RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, DECEMBER 2015

SECOND YEAR [BATCH 2014-17]

Date : 18/12/2015 **COMPUTER SCIENCE [General]**

Time : 11 am – 1 pm **Paper :** III Full Marks : 50

[Use a separate Answer Book for each group]

Group – A

Answer **any one** question :

1. Consider the following relational schema :
   EMPLOYEE (eno, ename, esal, ecity, estreet, dno, dname)
   Verify whether it is in 1NF, 2NF, 3NF. If not, reduce it up to 3NF. [5]

2. What do you mean by DBA? Explain the role of DBA. [2+3]

Answer **any two** questions :

3. a) Explain modification anomaly with an example. [2+2]
   b) Explain three level Architecture of DBMS. [3]
   c) Find out the functional dependencies present in the following relation R(A,B,C). [3]

R

A	B	C
a_1	b_2	c_2
a_1	b_2	c_3
a_2	b_1	c_1
a_3	b_1	c_2
a_4	b_3	c_4
a_4	b_3	c_4

4. a) Prove the pseudotransitive rule of functional dependency using Armstrong's inference rules. [2·5]
   b) R(A,B,C,D,E,F,G,H,I,J) is a relation schema with the following functional dependencies $ABD \to E,\ AB \to G, B \to F, C \to J, CJ \to I, G \to H$. Find the candidate key of R. [2·5]
   c) Check whether the following two sets of functional dependencies F and G are equivalent. $F = \{A \to C, AC \to D, E \to AD, E \to H\},\ G = \{A \to CD, E \to AH\}$. [3]
   d) How natural join is done in Relational Algebra? [2]

5. a) Explain the division operation of relational algebra with an example. [3]
   b) Define strong and weak Entity Set. [3]
   c) Write down the situations with null values appear in a relation. [2]
   d) Explain naive end user of database with an example in brief. [2]

6. a) Define 'Derived Attribute'. [2]
   b) How can a multivalued attribute present in ER model be mapped in a relational model? [3]
   c) Explain the chaining method of collision resolution in brief. [3]
   d) Differentiate between dense index and sparse index. [2]

Group – B

Answer **any one** question :

7. Describe various security threats in operating system. [5]

8. Consider the given processes with burst time in millisecond

Process	CPU Burst Time
P_1	15
P_2	5
P_3	7
P_4	10

Draw the Gnatt Chart for RR Scheduling where time quantum q = 5ms. Calculate Average Waiting Time. [5]

Answer **any two** questions :

9. a) What is Virtual Swap Space? [2]
   b) Describe how Peterson's Solution helps solving critical section problem for two processes. [5]
   c) Compare Co-operating and Independent process. [3]

10. a) Explain Page Replacement. [4]
    b) Consider a system with following state :
    Total resource : 12

Process	Maximum Need	Current Need
P_0	10	5
P_1	4	2
P_2	9	2

    Show whether the system has a safe state or not. [3]
    c) Differentiate logical and physical address space. [3]

11. a) Explain :
    (i) Compile Time (ii) Load Time and (iii) Execution Time [6]
    b) What is Segmentation? What is Page Fault? [2+2]

12. a) Explain multilevel queue scheduling and multilevel feedback queue scheduling. [4]
    b) What is PCB? [2]
    c) Explain various types of Kernel designs. [4]

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