



Rewarding Learning

ADVANCED

General Certificate of Education

Centre Number

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Candidate Number

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# Software Systems Development

Unit A2 1:

Systems Approaches and Database Concepts

**ML**

[ADV11]

Assessment

**TIME**

2 hours, plus your additional time allowance.

**Assessment Level of Control:**

Tick the relevant box (✓)

Controlled Conditions	
Other	

**INSTRUCTIONS TO CANDIDATES**

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.  
 This paper is accompanied by a Pre-release Case Study. You must **not** use your own annotated copy of this Case Study.  
 Write your answers in the spaces provided in this question paper.  
 Answer **all ten** questions.

**INFORMATION FOR CANDIDATES**

The total mark for this paper is 100.  
 Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.  
 Quality of written communication will be assessed in **questions 3, 5 and 6(b)**.

For Examiner's use only			
Question	Marks available	Marks	Remark
1	8		
2	8		
3	8		
4	5		
5	8		
6	14		
7	14		
8	5		
9	20		
10	10		
<b>Total</b>	<b>100</b>		

1 Following early discussions with Shepherd's Veterinary, Frank Adams, the senior analyst with Solutions Computer Consultancy (SCC) has told his team that there are major problems with both appointments system for farm visits and the billing procedures currently in place.

(a) Outline an example of how each of these issues might affect the business.

Appointments: \_\_\_\_\_  
\_\_\_\_\_ [1]

Billing: \_\_\_\_\_  
\_\_\_\_\_ [1]

(b) Explain the two best techniques the team could use to determine the extent of the problems found.

You must discuss why each of these techniques is suitable and how they might be applied at Shepherd's Veterinary.

Technique 1: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

Technique 2: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

Examiner Only	
Marks	Remark

2 Frank always involves new trainee analysts in the development process and insists on testing their knowledge whenever possible. He has asked the trainees to complete the following paragraphs using the word list provided. Words and phrases may be used more than once.

- |                     |                          |                   |                   |                           |
|---------------------|--------------------------|-------------------|-------------------|---------------------------|
| <b>beginning</b>    | <b>evaluation</b>        | <b>first</b>      | <b>objectives</b> | <b>scope</b>              |
| <b>budget</b>       | <b>execution</b>         | <b>initiation</b> | <b>plan</b>       | <b>schedule</b>           |
| <b>closure</b>      | <b>Feasibility Study</b> | <b>last</b>       | <b>project</b>    | <b>stakeholders</b>       |
| <b>controls</b>     | <b>feedback</b>          | <b>manages</b>    | <b>resources</b>  | <b>time</b>               |
| <b>deliverables</b> | <b>final</b>             | <b>monitors</b>   | <b>risks</b>      | <b>Terms of Reference</b> |

At SCC, the development of any new system is carefully planned using the project life cycle phases of initiation, planning, \_\_\_\_\_ and \_\_\_\_\_. In the initiation phase, one of the outcomes is a \_\_\_\_\_ which is an agreement and possibly a legal contract between SCC and Shepherd’s Veterinary. This document will define the vision, \_\_\_\_\_, scope and \_\_\_\_\_ of the new project.

In all projects, \_\_\_\_\_, scope and \_\_\_\_\_ are essential considerations. The project manager \_\_\_\_\_ and \_\_\_\_\_ the project and is responsible for ensuring that a detailed \_\_\_\_\_ is produced. This must contain a schedule to ensure the project is delivered on time, as well as the estimated \_\_\_\_\_ and all \_\_\_\_\_ necessary.

In the \_\_\_\_\_ phase, the project manager will identify any problems and take corrective action to deal with them. In the \_\_\_\_\_ phase of the project, the project manager will inform all \_\_\_\_\_ and conduct an \_\_\_\_\_ of the project.

[8]

Examiner Only	
Marks	Remark



- 4 Emily, the lead developer, tells the trainees that she is considering the use of database technology using Hierarchical, Network or Relational models in the development. In order to test some basic knowledge, she asks them to complete the table below by inserting **true** or **false** opposite each statement.

Complete the table below.

Statement	true/false
Use of a database demands more storage space than the use of conventional files.	
In a network model, multiple parents are possible for each child.	
In a relational model, each column in a table corresponds to a field that has a unique name holding multiple data types.	
Many to many relationships in a relational database are decomposed using a link table.	
The hierarchical model is the only model that requires knowledge of the physical storage of records in a file or memory.	

[5]

Examiner Only	
Marks	Remark



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[8]

Examiner Only	
Marks	Remark

6 SCC has decided to develop an enquiry system for vet appointments. This will provide the following functionality:

- A vet must be able to log on to the system using login credentials. These must be verified and an error message displayed if incorrect. It is assumed that being logged on is a prerequisite for any other functionality;
- A vet can view today's appointments and have the option to view future and historical appointments;
- Viewing today's appointments will automatically display the travel time and provide the option to view animal records.

(a) Frank has asked the trainees to complete the Use Case diagram opposite identifying the missing items.

Complete the missing symbols/names/connections.

(1) \_\_\_\_\_ (9) \_\_\_\_\_

(2) \_\_\_\_\_ (10) \_\_\_\_\_

(3) \_\_\_\_\_ (11) \_\_\_\_\_

(4) \_\_\_\_\_ (12) \_\_\_\_\_

(5) \_\_\_\_\_ (13) \_\_\_\_\_

(6) \_\_\_\_\_ (14) \_\_\_\_\_

(7) \_\_\_\_\_ (15) \_\_\_\_\_

(8) \_\_\_\_\_ (16) \_\_\_\_\_

[8]

Examiner Only	
Marks	Remark





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**(Questions continue overleaf)**

7 Normalisation is an important part of database design.

(a) State the three steps of the normalisation process.

1NF

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2NF

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3NF

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[3]

(b) **Multiple** and **Nested** repeating group types are often identified during the normalisation process.

With reference to the sample invoice given in the case study, identify the repeating group and indicate its group type.

Invoice repeating group

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[2]

Group type

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[1]

Examiner Only

Marks

Remark







- 9 **Figure 1** below shows a partial database design for animal appointments for use with the following requirements.

**Figure 1 Partial Database Design for Animal Appointments**

<p><b>ANIMAL</b></p> <p>AnimalID AnimalName AnimalDOB ClientID BreedID</p>	<p><b>CLIENT</b></p> <p>ClientID ClientForename ClientSurname ClientAddress1 ClientAddress2 ClientAddress3 ClientPostcode ClientTelNo</p>	<p><b>BREED</b></p> <p>BreedID BreedDesc</p>
<p><b>APPOINTMENT</b></p> <p>AppID AppDate AppTime ClientID VetID FarmVisitYN Duration NoOfAnimals</p>	<p><b>VET</b></p> <p>VetID VetForename VetSurname</p>	<p><b>APPANIMAL</b></p> <p>AppID AnimalID</p>

- (a) For the ANIMAL table, name and describe the constraint that **must** be applied to each of the following fields.

Field	Constraint / Description
AnimalID	
BreedID	
AnimalDOB	

[3]

Examiner Only

Marks Remark





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**(Questions continue overleaf)**

**10** Emily asks the trainees to consider the tests required to determine which vets are available to cover a two hour appointment at 3:00 pm on Wednesday 3rd June.

Complete the partial Test Table, opposite, to ensure that a selection list only includes available vets when new appointments are being made.

Use the partial database given in **Figure 1**, Question **9** and assume the following:

No appointments exist for June 3rd 2020  
Last AppID used            1045  
VetIDs:                      10 Peter Shepherd  
                                     11 Robert Hardy,  
                                     12 Jean Higgins and  
                                     13 Thomas Bryce.

IDs may be created for clients and animals. [10]

Examiner Only	
Marks	Remark

**Test Table (partial)**

Test data	Reason for test data	Expected outcome
<b>Appointment details:</b> <b>AppDate 3/06/2020</b> <b>AppTime 14:30</b> <b>Duration 1.5hrs</b> <b>VetID 12</b> <b>ClientID 0051</b> <b>NoOfAnimals 2</b> <b>FarmVisitYN N</b> <i>(animal IDs D156, D157)</i>	<b>Insert valid appointment details for VetID 12 ending between 3:00 pm and 5:00 pm</b>	<b>Appointment 1046 details added to Appointment table</b> <b>Animals added to AppAnimal table with AppID (Vet 12 will NOT be available)</b>
	<b>Insert valid appointment details for VetID 11 starting between 3:00 pm and 5:00 pm</b>	
<b>Appointment details:</b> <b>AppDate 3/06/2020</b> <b>AppTime 13:00</b> <b>Duration 2 hrs</b> <b>VetID 13</b> <b>ClientID 0066</b> <b>NoOfAnimals 3</b> <b>FarmVisitYN Y</b> <i>(animal IDs R804, R905, R906)</i>		
<b>Appointment details:</b> <b>AppDate 3/06/2020</b> <b>AppTime 15:00</b> <b>Duration 2 hrs</b>	<b>Check that only free vets are available for selection from grid</b>	

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**THIS IS THE END OF THE QUESTION PAPER**

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