

Topical Past Papers 2015 to 2022:

9608/12/M/J/18

7

A social media website has a relational database, WEBDATA, that stores the site's information.

The database has three tables to store users' details, and details of the images and text that they post.

USER(UserName, FirstName, SecondName, DateOfBirth)

PHOTO(PhotoID, UserName, Comment, UploadDate)

TEXTPOST(PostID, UserName, DateOfPost, TheText)

- (a) (i) Explain how the relationship between the tables USER and PHOTO has been implemented.

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- (ii) Draw the entity-relationship (E-R) diagram to show the relationships between the three tables.

- (b) A database administrator decides to enforce **referential integrity**. Use an example from the database WEBDATA to explain what is meant by referential integrity.

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- (c) The database has been normalised to Third Normal Form (3NF). Define the three stages of database normalisation.

1NF

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2NF

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3NF

..... [3]

- (d) The following shows sample data from the USER table.

UserName	FirstName	SecondName	DateOfBirth
gem123	John	Smith	01/01/1995
purpleSky	Muhammed	Ali	23/02/1956
OpenWindow	Sunny	Amir	03/03/1997
bluebird127	Raziya	Bello	04/03/1982


- (i) Write an SQL script to create the USER table.

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- (ii) The database administrator needs to alter the USER table. A new field, Country, needs to be added. Write an SQL script to add the field Country to the USER table.

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ANSWERS:
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Question	Answer	Marks
7(a)(i)	1 mark per bullet <ul style="list-style-type: none">∞ <u>UserName</u> is the primary key in <u>USER</u>∞ <u>UserName</u> is (included as) a foreign key in <u>PHOTO</u>	2
7(a)(ii)	1 mark for each correct relationship 	2

Question	Answer	Marks
7(b)	1 mark per bullet to max 2 for explanation <ul style="list-style-type: none">∞ Referential integrity is making sure tables do not try to reference data which does not exist // A value of one attribute of a table exists as a value of another attribute in a different table∞ A primary key cannot be deleted unless all dependent records are already deleted∞ Cascading delete∞ A primary key cannot be updated unless all dependent records are already updated∞ Cascading update / edit∞ Every foreign key value has a matching value in the corresponding primary key∞ The foreign keys must be the same data type as the corresponding primary key 1 mark for a suitable example e.g. <ul style="list-style-type: none">∞ A <u>UserName</u> cannot be deleted from the <u>USER</u> table if they have a related <u>photo/textpost</u>∞ If <u>UserName</u> is updated in <u>USER</u> table, it must also be updated in <u>PHOTO</u> and <u>TEXTPOST</u> tables∞ Cannot create/edit a record in <u>TEXTPOST</u> / <u>PHOTO</u> without a matching entry in <u>USER</u> table	3

7(c)	Max 1 mark from each bulleted group 1NF <ul style="list-style-type: none"> ∞ No repeated groups of attributes ∞ All attributes should be atomic ∞ No duplicate rows 2NF (in 1NF and) <ul style="list-style-type: none"> ∞ No partial dependencies 3NF (in 2NF and) <ul style="list-style-type: none"> ∞ No non-key dependencies ∞ No transitive dependencies 	3
7(d)(i)	1 mark per bullet <ul style="list-style-type: none"> ∞ CREATE TABLE USER and (); ∞ UserName, FirstName and SecondName as VARCHAR and commas ∞ DateOfBirth as DATE and comma ∞ PRIMARY KEY(UserName) ∞ An appropriate NOT NULL <pre>CREATE TABLE USER(UserName: varchar(15) NOT NULL, FirstName: varchar(25), SecondName: varchar(25), DateOfBirth: Date, PRIMARY KEY(UserName));</pre>	5
Question	Answer	Marks
7(d)(ii)	1 mark per bullet <ul style="list-style-type: none"> ∞ ALTER TABLE USER ∞ ADD COUNTRY varchar; <pre>ALTER TABLE USER ADD Country varchar;</pre>	2