STUDENT NO.						
1	7	0	5	0	4	5

1 7 0 5 0 4 5

EXAMINATION SCRIPT

DEPARTMENT:	3 L-2 T-2
CSE	

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

COURSE NO.	CSE215	DATE	23/1/2021
COURSE TITLE	Database		

SECTION B

Declaration on the Online Course Conduct by Undergraduate Student of BUET for COVID-19 Situation

Please write the declaration (as per no. 2 of 'Instructions' given in the footer) below in your own handwriting and sign it.

On my honour, I bearing Student No. 1705045 hereby declare that, I shall not misuse, in any form or method, the course materials, Audio, and video Records of the lectures of this course. I shall not adopt any unfair means during the Final examination and shall not receive any help or offer/provide help to anyone. I shall preserve hard copy and soft copies of the answer scripts and will not expose the same to any person/party/media. I agree to accept any punitive measure taken by BUET authority if any time during or after the completion of the course it is revealed/violated otherwise.

Signature: Iftekhar Hakim Khowsar Date: 23/1/2021

Instructions

1. Clearly enter your Student ID, Course Number, Course Title, and Date in the space provided. *Complete the declaration exactly as below with your signature and date.* You can also insert the scanned image of your handwritten declaration in this box.
2. Declaration: I shall not misuse, in any form or method, the course materials including Lecture Notes, Reading Materials, Audio and Video Records of the lectures of this course. I shall not adopt any unfair means during the Final Examination and shall not receive any help or offer/ provide help to anyone. I shall preserve hard copy and soft copies of the answer scripts and will not expose the same to any person/party/media. I agree to accept any punitive measure taken by BUET Authority if at any time during or after the completion of the course it is revealed/ violated otherwise.
3. Do not put your name or any other form of identification except the Student No. anywhere in the answer script.
4. Use offset/normal white paper of A4 size for writing the answer. Use only one side of the paper for writing. On each page, clearly write your Student ID and Page numbers.

Ans. to q-5

There are some fault —

1) "FROM EMPLOYEE" E1 JOIN E2"

Here EMPLOYEES table name should be present before E2.

2) It is grouped by E1.MANAGER_ID, but in SELECT, E1.LAST_NAME is written. It is not a ~~group by~~ column used for group by, neither an aggregate function.

3) The query is logically incorrect. After joining, we should have grouped by E2.EMPLOYEE_ID and E2.LAST_NAME ; and in select we should have written E2.LAST_NAME.

4) Actual table name is EMPLOYEES, not EMPLOYEE.

Correct possible way :

```
SELECT E2.LAST_NAME, COUNT(*) AS "TOTAL MANAGED
EMPLOYEES"
FROM EMPLOYEES E1 JOIN EMPLOYEES E2
ON (E1.MANAGER_ID = E2.EMPLOYEES_ID)
GROUP BY E2.EMPLOYEE_ID, E2.LAST_NAME
ORDER BY "TOTAL MANAGED EMPLOYEES" Asc;
```

Ans. to - 6

```
SELECT e.EMPLOYEE-ID, e.JOB-ID, e.DEPARTMENT-ID,
~~MAX~~ MIN(e.HIRE-DATE) AS "FIRST HIRING DATE",
MAX(e.HIRE-DATE) AS "LAST HIRING DATE",
AVG(e.SALARY)
FROM EMPLOYEES e, DEPARTMENTS d
WHERE e.DEPARTMENT-ID = d.DEPARTMENT-ID
GROUP BY e.EMPLOYEE-ID, e.DEPARTMENT-ID,
         e.JOB-ID
HAVING AVG(SALARY) > 3000
ORDER BY e.DEPARTMENT-ID.
```

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B-3

Ans to ~~to~~ 12

Schema:-

Production Unit (serial_no, exact_weight, is_quality_tested?, Product_desc, product_type, unit_price)

Lot (lot_no, lot_cost, create_date)

Raw Materials (material_id, material_type, unit_cost)

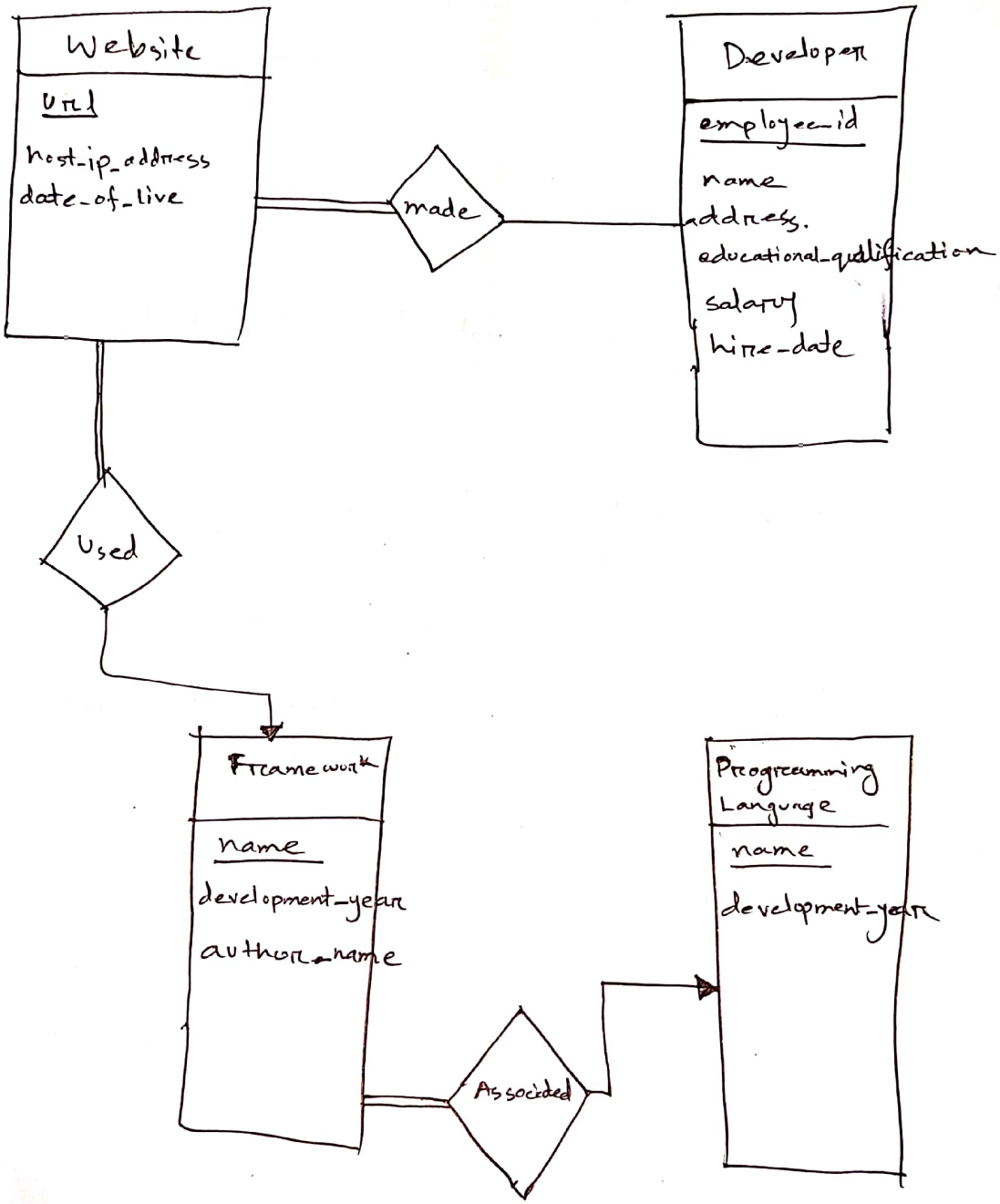
Includes (serial_no, lot_no)
(FK) (FK)

12elationship (lot_no, material_id, units)
(FK) (FK)

1705045

A B-4

Ans. to -13



1705045

B-5

Ans. to - 15

$$r_1 \leftarrow \sigma_{account\_branch = branch\_routing\_number \wedge account\_type = \text{"savings"}} (account \times branch)$$

$$r_2 \leftarrow \sigma_{branch\_name = \text{"BUET Br."}} (r_1)$$

$$r_3 \leftarrow \sigma_{account\_id = customer\_id} (r_2 \times loan)$$

~~$r_4 \leftarrow \sigma (r_3 \times customer)$~~

$$r_4 \leftarrow \Pi_{customer\_name, loan\_amount} (\sigma_{x.customer\_id = customer.customer\_id} (\rho_x (r_3) \times customer))$$

Final output is in r_4.

B-1

1705045

Ans. to - 16

$$\Pi_{\text{customer\_name, account\_id, transaction\_amount}}\left(\sigma_{\text{transaction\_date} = \text{"01-JAN-2020"} \wedge \text{transaction\_amount} > 5000}\left(\left(\sigma_{\text{customer\_id}=\text{account\_id}}(c \times a)\right) \bowtie \text{transaction}\right)\right)$$

P.T.O

Ans. to q-no-10

Redundancy and incompleteness leads to bad database design.

1. If database design consists redundancy, it will require more space. Moreover, for redundancy, there will insert and update anomalies. As a result, that design will be more complex and will be slower. We see in table-1, there is redundancy in dept_name; we could have used another table for storing department name for each department separately.

student	dept_id	dept_name
1	05	CSE
2	05	CSE
3	06	EEE
4	06	EEE

Table-1

In table-1, it is asking more space usage. Moreover, to insert (5,"06","EEE"), we have to insert "EEE" name again (insert anomaly). And, to update depart~~ment~~_name for

1705045

a department-id, we will have to update a lot of records.

(2) Incompleteness:- If it contains incompleteness we will be missing information. That will hamper whole use of database.

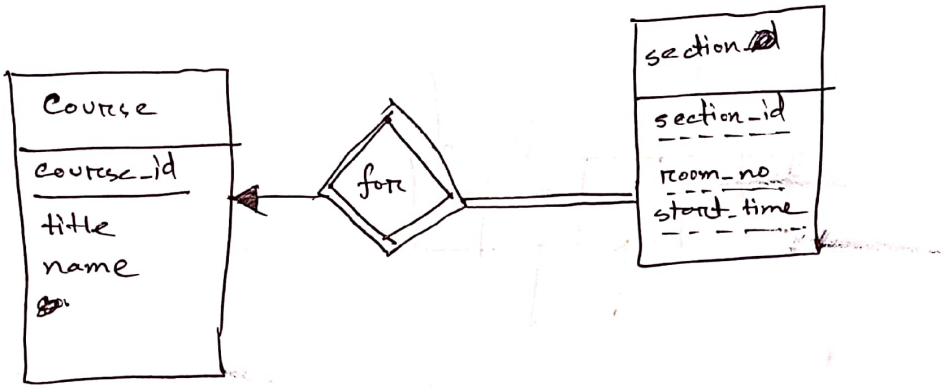
Std	Dept-id
1	05
2	05
3	06
4	06

Dept_name	Total student
CSE	120
EEE	180

Here we cannot retrieve department name for a student because dept-id attribute is not present in 2nd table. this is incompleteness.

Ans. to q.-11

A entity is weak if it does not have enough attribute to make a primary key. Every weak entity ~~set~~ a has an ~~owner~~ owner strong entity.



Here "section" is a weak entity set. We can distinguish between them, because weak entity set "section" has an owner entity set which is strong. Their relationship is shown in ERD by double diamond. (Identifying)

To ~~d desing~~ design weak entity in schema, we make their primary key as set of owner's primary key and all attributes of weak entity. So,

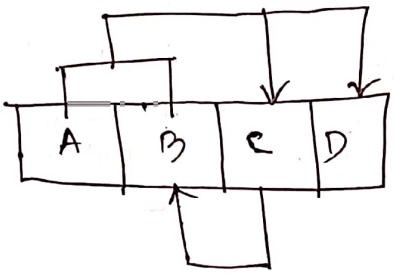
section (course_id, section_id, room_no, start_time)

FK

1705045

There should be not table/schema for identifying relationship set.

Ans. to — 14



Here A, B are candidate key.

And it is in 3NF, as no partial/transitive functional dependencies occurs.

But it is not in BCNF. Because, no-Key-attribute C derives Key-attribute B. (i.e. C → B)

So, it is in 3NF, but failed to meet criteria of BCNF.