=\{A \to BC, CD \to E, B \to D, E \to A\}$
   Decompose the relation into R1 and R2 so that decomposition is lossless and preserved dependency.   2½+2½
   b) What is the difference between 3NF and BCNF?   3
   c) What do you mean by Un-Normalized database?   2

5. a) Consider the following relations for a database
   teacher (tname, dept, tel_no, sub_title)
   student (st_name, course, hostel)
   study (sub_title, st_name, status, marks)
   Write down the Relational Algebra and SQL for the following query:

    (i) Find the name of the students who have secured equal marks in two different subjects.   1½+1½

    (ii) Find the total no. of students of 'Vinay bhavan' who secured more than average marks in 'OOP' subject.   1½+1½

b) What do you mean by domain relational calculus?   2

c) How does data redundancy create problem in file processing system?   2

6. a) What are the differences between fixed length and variable length records?   4

    b) What do you mean by Serializable Schedule?   3

    c) What are the difference between sparse and dense index?   3

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