



**University of Engineering & Management, Kolkata**  
**2<sup>nd</sup> Term Examination, November, 2023**  
**Programme Name: B.Tech in CSE / CSE (AIML) / CSE (IOT, CYS, BCT)**  
**Semester: 5<sup>th</sup>**  
**Course Name: Database Management Systems**  
**Course Code: PCCCSE501**

**Full Marks: 30**

**Date: 6<sup>th</sup> November, 2023**

**Time: 1.30 pm – 2.30 pm**

**Part - A**

**Attempt 5 questions**

**Each question carries 2 Marks (2 X 5)**

**1.A.** Define cascading rollback in a transaction schedule.

**Or**

**1.B.** Define strict 2PL.

**2.A.** Define your understanding on dirty read problem.

**Or**

**2.B.** Define your understanding on write-write conflict in a transaction schedule.

**3.A.** Illustrate the constraints to implement secondary indexing.

**Or**

**3.B.** Illustrate the difference between indexed allocation and linked allocation in file structure.

**4.A.** Analyse the advantage of using sorted main file (secondary storage) in indexing.

**Or**

**4.B.** Is the Index file always sorted (in any type of indexing)?  
Does this have any significance? Analyse your answer.

**5.A.** Differentiate total rollback and partial rollback with respect to transaction schedule.

**Or**

**5.B.** Analyse the wound wait method used for deadlock prevention.

**Part - B**

**Attempt 2 questions**

**Each question carries 5 Marks (5 X 2)**

**6.A.** Find the canonical cover of the following FDs on R(VWXYZ)

$V \rightarrow W, VW \rightarrow X, Y \rightarrow VWX$

**Or**

- 6.B. A relation R(ABC) having the following FDs:  
 $A \rightarrow B, B \rightarrow C, C \rightarrow A$   
 Evaluate whether the following decomposition is dependency preserving or not  
 – R1 (AB) & R2 (BC)
- 7.A. Create a B tree of order 4 with the following keys: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.  
**Or**
- 7.B. Create a B+ tree of order 3 with the following data: 13, 2, 5, 63, 23, 11, 74

**Part - C**

**Attempt 1 question**

**Each question carries 10 Marks (10 X 1)**

- 8.A. (i) Test the serializability for the following schedule with proper explanation.

T1	T2	T3	T4	T5
Read (y)	Read (x)			
Read (z)				
				Read (v)
				Read (w)
				Write (w)
	Read (y)			
	Write (y)			
		Write (z)		
Read (u)				
			Read (y)	
			Write (y)	
			Read (z)	
			Write (z)	
Read (u)				
Write (u)				

- (ii) Can deadlock happen in a schedule that strictly follows time-stamping protocol? – Justify. [7+3]

**Or**

- 8.B. (i) Consider the following situation:  
 $T_i$  request for write(Q) operation on a data item Q in a schedule that follows time-stamping protocol. Evaluate the following cases with proper justification-
- $TS(T_i) < RTS(Q)$
  - $TS(T_i) \geq RTS(Q)$
  - $TS(T_i) \geq WTS(Q)$
  - $TS(T_i) < WTS(Q)$

- (ii) A file structure that uses secondary indexing, has a main file of 30,000 record storage capacity and each record is of 100 bytes length. Its corresponding index file has the capacity to store 15 bytes/record. The block size is given as 1024 bytes standard. Compare the number of block accesses required to reach to one block of data in main file to the index file. [5+5]