Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

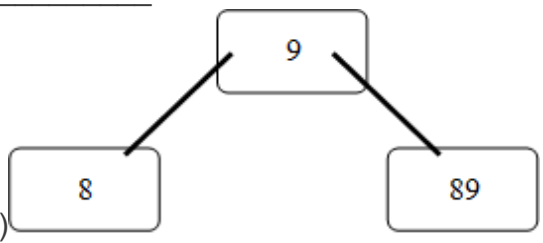
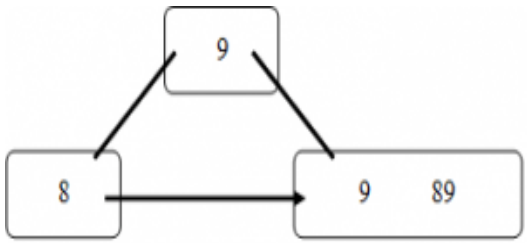
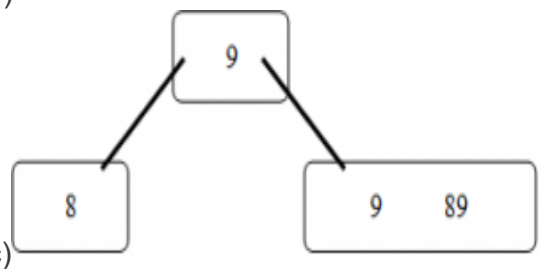
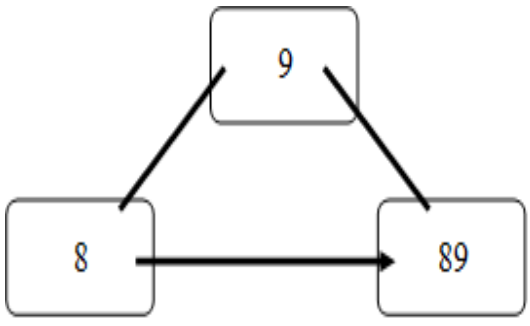
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, January 2021

Course: Advanced Database Management Systems **Semester: I**
Program: M. Tech. (CSE) **Time : 03 hours**
Course Code: CSEG 7002 **Max. Marks: 100**

SECTION A

1. Each Question will carry 5 Marks
2. Instruction: Complete the statement / Select the correct answer(s)

Q1	Given the following relation instance. **X Y Z** 1 4 2 1 5 3 1 6 3 3 2 2 Which of the following functional dependencies are satisfied by the instance? (A) XY -> Z and Z -> Y (B) YZ -> X and Y -> Z (C) YZ -> X and X -> Z (D) XZ -> Y and Y -> X	**CO1**
Q2	Consider two transactions T1 and T2, and four schedules S1, S2, S3, S4 of T1 and T2 as given below: T1 = R1[X] W1[X] W1[Y] T2 = R2[X] R2[Y] W2[Y] S1 = R1[X] R2[X] R2[Y] W1[X] W1[Y] W2[Y] S2 = R1[X] R2[X] R2[Y] W1[X] W2[Y] W1[Y] S3 = R1[X] W1[X] R2[X] W1[Y] R2[Y] W2[Y] S4 = R1[X] R2[Y]R2[X]W1[X] W1[Y] W2[Y] Which of the above schedules are conflict-serializable? (A) S1 and S2 (B) S2 and S3 (C) S3 only (D) S4 only	**CO2**
Q3	Consider a relation scheme R = (A, B, C, D, E, H) on which the following functional dependencies hold: {A–>B, BC–> D, E–>C, D–>A}. What are the candidate keys of R? (A) AE, BE (B) AE, BE, DE (C) AEH, BEH, BCH (D) AEH, BEH, DEH	**CO1**

Q4	Distributed transactions are well-formed and 2-phase locked, then ..... is the correct locking mechanism in the distributed transaction as well as in centralized databases. A. two-phase locking B. three phase locking C. transaction locking D. well-formed locking	**CO5**
Q5	B+ -tree of order 3 is generated by inserting 89, 9 and 8. The generated B+ -tree is _____ a)  b)  c)  d) 	**CO1**
Q6	SELECT item name, color, clothes SIZE, SUM(quantity) FROM sales GROUP BY rollup(item name, color, clothes SIZE); How many grouping is possible in this rollup? a) 8 b) 4 c) 2 d) 1	**CO4**

SECTION B **1. Each question will carry 10 marks** **2. Instruction: Write short / brief notes**		
Q7	Discuss OLTP and OLAP with the help of example and list the differences between them?	**CO4**
Q8	Mention the best practices used to improve query performance by taking an example?	**CO1**
Q9	Define ACID properties of a transaction with the help of example and also state the states of a transaction?	**CO2**
Q10	Under which situations will it be beneficial to have replication or fragmentation of data?	**CO5**
Q11	Consider the following schedule S1: r1(x) r3(y) w1(x) w2(y) r3(x) w2(x) Create the precedence graph and find out either it is conflict serializable or not? OR Explain the process of starvation with the help of an example and discuss how we can remove such situations from the database.	**CO2**
Section C **1. Each Question carries 20 Marks.** **2. Instruction: Write long answer.**		
Q12	a) Explain why log records for transactions on the undo-list must be processed in reverse order, whereas redo is performed in a forward direction. b) Disk space allocated to a file as a result of a transaction should not be released even if the transaction is rolled back. Explain why and explain how ARIES ensures that such actions are not rolled back. **OR** Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed? How does the frequency of checkpoints affect: a) System performance when no failure occurs? b) The time it takes to recover from a system crash. c) The time it takes to recover from a media (disk) failure?	**CO3**