2013 Information Systems

Advanced Higher

Finalised Marking Instructions

Part One: General Marking Principles for Information Systems Advanced Higher

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

(a) Marks for each candidate response must <u>always</u> be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.

(b) Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

GENERAL MARKING ADVICE: Information Systems Advanced Higher

The marking schemes are written to assist in determining the "minimal acceptable answer" rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates' evidence, and apply to marking both end of unit assessments and course assessments.

Part Two: Marking Instructions for each Question

SECTION I

Question			Expected Answer/s	Max Mark	Additional Guidance
1			**A software company is developing a replacement booking system for a sports centre.**		
1	a		**State two resources that should be considered in the *project plan.*** For example: • Time • Personnel • Budget • Hardware/software **Award 1 mark each for any two valid resources.**	**2** **KU DBAD 2.2**	
1	b		**At the end of the analysis stage, the *systems specification* is produced.** **Describe two *functional requirements* that would be stated in the systems specification for the sports centre.** For example: • The new booking system must allow users to check availability of sports facilities • The new booking system must allow users to search for list of all available sports facilities on any given date and time • Many other examples are possible **Award 1 mark each for any two valid functional requirements of a sports centre booking system.**	**2** **KU DBAD 2.5**	

Question			Expected Answer/s	Max Mark	Additional Guidance
1	**c**		**During the analysis stage of the development, *data flow diagrams (DFDs)* and an *entity relationship diagram (ERD)* were produced. Explain why a new ERD and new DFDs are created during the design stage of the development.** The diagrams produced at analysis represent the current system used by the sports centre whereas the diagrams produced at the design stage are logical designs of the replacement system that is under development. **Award 1 mark for clear description of difference.**	**1** **KU DBAD 1.1, 4.1.2**	
1	**d**		**State two features of a *user guide*.** For example: • Labelled screen shots showing the layout of screen and position of screen objects • Description of each feature of the booking system • Contents page • Other valid answers possible **Award 1 mark each for any two valid features of a user guide.**	**2** **KU DBIT 4.1**	
1	**e**		**Once the replacement booking system is completed, an *evaluation* is performed. Describe two aspects of the booking system that would be considered during the evaluation.** For example: Evaluation of the replacement system would consider the maintainability of the system to determine how easy it would be for future maintenance team to carry out any necessary maintenance work. Evaluation of the replacement system would consider the system's ease of use to determine how easy it would be for end users to operate the system and navigate their way around it. **Award 1 mark each for accurate description of two features considered in the evaluation of the replacement system.**	**2** **KU DBIT 4.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
1	**f**		**The booking system includes a number of elements including:** • *forms* • *queries* • *reports* • *tables.* **A member of the sports centre enquires about the availability of badminton courts on a particular day. Explain how the four elements of the booking system listed above would be used to handle the member's enquiry.** For example: The enquiry criteria would be entered into a form. A submit button on the form would cause a query to execute. This query would be used to check the availability of the courts. The query would access the underlying tables which would be used to store details of sports centre facilities and bookings. The results of the query would be presented to the user using the report facility. **Award 1 mark each for accurate explanation of how each element would be used to handle the member's enquiry.**	**4** **PS** **DBIT** **3.1**	

Question			Expected Answer/s	Max Mark	Additional Guidance
2			**A chain of pizza restaurants is upgrading its online ordering system.**		
2	a		*A feasibility study* **is carried out.**		
2	a	i	**Describe the purpose of a feasibility study.**	**1** **KU** **DBAD** **2.1**	
			For example: Feasibility study is used to investigate development costs and potential benefits; it is used to determine whether or not the proposed project is viable.		
			Award 1 mark for accurate description.		
2	a	ii	**Describe two aspects you would expect to find in the feasibility report.**	**2** **KU** **DBAD** **2.1**	
			Accurate description of any 2 of: • Economic • Technical • Legal • Time/schedule		
			Award 1 mark each for accurate description of any two types of feasibility.		
2	b		**Copy and complete the table below to indicate a suitable *investigation result*, *investigative technique* and source of information in each case:**		

Investigation Result	Investigative Technique	Source of Investigation
Components in existing system		
		Online customers

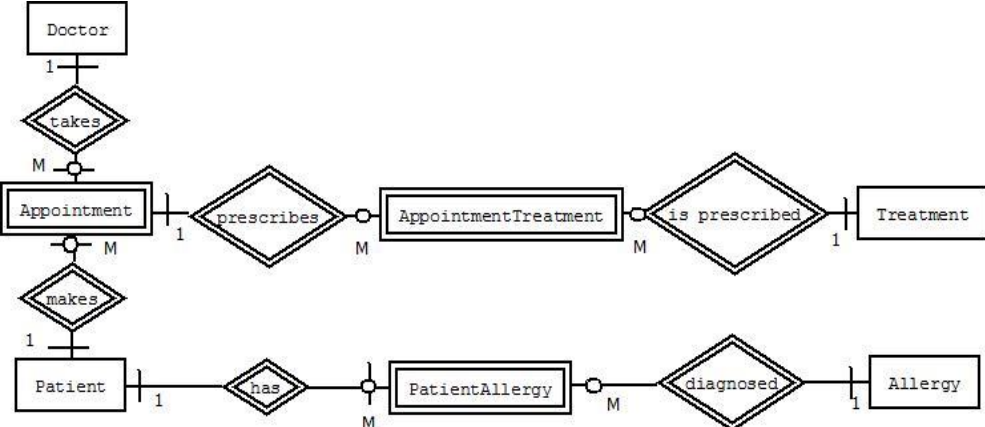|		
Components in existing system Observation of users, questionnaires to technical support staff, interview technical support staff. **Award 1 mark each for investigative technique and source.** Online customers Information about customer experience and feedback about likes/dislikes regarding current site could be gained from online questionnaires. Other acceptable answers possible. **Award 1 mark each for result from investigation and technique.**	**4** **KU** **DBAD** **2.3, 2.4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
2	**c**		**The interface of the upgrade is developed using *Rapid Application Development (RAD) tools*. Give one reason why the use of RAD tools may lead to:**		
2	**c**	**i**	**reduced costs;** For example: Purchase of RAD tools may cost less than build costs. Reduced development time will lead to reduction in staff costs. **Award 1 mark for any valid reason.**	**1** **KU DBAD 4.1.4**	
2	**c**	**ii**	**less efficient code.** For example: Code isn't hand written and often includes unnecessary overheads. **Award 1 mark for any valid reason.**	**1** **KU DBAD 4.1.4**	
2	**d**		**The pizza chain does not want to lose too much time or business when changing to the upgraded system. Select a suitable *conversion technique* that could be used to convert to the upgraded system and describe how this method would be used to carry out the changeover.** Pilot conversion: the chain could try the new system out in one branch for a period of time before rolling it out to the rest of the restaurants; this would require a filtering system on the landing page. Phased: the chain could introduce one or two components of the new system to one or more branches before gradually introducing other components of the system. Direct: immediate upgrade meaning no loss of business time. Parallel: do not accept since this is an online system. **Award 1 mark for suitable conversion technique; award 1 mark for description.**	**2** **PS DBIT 3.2**	

	Question		Expected Answer/s	Max Mark	Additional Guidance
2	**e**		**The need for an upgrade to an online ordering system can arise for a number of reasons. State one reason why the following types of _maintenance_ may be required.**		
2	**e**	**i**	**Adaptive** For example: Adaptive: upgrade is required to ensure that existing system is compatible with changes to OS or browser software.	**1** **KU DBIT 4.3**	
2	**e**	**ii**	**Perfective** Perfective: upgrade is required to add new functionality to the existing system **Award 1 mark each for any valid reason.**	**1** **KU DBIT 4.3**	

Question	Expected Answer/s	Max Mark	Additional Guidance
3	**The Green Garage has a contract to repair vehicles belonging to taxi companies. The description below details the processes carried out by the garage.**		

DEALING WITH BREAKDOWN

When a taxi breaks down or develops a fault, the taxi company notifies the garage of the details of the taxi and its whereabouts. The garage gets the taxi company details from its customer file and stores those details along with details of the broken down taxi in a job file. It then uses its contractor file to find a breakdown truck owner who is contacted with instructions to collect the taxi.

DEALING WITH REPAIR

The breakdown truck collects the taxi and delivers it to the garage. The garage inspects the vehicle to determine what work needs done. The details and prices of the replacement parts are retrieved from the parts file and saved in the job file. An estimate of repair costs is then calculated and e-mailed to the taxi company. Once the taxi company has given confirmation to proceed with the repair, the garage carries out the work and adds the actual time taken to a time sheet.

INVOICING

The garage then prepares an invoice – an example of which is shown. This is sent to the taxi company for payment and the invoice data is added to the invoice file.

THE GREEN GARAGE INVOICE

14 Hamilton Street INVOICE #123
DUNMILLER DATE: OCTOBER 5 2012
Phone 0199 999999 Fax 0199 999998

TO: FOR:
The Manager Repair of taxi – SB10BER
MERLIN TAXIS
54 Freeway Drive
MAXTON

DESCRIPTION	HOURS	RATE	AMOUNT
Replacement of exhaust			
Front Section			£45·45
Rear Section			£69·67
2 Clamps		3·85	£7·70
Time taken	2 hours	24·00	£48·00
		TOTAL	£170·82

Use the description and sample invoice above, to draw a *level one data flow diagram* for the processes of the Green Garage.

Question	Expected Answer/s	Max Mark	Additional Guidance

3   **(cont)**

Correct solution has:
14 data flows and 1 physical flow,
6 data stores, 2 external entities and
3 processes

Notes
1. Customer may be involved in the invoice process. This should be accepted.
2. Taxi details and Taxi company details may not be separate data flows in 'deal with breakdown' process.

Award max 10 marks as follows:
3 processes correct and both entities correct,
                             1 mark
6 data stores correct,   **1 mark**
1 physical flow correct,   **1 mark**
14, 13 data flows correct,   **7 marks**
12, 11 data flows correct,   **6 marks**
10, 9 data flows correct,   **5 marks**
8, 7 data flows correct,   **4 marks**
6, 5 data flows correct,   **3 marks**
4, 3 data flows correct,   **2 marks**
2, 1 data flows correct,   **1 mark**

Max Mark: **10**

PS
DBAD
3.4

Question			Expected Answer/s	Max Mark	Additional Guidance
4			An allergy clinic employs a number of doctors to treat patients. A patient makes an appointment for a set date and time. A doctor sees the patient for the appointment, and may prescribe or administer one or more treatment. The appointment system is to be converted from a manual system to a computerised one using a relational database system. In designing the system, an entity-relationship diagram is to be created. After normalisation to *Third Normal Form* (3NF), the following entities and attributes have been identified. In this representation, underlined attributes represent <u>**Primary keys**</u>, while asterisked attributes represent Foreign Keys*. Appointment [<u>Appointment No.</u>, Date, Time, <u>Doctor Name</u>*, <u>Patient ID</u>*] Doctor [<u>Doctor Name</u>, Doctor Room No., Doctor Phone No.] Treatment [<u>Treatment ID</u>, Treatment Description] Appointment Treatment [<u>Appointment No.</u>*, <u>Treatment ID</u>*] Patient [<u>Patient ID</u>, Patient Firs Name, Patient Surname, Patient Postcode, Patient Phone No.] Allergy [<u>Allergy ID</u>, Allergy Description] Patient Allergy [<u>Patient ID</u>*, <u>Allergy ID</u>*] The following information should be noted: - Appointment No., Doctor Name, Treatment ID, Patient ID and Allergy ID are unique identifiers - patients are only registered when they first make an appointment - all doctors see patients for appointments - appointments sometimes end without a treatment - some treatments have not yet been used - all patients referred to the clinic have allergies, and an individual patient may have several allergies - some allergies have yet to be found in patients.	**10** **PS** **DBAD** **3.2.1**	

Question	Expected Answer/s	Max Mark	Additional Guidance
4	**(cont.)** **Using the information provided above, design an *entity-relationship diagram* which shows:** • **the *cardinality* of all relationships;** • **any *weak entities* and *weak relationships*;** • **the *optionality* of all relationships.** Correct solution has 6 cardinality pairs, 6 optionality pairs, 2 weak entities and 4 weak relationships. Note: accept mandatory or optional relationship at 3 instances where this is indicated. **Cardinality: award 3 marks for 6 correct; award 2 marks for 4 correct; award 1 mark for 2 correct; else award 0 marks. Max 3 marks** **Optionality: award 3 marks for 6 correct; award 2 marks for 4 correct; award 1 mark for 2 correct; else award 0 marks. Max 3 marks** **Weak entities: award 2 marks for all correct award 1 mark for any 2 correct; else award 0; deduct 1 mark for unnecessary weak entities indicated. Max 2 marks.** **Weak relationships: award 2 marks for correct; award 1 mark for 4 correct; else award 0 marks; deduct 1 mark for unnecessary weak relationships indicated. Max 2 marks.** **Max 10 Marks to be awarded**		

Question			Expected Answer/s	Max Mark	Additional Guidance
5			**A hotel is upgrading its online booking system.**		
5	**a**		**Show how he following events would be recorded in the *entity-event matrix* for the hotel booking system.**	**3** **PS** **DBAD** **3.3.1**	

Event \ Entity	Customer	Guest	Room	Booking	Charge
A new customer makes a booking for his parents as a surprise anniversary gift. Since his parents are regular guests at this hotel, their details are already stored in the system. At the time of the booking, the cost of the room is paid in full; this is recorded as a new charge.					
During their stay at the hotel, his parents charge use of the beauty salon and restaurant to their booking.					

Completed entity event matrix

Event	Customer	Guest	Room	Booking	Booking charge
Booking	C	R	(R)	C	C
Charge				R (M)	C

Award 2 marks for booking event fully correct; deduct 1 mark for each error up to maximum 2 errors; award 1 mark for charges event fully correct.

Notes:
1. **Read of room entity is not necessary to receive full marks for 1st event**
2. **Accept modify event as alternative to read for 2nd event.**

Question			Expected Answer/s	Max Mark	Additional Guidance
5	**b**		**The booking system also includes an entity called "Room Facility". Sample data stored in this entity is shown below.**		

RoomID	FacilityID	Facility Description	Comment
125	26	Network point	Fibre Optic LAN
125	63	Fridge	Installed 26/4/09
382	63	Fridge	Repositioned by window
470	11	TV	Upgraded 18/10/11

Question			Expected Answer/s	Max Mark	Additional Guidance
5	**b**	**i**	**Define the validation needed for the "RoomID" attribute of this entity.** Existing RoomID Lookup Room entity **Award 1 mark for indicating lookup.**	**1** **PS DBAD 3.2.2**	
5	**b**	**ii**	**Explain why the "Room Facility" entity is a weak entity.** It is a weak entity because the primary key of the entity is formed by using the primary key of another entity in the system – in this case, the RoomFacilities entity has a weak relationship with the Room entity. **Award 1 mark for reason for weak entity.**	**1** **PS DBAD 3.2.1**	
5	**b**	**iii**	**The "Room Facility" entity may be considered to be inefficient in terms of memory. Explain why this is the case and suggest a more efficient solution.** The attributes FacilityDescription contains duplicate values. Creation of a new separate entity 'FacilityDetail' would remove this problem by storing each description only once and so reduce memory needed to store the attribute data. **Award 1 mark for identifying the problem with FacilityDescription attribute; award 1 mark for correct solution.**	**2** **PS DBAD 3.1**	

Question			Expected Answer/s	Max Mark	Additional Guidance
5	**c**		**The completed entity-event matrix entry for the "Room Facility" entity is shown below.**	**4** **PS DBAD 3.3.2**	

Event	Room Facility
Add new room to hotel	C
Install new facility in room	C
Upgrade facility in room	M
Reposition facility in room	M
Remove facility from room	D

Use the information in the entity-event matrix above to create the *entity life history* diagram for the "Room Facility" entity of the booking system.

Entity Life History Diagram

Award 1 mark for correct events in create and delete branches; award 1 mark for correct events in life branch; award 1 mark for correct use of 'o' notation; award 1 mark for correct use of * notation.

Question			Expected Answer/s	Max Mark	Additional Guidance
5	**d**		**An extract from the *test plan* for the hotel booking system is provided below.**	**3** **PS DBIT 2.2, 3.1**	

Test Number	Details	Type of Testing	Element(s) to be tested
	………………………………….. …………………………………..		
Test 14	Test validation rules for customer entity	**A**	Customer form
	………………………………….. …………………………………..		
Test 23	Create new booking for existing customer	Integrative	**B**
	………………………………….. …………………………………..		
Test 78	Ensure system meets client's expectations	**C**	User interface
	………………………………….. …………………………………..		

Complete the test plan to indicate the *type of testing* and the *element to be tested* in each case by identifying the missing entries labelled A, B and C.

Test 14 – Component testing
Test 23 – Booking form; Relationship
between booking and
customer tables
Test 78 – Acceptance testing

Award 1 mark each.

Question			Expected Answer/s	Max Mark	Additional Guidance
6			**A company offers sightseeing tours around six Scottish cities: Aberdeen, Dundee, Edinburgh, Glasgow, Inverness and Stirling. A special sightseeing bus is driven around the city as a commentary is played to inform the passengers of interesting facts about the city. A relational database system is being developed to store details of the tours.**		
	a		Normalise the attributes listed below.		

Attributes	Sample Data
City	Glasgow
Main depot	Buchanan Street
Tour manager ID	1234
Tour manager name	J Smith
Tour manager contact number	01419999991
Bus registration number	AB01RTF
Tour date	15/05/2013
Route number	3
Start point	Buchanan Street
End point	Hampden Park
Driver ID	FT4455
Driver name	P Anderson

You must show all stages of normalisation, from un-normalised form through to third normal form and your solution should take account of the following information.

- **Each city has at least 5 buses**
- **Each bus may be used on a number of different routes on the same day**
- **The registration number of each bus is unique**
- **Each city has only one tour manager**

Question			Max Mark	Expected Answer/s			
6	**a**		**10**	UNF	INF	2NF	3NF

			PS DBAD 3.1	<u>City</u>
				Main depot
				Tour manager ID
				Tour manager name
				Tour manager contact number
				   Bus registration number
				   Tour date
				   Route number
				   Start point
				   End point
				   Driver ID
				   Driver name
					<u>City</u>
					Main depot
					Tour manager ID
					Tour manager name
					Tour manager contact number
					
					City*
					<u>Bus registration number</u>
					Driver ID
					Driver name
					
					<u>Bus registration number*</u>
					<u>Tour date</u>
					<u>Route number</u>
					Start point
					End point
						<u>City</u>
						Main depot
						Tour manager ID
						Tour manager name
						Tour manager contact number
						
						City*
						<u>Bus registration number*</u>
						
						<u>Bus registration number</u>
						Driver ID
						Driver name
						
						<u>Bus registration number*</u>
						<u>Tour date</u>
						<u>Route number *</u>
						
						<u>Route number</u>
						Start point
						End point
							<u>City</u>
							Main depot
							Tour manager ID*
							
							<u>Tour manager ID</u>
							Tour manager name
							Tour manager contact number
							
							City*
							<u>Bus registration number*</u>
							
							<u>Bus registration number</u>
							Driver ID*
							
							<u>Driver ID</u>
							Driver name
							
							<u>Bus registration number*</u>
							<u>Tour date</u>
							<u>Route number*</u>
							
							Route number
							Start point
							End point

				NOTE: Based on the information provided, many alternative solutions are possible. One possible solution is provided. An alternative solution is provided in marking instructions for Question 12. **Award 10 marks for any fully correct solution; deduct 1 mark for each processing error (eg based on UNF provided by the candidate, failure to remove repeating data correctly, incorrectly identifying FK and PK, failure to correctly remove partial dependencies, failure to correctly remove transitive dependencies). Max 10 marks**			

Question			Expected Answer/s	Max Mark	Additional Guidance
6	**b**		**Read the following *structured English* which is used to calculate the total revenue for each tour.**	**3** **PS** **DBAD** **4.1.3**	

```
total revenue = 0
loop for each passenger
     if passenger is OAP
          apply 20% discount to ticket price
     end if
     add tour price to total revenue
end loop
```

Convert this structured English to a *graphical design notation* with which you are familiar.

For example – structure diagram

Award 1 mark for all steps of structured English indicated in correct sequence; award 1 mark for correctly indicating repetition; award 1 mark for correctly indicating selection.
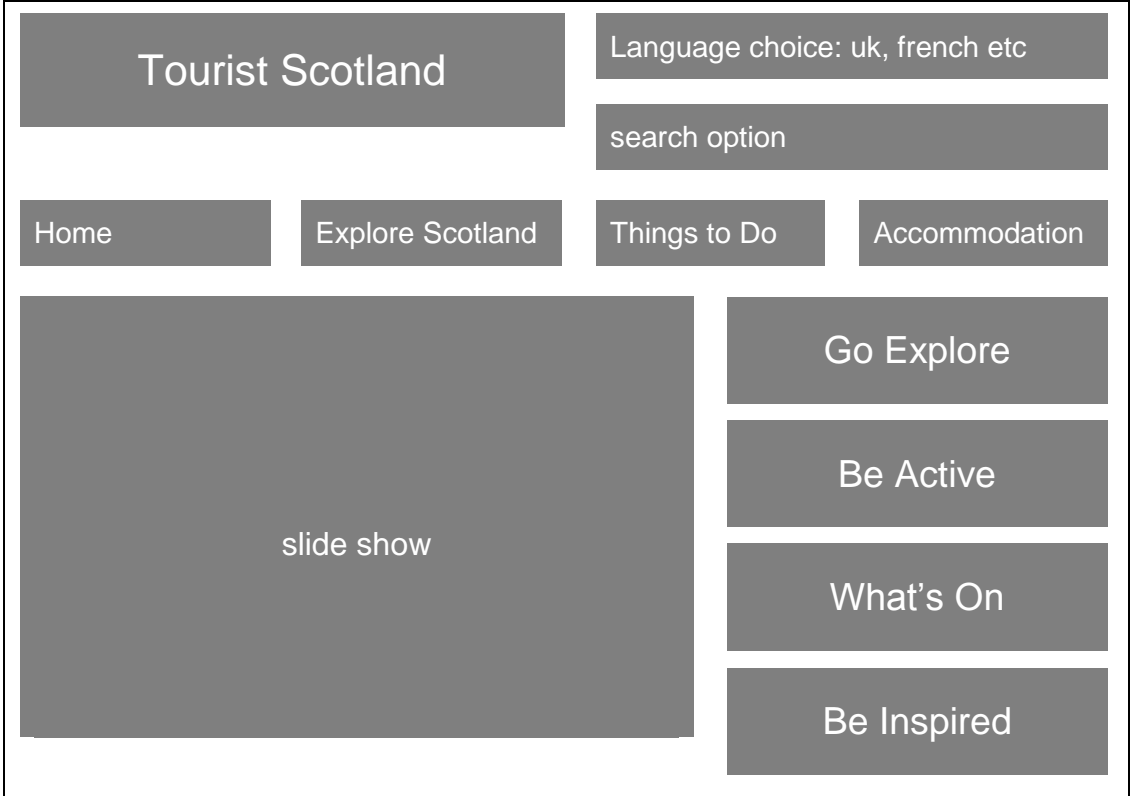
Question			Expected Answer/s	Max Mark	Additional Guidance
7			**A group of travel and photography enthusiasts is putting together a website called MyFotoDiary.com. The site will allow the uploading and sharing of photographs of people and places from around the world.** **The site will include facial recognition software for photographs and will allow users to "tag" the faces with a person's name. The software will then search for similar faces in other photos and tag them with that person's name.**		
7	a		**The site is to contain a search facility. Explain how a *predictive interface* would make the search facility easier to use.** As the user enters the search criteria, the interface looks ahead and suggests possible words. A changing list of possible choices is presented to the user, meaning there is less typing to do thus saving time and reducing errors. **Award 1 mark for explanation.**	**1** **PS** **ISI** **2.2.1**	
7	b		**State the name of the intelligent feature that finds and tags similar faces in other photographs.** Agent or agent-based interface **Award 1 mark.**	**1** **PS** **ISI** **2.2.1**	

Question			Expected Answer/s	Max Mark	Additional Guidance
7	c		A mobile version of the website is to be developed for smart phones and small wireless media players.		
7	c	i	State two *technological* differences which would have to be taken into account when converting from the laptop and desktop version to the mobile version of the site. For example: • Screen size • Screen resolution • Amount of RAM • Data transmission/reception rates **Award 1 mark each for any two valid responses.**	2 KU ISI 1.1	
7	c	ii	For each of your answers to part (c) (i) above, describe the changes that have to be made to the website. For example: • The small screen size of the smart phone could be got round by allowing the ability to zoom in and out • Or by finding an alternative to drop-down menus (spinning dial etc) • Data transmission rates could be compensated for by not downloading large graphic or media files unless specifically pulled/requested by the user, etc. **Award 1 mark each for any two sensible ways of addressing the technological differences identified in part (i), above. Note that solutions must relate to issues raised earlier.**	2 PS ISI 1.1	
7	d		New browser software displays a gallery of images that represents the site most visited by the user. Over time, the contents of the gallery are updated frequently. Name a feature of an intelligent interface which could update the gallery contents. Adaptive interface **Award 1 mark.**	1 PS ISI 2.2.1	
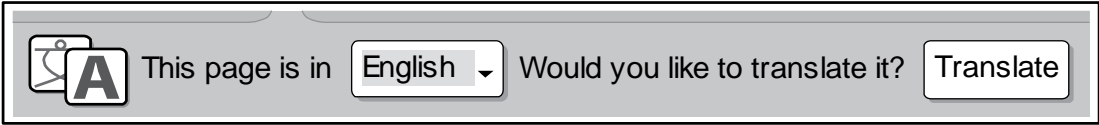
Question			Expected Answer/s	Max Mark	Additional Guidance
8			**A new generation of automated cash machines is being developed.**		
8	**a**		**Describe the purpose of *system refinement* during the design stage of any development.** System refinement is used to transform a systems specification into a formal design that will lead to implementation components; it is the methods used to transform a formal specification into a form which is closer to the desired final form of an executable program: it is the process of identifying tasks from the specification and breaking them down to give sufficient detail to aid implementation. **Award 1 mark for an accurate description.**	**1** **KU DBAB 4.1.1**	
8	**b**		**State one reason why it is necessary for any system being developed to undergo *systematic testing*.** Systematic testing is needed to ensure that: • the system being developed is free from errors • results of testing are recorded • pre-planned rather than ad hoc testing of the solution **Award 1 mark for any valid reason.**	**1** **KU DBIT 2.3**	
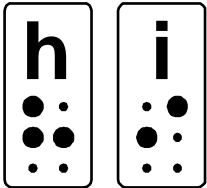
Question			Expected Answer/s	Max Mark	Additional Guidance
8	**c**		**The developer sketches a *low fidelity prototype* of the introductory screen.**		
8	**c**	**i**	With reference to the sketch above, explain **one** difference between the terms *syntax* and *semantics*. Click on the button 'ATM Services' would be the syntax, the method of issuing the instruction. The change to the screen for the ATM services would be the semantics, the effect of executing the instruction. Note: answer must refer to sketch provided. **Award 1 mark for syntax description; award 1 mark for semantic description.**	**2** **PS** **ISI** **1.4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
8	c	ii	**State two characteristics of a low fidelity prototype.** Characteristics – low cost, no coding involved, paper-based, quick and easy to update, focuses on usability issues rather than technology/hardware issues; other valid characteristics possible. **Award 1 mark each for any 2 valid characteristics.**	**2** **KU** **ISI** **3.6**	
8	c	iii	**Describe one advantage of prototyping as a method of interface design as opposed to the use of a *state transition diagram* for the same purpose.** Prototyping focuses on usability whereas a state transition diagram focuses on links between screens and actions that trigger those transitions **Award 1 mark.**	**1** **KU** **ISI** **3.3, 3.5**	

Question			Expected Answer/s	Max Mark	Additional Guidance
9			**A website is being developed to help promote Scotland as a tourist destination. The website aims to allow as many people as possible to access the information.**		
9	**a**		**The *storyboard* of the website includes the layout of the home page as shown below.**		

			Each screen layout in the storyboard shows the options in the same position with the same formatting used.		
9	**a**	**i**	**Name one *quality inspection method* that has influenced the layout of the storyboard**.	**1**	
			Consistency Inspection	**KU**	
			Award 1 mark.	**ISI**	
				4.3.4	

Question			Expected Answer/s	Max Mark	Additional Guidance
9	a	ii	**Explain how *time to learn* could be used to determine the effectiveness of this layout for new visitors to the site.** New visitors to the site should quickly be able to navigate their way around the site. A consistent layout will make it easier to learn where the options are and make it easier to remember them from page to page. **Award 1 mark.** **Note: to receive a mark, explanation must indicate how 'time to learn' is reduced by consistent layout and formatting of options**	**1** **PS** **ISI** **4.2**	
9	b		**The design team must decide between a text element and a graphical element to represent the help option on each screen. State one benefit of having the help option shown as:**		
9	b	i	**text;** For example: • Text is simple to implement • Text has no copyright implications **Award 1 mark text benefit.**	**1** **PS** **ISI** **3.4**	
9	b	ii	**a graphic.** For example: • Graphics are more universal and a wider range of users understand them **Award 1 mark graphic benefit.**	**1** **PS** **ISI** **3.4**	
9	c		**The designers are aware of the need to *adhere to standards.*** **Name one standard the designers of the website would need to consider.** Web-accessibility guidelines **Award 1 mark.**	**1** **KU** **ISI** **4.3.5**	

	Question		Expected Answer/s	Max Mark	Additional Guidance
9	**d**		**Once implemented and viewed from outside the UK, the website displays a message similar to the one shown below:** This page is in English ▾ Would you like to translate it? Translate		
9	**d**	**i**	**Describe one technique that may be used to change a web page from English to another language selected by the user.** Machine translation Appropriate description **Award 1 mark for machine translation; award 1 mark for description.**	**2** **KU ISI 2.2.2**	
9	**d**	**ii**	**A web page includes a facility that allows users to search for information by entering their own wording in the search box.** **Name this feature of an intelligent interface.** Natural Language Querying **Award 1 mark.**	**1** **KU ISI 2.2.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
10			A phone company is developing a mobile phone that will allow blind people to make phone calls and send text messages. They will use a keypad to press keys' identified by Braille letters and numbers, which are patterns of raised dots.		
10	a		State the *mode* of the keypad interface for the new phone. Sensory interface (also accept haptic interface) **Award 1 mark.**	1 KU ISI 1.3	
10	b		As an alternative method to keying in text or numbers using the Braille keypad, a blind person could use *speech driven software*. State two disadvantages of speech driven software over keying in text. Disadvantage: • Speech recognition software not 100% accurate • Difficult to use in noisy surroundings • Speech may not be recognized if user has cold, strong accent etc. **Award 1 mark each for any two valid disadvantages.**	2 KU ISI 2.2.2	
10	c		When text messages are received, they will be read using a touch sensitive screen which gives vibrational feedback to the fingers of the user in the form of Braille text. **Describe an alternative method that could be used for the output of text messages received by a blind person.** The text could be read out to the user, by means of text to speech conversion. **Award 1 mark.**	1 PS ISI 1.2	

	Question		Expected Answer/s	Max Mark	Additional Guidance
10	d		**The company will use the *LUCID methodology* to develop the new phone.** **Name the first stage of this methodology and describe two processes that the company would carry out during this stage.** Envision • identifying user groups • developing a share vision • identifying technical, schedule, resource and environmental constraints • establishing a project plan • establishing usability goals **Award 1 mark for stage; award 1 mark each for accurate description of any two tasks carried out.**	**3** **KU** **ISI** **3.1**	
10	e	i	**State one *qualitative technique* which would be suitable for usability testing of how easy it is for users to create and send text messages with the phone.** • Thinking aloud protocol • Question-asking protocol • Co-discovery method probably not suitable and eye tracking definitely not. **Award 1 mark for naming suitable technique.**	**1** **PS** **ISI** **4.1**	
10	e	ii	**Describe how this technique would be used.** Thinking aloud protocol: While creating and sending the text, the participant must speak aloud his or her thoughts, feelings, and opinions while interacting with the phone. The tester records all comments. Question-asking protocol: While the participant is doing the task, the tester asks him or her questions and records the replies. **Award 1 mark for accurate description of how the named technique would be used. Note that the question specifically asks HOW the technique would be used – mark should not be awarded for a straightforward description of the technique.**	**1** **PS** **ISI** **4.1**	

Question			Expected Answer/s	Max Mark	Additional Guidance
10	f		**After release of the new mobile phone, the company wishes to evaluate its usability by using either a *survey* or a *questionnaire*.**		
10	f	i	**Describe one difference between a survey and a questionnaire.** A questionnaire is sent out to users, who complete it themselves by answering all the questions, then return it to the sender. A survey is completed during a one-to-one interview with the user; the researcher asks the questions, and fills in the user's responses. This can either be done in a face-to-face interview, or by phone. **Award 1 mark.**	**1** **KU** **ISI** **4.4.1,** **4.4.2**	
10	f	ii	**Explain which would be better, a survey or a questionnaire, to evaluate the usability of the new mobile phone.** A survey is time consuming and expensive for the company but the researcher could explain the questions if they are not clear and would probably get a higher return rate than a questionnaire. **OR** A questionnaire would be difficult for a blind person to do on their own, but could be done with a friend. It is the simpler and cheaper option for the company. **Award 1 mark.**	**1** **PS** **ISI** **4.4.1,** **4.4.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
11			**The new MoOS operating system is being developed. Key features of the user interface of the new operating system are described below.**		

- Optimised for touch but works equally well with a mouse and keyboard, including keyboard shortcuts.

- Fast launching of applications from tile-based start screen, similar to that used in smart phones.

- Suitable for desktop PCs, laptops, tablet computers and notebook PCs.

- Designed to go from 10" tablet screen to big screens in your living room, from ultra-portable notebooks to large gaming systems and business desktops.

A screenshot of the MoOS operating system is shown below.

Question			Expected Answer/s	Max Mark	Additional Guidance
11	a		**Discuss the interface of the MoOS operating system in terms of:** • *typical users* • *physical constraints.* **Justify each comment by making reference to the screenshot or relevant statements in the description above.** Typical users: interface is suitable for members of the public due to the touch interface and tile-based start screen similar to that in smart phones which novice users are likely to already be familiar with. It is also suitable since it provides an interface that is similar to interfaces on smart phones and can be used on different types of PC making it easier for someone who knows what they are doing to switch from one device to another. The operating system provides keyboard shortcuts which are useful for expert/frequent users who have the knowledge and skills to make use of these productivity boosting features. **Award 1 mark for description of users; award 1 mark for appropriate supporting evidence from screenshot / statements in stem.** **Max 2 marks** Physical constraints: the interface is available for different types of PC – desktops, laptops, tablets and notebooks – meaning that there are few physical constraints. The operating system has been designed to cope with any screen size, once again indicating that there are few physical constraints. Similarly, the OS can be used on portable PCs and therefore is not limited physically. Since it is optimized for touch, the interface does require a high resolution touch sensitive screen. **Award 1 mark for discussion of one aspect of interface that relates to physical constraints; award 1 mark for appropriate supporting evidence from screenshot / statements in stem.** **Max 2 marks**	**4** **PS** **ISI** **1.2**	

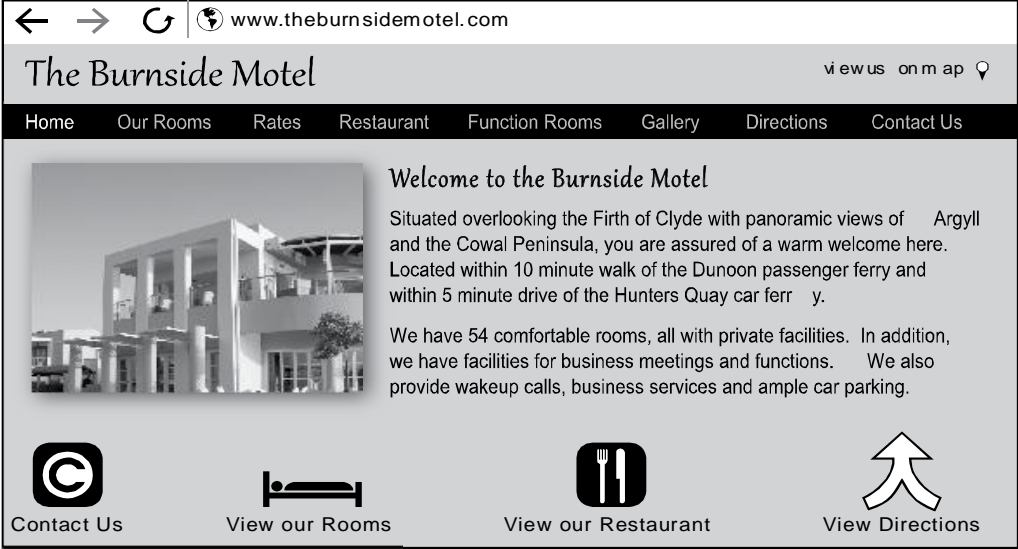| Question			Expected Answer/s	Max Mark	Additional Guidance
11	b		**The MoOS operating system incorporates a number of features of an *intelligent interface*. One such feature is described below.**		
			Applications running under the MoOS operating system are context-aware making it possible for users to have direct access to system functions such as the volume buttons when watching video.		
			State the type of intelligent interface exemplified in the description of the user interface described above. Agent-based interface **Award 1 mark.**	**1** **PS** **ISI** **2.2.1**	
11	c		**Describe one additional feature that could be added to the new MoOS operating system to support *knowledgeable intermittent users* who are already familiar with other operating systems.** Needs of knowledgeable intermittent users could be met by providing a feature that allows users to display files and documents as icons rather than tiles. This would enable those users to acquaint themselves with the new operating system using an environment that is familiar to them. As they become more confident, they can choose to switch to the tile-based interface and so benefit from all of the features that it offers. Other valid suggestions are possible. **Award 1 mark for description of any reasonable suggestion; award 1 mark for indicating how the suggestion would help meet the needs of intermittent users.**	**2** **PS** **ISI** **3.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
11	d		**Several *quantitative techniques* are used to measure the usability of the MoOS operating system.**		
11	d	i	**Describe one suitable piece of data that would be gathered to measure *user error rates* and explain how this data would be used by the development team.** Piece of data – number of errors made carrying out a task specified by development team, type of errors made carrying out a specified task Use made – if type of error is common to several users, developers could use this information to redesign the interface to increase user friendliness and reduce error rate; allow developers to determine whether or not there has been in/decrease in error rates. **Award 1 mark for any piece of data that would inform development team about user error rates: award 1 mark for description of how this data could be used by the development team.**	**2** **PS** **ISI** **4.2.3**	
11	d	ii	**Name one quantitative technique other than user error rates that could be used to provide feedback to the development team on the quality of the user interface. Justify your answer.** Subjective user satisfaction This would give developers feedback about how the user feels about the user interface and its usefulness to users. Note that other techniques are possible. User error rates must NOT be accepted. **Award 1 mark for naming an appropriate technique; award 1 mark for justification of this technique in measuring the quality of the interface.**	**2** **PS** **ISI** **4.2.5 *or*** **4.2.1 *or*** **4.2.2 *or*** **4.2.4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
11	e		**Developers of the new MoOS operating system claim that its start-up time is significantly faster than the start-up time of previous operating systems.**		
11	e	i	**Describe one *social factor* that has led to this improvement in start-up time.** User demand for reduction in start-up time **Award 1 mark for any valid social factor.**	**1** **KU ISI 1.1**	
11	e	ii	**The developers' own research shows that 57% of desktop PC users and 43% of laptop users shutdown their machines rather than put them into sleep mode.** **Describe one *inquiry method* that could be used to gather this information without making excessive demands on users. You should indicate clearly how this method would be used to gather the information required.** Survey or user performance data logging User would be asked questions about whether they shut down their PC/laptop or whether they left them in sleep mode and their responses would be recorded. Software would automatically note whether PC/laptop was shut down or left in sleep mode and submit usage details to developers. **Award 1 mark for suitable method; award 1 mark for description of how method would be used to gather information required.**	**2** **PS ISI 4.4.1 *or* 4.4.4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
12			**A company offers sightseeing tours around six Scottish cities: Aberdeen, Dundee, Edinburgh, Glasgow, Inverness and Stirling. A special sightseeing bus is driven around the city as a commentary is played to inform the passengers of interesting facts about the city. A relational database system is being developed to store details of the tours.**		
	a		Normalise the attributes listed below.		

Attribute	Sample Data
City	Glasgow
Main depot	Buchanan Street
Tour manager ID	1234
Tour manager name	J Smith
Tour manager contact number	01419999991
Bus registration number	AB01RTF
Tour date	15/05/2013
Route number	3
Start point	Buchanan Street
End point	Hampden Park
Driver ID	FT4455
Driver name	P Anderson

You must show all stages of normalisation, from un-normalised form through to third normal form and your solution should take account of the following information.

- **Each city has at least 5 buses**
- **Each bus may be used on a number of different routes on the same day**
- **The registration number of each bus is unique**
- **Each city has only one tour manager**

Question			Max Mark	Expected Answer/s			
12	a		10	UNF	INF	2NF	3NF
			PS DBAD 3.1	Bus registration number City Main depot Tour manager ID Tour manager name Tour manager contact number Driver ID Driver name Tour date Route number Start point End point	Bus registration number City Main depot Tour manager ID Tour manager name Tour manager contact number Driver ID Driver name Bus registration number* Tour date Route number Start point End point	Bus registration number City Main depot Tour manager ID Tour manager name Tour manager contact number Driver ID Driver name Bus registration number* Tour date Route number* Route number Start point End point	Bus registration number City* Tour manager ID* Driver ID* City Main depot Tour manager ID Tour manager name Tour manager contact number Driver ID Driver name Bus registration number * Tour date Route number* Route number Start point End point
				NOTE: Based on the information provided, many alternative solutions are possible. One possible solution is provided. An alternative solution is provided in marking instructions for Question 6. **Award 10 marks for any fully correct solution; deduct 1 mark for each processing error (eg based on UNF provided by the candidate, failure to remove repeating data correctly, incorrectly identifying FK and PK, failure to correctly remove partial dependencies, failure to correctly remove transitive dependencies). Max 10 marks.**			

Question			Expected Answer/s	Max Mark	Additional Guidance
12	**b**		**Read the following *structured English* which is used to calculate the total revenue for each tour.**		
1					

```
total revenue = 0
loop for each passenger
     if passenger is OAP
          apply 20% discount to ticket price
     end if
     add tour price to total revenue
end loop
```

Convert this structured English to a *graphical design notation* with which you are familiar.

3

**PS
DBAD
4.1.3**

For example – structure diagram

Award 1 mark for all steps of structured English indicated in correct sequence; award 1 mark for correctly indicating repetition; award 1 mark for correctly indicating selection.

Question			Expected Answer/s	Max Mark	Additional Guidance
13			**The Burnside Motel uses its website to provide details of the motel's facilities, rooms and room rates. An application called "quickRes" has been developed to add e-commerce functionality to a hotel website.**		

Question			Expected Answer/s	Max Mark	Additional Guidance
13	**a**		**The e-commerce facilities provided by the "quickRes" application include:** • **a reservations system** • **a secure booking and payment system.** **Describe two additional features of an *e-commerce platform* that you would expect to find in the "quickRes" application.** For example: Search facility: allows visitors to check for room availability on any given date. E-commerce statistics: provides statistics about product views, checkouts, sales and other metrics to help optimise the storefront and track the return on investment. Marketing: facility to help advertise motel and its facilities to wider audience. Other valid features possible. Note: shopping basket feature would not be appropriate. **Award 1 mark each for accurate description of any 2 valid features.**	**2** **PS** **ODB** **1.1.3**	

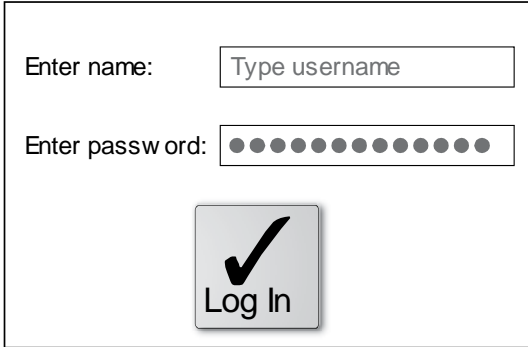| Question			Expected Answer/s	Max Mark	Additional Guidance
13	b		**Describe one advantage of integrating the "quickRes" application within the website for everyone who wants to make a booking for the motel.** For example: No need to leave the website to make a reservation, query available or make a secure payment. This means that it would be easier and faster for users to make bookings for the hotel. Note: no mark should be awarded for simply stating a benefit. **Award 1 mark for description of any valid benefit.**	**1** **PS** **ODB** **1.1.3**	
13	c		**The "quickRes" application is an example of *commercial* software. Many *open source* alternatives are, however, available.** **Explain one possible drawback of using an open source alternative to "quickRes" in terms of *security*.** Since code is available to anyone who wishes to inspect it, there is a concern that payment details could be less secure when processed with open source software since more people are aware of how the security of details is enforced. **Award 1 mark for explanation security concern; award 1 mark for exemplification within context.**	**2** **PS** **ODB** **1.2.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
13	d		A future development of the "quickRes" application will direct guests to other travel and tourist providers and enable them to create personalised travel packages. These other providers would be able to share guest and booking details with the motel using *Electronic Data Interchange (EDI)*. **Explain one** *legal restriction* **that would apply when EDI is used to share guest and booking details.** For example: Data protection Act applies in this situation since personal details of guest are being transmitted electronically. Appropriate steps must be taken to ensure that the details are secure and privacy is not compromised. **Award 1 mark for correctly explaining why DPA applies; award 1 mark for identifying one consequence of this.**	**2** **KU** **ODB** **1.3.4**	
13	e		**The motel allows guests to upload photographs taken during their stay. An HTML form is used for this purpose.** Photo Upload Form Select photo to upload: Browse No file chosen Upload		
13	e	i	**The HTML** *form element* **for the Photo Upload Form is provided below.** `< form action = "guest_photo.asp" method = "get" >` **Explain the purpose of the** *action* **attribute.** The action attribute specifies the page on the server that will receive any images submitted by guests. **Award 1 mark.**	**1** **KU** **ODB** **4.3.1**	

Question			Expected Answer/s	Max Mark	Additional Guidance
13	**e**	**ii**	The incomplete HTML code used to implement the browse button is provided below.	**1** **PS** **ODB** **4.3.2**	
			`Select photo to upload: < input type = ............................ >`		
		ii	**Complete the *type attribute* of the input element for the button used to browse for the photo to be uploaded.** `< input type="file" >` **Award 1 mark.**		

Question			Expected Answer/s	Max Mark	Additional Guidance
14			**ScotEc is a Scottish electronics company. ScotEc wins a contract to supply parts to a washing machine manufacturer. This manufacturer uses Electronic Data Interchange (EDI) for all its business transactions and ScotEc must comply.**		
14	a		**Part of the EDI process involves the use of *translation software*.**		
14	a	i	**Describe the task carried out by the EDI translation software when ScotEc receives an order from the washing machine manufacturer.** The translation software converts the EDI document in standard format either to a flat text file or to a file that can be used directly by ScotEc's system. **Award 1 mark.**	**1** **KU ODB 1.3.2**	
14	a	ii	**For the development of the translation software, ScotEc software engineers plan to use open source software rather than commercial software.** **Compare the ease of maintaining open source software to the ease of maintaining commercial software in term of *flexibility and adaptability*.** Open source software would allow the company's software engineers to view the source code and make changes when and if needed. With commercial software there is no flexibility since the source code cannot be viewed; only product developers would have access to the source code. **Award 1 mark for accurate description of flexibility of open source software; award 1 mark for accurate description of flexibility of commercial software.**	**2** **KU ODBS 1.2.3**	

Question			Expected Answer/s	Max Mark	Additional Guidance
14	b		**ScotEc uses a specialist company to implement its EDI *communication*.** **Describe one advantage and one disadvantage of using a specialist company rather than using the internet for its purpose.** Advantages of specialised company include: • data transfer possibly more secure • extra services may be available eg e-mail Disadvantages of specialised company include: • cost – probably more expensive • maybe slower than using Internet directly Other valid advantages and disadvantages are possible. **Award 1 mark for any valid advantage; award 1 mark for any valid disadvantage.**	**2** **KU** **ODB** **1.3.3**	
14	c		**When ScotEc receives an order, data is stored in the ORDER table and made available online so that it can be accessed using a web browser by any of their employees.** **For this service to operate, the company will use a database server and a web server with a *scripting language*.**		
14	c	i	Other than the user's name and password, state **two** additional pieces of data which will be used by the script to access the ORDER table. • server address • database name **Award 1 mark each for any two from above.**	**2** **KU** **ODB** **2.1.2** **2.1.3**	

Question			Expected Answer/s	Max Mark	Additional Guidance
14	c	ii	**Describe three processes which are carried out by the script used to retrieve the data from the ORDER table.** Processes include: • extracts data from the user's query • makes server connection • makes database selection or connection • creates the SQL code to access the orders table • executes the SQL code • creates code to display any data extracted from the table • creates code to display other items on the web page **Award 1 mark each for any three from above.**	**3** **PS** **ODB** **4.1**	
14	d		**ScotEc's database administrator uses a *server based database management tool*. Describe two tasks she could carry out on the ORDER table using this tool.** Possible tasks include: • Change table structure (eg create new column, delete column, and change constraints…) • Changes access permissions • Create backup **Award 1 mark each for any two valid tasks.**	**2** **PS** **ODB** **2.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
14	e		The picture shows the part of the form on the webpage used to gain access to ScotEc's database server. Enter name: [Type username] Enter password: [●●●●●●●●●●●●●] ✓ Log In		
14	e	i	State the *value attribute* of the *<input> element* which produces the box where the name is to be entered. value = "Type user name" **Award 1 mark.**	**1** **PS** **ODB** **4.3.2**	
14	e	ii	The HTML code for the button to send the login data to ScotEc's webserver is given below. **<button type = "-------" >** **** **Log in** **</button>** State the button type which has been missed out in the code above. type = "submit" **Award 1 mark.**	**1** **PS** **ODB** **4.3.3**	

Question			Expected Answer/s	Max Mark	Additional Guidance
14	e	iii	State one advantage of using a button created by the button element rather than by the input element. For example: • Better control of rendering of images is possible. **Award 1 mark for any valid advantage.**	1 KU ODB 4.3.3	

Question			Expected Answer/s	Max Mark	Additional Guidance
15			**Finest is an online fashion store. Customers can browse the company website, search for items of clothing and make online purchases.** **The company uses a *Customer Relationship Management* system to help better understand customer needs and improve satisfaction. The screen shot below shows one page from the Finest website:**		

Question			Expected Answer/s	Max Mark	Additional Guidance
15	a		**The website allows customers to leave feedback. Explain how this feature of the company's Customer Relationship Management system is of benefit to:**		
15	a	i	**the company;** For example: Company: feedback provides them with information about usefulness and quality of products which can be used to plan purchasing and maintain stock levels of popular items. Other valid answers are possible. **Award 1 mark for any valid benefit for the company.**	**1** **KU** **ODB** **1.1.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
15	a	ii	customers. For example: Customers: leaving feedback allows them to feel that their opinion is valued by the company. As a result, they are more likely to purchase from the company in the future. Other valid answers are possible. **Award 1 mark for any valid benefit for the customer.**	1 KU ODB 1.1.2	
15	b		**Select two additional features of the website that contribute to the company's Customer Relationship Management system. Explain the benefit of the features you select to both the company and its customers.** Features selected could be: • Customer ratings • Sign up for newsletter • Wish list • Track order • Connect via social networking sites • Other valid features are possible Explanation should clearly describe benefits of each feature selected for both the company and the customer. **Award 1 mark each for correctly identifying additional features of the website that contribute towards the CRM; award 1 mark each for explanation of any valid benefit for each named feature.**	4 PS ODB 1.1.2	

Question			Expected Answer/s	Max Mark	Additional Guidance
15	**c**		**The website was created using a *Content Management System*.**		
15	**c**	**i**	**Describe two benefits of the company of using a Content Management System to add details of new products to the website.** For example: Since the content is separate from the layout, adding details of new products is simply an administrative task that requires no knowledge of HTML. Once the products details have been entered and images have been uploaded, the details can be checked by the website administrator before they are published. Other valid answers are possible. **Award 1 mark each for description of any two valid benefits to the company.**	**2** **KU** **ODB** **1.1.1**	
15	**c**	**ii**	**Explain how the Content Management System is of benefit when customers leave feedback on items purchased.** For example: When customers leave feedback, it is submitted to the CMS but it is not published live on the website. Instead, the system waits for the approval of the website administrator. When approval is given, the feedback is then published on the company website. In this way, offensive or obscene comments can be filtered. Also, company can filter what is published and remove any bad press. **Award 1 mark each for any two valid points.**	**2** **KU** **ODB** **1.1.1**	

Question			Expected Answer/s	Max Mark	Additional Guidance
15	**d**		**Visitors to the Finest website can submit data using online forms. These forms can be used to insert or amend data stored in the underlying tables of the company's database server.**		
15	**d**	**i**	**Give one example of when a form would be used to insert data into a table in the underlying database.** For example: • Customer registers with the company • Customer submits an order Other valid answers are possible. **Award 1 mark.**	**1** **PS ODB 4.2.1**	
15	**d**	**ii**	Give **one** example of when a form would be used to amend data in a table in the underlying database. For example: • Customer moves house • Customer edits email address Other valid answers are possible. **Award 1 mark.**	**1** **PS ODB 4.2.2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
16			**A new generation of automated cash machines is being developed.**		
16	**a**		**Describe the purpose of *system refinement* during the design state of any development.** System refinement is used to transform a systems specification into a formal design that will lead to implementation components; it is the methods used to transform a formal specification into a form which is closer to the desired final form of an executable program. **Award 1 mark for an accurate description.**	**1** **KU** **DBAD** **4.1.1**	
16	**b**		**State one reason why it is necessary for any system being developed to undergo *systematic testing*.** Systematic testing is needed to ensure that: • the system being developed is free from errors • results of testing are recorded • pre-planned rather than ad hoc testing of the solution **Award 1 mark for any valid reason.**	**1** **KU** **DBIT** **2.3**	

Question			Expected Answer/s	Max Mark	Additional Guidance
16	c		**The cash machine uses *Structured Query Language (SQL)* to manipulate the database used to store customer and account data. Part of each table in the database is shown below.**		

customer

customerID	lastName	firstName	teleNo
22113211	Smith	Alan	06633121211
22113212	Adams	Peter	06621145122
22113213	Jones	Alison	06612134567

account

accountID	customerID
16784321	22113211
12311221	22113212
12451278	22113213

withdrawal

withdrawalID	AccountID	dateOfWithdrawal	amount
236751298	16784321	23/04/13	£60·00
236783471	12451278	23/04/13	£24·00
236814296	16784321	27/04/13	£20·00

card

cardNo	PIN	accountID
1234567	1111	16784321
1212121	1122	12451278

Question			Expected Answer/s	Max Mark	Additional Guidance
16	c	i	**A customer changes their PIN. Copy and complete the SQL statement below which will change the PIN for card number 1234567 to 4491.**	3 PS ODB 3.1	

```
_____ card

_____

WHERE      _____;
```

```
UPDATE card
SET pin = ′4491′ WHERE card
number=′1234567′;
```

Award 1 mark for UPDATE; award 1 mark for SET clause; award 1 mark for WHERE clauses.

Question			Expected Answer/s	Max Mark	Additional Guidance

16	c	ii	The amount of money withdrawn is stored in the attribute "Amount" in the withdrawal table. At the end of each month, these amounts are totalled.
			
			Copy and complete the SQL statement below to total all the withdrawals for account 16784321 for the month of April 2013.
			
			<pre>SELECT _____
			
			FROM withdrawal
			
			WHERE dateOfWithdrawal _____;</pre>
			<pre>SELECT SUM (amount)
			FROM withdrawal
			WHERE dateOfWithdrawal
			BETWEEN # 4/01/13 # AND # 4/30/13 #;
			AND accountID=16784321;
			
			Accept also:
			WHERE dateOfWithdrawal
			BETWEEN 01/04/13 AND 30/04/13;
			AND accountID=16784321;</pre>
			Award 1 mark for SELECT clause; award 1 mark for use of correct date; award 1 mark for use of correct account. Max 3 marks
				3
				
				PS
				ODB
				3.2.2	

16	c	iii	**Explain the term *equi-join*.** An equi-join links tables using equality or =. **Award 1 mark.**	1 KU ODB 3.2.6	

Question			Expected Answer/s	Max Mark	Additional Guidance

16	c	iv	The bank wishes to find details of all customers who have not yet withdrawn from their accounts.
			
			Copy and complete the SQL statement below to find the required information.
			
			``` SELECT * FROM customer, account WHERE customer.customerID = account.customerID AND _____ (SELECT * from withdrawal WHERE _____); ```
			
			``` Select * FROM customer, account WHERE customer.customerID = account.customerID AND NOT EXISTS (Select * from withdrawal WHERE account.accountID = withdrawal.accountID); ```
			
			Award 1 mark for use of NOT EXISTS; award 1 mark for correct use of primary and foreign keys.
				2
				
				PS
				ODB
				3.2.3	

[END OF MARKING INSTRUCTIONS]