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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Information and Communication Technology
First Year - Semester IIExamination – Oct/Nov 2017

ICT 1407 – DATABASE SYSTEMS

Time: Three (03) hours

Answer all questions.

1.

a) Describe main characteristics of the database approach compared to the file processing approach. (03 marks)

b) State four (04) advantages of the Database Management System approach. (04 marks)

c) Explain Three Schema Architecture using a diagram. (05 marks)

d) Define Logical and Physical Data Independence. (04 marks)

e) Briefly explain the following terms giving examples for each term. (04 marks)

i. DDL
ii. DCL
iii. DML

[Total 20 marks]

2.

a) Explain two types of constraints in relational model giving examples. (04 marks)

b) Define following terms used in relational model (04 marks)

i. Relation
ii. Attribute
iii. Domain
iv. Degree

c) What are Generalization and Specialization in database design? (04 marks)

d) Considering the relational schemas given below, write the relational algebraic query expressions for the followings. (06 marks)

Hotel (hotelNo, hotelName, city)
Room (roomNo, hotelNo, type, price)
Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)
Guest (guestNo, guestName, guestAddress)

i. Display the hotel numbers with their names.
ii. Select the guests who have booked room number 15 on 1st of May 2018.
iii. Display all the hotels located in Anuradhapura.

[Total 18 marks]

3.

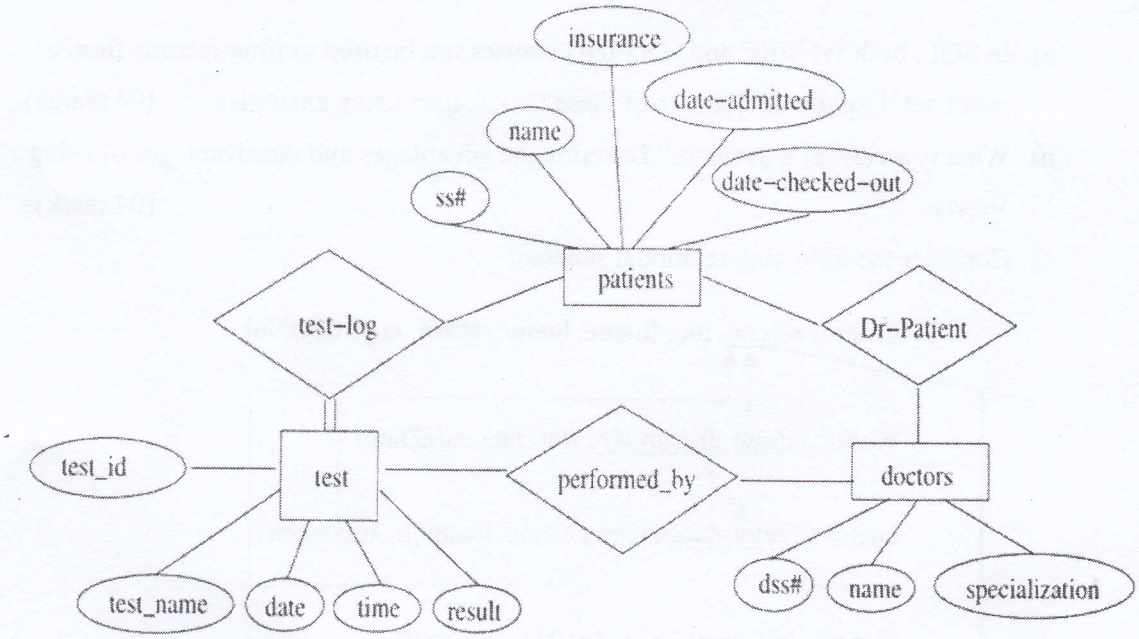
a) What are the two types of constraints in relationships? (02 marks)

b) What is the classification of entity types? Give two similar terms to them. (03 marks)

c) Explain the following terms using examples. (03 marks)

i. Weak Entity
ii. Identifying relationship
iii. Multivalued attribute

d) Design an E-R diagram for keeping track of the exploits of your favorite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statics for each match. Summary statistics should be modeled as derived attributes (07 marks)



e) Derive the relational schema corresponding to the ER diagram of a hospital scenario given in figure above. State all your assumptions. (05 marks)

[Total 20 marks]

4.

a) What is meant by Normalization? (03 marks)

b) Describe the anomalies in database systems. (04 marks)

c) Explain the followings. (04 marks)

i. Full functional dependency

ii. Transitive dependency

d) Explain how to decompose a 1NF relation to 2NF, using an example. (03 marks)

e) The following relation is given in 0NF (Zero Normal Form). (06 marks)

Purchase _Order(po_no, po-date, emp_code, supp_no, supp_name, part_no, part_desc, part_qty)

Decompose the Purchase_Order relation in to 1NF, 2NF and 3NF relations respectively.

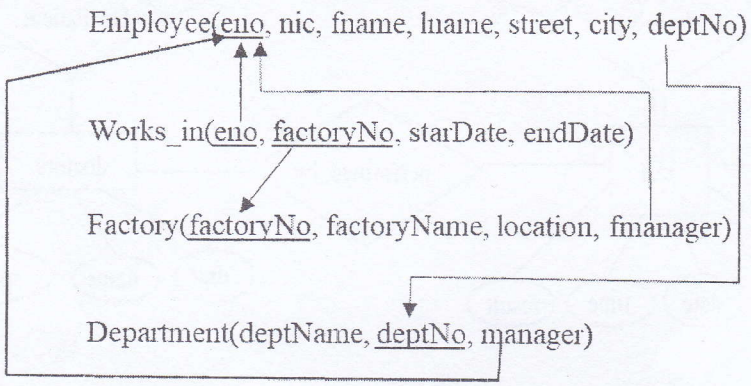
[Total 20 marks]

5.

a) In SQL, both WHERE and HAVING clauses can be used to filter records from a result set. Explain differences of these two clauses using examples. (04 marks)

b) What is a view in a database? Describe the advantages and disadvantages of using Views. (04 marks)

c) Consider the following relational schema;



i. Identify the constraints in *Works_in* relation. (02 marks)

ii. Write SQL DDL statements to construct *Factory* and *Works_in* tables assuming that two tables, *Employee* and *Factory*, have already been created. (05 marks)

iii. Write a query to list the full names of employees who works/worked in the factory managed by employee whose eno is "EM0100". (03 marks)

iv. Write a query to list nic and lname of employees who works in same department as employee "EM0150". (04 marks)

[Total 22 marks]

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