BHARATIYA VIDYA BHAVAN'S

SARDAR PATEL INSTITUTE OF TECHNOLOGY

MUNSHI NAGAR, ANDHERI (WEST), MUMBAI – 400 058, India
(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination

Max. Marks: 20 — Duration: 1 hr
Class: SYMCA — Semester: III
Course Code: MCA32 — Date:
Subject: Database Management System

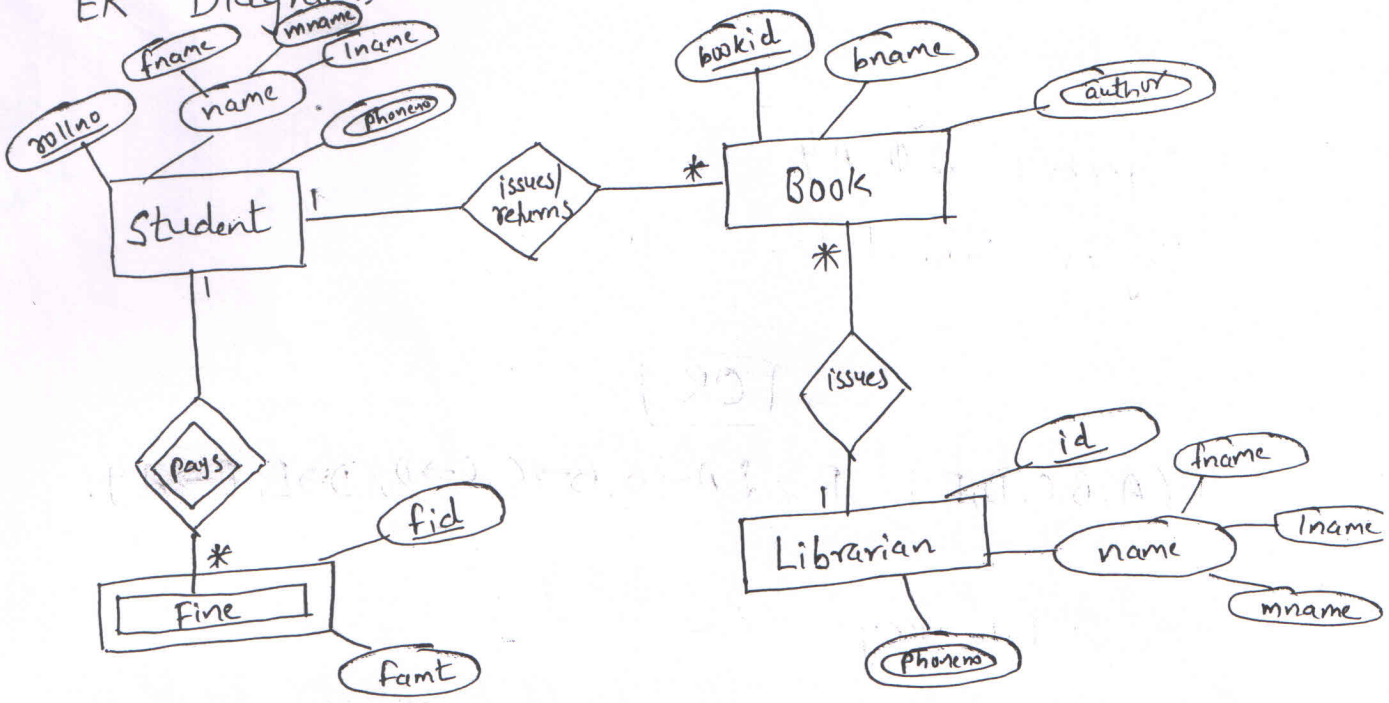
Instructions:
(1) All questions are compulsory.
(2) Use of scientific calculator is allowed.
(3) Assume any necessary data but justify the same.

Synoptic

Q. No.	Key Points
Q. 1	Definition of ER diagram (1 mk) Designing an ER diagram {3 mks: 1 mk for each main entity(Main entity can be weak or strong). Each main entity should include all types of attributes.The main entities are student,book, librarian and Fine. But it is not limited to these entities } Designing a Relational Database by applying ER to Relational Mapping steps (3 mks : 1 mk for each relation)
Q. 2	Definition of Normalization. (1 mk) Steps for calculating candidate keys and super keys (2 mks) Checking for different Normal Forms (3 mks) OR Definition of Candidate key and Super key (2 mks) Steps for calculating candidate keys and super keys (4 mks)
Q. 3	Transaction table creation with final value of A (2 mk) Justifying each property with appropriate reason (2 mks)
Q. 4	Definition of conflict serializable schedule (1 mk) Schedule creation (1 mk) Testing conflict serializibilty by drawing proper precedence graph (2 mks) OR Definition of recoverable schedule (1 mk) Schedule creation (1 mk) Testing for recoverable schedule and conversion (2 mks)

3-1)

ER Diagram:-



Relational Database:-

Student (rollno , fname , mname , lname)

Book (bookid , bname , id , rollno)

Librarian (id , fname , mname , lname)

Fine (fid , famt , rollno)

Student-ph (rollno , phoneno)

Librarian-ph (id , phoneno)

book_author (bookid , author)

Q-2)

$R(A,B,C,D,E)$ $F = \{ A \to BC, B \to DE, C \to D \}$.

Candidate key = $\{A\}$

Superkey = $\{\phi, A\}$.

Highest Normal Form = 2NF.

OR

$R(A,B,C,D,E)$ $F = \{ A \to B, B \to C, C \to D, D \to E, E \to A \}$.

Candidate key = $\{A, B, C, D, E\}$

Super key = $\{\phi, A, B, C, D, E, AB, AC, AD, AE, BC, BD, BE, CD, CE, DE, ABC, ABD, ABE, ACD, ACE, ADE, BCD, BDE, CDE, ABCD, ABCE, ABDE, BCDE, ABCDE\}$

Q-3)

A = 200

T_1	T_2	Value
R(A);		200
A := A−100;		100
W(A);		100
	R(A);	200
	A := A+100;	300
	W(A);	300
	commit;	300.

(i) Atomicity is achieved as all transactions are executed.

(ii) Consistency is not achieved ans is wrong

(iii) Isolation is achieved both transaction are unaware of one another

(iv) Durability is achieved as commit is executed.

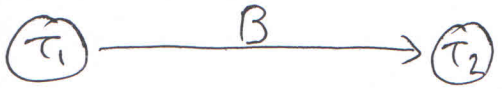
Q-4)

created Schedule

S

T_1	T_2
R(A)	
W(A)	
	R(A)
	commit
commit	
R(B)	
	W(B)

Precedence graph



As there is no cycle, the schedule is conflict equivalent/ serializable schedule.

OR

S

created schedule

T_1	T_2
R(A)	
W(A)	
	R(B)
	R(A)
W(A)	
	W(B)
R(B)	
	W(B)

Not a recoverable schedule.

Hence, the converted recoverable schedule is,

$R_1(A) W_1(A), C_1, R_2(B), R_2(A), W_1(A), W_2(B), C_2, R_1(B), W_2(B)$