COMPUTER ENGINEERING DEPARTMENT

SUBJECT: DATABASE MANAGEMENT SYSTEM

COURSE: T.E. **Year: 2020-2021** **Semester: V**

DEPT: Computer Engineering

SUBJECT CODE: CSC502 **EXAMINATION DATE: 09/01/2021**

==========

DATABASE MANAGEMENT SYSTEM ANSWER SHEET

Name : AMEY MAHENDRA THAKUR

Seat No.: 51112146

Exam : SEMESTER V

Subject : DATABASE MANAGEMENT SYSTEM

Date : 09/01/2021

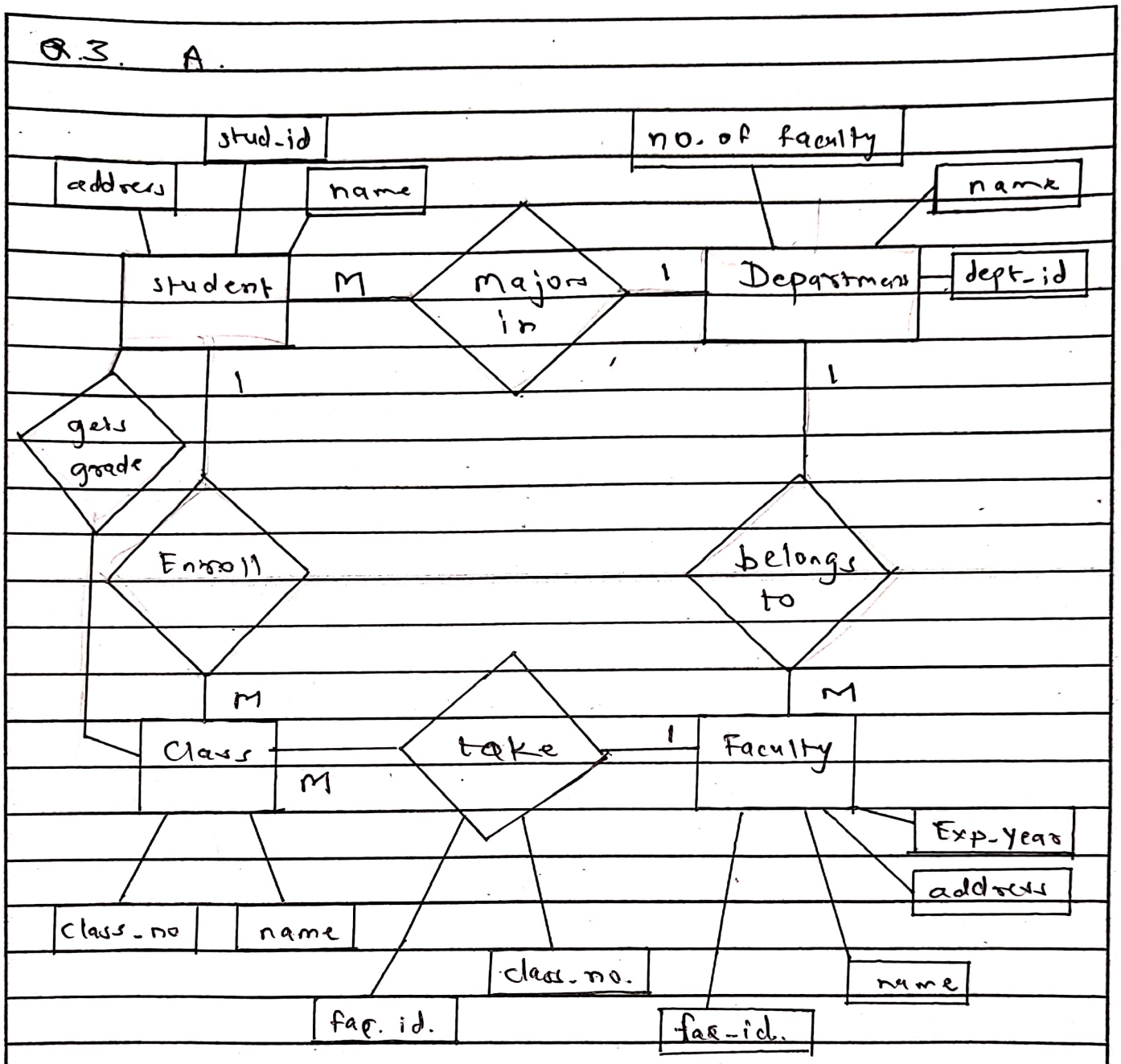
Day : SATURDAY

Student Signature: 

Name: AMEY MAHENDRA THAKUR **Branch:** COMPUTER **Seat No.:** 51112146

Subject: DATABASE MANAGEMENT SYSTEM **Exam:** SEMESTER V **Page No.:** 1

Q.3. A.



E-R Diagram

09-01-2021

Student Signature: Amey

Student	
Id	Primary key
Name	
Address	
Dept_id	Foreign key references to dept_id column of department table

Faculty	
Fac_Id.	Primary key
Fac_Name	
Exp_Years	
Address	
Dept-id	Foreign key references to dept_id column of department table

Class	
Class_no.	Primary key
C-name	

Stud_Class	
Class_no.	Foreign key references to dept_id column of department table
Stud_id	Foreign key references to dept-id column of department table

Department	
Dept_id	Primary key
D-name	
No. of faculty	

take_class	
Fac-id	Foreign key references to fac-id column of faculty table
Class_no.	Foreign key references to class_no. column of Class table

Grade	
stud-id	Foreign key references to dept_id column of department table
Class_no	Foreign key references to dept-id column of Department table
Grade	

09-01-2021 **Student Signature:** Amey

Q3. C

Concurrency Control Protocol

- Concurrency control is provided in a database to:
  1. Enforce isolation among transactions
  2. Preserve database consistency through consistence preserving execution of transaction
  3. Resolve read - write and write - read conflicts
- Various concurrency control techniques are
  1. Two phase locking protocol
  2. Time stamp ordering protocol
  3. Multiversion concurrency control
  4. Validation concurrency control.

Time Stamp based Ordering Protocol

- In time stamp based concurrency control algorithm each site maintain logical clock
- This clock is incremented when a transaction is submitted at the site and updated whenever the site receive message with higher clock value.
- Each transaction is assigned a unique time stamp and conflicting actions are executed in order of the time stamp of the transaction.

09 - 01 - 2021 Student Signature: Amey

- Time stamp can be used in two ways.
(1) To determine the concurrency or outdatedness of request with respect to data object it is operating on.
(2) To order events with respect to one another.

- The timestamp of data item can be of 2 types
(1) W - timestamp (x)
- This means the latest time when the data item X has been written into.
(2) R - timestamp (x)
- This means the latest time when the data item x has been read from.
- These two timestamps are updated each time a successful read / write operation is performed on the data item X.

Time Stamp ordering Protocol and its rules
(1) When a transaction Ti issues a read (Q) instruction.
(2) When a transaction Ti issues write (Q).

09-01-2021 Student Signature: Amey

Concurrency Control Protocol

Two Phase Locking Protocol (2PL)

- The use of locks has helped us to create neat and clean concurrent schedule.
- The Two Phase Locking Protocol defines the rules of how to acquire the locks on a data item and how to release the locks.
- 2PL is concurrency control method that guarantees serilizability.
- The protocol utilizes locks, applied by a transaction on data which may block other transactions from accessing the same data during the transactions life.
- The two phase locking protocol assumes that a transaction can only be in one of two phases.
- Phases:

  Phase 1: Growing Phase
  Phase 2: Shrinking Phase

(1) Growing Phase

- In this phase, the transaction can only acquire locks but cannot release any lock.
- The transaction enters the growing phase as soon as it acquires the first lock it wants.
- From now on it has no option but to keep acquiring all the locks it would need.

09-01-2021 Student Signature: Amey

- It cannot release any lock at this phase even if it has finished working with a locked data item.
- Ultimately the transaction reaches a point where all the locks it may need has been acquired. This point is called lock point.

(2) Shrinking Phase
- After lock point has been reached the transaction enters the shrinking phase.
- In this phase the transaction can only release locks but cannot acquire any new lock.
- The transaction enters the shrinking phase as soon as it releases the first lock after crossing the lock point.
- From now on it has no option but to keep releasing all the acquired locks.

- The two phase locking protocol ensures serilizability
- There are 2 different versions of 2PL.
  (1) Strict Two Phase Locking Protocol.
  (2) Rigorous Two Phase Locking Protocol.

09-01-2021 Student Signature: Amey