

G12 ECZ COMPUTER STUDIES P1 2016 GCE SOLUTIONS

Grade 12 ECZ Computer Studies Paper 1, 2016 GCE (7010/1)

2 hours 30 minutes | 13 questions, answer all

The full question paper appears first — worked answers follow.

Candidate Name: _____

Centre Number			Candidate Number					

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level

Computer Studies 7010/1

Monday

25 JULY 2016

Candidates answer on the question paper

No additional materials are required

Time: 2 hours 30 minutes

Instructions to candidates

Write your name, centre number and candidate number in the spaces at the top of this page.

There are **13 questions** in this paper. Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Information for candidates

The number of marks is given in brackets [] at the end of each question or part question.

Cell phones are not allowed in the Examination Room.

FOR EXAMINER'S USE

1 Explain the meaning of the following computer terms using examples where necessary;

(a) Auto correct.....
.....
..... [2]

(b) Arithmetic Logic Unit.....
.....
..... [2]

(c) Primary storage.....
.....
..... [2]

(d) Smart Phone
.....
..... [2]

(e) Desktop
.....
..... [2]

(f) Log off ,.....
.....
..... [2]

- 2 (a) State **two** advantages of using data stored on a hard disk rather than data stored on a magnetic tape.

Advantage 1..... [1]

Advantage 2..... [1]

- (b) Give **two** advantages of removable secondary storage devices.

Advantage 1..... [1]

Advantage 2..... [1]

- (c) Give **two** reasons why the system software of a computer is stored in the Read Only Memory (ROM).

Reason 1 [1]

Reason 2 [1]

- (d) Give **one** example of storage media which is read-only apart from the Read Only Memory (ROM).

..... [1]

- 3 An air travel agent makes flight bookings for customers around the capital city. The bookings are made using an on-line booking system. The system is interactive.

(a) What is meant by the system being interactive?

.....
..... [2]

(b) Give **two** other examples of an interactive system.

Example 1..... [1]

Example 2..... [1]

(c) When the operator makes a booking, the system queries a central remote database. Give **two** reasons why flight bookings are made on central databases.

Reason 1 [1]

Reason 2 [1]

(d) What is the name given to the type of processing that takes place in the booking system?

..... [1]

(e) Give **two** other examples that work like air-line booking systems.

Example 1..... [1]

Example 2..... [1]

4 Trading in goods and services has been popularised with the increase in access to the Internet.

(a) What is the term used to describe the trading of goods and services using the Internet?

..... [1]

(b) Give **two** benefits of trading on the Internet to the

(i) seller

Benefit 1

..... [1]

Benefit 2

..... [1]

(ii) buyer

Benefit 1

..... [1]

Benefit 2

..... [1]

(c) State **two** disadvantages of trading using the Internet.

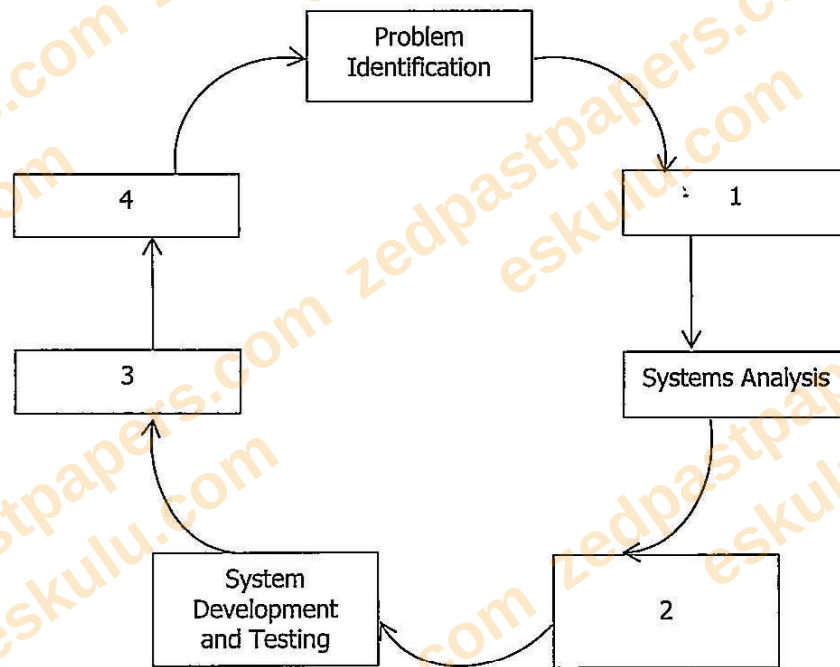
Disadvantage 1

..... [1]

Disadvantage 2

..... [1]

- 5 Study the diagram below and answer the questions that follow.



- (a) What is the purpose of the process shown?

..... [1]

- (b) Name the stages marked by the numbers.

1 [1]

2 [1]

3 [1]

4 [1]

- (c) State **three** types of tests carried out during the System Development and Testing stage.

Test type 1 [1]

Test type 2 [1]

Test type 3 [1]

- (d) List **two** activities that are done in the Systems Analysis stage.

Activity 1 [1]

Activity 2 [1]

6 Many organisations including schools have set up their computer networks as Intranets.

(a) (i) What is the difference between an Intranet and the Internet?

.....
 [2]

(ii) Describe **two** benefits of an Intranet to a school.

Benefit 1 [1]

Benefit 2 [1]

(b) State **two** precautions that a user should take when accessing files on the Internet.

Precaution 1 [1]

Precaution 2 [1]

(c) Give **one** advantage of the Internet over an Intranet.

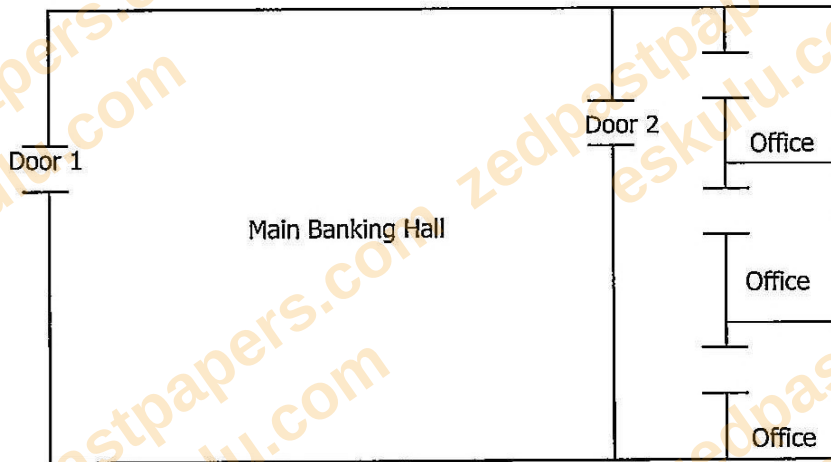
..... [1]

(d) Describe **two** security measures used on an Intranet.

Measure 1 [1]

Measure 2 [1]

- 7 A bank has two security doors used to control access to its premises. Door 1 is the entrance to the main banking hall and opens automatically as any one approaches. Door 2 gives access to offices for staff only and requires entrance rights to open. Use the illustration below to answer questions that follow.



- (a) Name **two** sensors that can be used at door 1.
- Sensor 1 [1]
- Sensor2 [1]
- (b) (i) Describe briefly the process that takes place in order for door 1 to open.
-
-[2]
- (ii) Give **one** item in the entrance rights required for door 2 to open.
-
-[1]
- (c) Give **two** advantages to the bank of using a microprocessor controlled security door.
- Advantage 1..... [1]
-
- Advantage 2..... [1]
-
- (d) State **one** disadvantage of microprocessor controlled security equipment.
- [1]

- 8 Ngwangwa Finance Company keeps records of its creditors in a spreadsheet. An extract of one of the records kept is shown below. Use this extract to answer the questions that follow.

	A	B	C	D	E
1	CREDITOR	AMOUNT		CREDITOR	TOTAL
2	CHALI	60		AKA	140
3	MOONGA	90		CHALI	
4	AKA	70		MAUNGA	
5	MOONGA	110		MOONGA	
6	MAUNGA	80			
7	AKA	50			
8	MAUNGA	100			
9	AKA	20			

- (a) If the total credit for AKA entered at E2 was calculated by the function = Sum if (A2 : A9, "AKA", B2 : B9), write the function that can be entered at E3.
 [2]
- (b) Describe another way that can be used to add up the total amount for each creditor.

 [2]
- (c) Give **one** validation method that can be used to restrict the amount of credit allowed to each customer.
 [1]
- (d) Describe how you can create a graph for creditor subtotals.

 [2]

- 9 Computer systems are very important in the running of supermarkets and other stores. Sometimes computers at these stores develop problems.

(a) Give **two** problems that may cause a computer to malfunction.

Problem 1 [1]

Problem 2 [1]

(b) Describe **two** effects of system failure to the supermarket business.

Effect 1 [1]

Effect 2 [1]

(c) Describe **one** way of recovering lost data on the Supermarket's Computer System.

..... [2]

ORDER QUERY					
CUSTOMER	PRODUCT	DESCRIPTION	PRICE	QTY	AMOUNT
CO1					X
CO3					Y

- (a) Give **one** reason for having the table relationship.
..... [1]
- (b) AMOUNT in the order query is a calculated field defined by,
AMOUNT: [QTY] * [PRICE].
Using this formula, find the value for X and Y in the AMOUNT field.
X [1]
Y [1]
- (c) Give **one** of the conditions necessary for the two tables to be related.
..... [2]
- (d) Explain how similar records can be extracted from a database table.
.....
..... [2]
- (e) What feature is used to extract records in a database?
..... [1]

11 A company has invested in computer systems to help carry out the following tasks:

- advertise products (both on the internet and paper leaflets),
- keep track of customers and staff contact details,
- produce online products on offer,
- produce reports to management.

Describe **four** software packages the company could use to carry out the above tasks and give a reason why each software package has been chosen.

Package 1..... [1]

Reason..... [1]

Package 2..... [1]

Reason..... [1]

Package 3..... [1]

Reason..... [1]

Package 4..... [1]

Reason..... [1]

- 12 The algorithm below was written to calculate tax for five employees at Jumulo Internet Cafe.

Count = 0

WHILE count ≤ 5

Input salary

IF salary > 3 000 **THEN** tax = salary × 0.20

ELSE if salary > 4 500 **THEN** tax = salary × 0.25

ELSE if salary > 7 000 **THEN** tax = salary × 0.40

ELSE tax = 0

ENDIF

ENDIF

ENDIF

print tax

count = count + 1

ENDWHILE

- (a) How many tax bands (tax range) is the program using to calculate tax?

..... [1]

- (b) Write the output if the following salaries are entered.

(i) 2 700 [1]

(ii) 4 200 [1]

(iii) 12 700 [1]

13 A hotel offers a virtual tour of its facilities on a website.

(a) Describe how images are created and processed for use in the virtual tour.

.....
..... [1]

(b) What **two** features would you expect to see on the virtual tour website?

Feature 1.....
..... [1]

Feature 2.....
..... [1]

(c) Give **two** other applications that use virtual reality.

Application 1.....
..... [1]

Application 2.....
..... [1]



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Question Q1. Explain the meaning of the following computer terms using examples where necessary: (a) Auto correct [2] (b) Arithmetic Logic Unit [2] (c) Primary storage [2] (d) Smart Phone [2] (e) Desktop [2] (f) Log off [2]

(a) Auto correct is a word-processing feature that automatically detects and fixes common spelling/typing mistakes as the user types (e.g. changing 'teh' to 'the').

(b) The Arithmetic Logic Unit (ALU) is the part of the CPU that carries out all arithmetic calculations (add, subtract, etc.) and logical/comparison operations (e.g. checking if one value is greater than another).

(c) Primary storage is the computer's main, directly-accessible memory (RAM and ROM) used to hold data and instructions that the CPU is currently working with; it is much faster than secondary storage but (in the case of RAM) loses its contents when power is switched off.

(d) A Smart Phone is a mobile phone that combines the functions of a small computer (running apps, connecting to the internet, taking photos) with the ability to make calls and send messages.

(e) A Desktop (or desktop computer) is a personal computer designed to stay in one place on/under a desk, made up of a separate monitor, keyboard, mouse and system unit, as opposed to a portable laptop or tablet.

Answer: (f) Log off is the action of ending a user's current session on a computer or network, closing their account access, so that the computer returns to a login screen (without switching the machine off completely, unlike shutting down).

Question Q2. (a) State two advantages of using data stored on a hard disk rather than data stored on a magnetic tape. [2] (b) Give two advantages of removable secondary storage devices. [2] (c) Give two reasons why the system software of a computer is stored in the Read Only Memory (ROM). [2] (d) Give one example of storage media which is read-only apart from the Read Only Memory (ROM). [1]

(a) Two advantages of a hard disk over magnetic tape: a hard disk allows DIRECT/random access to any file immediately, whereas a tape must be read sequentially from the start; and a hard disk generally has a much FASTER data transfer/access speed than tape.

(b) Two advantages of removable storage: data/files can easily be TRANSPORTED between different computers; and it provides a convenient way to make BACKUP copies of important data, kept safely separate from the computer.

Answer: (c) Two reasons system software (e.g. the BIOS) is stored in ROM: ROM is NON-VOLATILE, so its contents are not lost when the computer's power is switched off, meaning the essential start-up instructions are always available; and data in ROM CANNOT be accidentally altered or deleted (it is read-only), protecting these critical instructions from corruption.

(d) An example of read-only storage media apart from ROM: a CD-ROM/DVD-ROM (a factory-pressed optical disc).

Question Q3. An air travel agent makes flight bookings for customers using an on-line booking system. The system is interactive. (a) What is meant by the system being interactive? [2] (b) Give two other examples of an interactive system. [2] (c) When the operator makes a booking, the system queries a central remote database. Give two reasons why flight bookings are made on central databases. [2] (d) What is the name given to the type of processing that takes place in the booking system? [1] (e) Give two other examples that work like air-line booking systems. [2]

(a) A system is interactive when it allows a two-way exchange between the user and the computer — the user enters a request/command and the computer responds immediately, and this response can influence the user's next input, allowing a real 'conversation' between user and system.

(b) Two other examples of interactive systems: an ATM (cash machine) transaction; and an online shopping checkout system.

Answer: (c) Two reasons bookings use a central database: it ensures every travel agent/booking office around the country sees the SAME up-to-date seat availability, preventing the same seat being sold twice (double-booking); and it allows all booking data to be managed, backed up and secured in ONE place rather than many scattered separate copies.

(d) The type of processing used is REAL-TIME (on-line, transaction) processing — each booking updates the central records immediately.

(e) Two other examples working like airline booking systems: a cinema/theatre seat-booking system; and a hotel room-booking system.

Question Q4. (a) What is the term used to describe the trading of goods and services using the Internet? [1] (b) Give two benefits of trading on the Internet to the (i) seller [2] (ii) buyer [2] (c) State two disadvantages of trading using the Internet. [2]

(a) This is called E-COMMERCE (electronic commerce).

(b)(i) Two benefits to the seller: they can reach CUSTOMERS all over the world, not just locally; and they save the cost of renting/running a physical shop. (ii) Two benefits to the buyer: they can shop from HOME at any time (24/7), without travelling; and they can easily COMPARE prices between different online sellers.

Answer: (c) Two disadvantages of trading on the Internet: the buyer cannot physically SEE/TOUCH/try the goods before buying them; and there is a risk of FRAUD (e.g. card details being stolen, or goods never being delivered).

Question Q5. The diagram shows a cyclic system development process: Problem Identification -> [1] -> Systems Analysis -> [2] -> System Development and Testing -> [3] -> [4] -> back to Problem Identification. (a) What is the purpose of the process shown? [1] (b) Name the stages marked by the numbers 1-4. [4] (c) State three types of tests carried out during the System Development and Testing stage. [3] (d) List two activities that are done in the Systems Analysis stage. [2]

(a) Purpose of the process: to guide the development of a computer system through a set of organised, repeating stages, ensuring problems are correctly identified, analysed, designed, built, tested and reviewed, with the cycle repeating so the system can be continually improved.

Answer: (b) 1 = FEASIBILITY STUDY (checks whether the identified problem is worth solving with a new system). 2 = SYSTEMS DESIGN (designs the new system based on the analysis). 3 = IMPLEMENTATION (installs/rolls out the new system). 4 = EVALUATION (reviews how well the new system meets its objectives, feeding back into the next Problem Identification stage).

(c) Three types of tests: testing with NORMAL/valid data (checks correct results for expected inputs); testing with ABNORMAL/invalid data (checks the system correctly rejects bad input); and testing with EXTREME/boundary data (checks the system copes correctly at the very edge of acceptable values).

(d) Two activities in Systems Analysis: interviewing and observing users to find out how the CURRENT system works and what its problems are; and examining existing DOCUMENTS/records used by the current system.

Question Q6. Many organisations including schools have set up their computer networks as Intranets. (a)(i) What is the difference between an Intranet and the Internet? [2] (ii) Describe two benefits of an Intranet to a school. [2] (b) State two precautions that a user should take when accessing files on the Internet. [2] (c) Give one advantage of the Internet over an Intranet. [1] (d) Describe two security measures used on an Intranet. [2]

(a)(i) The Internet is a huge PUBLIC, worldwide network open to anyone, whereas an Intranet is a PRIVATE network restricted to use only within a single organisation.

(ii) Two benefits of an Intranet to a school: it lets teachers/pupils share files and resources (e.g. lesson notes) SECURELY within the school, without exposing them to the public internet; and it allows the school to control/restrict what content pupils can access.

Answer: (b) Two precautions when accessing internet files: SCAN downloaded files for viruses before opening them; and only download files from TRUSTED/reputable websites.

(c) Advantage of the Internet over an Intranet: it gives access to a far GREATER range/amount of information and resources from all over the world, not just within one organisation.

(d) Two Intranet security measures: a FIREWALL (blocks unauthorised outside access); and PASSWORDS/user accounts (restrict which internal users can access which resources).

Question Q7. A bank has two security doors: Door 1 (main banking hall entrance, opens automatically as anyone approaches) and Door 2 (offices, staff only, requires entrance rights to open). (a) Name two sensors that can be used at door 1. [2] (b)(i) Describe briefly the process that takes place for door 1 to open. [2] (ii) Give one item in the entrance rights required for door 2 to open. [1] (c) Give two advantages to the bank of using a microprocessor controlled security door. [2] (d) State one disadvantage of microprocessor controlled security equipment. [1]

(a) Two sensors for door 1: a PRESSURE/motion (infra-red) sensor detecting someone approaching; and a PROXIMITY sensor.

(b)(i) Process for door 1: the sensor detects a person approaching and sends a signal to the microprocessor; the microprocessor then sends a signal to the motor/actuator, which opens the door automatically.

(ii) An item in the entrance rights for door 2: a valid access CARD/PIN code (or fingerprint) belonging to an authorised staff member.

Answer: (c) Two advantages of a microprocessor-controlled door: it can restrict access automatically to ONLY authorised staff, improving security; and it removes the need for a security guard to check every person manually, saving staffing costs.

(d) Disadvantage: if there is a power failure or the microprocessor/sensor malfunctions, the door may fail to open (or fail to open for legitimate staff), which could trap people inside or lock staff out.

Question Q8. Ngwangwa Finance Company keeps records of its creditors in a spreadsheet: columns A=CREDITOR, B=AMOUNT, D=CREDITOR, E=TOTAL. Rows list CHALI 60, MOONGA 90, AKA 70, MOONGA 110, MAUNGA 80, AKA 50, MAUNGA 100, AKA 20. E2 (for AKA) =SUMIF(A2:A9,"AKA",B2:B9) giving 140. (a) Write the function that can be entered at E3 (for CHALI). [2] (b) Describe another way that can be used to add up the total amount for each creditor. [2] (c) Give one validation method that can be used to restrict the amount of credit allowed to each customer. [1] (d) Describe how you can create a graph for creditor subtotals. [2]

Answer: (a) Following the same pattern for D3 = CHALI, the function for E3 is: =SUMIF(A2:A9,"CHALI",B2:B9) (or =SUMIF(A2:A9,D3,B2:B9)). CHALI only appears once in the list (60), so this gives a result of 60.

(b) Another way to total each creditor's amount: SORT the data by the CREDITOR column so all of one creditor's entries are grouped together, then use the SUBTOTAL feature (or manually insert SUM formulas) to total each group.

(c) A validation method to restrict credit: a RANGE CHECK, which rejects any amount entered above a set maximum credit limit for that customer.

(d) To create a graph for creditor subtotals: first calculate each creditor's SUBTOTAL (as in part (a)), then select the creditor names together with their subtotal values, and use Insert -> Chart, choosing an appropriate chart type (e.g. a bar or pie chart).

Question Q9. Computer systems are very important in the running of supermarkets and other stores. Sometimes computers at these stores develop problems. (a) Give two problems that may cause a computer to malfunction. [2] (b) Describe two effects of system failure to the supermarket business. [2] (c) Describe one way of recovering lost data on the Supermarket's Computer System. [2]

(a) Two problems causing malfunction: a VIRUS infection corrupting files/software; and a HARDWARE fault (e.g. a failed hard disk or power supply).

(b) Two effects of system failure on the supermarket: tills/checkouts cannot process sales, so the business LOSES money/trading time; and customer trust/reputation may suffer if service is repeatedly disrupted.

Answer: (c) One way to recover lost data: restore the most recent BACKUP copy of the data (e.g. from an external drive or cloud backup) onto the system, replacing the lost/corrupted files.

Question Q10. Databases kept by organisations are usually linked. PRODUCT table (Product/Description/Price: PO1 Salt 30, PO2 Sugar 20, PO3 Rice 15) is linked to CUSTOMER table (Customer/Product/Qty: CO1/PO3/100, CO2/PO2/50, CO3/PO3/60, CO4/PO1/70) via the linked PRODUCT field. An Order Query has AMOUNT=[QTY]*[PRICE] for CO1 (=X) and CO3 (=Y). (a) Give one reason for having the table relationship. [1] (b) Find the value for X and Y in the AMOUNT field. [2] (c) Give one of the conditions necessary for the two tables to be related. [2] (d) Explain how similar records can be extracted from a database table. [2] (e) What feature is used to extract records in a database? [1]

(a) Reason for the table relationship: it avoids storing the same product details (description, price) repeatedly for every customer order, reducing data redundancy while still allowing matching data to be combined when needed.

Answer: (b) CO1 orders PO3 (Rice, price 15), Qty 100, so $X = 100 \times 15 = 1\,500$. CO3 also orders PO3 (Rice, price 15), Qty 60, so $Y = 60 \times 15 = 900$.

(c) Condition necessary for the tables to relate: both tables must share a COMMON field holding matching values (here, the PRODUCT field), usually a key in one table matching a foreign key in the other.

(d) Similar records can be extracted by creating a QUERY and entering a CRITERION/condition (e.g. Product = "PO3") in the relevant field, so only records matching that condition are shown.

(e) The feature used to extract records in a database is a QUERY.

Question Q11. A company has invested in computer systems to help: advertise products (internet and paper leaflets), keep track of customers/staff contacts, produce online products on offer, and produce reports to management. Describe four software packages the company could use and give a reason for each. [8]

Answer: Package 1: DESKTOP PUBLISHING (DTP) software. Reason: it is best suited to designing professionally laid-out PAPER LEAFLETS with precise control over text and images for printing. Package 2: WEB-AUTHORING/website-design software. Reason: it is needed to build and update the company's WEBSITE, used both to advertise products online and to show products on offer. Package 3: DATABASE software. Reason: it can store and organise large numbers of CUSTOMER and STAFF contact records, allowing fast searching/sorting/updating. Package 4: SPREADSHEET software. Reason: it can perform calculations and totals on business data and present them as clear REPORTS/charts for management.

Question Q12. The algorithm calculates tax for five employees at Jumulo Internet Cafe: Count=0; WHILE count<=5: Input salary; IF salary>3000 THEN tax=salary*0.20 ELSE IF salary>4500 THEN tax=salary*0.25 ELSE IF salary>7000 THEN tax=salary*0.40 ELSE tax=0 ENDIF ENDIF ENDIF; print tax; count=count+1; ENDWHILE. (a) How many tax bands (tax range) is the program using to calculate tax? [1] (b) Write the output if the following salaries are entered: (i) 2 700 [1] (ii) 4 200 [1] (iii) 12 700 [1]

(a) As written, the algorithm defines 4 tax bands/outcomes (salary>3000 at 20%; salary>4500 at 25%; salary>7000 at 40%; otherwise 0%) — NOTE: because the FIRST condition tested is simply 'salary>3000', any salary that also satisfies '>4500' or '>7000' is caught by this first, broadest condition before the later (narrower) ELSE-IF branches are ever reached, so in practice only the 20% and 0% bands can ever actually be applied — this is a logic quirk of the ordering in this particular algorithm.

Answer: (b)(i) Salary 2 700: is NOT greater than 3 000, and is NOT greater than 4 500 or 7 000 either, so it falls through to the final ELSE: tax = 0. Output: 0.

Answer: (ii) Salary 4 200: IS greater than 3 000, so the FIRST condition is satisfied and tax = 4 200 x 0.20 = 840. Output: 840.

Answer: (iii) Salary 12 700: IS greater than 3 000, so again the first condition applies: tax = 12 700 x 0.20 = 2 540. Output: 2 540.

Question Q13. A hotel offers a virtual tour of its facilities on a website. (a) Describe how images are created and processed for use in the virtual tour. [1] (b) What two features would you expect to see on the virtual tour website? [2] (c) Give two other applications that use virtual reality. [2]

(a) Images for the virtual tour are usually captured using a special 360-degree camera (or several overlapping photos), and then processed/stitched together using image-editing/panorama software so they can be viewed as one continuous scene on the website.

(b) Two features expected on the virtual tour: clickable NAVIGATION arrows/hotspots to move between different rooms/areas; and a ZOOM feature to look more closely at details.

(c) Two other applications of virtual reality: flight/driving SIMULATORS used for training; and VIDEO GAMES.

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