FACULTY OF SCIENCE

ACADEMY OF COMPUTER SCIENCE & SOFTWARE ENGINEERING

MODULE	IFM2A10/IFM02A2 INFORMATICS 2A
CAMPUS	APK
SSA EXAM	July 2019

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INTERNAL MODERATOR		MR FF BLAUW	
DURATION	120 minutes	**MARKS**	100

PLEASE TAKE CAREFUL NOTE OF THE FOLLOWING:

1. Answer ALL questions in the ANSWER SHEET supplied.
2. Do NOT write in pencil. Anything in pencil WILL NOT BE MARKED.
3. Write neatly and legibly.
4. Answers must pertain to the material covered during the course of the module.
5. NO calculators may be used.
6. This question paper consists of 4 (including this cover page) pages.
7. This question paper consists of 6 question sections.

Question 1

A new university has approved you to help them with a new database design for their campuses.

The new University will have multiple campuses with many new departments. A specific department can only be located on one campus to make it easier for students to visit the departments. Each department consists of multiple academic staff as well as administrative staff.

The new university wants to keep track of all its employees. The university will have two types of employees. The first will be academic staff, which is a lecturer, and the second is the support staff, who is the administrative person that does most of the secretarial work. Both entities consist of a staff number represented by a 12-digit number as well as their names, surname, ID number, and contact details. A lecturer also has a title. A staff member can only belong to one department.

Each lecturer can present/lecture multiple modules at a time. Each module can only be presented by one lecturer. The modules are identified by a sting of 7 alphanumerical characters. Each module has a credit value and a difficulty level represented with a numerical value between 0 and 10 (0 being very easy and 10 extremely difficult).

The students, who are identified with a 9-digit number, can only register for one degree. Each degree has a degree type (Bcom, Bsc, B-tech, BA). Each degree also has a minimum APS requirement, which is a numerical value indicating the what APS score is required to register for the degree.

A student can register for multiple modules at a time. The university would also like to capture a student's semester mark as well as their exam mark for each module he/she is registered for.

1. Draw an Extended Entity Relationship model to model the storage of the information provided above. **[20]**

Question 2

2.1 Using a diagram, illustrate how the System Development Life Cycle works. [8]

2.2 Discuss the Planning phase of the SDLC [2]

[10]

Question 3

3.1 Discuss the differences between a weak relationship and a strong relationship. [2]

3.2 What is the Degree of the Employee table? [1]

3.3 Discuss the difference between a secondary key and a surrogate key. [2]

3.4 Name and Discuss five of Dr. Codd's relational database rules. [5]

[10]

Question 4

4.1 Briefly discuss the three stages of database design. [6]

4.2 Discuss the properties of a Transaction. [5]

4.3 Define lock granularity. [1]

4.4 Discuss the difference between a database level and a row level lock granularity. [2]

4.5 What is the purpose of the locking feature? [1]

[15]

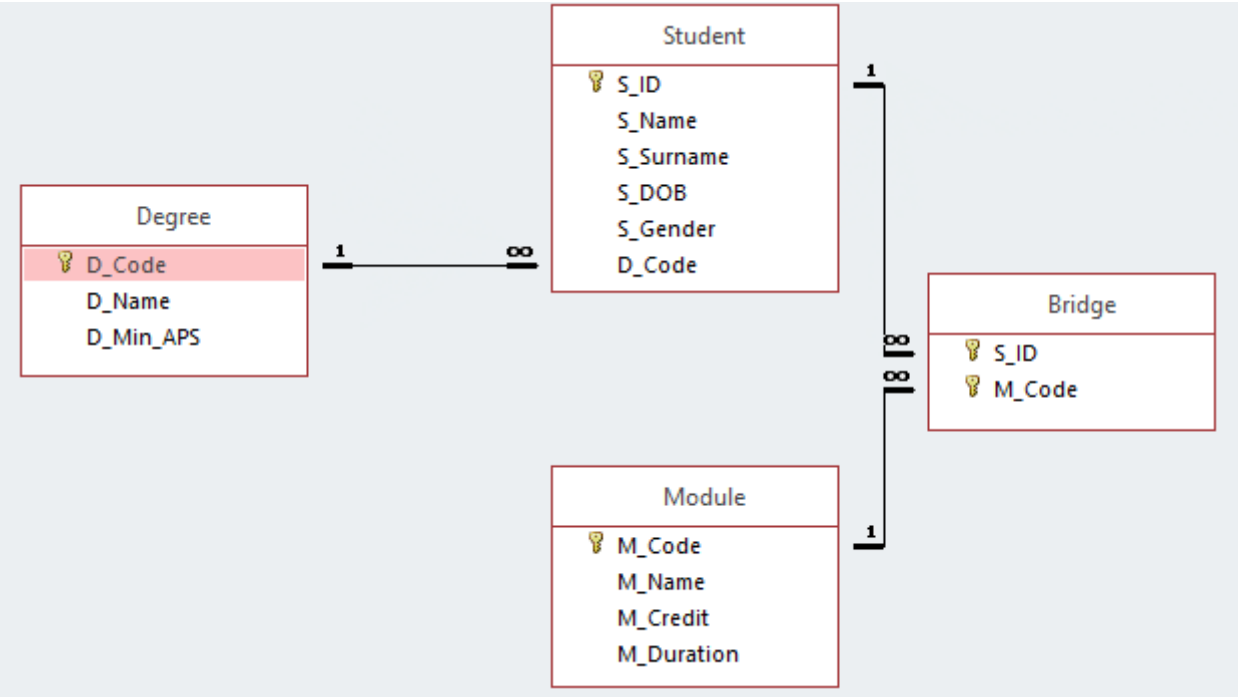
Question 5

Invoice-No	Invoice-Date	Product-No	Product-Name	Product-Price	Quantity
12345	22/04/2017	1023	Soft Chair	R2000	3
		1022	Hard Chair	R1000	12
		1087	Desk	R5000	3
12346	20/04/2017	1023	Soft Chair	R2000	5
12348	19/04/2017	1987	Large Chest	R3000	4
23144	19/04/2017	6548	Coffee Table	R500	3
12387	10/04/2017	6547	Tea Table	R200	2

5.1	In which Normal Form is the above table? Explain how you arrived at your answer.	[2]
5.2	Explain the step to convert an unnormalized table into 2nd Normal form.	[5]
5.3	Explain the conditions required to be in Boyce-Codd Normal form.	[2]
5.4	Convert the given table into 3rd Normal form. Write your answer as a relation.	[6]

5.7	Define Normalization	[3]
5.8	Define Denormalization	[2]
		[20]

Question 6



Write SQL statements for the following:

6.1 Create the student table displayed above. [10]

6.2 List all the students that have registered for IFM2A and CSC2A. [5]

6.3 List the number of students registered for each Degree. [5]

6.4 List the number of Degrees that currently have no registered students [5]

[25]

TOTAL 100

END