UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B.Tech. CSE – All IBM Branches   Semester   : III
Subject (Course): Advanced Database Management System   Max. Marks   : 100
Course Code   : CSEG 235   Duration   : 3 Hrs
No. of page/s: 3

Section A

Attempt all questions from section A. Each Question carries 5 marks.   **[4*5=20]**

1. What is data replication? Why is data replication useful in DDBMSs?
2. How are catastrophic failures handled by recovery manager?
3. What is the difference between persistent and transient objects? How is persistence handled in typical Object-Oriented Database Systems?   **[2+3]**
4. What is the difference between the directories of extendible and dynamic hashing?

Section B

Attempt all questions from section B. Each Question carries 10 marks.
[4*10=40]

5. (a) Explain the transparency feature of a distributed DBMS. Define and explain the different types of distribution transparency.
   (b) How is vertical partitioning of a relation specified? How can a relation be put back together from a complete vertical partitioning.   **[5 + 5]**

6. **(a)** List the different deadlock prevention schemes and comment on how younger transactions are handled in either scheme.

   (b) How does the granularity of data items affect the performance of concurrency control? What factors affect selection of granularity size for data items?   **[5 + 5]**

7. (a) State whether the following schedule S is conflict serializable or not? Also, determine the equivalent serial schedule

         S: R1(X), R3(X), W1(X), R2(X), W3(X);

   (b) Write any two problems faced when concurrent transactions are executed in an uncontrolled manner? Give an example & explain.   **[5 + 5]**

8. The following is Entity Relationship Model of ABC Medical Centre. Map the Entity Relationship Model into Relational Model.
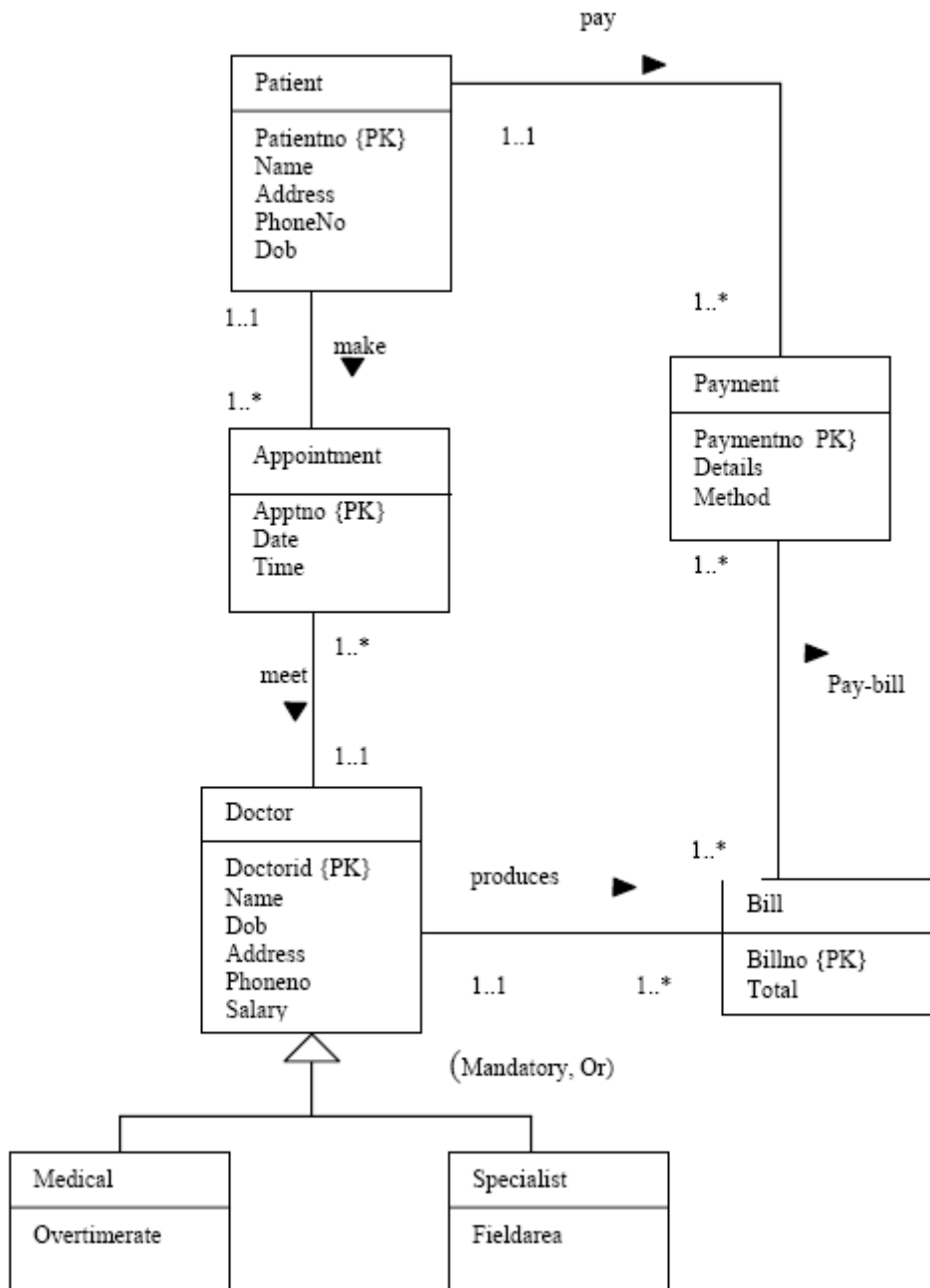
Section-C

Attempt all the questions each question carries 20 marks. [2*20=40]

9. Figure below shows the log corresponding to a particular schedule at the point of a system crash for four transactions T1, T2, T3 and T4. Suppose that we use the *immediate update protocol* with checkpointing.

    i.   Describe the recovery process from system crash.

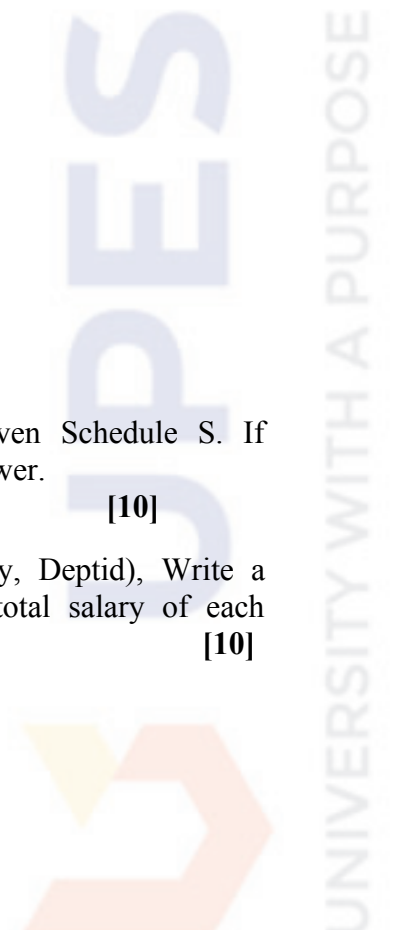   ii.   Specify which transactions are rolled back, which operations in the log are redone and which (if any) are redone. [4 + 8]

[start_transaction, T1]
[read_item, T1, A]
[read_item, T1, D]
[write_item, T1, D, 20, 25]
[commit, T1]
[checkpoint]
[start_transaction, T2]
[read_item, T2, B]
[write_item, T2, B, 12, 18]
[start_transaction, T4]
[read_item, T4, D]
[write_item, T4, D, 25, 15]
[start_transaction, T3]
[write_item, T3, C, 30, 40]
[read_item, T4, A]
[write_item, T4, A, 30, 20]
[commit, T4]
[read_item, T2, D]
[write_item, T2, D, 15, 25]

10. (a) Draw the precedence graph and test serializability for the given Schedule S. If serializable, then write the equivalent serial schedule justifying your answer.

S: $r_1(X)$, $r_2(Z)$, $r_1(Z)$, $r_3(X)$, $r_3(Y)$, $w_1(X)$, $w_3(Y)$, $r_2(Y)$, $w_2(Z)$, $w_2(Y)$; **[10]**

(b) For a table EMPLOYEE (Emp_id, Fname, Lname, DoB, Salary, Deptid), Write a PL/SQL function that accepts department number and returns the total salary of each department. **[10]**

✔

Name of Examination (Please tick, symbol is given)	:	MID		END	✔	SUPPLE	
Name of the College (Please tick, symbol is given)	:	COES	✔	CMES		COLS	
Program	:	B.Tech. CSE – All IBM Branches					
Semester	:	III					
Name of the Subject (Course)	:	Advanced Database Management System					
Course Code	:	CSEG 235					
Name of Question Paper Setter	:	Dr. Susheela Dahiya					
Employee Code	:	40001471					
Mobile & Extension	:	9045965953, 1752					

Note: Please mention additional Stationery to be provided, during examination such as Table/Graph Sheet etc. else mention "NOT APPLICABLE":

FOR SRE DEPARTMENT

Date of Examination	:	
Time of Examination	:	
No. of Copies (for Print)	:	

Note: - Pl. start your question paper from next page

Roll No: ---------------------------

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B.Tech. CSE – All IBM Branches	Semester : III
Subject (Course): Advanced Database Management System	Max. Marks : 100
Course Code : CSEG 235	Duration : 3 Hrs
No. of page/s: 3	

Attempt all questions from section A. Each Question carries 5 marks. **[4*5=20]**

1. What do you mean by autonomy in DDBMSs? Define and explain the different types of distribution autonomy?
2. Discuss how disaster recovery from catastrophic failures is handled?
3. How is horizontal partitioning of a relation specified? How can a relation be put back together from a complete horizontal partitioning.
4. Why is accessing a disk block expensive? Discuss the time components involved in accessing a disk block.
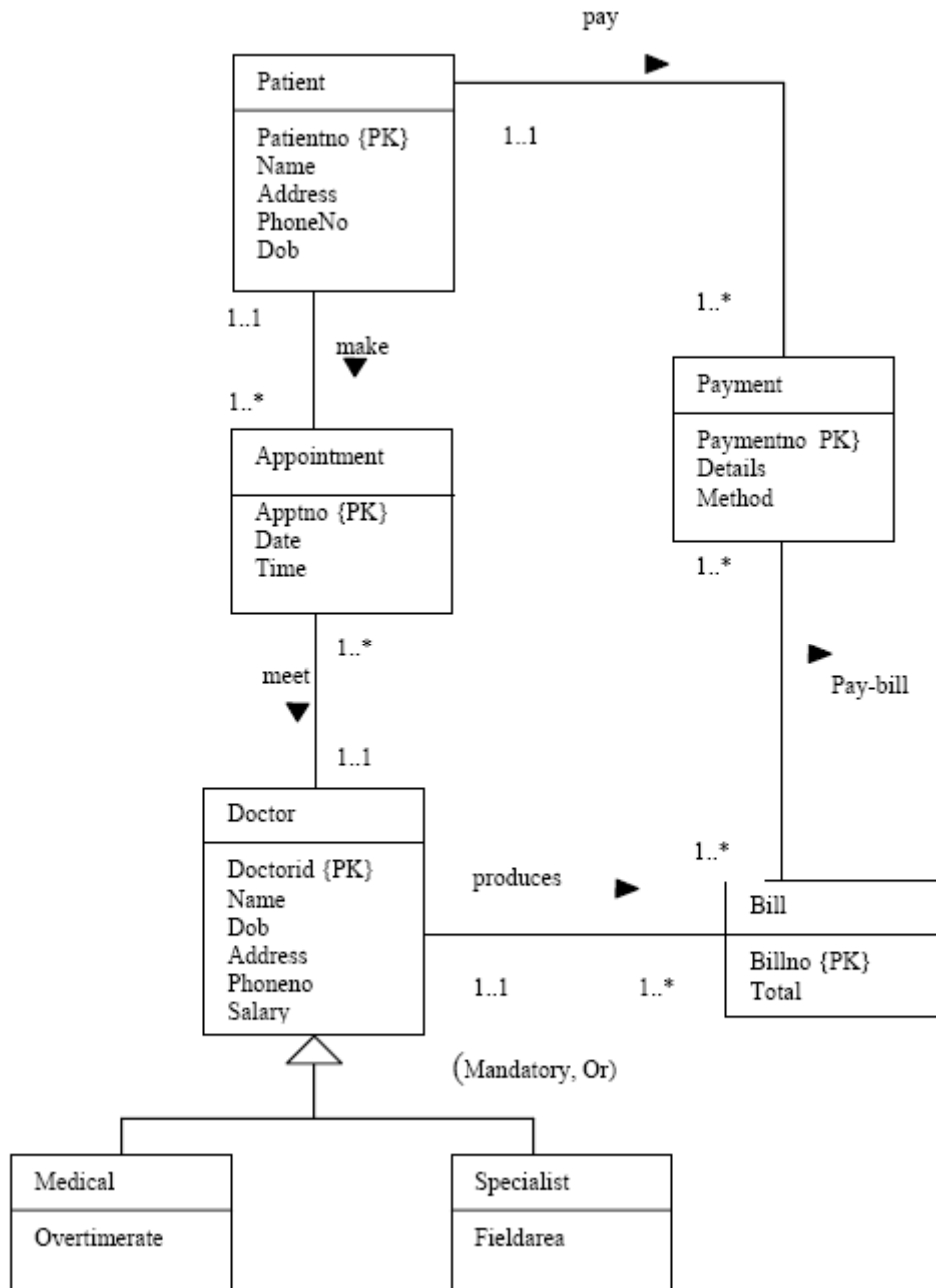
Section B

Attempt all questions from section B. Each Question carries 10 marks.
[4*10=40]

5. (a) Explain the Three-Tier Client-Server Architecture in DDBMSs.

    (b) "Database recovery is required for any kind of database system" justify the statement along with elaborate the one database recovery method where undo and redo both are not required. **[5 + 5]**
6. Based upon the schedule S given below, answer the following questions.
    i. How many conflict equal serial schedules possible?
    ii. How many view equal serial schedule possible? **[5 + 5]**

T1	T2	T3	T4
R(A)			
	R(A)		
		R(A)	
			R(A)
W(B)			
	W(B)		
		W(B)	
			W(B)

7. (a) What is the difference between persistent and transient objects? How is persistence handled in typical Object-Oriented Database Systems? **[2 + 3]**
(b) Prove that every strict schedule is not serial schedule while every serial schedule is strict schedule. Explain with example. **[5]**

8. The following is Entity Relationship Model of ABC Medical Centre. Map the Entity Relationship Model into Relational Model.

Attempt all the questions each question carries 20 marks. **[2*20=40]**

9. **a)** A PARTS file with Part# as the key field includes records with the following Part# values:

    23, 65, 37, 60, 46, 92, 48, 71, 56, 59, 18, 21, 10, 74, 78, 15, 16, 20, 24, 28, 39, 43, 47, 50, 69, 75, 8, 49, 33, 38.

    Suppose that the search field values are inserted in a B tree of order p=4. Show how the tree will expand and what the final tree will look like.

    (a) For a table EMPLOYEE (Emp_id, Fname, Lname, DoB, Salary, Deptid), Write a PL/SQL procedure that accepts department number and returns the total salary of each department.

10. **(I)** Consider a concurrency control manager by timestamps. Below are several sequences of events, including start events, where **sti** means that transaction Ti starts and **coi** means Ti commits. These sequences represent real time, and the timestamp-based scheduler will allocate timestamps to transactions in the order of their starts.

    In each of the case below, say what happens with the last request. **[2*5=10]**
    (a) st1; st2; r1(A); r2(A); w1(B); w2(B);
    (b) st1; st2; r2(A); co2; r1(A); w1(A)
    (c) st1; st2; st3; r1(A); w3(A); co3; r2(B); w2(A)
    (d) st1; st2; st3; r1(A); w1(A); r2(A);
    (e) st1; st2; st3; r1(A); w2(A); w3(A); r2(A);

    You have to choose between one of the following four possible answers:
    (i) the request is accepted,
    (ii) the request is ignored,
    (iii) the transaction is delayed,
    (iv) the transaction is rolled back.

    (II) Write the problems faced when concurrent transactions are executed in an uncontrolled manner? Give an example & explain. **[6]**

    (III) Determine whether the schedule is strict, cascadeless, recoverable, or nonrecoverable

    S: $r_1(X)$, $r_2(Z)$, $r_1(Z)$, $r_3(X)$, $r_3(Y)$, $w_1(X)$, c_1; $w_3(Y)$, c_3; $r_2(Y)$, $w_2(Z)$, $w_2(Y)$, c_2; **[4]**