

- N.B.** (1) All questions are **compulsory**.  
 (2) **Figures** to the **right** indicate **full** marks.  
 (3) **Illustrations**, in-depth answers and **diagrams** will be **appreciated**.  
 (4) **Mixing** of sub-questions is **not** allowed.

1. Attempt the following (any **two**) : – 12  
 (a) What is closure set of FD ? Find and explain which Armstrong's Axioms can be applied on following FDs to find closure. R(A, B, C, D, E, F, G) and the FDs : A→B, BC→DE, AEF→G.  
 (b) Comment on "Every serializable schedule is not conflict serializable".  
 (c) Discuss Multivalued dependency and forth normal form.  
 (d) Explain precedence graph with an example.
2. Attempt the following (any **two**) : – 12  
 (a) Explain ARIES algorithm  
 (b) Write a short note on Time Stamp protocol  
 (c) Describe recovery related structures  
 (d) What is two phase locking ? Explain upgrading and downgrading of lock.
3. Attempt the following (any **two**) : – 12  
 (a) Write a short note on Loop-End loop statement of PL/SQL. What is the role of exit statement in the same ?  
 (b) Elaborate the concept of nested tables  
 (c) Write a brief note on case statements along with an example  
 (d) Consider the table employee with columns Emp\_code, Emp\_type (Head, worker), Status (Permanent, Temporary) and salary. Write a PL/SQL block to display bonus based on Emp\_type and status.  
 Conditions 1 : Head – Permanent → 3 month's Salary  
 2 : Head – Temporary → 1½ month's Salary  
 3 : Worker – Permanent → 1 month's Salary  
 4 : Worker – Temporary → No Bonus.
4. Attempt the following (any **two**) : – 12  
 (a) Write a short note on sequence with an example  
 (b) Discuss all locking strategies in brief  
 (c) List and explain different steps involved in managing an explicit cursor.  
 (d) Consider the table Project (Project\_id, Project\_name, Total\_Hrs) and Developer (Developer\_id, Name, Project\_id) Write a PL/SQL block to print Developers information according to project\_name.
5. Attempt the following (any **two**) : – 12  
 (a) Describe decomposition. Explain desirable properties of it.  
 (b) What is checkpointing ? Explain the three steps of checkpointing in ARIES.  
 (c) Illustrate the use of GOTO statement with suitable example.  
 (d) Discuss transaction control statements.