

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

SECOND YEAR [2016-19]

B.A./B.Sc. THIRD SEMESTER (July – December) 2017

Mid-Semester Examination, September 2017

Date : 13/09/2017

COMPUTER SCIENCE (General)

Time : 12 noon – 1 pm

Paper : III

Full Marks : 25

[Use a separate Answer Book for each group]

## Group – A

(Answer any one question)

[1×12·5]

1. a) Write down the difference between procedural DML and non-procedural DML? [2]  
b) Briefly discuss about 3 level schema in DBMS. [3]  
c) List different functions performed by DBA. [2]  
d) What do you mean by Cartesian product? [2·5]  
e) Discuss the following terms in the context of DBMS: [3]  
DDL Interpreter, Transaction Manager, Data Dictionary
2. a) Write down the advantages of hierarchical model. [2·5]  
b) What do you mean by weak entity, partial key and derived attribute in DBMS? [3]  
c) Consider the database schema given below and answer the queries in relational algebra and SQL :  
Teacher (t\_name, dept, tel•no)  
Subject (s\_title, credit)  
Student (s\_name, course, hostel)  
Taught•by (t\_name, s\_title)  
Taken•by (s\_name, s\_title, status, grade)  
i) Find the names of students who take DBMS (subject) as elective (status) and secure A-grade. [0·5+0·5]  
ii) Name of students who study all subjects taught by Prof. X. [0·5+0·5]  
iii) Find the names of students of B.Sc course living in Netaji hostel and studying no subject taught by Prof. X. [0·5+0·5]  
iv) Find the names of students who study at least one subject taught by Prof XYZ and also find the title and status of the subjects. [0·5+0·5]  
d) Discuss the following terms in the context of DBMS : Projection, Outer Join, Natural Join. [3]

## Group – B

(Answer any one question)

[1×12·5]

3. a) Encrypt the message “the house is being sold tonight” using Vigenere cipher with key : “dollars”. Ignore spaces between words. [4]  
b) Write one advantage and one disadvantage of ECB mode of operation. [1+1]  
c) Explain the term “Denial of Service” attack. [2]  
d) Using Euclidean algorithm, find out G.C.D of 45 and 75. [3]  
e) “Diffusion hides the relationship between plaintext and ciphertext.” —Explain. [1·5]

4. a) Encrypt the message “this is an exercise” using Affine cipher with key = (15, 20). Ignore spaces between words. [4]
- b) “Transmission ciphers do not preserve frequency of digrams and trigrams” — Explain. [2]
- c) What do you mean by perfect secrecy? [2]
- d) How the effect of a non-invertible component in encryption algorithm can be cancelled in decryption algorithm? [3]
- e) How “known-plaintext attack” is different from “chosen-plaintext attack”? [1·5]

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