This question paper contains 4 printed pages.

6138 *Your Roll No* .....

MCA / IV Sem. **J**

Paper— MCA–405 · DATABASE APPLICATIONS

(Admissions of 2008 and before)

Time : 3 hours *Maximum Marks* : 60

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt all questions.

A database is maintained for several hotels, and the bookings in respective hotels.

Given the following relations for a Hotel Database

a. Hotel (Hotel_no, Name, Address)
Hotel numbers must be between 100 and 1000

b Room (Room_no, Hotel_no, Type, Price)

Type of room can be can be single, double, or family,

Price (room rent for a day) must be between Rs500 00 and Rs1000 00,

Room_no must be between 1 and 100

c. Booking (Hotel_no, Guest_No, Date_From, Date_To. Room_No)
Date_from must be less or equal to Date_To and both dates should be more than today's date

d. Guest (Guest_No, Name, Address)
Guest numbers should be greater than zero

The underlined data items given above are primary keys.

1. Write "Create Table", statements for the above relations. Include all possible appropriate constraints for all tables. 5

2. Create a view containing the hotel name and the names of guests staying at the hotel. 2

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3. Assume there are users MANAGER and SECRETARY. Give these two users full access to this view, with the privilege to pass the access on to other users. Give the user ACCOUNTS, a SELECT access to the view. 2

4. Give syntax for finding access privileges on objects granted to users. Revoke the access from the user ACCOUNTS. 2

5. Give syntax for creating sequences and explain how to find current value of a sequence. Assume that Hotel numbers start from 100 and may go upto 1000 . Create a sequence hotel_no_sequence and use it to insert a row in the table Hotel. 2

6. Write a PL/SQL procedure that prompts a user to enter guest details and inserts a record into the Guest table. If the guest already exists in the database then exception should be raised with appropriate error message. 3

7. Suppose you use the exception "When others" in a PL/SQL subprogram, and you want to find out the reason for the exception, how will you interpret the error message? 1

8. Write a PL/SQL function that takes two arguments viz the rate of price increase (e.g. 5%) for a room and the room type, and updates the ROOM table. If this price increase is more than 10%, the function should raise user-defined exception "too_high_increase". 3

9. Create a trigger in PL/SQL that will be invoked when the price of the room in the Room table is updated with price less than the price already stored in the table. In this case, Room table should not get updated and an appropriate message must be printed. 3

10. There are following two constraints on booking a room:
The same room cannot be doubly booked and
The same guest cannot have overlapping bookings
Create a trigger in PL/SQL which gets invoked when a room is being booked for a guest which ensures that both the above constraints are not violated. 3

11. The owners of the company maintaining the "Hotel Database", want to know whether they should use Object Relational features of Oracle for their database or should continue to use only the relational features. Give your opinion in favour and against using the Object relational features in maintaining Hotel Database. 3

12. Convert the Hotel Database schema given above into Object Relational Database schema so that Object Relational features of Oracle DBMS can be utilized. Do the following changes to the relational schema:

a) Create type room_t with attributes Room_no, Hotel_no, Type, and Price. 1

b) Create type telephone_t of varray type which can contain maximum four telephone numbers 1

c) Create type hotel_t with attributes Hotel_no, Name, Address, and nested table for rooms, varray for telephones. 2

d) Create table, Hotel of type hotel_t 1

e) Insert one row for hotel_no=110, with three rooms and two telephone numbers. 1

f) Write a query for finding all details of all rooms in a specified hotel_no.(say hotel_no = 110). Show the output with column names 2

g) Write a query for finding all telephone numbers of a specified hotel_no. 1

h) For a hotel with specified hotel_no, it is required to add one new room to it. Write a query for this pupose. 2

i) Create type guest_t with attributes guest_no, name, address 1

j) Create table guests of type guest_t 1

k) Insert one row into guests table. Assume your own data. 1

l) Create type booking with attributes hotel_no, guest_no, date_from, date_to, room_no, reference to guest type and reference to hotel_type. 2

m) Create table bookings of booking_t 2

n) Insert one row into bookings table with your own data. 1

o) Given the hotel_no and guest_no, print the hotel name and guest name without using join in the query. Show the output. 2

13. What type of statistics should be stored by DBMS to be able to derive estimates of relational algebra operations? 2

14. Give the heuristics rules normally used during query processing and optimization. 3

15. Using the hotel schema, draw a relational algebra tree for the following query and heuristic rules to transform the query into a more efficient form. 5

```
SELECT r.room_no, r.Type, r.Price
FROM Room r, Booking b, Hotel h
WHERE r.Room_no = b.Room_no
        AND b.Hotel_no = h.Hotel_no
                AND h.Name = 'Taj' AND r.price > 500,
```

State the transformation rules used in each step.