

G12 ECZ COMPUTER STUDIES P1 2015 SOLUTIONS

Grade 12 ECZ Computer Studies Paper 1, 2015 (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 School Certificate Ordinary Level

Computer Studies 7010/1

Tuesday

20 OCTOBER 2015

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.

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

(a) Booting [2]

(b) Feedback [2]

(c) Junk mail [2]

(d) Social network [2]

(e) Process control [2]

(f) Pointer [2]

2 (a) Give **two** ways in which documents saved on a computer may be lost.

Way 1 [1]

Way 2 [1]

(b) Describe **two** methods you can use to backup documents on a computer system.

Method 1 [1]

Method 2 [1]

(c) State **two** methods you can use to restrict access to important documents on a computer system.

Method 1 [1]

Method 2 [1]

- 3 A firm intends to change its funds distribution system from manual to computerised. The Systems Analyst is studying problems associated with the current system.

(a) List **two** items the Analyst can include in the requirements specification of this project.

Item 1 [1]

Item 2 [1]

(b) Give **one** advantage of observation method when studying the current manual funds distribution system.

..... [1]

(c) Give **two** reasons why output formats are considered first before inputs when designing the required system.

Reason 1 [1]

Reason 2 [1]

- 4 Maphunziro Private School has installed an intranet. This network will enable lessons to be taught using video conferencing.

(a) What is an intranet?

..... [2]

(b) State **two** hardware devices necessary for video conferencing apart from the computer.

Hardware Device 1 [1]

Hardware Device 2 [1]

(c) Explain how each hardware device you stated in (b) can be used during video conferencing.

Use of Device 1 [1]

Use of Device 2 [1]

(d) Give **one** advantage of this method of lesson delivery to the

(i) pupils, [1]

(ii) teachers, [1]

(iii) school [1]

- 5 (a) In the space below, draw **two** ring networks (each having 4 client computers) connected to one server. The server has a network printer attached to it.

- (b) Give **two** functions of a file server on the network.

Function 1..... [1]

Function 2..... [1]

- (c) Identify **one** disadvantage for users stationed in either networks.

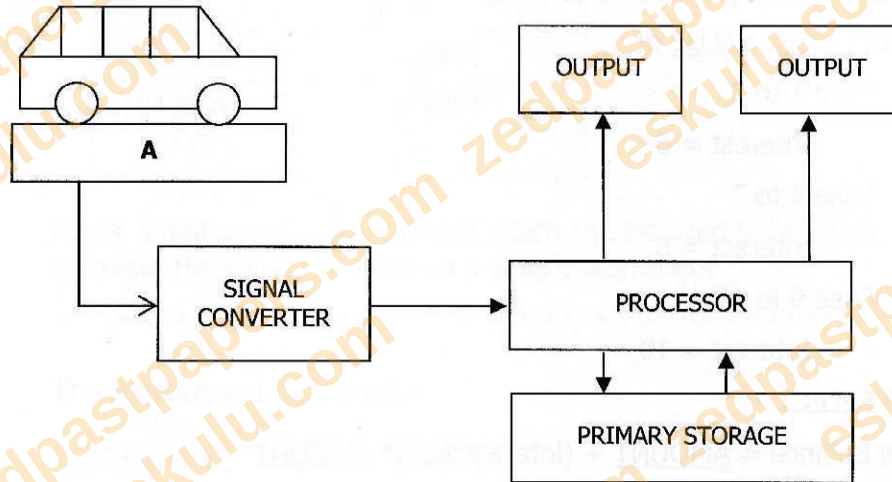
..... [1]

- (d) Give **one** advantage of this type of network to designers of newsletters.

.....

..... [1]

- 6 The diagram below shows a computerised weigh bridge designed by a Grade 12 pupil.



- (a) Name the sensor found in A.

..... [1]

- (b) Explain the purpose of the signal converter in the circuit illustrated above.

..... [2]

- (c) Name **two** output devices suitable for the circuit and give a reason for your answer.

Output device 1..... [1]

Reason..... [1]

Output device 2..... [1]

Reason..... [1]

7 Study the algorithm below and answer the questions that follow.

BEGIN

ENTER amount invested as Amount

ENTER a value (Between 1 and 10)

SELECT CASE VALUE of

Case 1 to 3

Interest = 6

Case 4 to 7

Interest = 8

Case 9 to 10

Interest = 10

END SELECT

Final Balance = AMOUNT + (interest/100)* AMOUNT

END

(a) Estimate the final Balance if the following data is input

AMOUNT = 170

value = 9

..... [2]

(b) What is the purpose of this algorithm?

..... [2]

- 8 Study the profitability and investment analysis strategic spreadsheet shown below and answer the questions that follow.

	A	B
1	AMOUNT	140
2	PROFITABILITY	PROFIT
3	STRATEGY	INVEST
4		

- (a) Name a feature of a spreadsheet which can be used to automatically calculate the same formulas on a similar worksheet.

..... [1]

- (b) The function entered in B2 is

= IF(B1>100, "PROFIT," "LOSS").

Complete the table below with the given values.

VALUE IN B1	RESULT IN B2
80	
200	

[2]

- (c) The function entered in B3 is

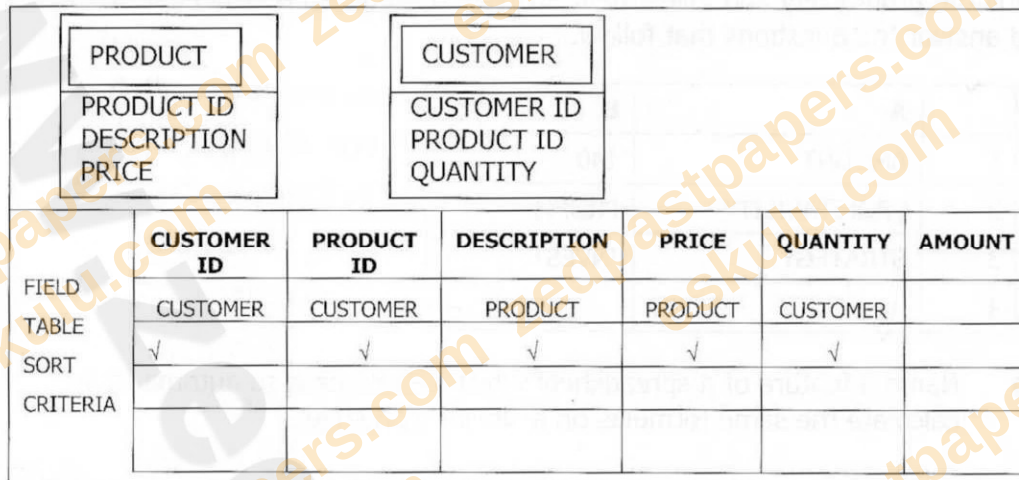
= IF (B2) = "PROFIT", "INVEST").

Write the results in the table below using the numbers given.

VALUE IN B1	RESULT IN B2	RESULT IN B3
200		
60		

[4]

- 9 The diagram below shows a database under construction.



- (a) From the diagram, list the tables designed.

Table 1 [1]

Table 2 [1]

- (b) Which field can be used to link the tables?

..... [1]

- (c) Inside the diagram above, draw a line to show a suitable table relationship.

[1]

- (d) Give **one** reason why tables are linked in a relationship.

..... [2]

- (e) Using the formula, "AMOUNT: [PRICE]*[QUANTITY]" and the information from table A and B below, complete table C. The first record has been done for you.

PRODUCT

PRODUCT ID	DESCRIPTION	PRICE
PO3	MILLET	70
PO2	MAIZE	80
PO1	SORGHUM	90

CUSTOMER

CUSTOMER ID	PRODUCT ID	QUANTITY
CO1	PO3	100
CO2	PO1	120
CO3	PO2	70

Table A

Table B

ORDER QUERY

CUSTOMER ID	PRODUCT ID	DESCRIPTION	PRICE	QUANTITY	AMOUNT
CO3	PO2	MAIZE	80	70	5 600
CO1	PO3				

Table C

- 10 The two diagrams below show a document created using a word processor.

Widow				
A	A	A	A	A
A	A	A	A	A
A	A	A	A	A
A	A	A	A	A
A	A	A	A	A
Page 1				

A

Orphan				
A	A	A	A	A
Page 2				

B

- (a) Give two features of a word processor.

Feature 1 [1]

Feature 2 [1]

- (b) State the type of alignment used in this document.

..... [1]

- (c) Explain how you can get rid of the orphan page so that you only have one single page.

..... [2]

- (d) State **two** ways in which a word processor saved document can be protected from changes by other users.

Way 1 [1]

Way 2 [1]

- (e) How can the document creator remind the users of the document about the violation of copyright law for a given word processor created pamphlet?

..... [1]

11 Pilots are usually trained using simulators.

(a) State **one** input device and one output device used in simulators.

Input device..... [1]

Output device..... [1]

(b) Give **one** advantage and **one** disadvantage of using a simulator to train pilots.

Advantage [1]

Disadvantage [1]

(c) Describe one simulated condition that the flight instructor can use in the training of pilots.

..... [1]

(d) Give **one** reason why training pilots in simulated environment is not always suitable.

..... [1]

12 A lodge has CCTV installed at the entrance of all rooms.

(a) State **one** way in which CCTV has helped to manage the lodge business on the part of the

(i) Lodge owners..... [1]

(ii) Law enforcement workers [1]

(b) In the past, lodge owners complained of thefts. Give **two** ways in which CCTV can be used to minimise thefts.

Way 1..... [1]

Way 2 [1]

(c) Describe a situation in which CCTV cannot be relied upon.

..... [2]

(d) How can CCTV be used to infringe on the basic human rights.

..... [1]

13 (a) List the programming constructs that can be used to

(i) execute one statement after another without branching,

..... [1]

(ii) execute a double branch statement,

..... [1]

(iii) execute a multiple branch statement,

..... [1]

(iv) execute a group of statements several times at a go.

..... [1]

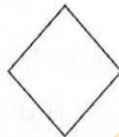
(b) State the meaning of each of the following flowchart symbols.

(i)



..... [1]

(ii)



..... [1]

(c) Study the compound assignment statement shown below where **A**, **B** and **TEMP** are variables.

BEGIN

A = 2

B = 3

TEMP = A

A = B

B = TEMP

PRINT A, B

END

(i) Give the output of variables **A** and **B**.

A = [1]

B = [1]

(ii) Explain the purpose of this programming construct.

.....

..... [2]



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Question Q1. Explain the meaning of the following computer terms: (a) Booting [2] (b) Feedback [2] (c) Junk mail [2] (d) Social network [2] (e) Process control [2] (f) Pointer [2]

(a) Booting is the process of starting up a computer, during which the Operating System is loaded from secondary storage into main memory (RAM) so the computer becomes ready to use.

(b) Feedback is information about the output/result of a process that is sent back into the system, and is used to check, control or adjust the process going forward.

(c) Junk mail is unsolicited, unwanted electronic mail (also called spam) sent out in bulk to many recipients, usually for advertising or fraudulent purposes.

(d) A Social network is an online platform/website (e.g. Facebook, WhatsApp) that allows people to create profiles, connect with each other and share information, messages, photos and videos.

Answer: (e) Process control is the use of a computer, fitted with sensors, to automatically monitor and control an ongoing industrial process (e.g. temperature or pressure in a chemical plant) in real time, without constant human intervention.

(f) A Pointer is a symbol (such as an arrow) displayed on the screen that moves as the mouse is moved, used to select, click or point at items on the screen.

Question Q2. (a) Give two ways documents saved on a computer may be lost. [2] (b) Describe two methods to backup documents on a computer system. [2] (c) State two methods to restrict access to important documents on a computer system. [2]

(a) Two ways documents may be lost: a virus attack that corrupts or deletes files; and accidental deletion of the file by the user (also acceptable: hard disk failure, theft of the computer, fire/power surge).

(b) Two backup methods: copying the documents onto an external storage device such as a flash disk or external hard drive; and saving a copy of the documents to online/cloud storage.

Answer: (c) Two methods to restrict access: protecting the documents/folders with a PASSWORD; and using file/folder PERMISSIONS (user access rights) so only authorised users can open or edit the documents.

Question Q3. A firm intends to change its funds distribution system from manual to computerised. The Systems Analyst is studying problems associated with the current system. (a) List two items the Analyst can include in the requirements specification of this project. [2] (b) Give one advantage of observation method when studying the current manual funds distribution system. [1] (c) Give two reasons why output formats are considered first before inputs when designing the required system. [2]

(a) Two items for the requirements specification: the OUTPUT requirements (reports/information the new system must produce); and the HARDWARE requirements (equipment needed to run the new system).

(b) Advantage of observation: the Analyst sees exactly how the current manual system actually works in practice, giving firsthand, accurate information rather than relying on what staff say they do.

Answer: (c) Two reasons outputs are considered first: the required OUTPUTS determine exactly what data must be collected as INPUT, so designing outputs first avoids collecting unnecessary data; and it ensures the finished system will actually meet the users' information needs, since the end-result is planned before working backwards to the inputs and processing needed to produce it.

Question Q4. Maphunziro Private School has installed an intranet. This network will enable lessons to be taught using video conferencing. (a) What is an intranet? [2] (b) State two hardware devices necessary for video conferencing apart from the computer. [2] (c) Explain how each hardware device you stated in (b) can be used during video conferencing. [2] (d) Give one advantage of this method of lesson delivery to the (i) pupils [1] (ii) teachers [1] (iii) school [1]

(a) An Intranet is a PRIVATE network that uses internet technology (web pages, browsers), but is restricted to the computers within a single organisation and is not accessible to the general public.

(b) Two hardware devices: a webcam; and a microphone (also acceptable: speakers/headphones, a projector).

(c) Use of Device 1 (webcam): captures live video of the teacher/pupils and sends it to the other location so participants can see each other. Use of Device 2 (microphone): captures the speaker's voice and transmits it as audio to the other location so participants can hear each other.

Answer: (d) (i) Pupils: they can attend and follow lessons without having to travel to another location/campus. (ii) Teachers: a single teacher can teach pupils at more than one location at the same time, saving travelling time. (iii) School: the school saves the cost of hiring extra teachers for every location/branch.

Question Q5. (a) Draw two ring networks (each having 4 client computers) connected to one server. The server has a network printer attached to it. [5] (b) Give two functions of a file server on the network. [2] (c) Identify one disadvantage for users stationed in either networks. [1] (d) Give one advantage of this type of network to designers of newsletters. [1]

(a) Each ring network is drawn as 4 client computers joined to each other and to the server in a closed loop/circle (a ring), with data passing from one computer to the next around the ring; both rings connect to the single central SERVER, which has a network printer attached to it so that both rings can print to the same shared printer.

(b) Two functions of a file server: it stores files/documents centrally so that all client computers on the network can access them; and it manages/controls user access permissions to the shared files.

Answer: (c) Disadvantage: because data passes around the ring from one computer to the next, if one cable/computer in the ring fails, it can bring down/disrupt communication for the whole ring network.

(d) Advantage to newsletter designers: large graphics/newsletter files can be stored centrally on the server and shared/accessed by all designers on the network, allowing them to collaborate on the same files and use the same shared network printer to produce printed copies.

Question Q6. The diagram shows a computerised weigh bridge designed by a Grade 12 pupil, with a vehicle on a weighing platform labelled A, feeding into a SIGNAL CONVERTER, then a PROCESSOR (linked to PRIMARY STORAGE), then two OUTPUT devices. (a) Name the sensor found in A. [1] (b) Explain the purpose of the signal converter in the circuit illustrated above. [2] (c) Name two output devices suitable for the circuit and give a reason for your answer. [4]

(a) The sensor found in A is a PRESSURE (weight/load) sensor, which detects the weight of the vehicle pressing down on the weighing platform.

Answer: (b) Purpose of the signal converter: the sensor produces an ANALOGUE signal, so the signal converter (an Analogue-to-Digital Converter, ADC) converts this analogue signal into a DIGITAL signal that the processor can understand and process.

(c) Output device 1: a PRINTER. Reason: it produces a permanent, printed weight ticket/receipt for the vehicle that has been weighed. Output device 2: a MONITOR/screen. Reason: it displays the weight reading immediately to the weighbridge operator so they can check it in real time.

Question Q7. Study the algorithm: BEGIN; ENTER Amount; ENTER value (1 to 10); SELECT CASE VALUE: Case 1 to 3 -> Interest=6; Case 4 to 7 -> Interest=8; Case 9 to 10 -> Interest=10; END SELECT; Final Balance = AMOUNT + (interest/100)*AMOUNT; END. (a) Estimate the final Balance if AMOUNT=170 and value=9. [2] (b) What is the purpose of this algorithm? [2]

Answer: (a) value = 9 falls in the range 'Case 9 to 10', so Interest = 10. Final Balance = AMOUNT + (interest/100)*AMOUNT = 170 + (10/100) x 170 = 170 + 17 = K187.

(b) Purpose of the algorithm: to calculate the final balance of money invested/deposited, after adding interest earned, where the interest rate charged depends on which range the entered 'value' falls into (i.e. it is an investment/savings interest calculator).

Question Q8. Study the profitability and investment analysis spreadsheet: A1=AMOUNT, B1=140; A2=PROFITABILITY, B2=PROFIT; A3=STRATEGY, B3=INVEST. (a) Name a feature of a spreadsheet which can be used to automatically calculate the same formulas on a similar worksheet. [1] (b) The function in B2 is =IF(B1>100,"PROFIT","LOSS"). Complete the table for VALUE IN B1 = 80 and 200. [2] (c) The function in B3 is =IF(B2="PROFIT","INVEST"). Using VALUE IN B1 = 200 and 60, write the results in B2 and B3. [4]

(a) The feature is 'COPY/FILL' (e.g. using the fill handle or copy-and-paste of a formula), which automatically re-applies the same formula (with relative cell references adjusted) to other similar rows/cells on the worksheet.

**Answer: (b) VALUE IN B1 = 80: since 80 is NOT greater than 100, RESULT IN B2 = "LOSS".
VALUE IN B1 = 200: since 200 IS greater than 100, RESULT IN B2 = "PROFIT".**

Answer: (c) VALUE IN B1 = 200: RESULT IN B2 = "PROFIT" (since $200 > 100$); because B2 = "PROFIT", RESULT IN B3 = "INVEST". VALUE IN B1 = 60: RESULT IN B2 = "LOSS" (since 60 is not > 100); because B2 is NOT "PROFIT", the IF condition in B3 is false and no false-result was given in the formula, so RESULT IN B3 = FALSE (blank/no value is returned).

Question Q9. The diagram shows a database under construction with tables PRODUCT (Product ID, Description, Price) and CUSTOMER (Customer ID, Product ID, Quantity), plus a query grid. (a) From the diagram, list the tables designed. [2] (b) Which field can be used to link the tables? [1] (c) Inside the diagram, draw a line to show a suitable table relationship. [1] (d) Give one reason why tables are linked in a relationship. [2] (e) Using $\text{AMOUNT} = [\text{PRICE}] \times [\text{QUANTITY}]$ and Table A (Product) and Table B (Customer), complete Table C (Order Query): row CO3/PO2 is already done as MAIZE, 80, 70, 5600; complete the row for CO1/PO3. [4]

(a) Table 1 = PRODUCT. Table 2 = CUSTOMER.

(b) The field used to link the tables is PRODUCT ID (it appears in both the PRODUCT table and the CUSTOMER table).

(c) A line is drawn joining PRODUCT ID in the PRODUCT table to PRODUCT ID in the CUSTOMER table, showing a one-to-many relationship (one product can be ordered by many customers).

Answer: (d) Reason tables are linked: linking the tables in a relationship avoids storing the same data (e.g. Description and Price) repeatedly in more than one table, reducing data redundancy, while still allowing matching information to be retrieved together from both tables when needed.

Answer: (e) For CO1, PO3: from Table A, PO3 = MILLET, PRICE = 70. From Table B, CO1 orders PO3 with QUANTITY = 100. So DESCRIPTION = MILLET, PRICE = 70, QUANTITY = 100, and $\text{AMOUNT} = \text{PRICE} \times \text{QUANTITY} = 70 \times 100 = 7\,000$.

Question Q10. The two diagrams below show a document created using a word processor: page 1 is full of text (a 'Widow'-causing page) and page 2 has just one line left over (an 'Orphan'). (a) Give two features of a word processor. [2] (b) State the type of alignment used in this document. [1] (c) Explain how you can get rid of the orphan page so that you only have one single page. [2] (d) State two ways in which a word processor saved document can be protected from changes by other users. [2] (e) How can the document creator remind the users of the document about the violation of copyright law for a given word processor created pamphlet? [1]

(a) Two features of a word processor: a SPELL-CHECK feature that finds and corrects spelling errors; and a MAIL MERGE feature that combines a standard letter with a list of names/addresses to produce personalised copies.

(b) The type of alignment used is JUSTIFIED alignment (text is stretched so that it lines up evenly along both the left and right margins).

Answer: (c) To remove the orphan page: reduce the amount of text/blank lines (e.g. delete extra empty paragraph marks) at the end of the document, or reduce the font size/margins slightly, so that the last line of text fits back onto the previous page instead of overflowing onto its own extra page.

(d) Two ways to protect a saved document: setting the file/document to READ-ONLY; and PASSWORD-PROTECTING the document so only authorised users with the password can open or edit it.

(e) The document creator can insert a COPYRIGHT NOTICE (e.g. a footer or watermark stating '© All rights reserved') on the pamphlet to remind users that the content is protected by copyright law.

Question Q11. Pilots are usually trained using simulators. (a) State one input device and one output device used in simulators. [2] (b) Give one advantage and one disadvantage of using a simulator to train pilots. [2] (c) Describe one simulated condition that the flight instructor can use in the training of pilots. [1] (d) Give one reason why training pilots in simulated environment is not always suitable. [1]

(a) Input device: the joystick/control yoke (used to steer the simulated aircraft). Output device: the monitor/visual display screen (shows the simulated view from the cockpit).

(b) Advantage: pilots can be trained and can practise handling emergencies in a completely SAFE environment, without risking real lives or a real, expensive aircraft. Disadvantage: a simulator cannot perfectly recreate the real fear/pressure of an actual emergency, so a pilot's reaction in real life may still differ from their reaction in the simulator.

(c) A simulated condition: an engine failure (also acceptable: bad weather/storm, turbulence, or an instrument fault), which the instructor sets up so the trainee pilot practises responding to it.

Answer: (d) Reason simulated training is not always suitable: a simulator cannot fully reproduce the real psychological stress and genuine danger of an actual flight, so some real-life skills and reactions cannot be completely learned through simulation alone.

Question Q12. A lodge has CCTV installed at the entrance of all rooms. (a) State one way in which CCTV has helped to manage the lodge business on the part of the (i) lodge owners [1] (ii) law enforcement workers [1] (b) In the past, lodge owners complained of thefts. Give two ways in which CCTV can be used to minimise thefts. [2] (c) Describe a situation in which CCTV cannot be relied upon. [2] (d) How can CCTV be used to infringe on the basic human rights. [1]

(a) (i) Lodge owners: CCTV lets them monitor staff and guest activity around the rooms remotely, helping them manage the business and catch any wrongdoing. (ii) Law enforcement workers: recorded CCTV footage can be used as EVIDENCE to investigate and solve crimes that occurred at the lodge.

(b) Two ways CCTV minimises theft: the visible presence of cameras DETERS would-be thieves from attempting to steal; and recorded footage helps IDENTIFY thieves after a theft has occurred, so they can be caught.

Answer: (c) Situation CCTV cannot be relied upon: during a power outage, or if the camera is faulty/badly positioned (e.g. a blind spot, or poor lighting at night), the footage may not be

recorded at all or may be too unclear to identify anyone involved.

(d) CCTV can infringe on human rights by recording people (e.g. guests) without their knowledge or consent, which violates their right to PRIVACY.

Question Q13. (a) List the programming constructs that can be used to (i) execute one statement after another without branching [1] (ii) execute a double branch statement [1] (iii) execute a multiple branch statement [1] (iv) execute a group of statements several times at a go [1] (b) State the meaning of a rectangle-with-double-vertical-bars flowchart symbol [1] and a diamond flowchart symbol [1] (c) Study: BEGIN; A=2; B=3; TEMP=A; A=B; B=TEMP; PRINT A,B; END. (i) Give the output of variables A and B. [2] (ii) Explain the purpose of this programming construct. [2]

(a) (i) SEQUENCE. (ii) SELECTION (an IF...THEN...ELSE, double-branch decision). (iii) CASE/multiple SELECTION (a SELECT CASE, multiple-branch decision). (iv) ITERATION/repetition (a loop, e.g. FOR or WHILE).

(b) The rectangle with double vertical bars represents a PRE-DEFINED PROCESS/sub-routine (a separate, named process/procedure called from the main flowchart). The diamond represents a DECISION (a point where a condition is tested and the flow branches depending on whether it is true or false).

Answer: (c) (i) Tracing the statements: A=2, B=3, TEMP=A so TEMP=2, A=B so A=3, B=TEMP so B=2. PRINT A,B outputs: A = 3, B = 2. (ii) Purpose: this construct SWAPS/exchanges the values held by two variables (A and B), using a third, temporary variable (TEMP) to hold one value safely while the swap takes place.

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