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General Certificate of Education

2018

Centre Number

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Candidate Number

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# Software Systems Development

Unit A2 1:

Systems Approaches and Database Concepts



A2S11

[A2S11]

FRIDAY 1 JUNE, AFTERNOON

### TIME

2 hours.

### 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 2, 4 and 6**.

For Examiner's use only			
Question	Marks available	Marks	Remark
1	10		
2	6		
3	6		
4	8		
5	10		
6	10		
7	8		
8	15		
9	6		
10	21		
<b>Total</b>	<b>100</b>		



Horizon Solutions will clearly apply a range of fact-finding techniques to their investigation. It has been suggested that observation could be used as a way to obtain relevant information.

**(b) (i)** Give one advantage and one disadvantage of using observation as a suitable fact-finding technique at Connected Works.

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**(ii)** Describe an instance of how this technique could be applied at Connected Works.

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[4]

Examiner Only	
Marks	Remark



3 Horizon Solutions is keen to ensure that Stephen and John understand why the use of a methodology might be considered in the development process.

Outline **three** benefits of using a systems development methodology at Connected Works.

1. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

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\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[6]

Examiner Only

Marks

Remark



5 Thorough testing is critical to the success of any project. Complete the paragraphs below relating to testing by selecting the correct words or phrases from the selection provided. Words or phrases may be used more than once.

- |             |             |           |                   |           |
|-------------|-------------|-----------|-------------------|-----------|
| programmer  | white-box   | manager   | users             | alpha     |
| test-data   | system      | analyst   | black-box         | analysis  |
| design      | product     | prototype | sub systems       | errors    |
| program     | acceptance  | project   | procedures        | test plan |
| methods     | test        | beta      | methodology       | analysts  |
| integration | description | plan      | corrective action |           |

Testing is conducted in order to find errors in a software system. Testing takes place all through the development life cycle and commences at the \_\_\_\_\_ stage. Finding errors at an early stage in the development is important as this can reduce time and save money. The product must be fit for purpose.

Testing sections of code in isolation to ensure that they function correctly is known as \_\_\_\_\_ testing. This type of testing is conducted by the \_\_\_\_\_.

Where the whole system is treated like a black box and the internal working of the code is not checked the type of testing is called \_\_\_\_\_ testing. This involves testing a complete \_\_\_\_\_ with all the \_\_\_\_\_ integrated together.

Every systems specification should contain a test plan. This plan should contain a description of each test, \_\_\_\_\_, expected outcome, actual outcome and \_\_\_\_\_.

Testing conducted by \_\_\_\_\_ at the end of the development cycle is called \_\_\_\_\_ testing. [10]

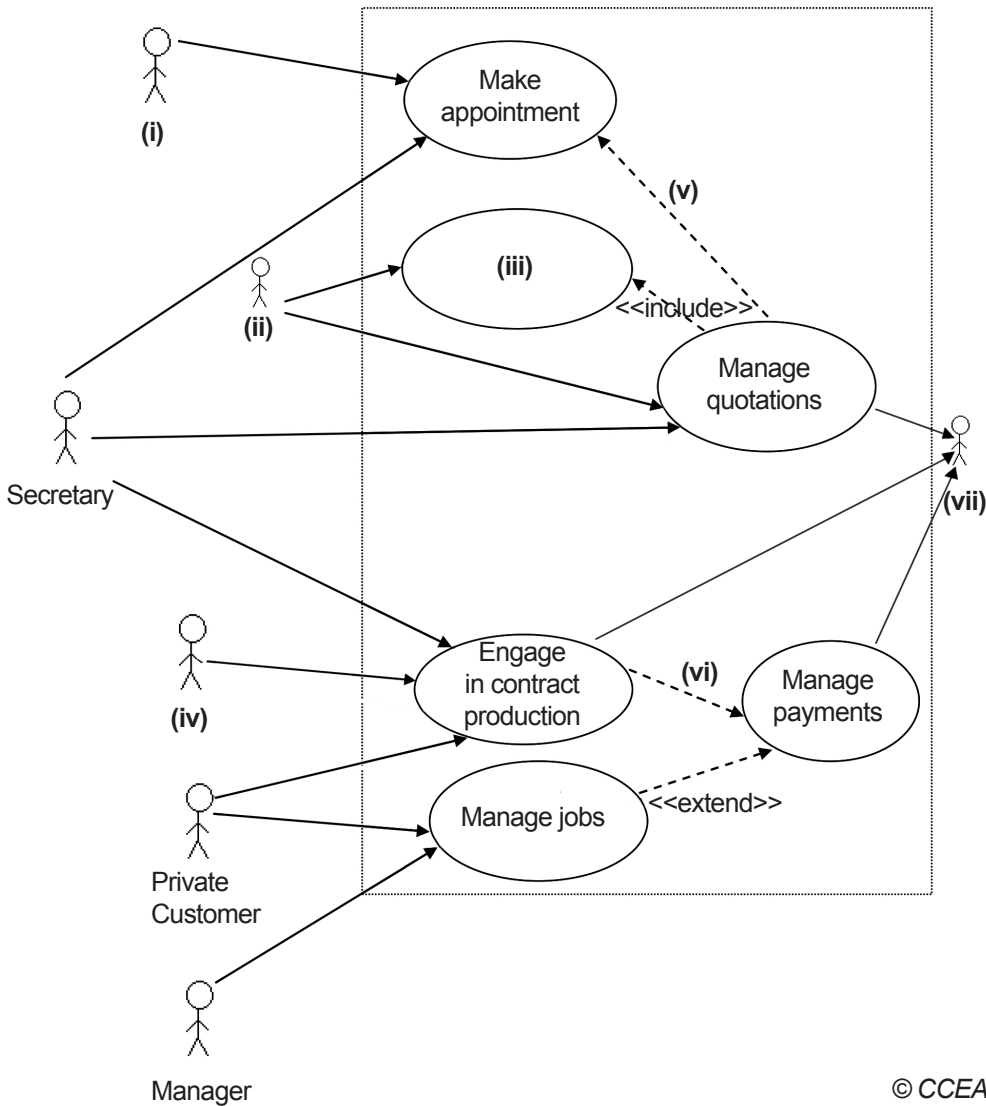
Examiner Only	
Marks	Remark



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**(Questions continue overleaf)**

7 Using UML, Anne the analyst has begun to develop a diagram to represent processes associated with private customers. Complete the partial UML diagram she has started below.



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- (i) \_\_\_\_\_
  - (ii) \_\_\_\_\_
  - (iii) \_\_\_\_\_
  - (iv) \_\_\_\_\_
  - (v) \_\_\_\_\_
  - (vi) \_\_\_\_\_
  - (vii) \_\_\_\_\_
- Identify Type of UML diagram
- (viii) \_\_\_\_\_ [8]

Examiner Only	
Marks	Remark

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**(Questions continue overleaf)**

8 Robert, one of the software development team, is designing the database structure for the new system at Connected Works. He uses a variety of documents gathered from the current system for the normalisation process.

Using the sample quotation document given in the case study Robert has identified the derived fields and the non-atomic data.

(a) (i) Give an example of a derived field that does not need to be included in the normalisation process.

\_\_\_\_\_ [1]

(ii) Give an example of a **non**-atomic field indicating the breakdown required.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

Robert has also noted the repeating groups (nested) and devised the table names required for 1NF. The un-normalised data identified by Robert is shown below.

QuotationNo, QuotationDate, StaffNo, StaffSurname, StaffForename,  
CustomerNo, CustomerSurname, CustomerForename,  
CustomerAddress1, CustomerAddress2, Customer TelNo, {JobNo,  
JobType, Duration, {MaterialNo, Material, QtyRequired, Price,}}  
LabourCost

Examiner Only	
Marks	Remark

(b) Complete the transformation of the data into third normal form showing:

- 1st Normal Form (Attribute names may be abbreviated)

QUOTATION

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QUOTATIONJOB

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QUOTATIONJOBMATERIAL

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Examiner Only	
Marks	Remark





9 The tables below form part of the proposed database system.

Examiner Only	
Marks	Remark

CONTRACT	
field	Data Type
<u>ContractNo</u>	int
StartDate	Date
EndDate	Date
CustomerNo*	int
FeeNo*	int

CONTRACTJOB	
field	Data Type
<u>ContractNo*</u>	int
<u>JobNo*</u>	int
Frequency	char
DateLastCarriedOut	date

JOB	
field	Data Type
<u>JobNo</u>	int
JobType	Varchar(30)
SkillNo*	int

STAFF	
field	Data Type
<u>StaffNo</u>	int
StaffSurname	varchar(20)
StaffForename	varchar(20)
Salary	Decimal(8,2)
SkillNo*	int

SKILL	
field	Data Type
<u>SkillNo</u>	int
Skill	Varchar(25)
Cost_hr	Decimal(5,2)

The team must ensure that one or more suitably skilled staff members are allocated to a contracted job.

Clearly identifying the primary key and foreign keys, complete the table CONTRACTJOBSTAFF given below to support this requirement.

CONTRACTJOBSTAFF	
field	Data Type
ContractNo	int

[6]





(c) Write the SQL script to count the number of new contracts for each fee number. A new contract has a start date in the future.

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[4]

Examiner Only	
Marks	Remark

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

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