

National Institute of Technology Hamirpur (H.P.)

**Computer Science and Engineering
End Semester Examination**

Branch/ Semester: CSE (B. Tech 3rd Year)

Semester 5th

Subject Code: CSD-313

Duration: 120 Minutes

Subject Name: Database Management System

Max. Marks: 50

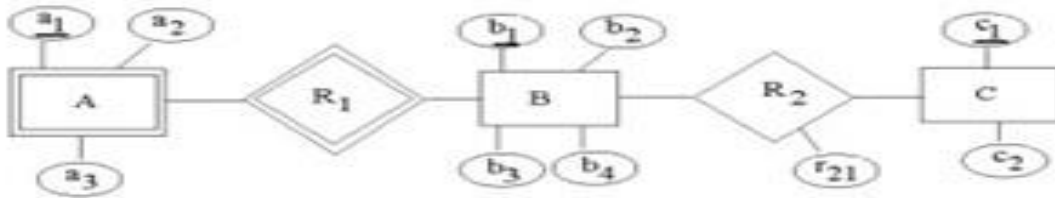
Date: 12/12/2020

Time: 10.00 AM -12.00 PM

Note: All questions are compulsory.

1. (a) What is indexing? Differentiate the requirement of primary indexing and secondary indexing.
 (b) A relation R(A, B, C, D, E, F, G, H) and set of functional dependencies are
 $CH \rightarrow G, A \rightarrow BC, B \rightarrow CFH, E \rightarrow A, F \rightarrow EG$
 How many possible super keys are present ? [3+4=7]

2. (a) Convert the following ER-Diagram into a relational database (the primary keys are underlined)



(b) Let R(A, B, C) and S(B, C, D)

R:	<u>A</u>	<u>B</u>	<u>C</u>	S:	<u>B</u>	<u>C</u>	<u>D</u>
	a	c	c		c	c	a
	a	c	c		d	c	a
	b	d	d		e	d	b

Compute the following for relations above

- (i) $R \div \pi_c(S)$
- (ii) $\pi_{R:B, S:C}(\sigma_{A=D}(R \times S))$
- (iii) $R \cup S$

[3+3=6]

3. Consider the following transactions and the schedule S:

$T_1 = r_1[a], w_1[a], c_1$

$T_2 = r_2[b], w_2[b], c_2$

$S = r_1[a], r_2[b], w_2[a], c_2, w_1[a], c_1$

Answer the following questions.

- (a) Is S c-Serializable? Explain using swapping non-conflicting instructions and precedence graph.
- (b) Is S a schedule produced by a strict 2PL protocol? Explain.

[6+2=8]

4. Let transactions T1, T2 and T3 be defined to perform the following operations.

T1: Add **two** to A

T2: **Triple** A

T3: Display A on the screen and then set A to one.

Suppose transactions T1, T2 and T3 are allowed to execute concurrently. If A has initial value zero, how many possible correct results are there? Enumerate them.

[10]

5. (a) A relation R (A, B, C, D) having two FD sets $FD_1 = \{A \rightarrow B, B \rightarrow C, A \rightarrow C\}$ and $FD_2 = \{A \rightarrow B, B \rightarrow C, A \rightarrow D\}$. Check the equivalence relation in both the functional dependencies.

- (b) Suppose you are given a relation R = (A, B, C, D, E) with the following functional Dependencies: $\{CE \rightarrow D, D \rightarrow B, C \rightarrow A\}$. Is the relationship in BCNF? If not, convert it into BCNF.

[5+5=10]

6. Consider the following relations with underlined primary keys.

Product(P_code, Description, Stocking_date, QtyonHand, MinQty, Price, Discount, V_code)

Vendor(V_code, Name, Address, Phone)

Write SQL statement of following queries.

- (1) List the names of all the vendors who supply more than two products.
- (2) List the details of the products whose prices exceeds the average product price.
- (3) List the Name, Address and Phone of the vendors who are currently not supplying any product.
- (4) List the name and phone no. of supplier who supply all the products.

[2+2+3+2=9]