Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **18CS3007** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED DATABASE MANAGEMENT SYSTEMS** | **Max. marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Consider the following Query Evaluation Plan (QEP):  πSname*(on-the-fly)*  Ϭbid=100 ᴧ rating >5 *(on-the-fly)*  *(Simple nested loops)*  sid= sid  *(File scan)* Reserves Sailors *(File scan)*  Draw any two alternative plans for the above QEP? Explain how the alternative plans are better than the original plan in detail with appropriate cost calculation. | CO1 | 10 |
| b. | What are the main approaches to evaluate joins? Why are joins expensive? | CO1 | 6 |
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| 2 | a. | Consider the execution shown in the following figure and answer the questions given below   |  |  |  | | --- | --- | --- | | **LSN** |  | **LOG** | | **00,05** |  | **Begin\_checkpoint, end\_checkpoint** | | **10** |  | **Update: T1 writes P5** | | **20** |  | **Update: T2 writes P3** | | **30** |  | **T1 abort** | | **40, 45** |  | **CLR: Undo T1 LSN 10,T1 end** | | **50** |  | **Update: T3 writes P1** | | **60** |  | **Update: T2 writes P5** | |  | **x** | **CRASH : RESTART** | | **?** |  | **?** | | **?** |  | **?** | |  | **x** | **CRASH : RESTART** | | **?** |  | **?** |  1. What is done during analysis phase? 2. What is done during redo phase? 3. What is done during undo phase? 4. Describe the actions that has be done in case of repeated crash and specify the missing LSN and LOG information of the above diagram. | CO2 | 10 |
|  | b. | In optimistic concurrency control, no locks are set. Transactions read and modify data objects in a private workspace. How are conflicts between transactions detected and resolved in this approach? | C03 | 6 |
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| 3. | a. | What decisions need to be made during physical design? Describe six high-level guidelines for index selection with examples. | CO5 | 10 |
| b. | Elucidate the choices in tuning queries and views with suitable examples. | CO5 | 6 |
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| 4. | a. | When processing queries in distributed DBMS, the location of partitions of the relation needs to be taken into account. Discuss the alternatives when joining two relations that reside on different sites. In particular, explain and describe the motivation behind the semi join and bloom join technique. | CO4 | 10 |
| b. | Discuss deadlock detection in a distributed database. Contrast the centralized, hierarchical and time-out approaches. | CO4 | 6 |
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| 5. | a. | List the characteristics of spatial data. What do you mean by spatial extent? Discuss the differences between spatial range queries, nearest neighbor queries and spatial join queries in detail with appropriate examples. | CO6 | 8 |
| b. | What is a space-filling curve and how can it be used to design a spatial index? Describe the spatial index structure based on space-filling curves. | CO6 | 8 |
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| 6. | a. | Consider a database with objects X and Y and assume that there are two transactions T1 and T2. Transaction T1 reads objects X and Y and then writes object X. Transaction T2 reads objects X and Y and then writes objects X and Y.   1. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a read-write conflict. 2. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-write conflict. 3. For the above two schedules, show that strict 2PL disallows the schedule. | CO3 | 9 |
| b. | What are the different types of log records and when are they written? Explain each log record with its structure and example. | CO2 | 7 |
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| 7. | a. | Describe the three main architectures for parallel DBMSs. Explain why the shared-memory and shared-disk approaches suffer from interference. What can you say about the speed-up and scale-up of the shared nothing architecture? | CO4 | 12 |
| b. | What is a deadlock? Explain the dead lock prevention algorithms. | CO3 | 4 |
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| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | What is an authorization graph? Explain SQL’s GRANT and REVOKE commands in terms of their effect on this graph. In particular, discuss what happens when user pass on privileges that they receive from someone else. | CO2 | 6 |
| b. | Describe the scenario in which mandatory access controls prevent a breach of security that cannot be prevented through discretionary access controls. | CO2 | 6 |
| c. | What is the difference between symmetric and public-key encryption? Give examples of well known encryption algorithms of both kinds. What is the main weakness of symmetric encryption and how is this addressed in public-key encryption? | CO2 | 8 |