

G12 ECZ COMPUTER STUDIES P1 2017 GCE SOLUTIONS

Grade 12 ECZ Computer Studies Paper 1, 2017 GCE (7010/1)

2 hours 30 minutes | 13 questions, 12 in Section A + 1 in Section B, 70 marks

The full question paper appears first, followed by full worked answers to every question.

Candidate Name _____

Centre Number				Candidate Number			

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level

Computer Studies

7010/1

Paper 1

Monday

14 AUGUST 2017

Candidates answer on the question paper
No additional materials are required

Time: 2 hours 30 minutes

Instructions to Candidates

- 1 Write your **name**, **centre number** and **candidate number** in the spaces at the top of this page.
- 2 There are 13 questions in this paper, 12 in Section A and 1 in Section B. Answer **all** questions.
- 3 Write your answers in the spaces on the question paper.

Information For Candidates

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

The total number of marks for this paper is 70.

Cell phones are not allowed in the Examination Room.

For Examiner's Use	
Section A	
Section B	
Total	

Section A

1 (a) What is a file?

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

(b) State **one** disadvantage of using folders.

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

(c) Why does the operating system hide certain folders?

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

(d) Give **one** advantage of saving files in the same folder.

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

2 Macros are common in most application software.

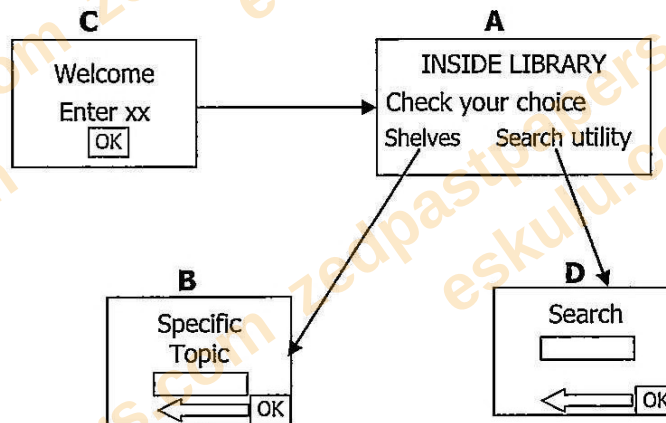
(a) Give **one** use of macros.

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

(b) Give **one** draw back of macros.

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

- 3 The diagram below shows the link of web pages of a school library website.



- (a) State information requested in **C**.

..... [1]

- (b) Which diagram is the home page?

..... [1]

- (c) What is the name of the computer that keeps pages of the website?

..... [1]

- (d) Give **two** precautions users should take when using the internet.

Way 1 [1]

Way 2 [1]

- 4 (a) River pollution is common in large mining operations. Computer control is often used to effectively deal with this problem.

Name **one** sensor and the data it collects in this system.

Sensor [1]

Data [1]

- (b) Give **one** reason why data is collected remotely and automatically.

Remote reason.....

..... [1]

Automatic reason

..... [1]

- 5 The following is the order in which a short message (SMS) is sent and received on a mobile phone. Write the numbers from 1 to 8 in the right hand column for each stage in the correct order. Stage 1 and 5 have been done for you.

Description of Stage	Order of Stage
Message travels to recipient's mobile service storage server	5
Message sent to sender's mobile mail server	
Message tone rings on receiver's phone	
Sender composes message and presses the send button	1
Message held in recipient's in box awaiting to be read	
Mobile service provider system examines address	
Message retrieved and sent to recipient's phone	
Mobile service provider system decides how to route message	

[3]

- 6 (a) Give **one** difference between a simulation and virtual reality.

.....

.....

.....

[2]

- (b) Give **three** requirements of a virtual reality system.

Requirement 1 [1]

Requirement 2 [1]

Requirement 3 [1]

- (c) Give **one** area of entertainment and **one** area of training that uses virtual reality.

Entertainment [1]

Training..... [1]

- 7 Lundu is a television technician who uses an expert system installed on his laptop to trace faults when repairing televisions.

(a) Explain how Lundu will interact with the expert system to help diagnose the fault in a television.

.....

.....

.....

[2]

(b) Give **one** reason why files in the knowledge base need to be updated regularly.

.....

.....

[1]

- 8 A turtle that draws shapes on paper uses the following instructions:

Forward **n** – moves **n** cm forward.

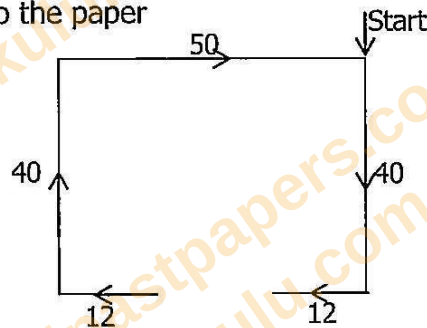
Backward **n** – moves **n** cm backward.

Turn left **t** – turns left **t** degrees

Turn right **t** – turns right **t** degrees

Pen up – lift the pen off paper

Pen down – lower the pen onto the paper



Write the set of instructions that makes the turtle to draw the shape shown above in the directions indicated.

Assume that the pen is down at the start.

.....

.....

.....

.....

.....

.....

[4]

- 9 (a) Study the following algorithm that is written in pseudocode and convert it to a flow chart.

BEGIN

Prompt user for amount

IF amount is less or equal to K5000 THEN

Calculate interest at 15% of amount

ELSE

Calculate interest at 20% of amount

END IF

Display amount

Display interest

END

[3]

- (b) What is the purpose of this algorithm?

.....

.....

[1]

10 (a) State **two** stages in Systems Development Life Cycle (SDLC).

Stage 1 [1]

Stage 2 [1]

(b) Which stage will the analyst specify what the user wants in the new system?

..... [1]

(c) Rather than supply the user documentation on-line, the analyst decides to make a printout.

(i) Give **one** advantage of doing this.

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

(ii) Give **one** disadvantage of doing this.

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

- 11 A database below was set up to show information about the largest ocean ships.

SHIP ID	YEAR BUILT	GROSS CAPACITY	COUNTRY OF REGISTRATION	COUNTRY OF CONSTRUCTION
AO	2009	225 383	UK	Finland
NI	2008	155 408	UK	Finland
MQ	2004	148 530	Japan	France
EX	1999	137 308	France	Japan
OV	1996	108 866	Germany	UK
DE	1972	77 488	Israel	UK
RF	1940	79 280	USA	USA

- (a) How many records are shown in the above database?

..... [1]

- (b) Using ship ID, what would be the output if the following search condition was typed in;
(year built < 2 000) and (country of registration = country of construction)

..... [1]

- (c) Complete the SQL statement below which locates ship ID from records with Gross capacity > 120 000.

SELECT..... from largest ocean ships table
WHERE..... [2]

- 12 (a) The table below shows the type of processing and the application. Fill in the appropriate application against the processing method.

PROCESSING SYSTEM	APPLICATION
Online processing	
Batch processing	

[2]

- (b) Define process control.

..... [2]

Section B

B Kazizela Manufacturers would like to computerise their existing manual order processing system. A systems analyst has been hired to work on this project.

- (a) Describe what the analyst would do if the proposed change does not meet the requirements in the feasibility study.

.....
 [1]

- (b) State **three** activities that would be done during the design stage.

Activity 1 [1]

Activity 2 [1]

Activity 3 [1]

- (c) Write down **two** reasons why the system being developed must be subjected to more than one test.

Reason 1 [1]

Reason 2 [1]

- (d) When the program of the system is being written, it is broken into modules. Give **two** advantages of this.

Advantage 1 [1]

Advantage 2 [1]

- (e) This system would need additional hardware, apart from the computer itself. Name **two** additional hardware the system might require and give a reason for each.

Hardware 1..... [1]

Reason [1]

Hardware 2..... [1]

Reason [1]

- (f) After computerisation of the system, the company decides to advertise on the internet. Write down **two** advantages and **two** disadvantages of this type of advertising.

Advantage 1 [1]

Advantage 2 [1]

Disadvantage 1 [1]

Disadvantage 2 [1]

- (g) Give **three** items to consider in evaluating the system.

Item 1 [1]

Item 2 [1]

Item 3 [1]



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Question Q1. (a) What is a file? [2] (b) State one disadvantage of using folders. [1] (c) Why does the operating system hide certain folders? [2] (d) Give one advantage of saving files in the same folder. [1]

Answer: (a) A file is a named collection/set of related data or records stored together as a single unit on a storage medium (e.g. a document, picture or program saved under one name).

Answer: (b) Disadvantage of folders: if a folder is deleted or moved by mistake, all the files inside it are lost/moved too (or: too many nested folders can make files hard to locate).

Answer: (c) The operating system hides certain folders (usually system folders) to protect important system/configuration files from being accidentally moved, edited or deleted by users, which could stop the computer working properly.

Answer: (d) Advantage of saving files in the same folder: it is easier and quicker to find/locate related files since they are all kept together in one place.

Question Q2. Macros are common in most application software. (a) Give one use of macros. [1] (b) Give one draw back of macros. [1]

Answer: (a) Use of a macro: to automate a repetitive/frequently-performed task (a sequence of commands recorded once and replayed with a single click/key press), saving time.

Answer: (b) Drawback of macros: macros from an untrusted source can carry viruses (macro viruses); also, if written incorrectly they can be hard to debug/edit.

Question Q3. Diagram shows linked web pages of a school library website: C (Welcome / Enter xx / OK) links to A (INSIDE LIBRARY / Check your choice / Shelves, Search utility); A links onward to B (Specific Topic, with a back arrow) and to D (Search, with a back arrow). (a) State information requested in C. [1] (b) Which diagram is the home page? [1] (c) What is the name of the computer that keeps pages of the website? [1] (d) Give two precautions users should take when using the internet. [2]

Answer: (a) C requests the user's access details to enter the site — e.g. a password/access code (the 'Enter xx' box), entered before clicking OK to proceed into the library.

Answer: (b) The home page is C — it is the first page displayed, requesting entry before the user reaches the 'INSIDE LIBRARY' menu (A) and its linked pages (B, D).

Answer: (c) The computer that stores/serves the website's pages is called a web server (host server).

Answer: (d) Two precautions when using the internet: (1) do not share personal/confidential information (passwords, bank details) with unknown sites; (2) only download files or click links from trusted, verified sources / keep antivirus software updated.

Question Q4. River pollution is common in large mining operations; computer control is used to deal with this. (a) Name one sensor and the data it collects in this system. [2] (b) Give one reason why data is collected remotely and one reason why it is collected automatically. [2]

Answer: (a) Sensor: a pH sensor. Data it collects: the acidity/alkalinity (pH level) of the river water (alternatively: a turbidity sensor collecting the cloudiness/particulate level of the water).

Answer: (b) Remote reason: the mining/river site may be dangerous, dirty or hard for a person to reach safely, so sensors positioned there send readings back to a computer elsewhere. Automatic reason: readings must be taken continuously (24 hours a day) and reacted to immediately if pollution levels rise, faster and more reliably than a human checking manually at intervals.

Question Q5. The stages of sending/receiving an SMS message are listed out of order. Write the numbers 1 to 8 for each stage in the correct order (stage 1 and 5 given).

Answer: Correct order: 1 = Sender composes message and presses send button (given). 2 = Message sent to sender's mobile mail server. 3 = Mobile service provider system examines address. 4 = Mobile service provider system decides how to route message. 5 = Message travels to recipient's mobile service storage server (given). 6 = Message held in recipient's in box awaiting to be read. 7 = Message retrieved and sent to recipient's phone. 8 = Message tone rings on receiver's phone.

Question Q6. (a) Give one difference between a simulation and virtual reality. [2] (b) Give three requirements of a virtual reality system. [3] (c) Give one area of entertainment and one area of training that uses virtual reality. [2]

Answer: (a) A simulation is a computer model that imitates a real-world process or system so it can be studied or tested (usually viewed on an ordinary screen, not necessarily interactive); virtual reality goes further by creating a fully immersive, interactive artificial 3-D environment that responds to the user's own movements (via a headset/gloves), making the user feel physically present inside it.

Answer: (b) Three requirements of a VR system: (1) a head-mounted display/headset (HMD), (2) data/haptic gloves (or hand controllers) for interaction, (3) a powerful computer with a high-performance graphics processor (plus motion sensors/trackers to detect the user's movement).

Answer: (c) Entertainment: video gaming. Training: pilot flight-simulation training (alternatively: surgical/medical training, or driving simulation).

Question Q7. Lundu is a television technician who uses an expert system installed on his laptop to trace faults when repairing televisions. (a) Explain how Lundu will interact with the expert system to help diagnose the fault. [2] (b) Give one reason why files in the knowledge base need to be updated regularly. [1]

Answer: (a) Lundu uses the user interface to answer a series of questions the expert system asks about the television's symptoms/fault (e.g. selecting options or typing responses); the system's inference engine compares his answers against the rules stored in the knowledge base and works out (infers) a diagnosis, which it then displays to Lundu along with the recommended repair.

Answer: (b) The knowledge base needs regular updates because new television models, components and faults appear over time, so the rules and facts must be kept current for the expert system to keep giving accurate, up-to-date diagnoses.

Question Q8. A turtle draws shapes using Forward n, Backward n, Turn left t, Turn right t, Pen up, Pen down. Write the set of instructions that makes the turtle draw the given staple/bracket-shaped figure (top edge 50, two vertical sides of 40 each, two bottom 'foot' segments of 12 each, with a gap between the feet), starting at 'Start' (top right) with the pen down.

*** NOTE ON THE DIAGRAM: the scanned figure's arrowheads (showing measurement direction for each side) are not fully unambiguous once redrawn as text, so the instruction set below is the single, internally-consistent path that reproduces the shape exactly as drawn: a flat top of 50, a vertical side of 40 down each end, and a 12-unit 'foot' at the bottom of each side pointing in toward the middle, leaving a gap between the two feet (like the underside of a table/bracket). ***

Answer: Assuming the turtle starts at 'Start' (top right corner) facing left, with the pen down: 1. Forward 50 (draws the top edge, right to left, to the top-left corner) 2. Turn Left 90 (now facing down) 3. Forward 40 (draws the left side, down to the bottom-left corner) 4. Turn Left 90 (now facing right) 5. Forward 12 (draws the left foot, in toward the middle) 6. Pen up 7. Forward 26 (moves across the gap between the two feet, without drawing) 8. Pen down 9. Forward 12 (draws the right foot, continuing right to the bottom-right corner) 10. Turn Left 90 (now facing up) 11. Forward 40 (draws the right side, back up to Start) 12. Pen up (finished)

Question Q9. (a) Study the pseudocode algorithm (BEGIN / Prompt user for amount / IF amount $\leq$ K5000 THEN Calculate interest at 15% of amount ELSE Calculate interest at 20% of amount END IF / Display amount / Display interest / END) and convert it to a flow chart. [3] (b) What is the purpose of this algorithm? [1]

Answer: (a) Flow chart (described in sequence, since a flow chart cannot be hand-drawn here): Start (terminal) -> Input amount (parallelogram) -> Decision: Is amount $\leq$ K5000? (diamond) -> if YES: Process box 'Calculate interest = 15% of amount'; if NO: Process box 'Calculate interest = 20% of amount' -> both branches join -> Output amount (parallelogram) -> Output interest (parallelogram) -> End (terminal).

Answer: (b) Purpose: to work out (calculate) the interest due on an amount of money, charging 15% interest if the amount is K5000 or less, and 20% interest if the amount is more than K5000, then display the original amount together with the interest calculated.

Question Q10. (a) State two stages in the Systems Development Life Cycle (SDLC). [2] (b) Which stage will the analyst specify what the user wants in the new system? [1] (c) Rather than supply the user documentation on-line, the analyst decides to make a printout. (i) Give one advantage of doing this. [1] (ii) Give one disadvantage of doing this. [1]

Answer: (a) Two SDLC stages: Systems Analysis and Systems Design (other valid stages: Feasibility Study, Development and Testing, Implementation, Evaluation).

Answer: (b) The Systems Analysis stage is where the analyst investigates and specifies exactly what the user wants/needs from the new system.

Answer: (c)(i) Advantage of a printed (paper) copy: it can still be read even if there is no computer available or if there is a power/system failure, and it is easy to carry around and annotate by hand.

Answer: (ii) Disadvantage: printing costs money (paper, ink) and takes up physical storage space, and a printed copy is harder to update/keep current than an on-line one.

Question Q11. A database shows information about the largest ocean ships (7 records: Ship ID, Year Built, Gross Capacity, Country of Registration, Country of Construction). (a) How many records are shown? [1] (b) Using Ship ID, what would be the output if (year built < 2000) AND (country of registration = country of construction)? [1] (c) Complete the SQL statement that locates Ship ID from records with Gross capacity > 120 000. [2]

Answer: (a) 7 records are shown (AO, NI, MQ, EX, OV, DE, RF).

Answer: (b) Checking every record against BOTH conditions: AO(2009), NI(2008), MQ(2004) all fail 'year<2000'. EX(1999, France/Japan) and OV(1996, Germany/UK) and DE(1972, Israel/UK) all satisfy year<2000 but their registration and construction countries differ, so they fail the second condition. Only RF (1940, USA/USA) satisfies both conditions (year<2000 AND registration country = construction country). Output: RF only.

Answer: (c) SELECT Ship ID from largest ocean ships table WHERE Gross capacity > 120000. This matches 4 ships: AO (225 383), NI (155 408), MQ (148 530) and EX (137 308).

Question Q12. (a) Fill in the appropriate application against each processing method: Online processing; Batch processing. [2] (b) Define process control. [2]

Answer: (a) Online processing application: real-time transaction systems such as an ATM/banking system or an airline seat-reservation system (the record is updated immediately as the transaction happens). Batch processing application: jobs collected and processed together at a set time, such as payroll processing or electricity/utility bill printing.

Answer: (b) Process control is the use of a computer, together with sensors and actuators, to automatically monitor and control an ongoing physical or industrial process (e.g. temperature, pressure or flow in a factory/plant) in real time, using feedback from the sensors to make automatic adjustments without constant human intervention.

Question Q13 (Section B). Kazizela Manufacturers would like to computerise their existing manual order processing system; a systems analyst has been hired. (a) Describe what the analyst would do if the proposed change does not meet the requirements in the feasibility study. [1] (b) State three activities done during the design stage. [3] (c) Write down two reasons why the system must be subjected to more than one test. [2] (d) The program is broken into modules when it is written. Give two advantages of this. [2] (e) Name two additional hardware the system might require and give a reason for each. [4] (f) Write down two advantages and two disadvantages of advertising this business on the internet. [4] (g) Give three items to consider in evaluating the system. [3]

Answer: (a) If the proposed change does not meet the feasibility requirements, the analyst would abandon (or substantially revise) the proposal rather than continue — the project does not proceed to the next SDLC stage until it is shown to be feasible.

Answer: (b) Three design-stage activities: (1) designing the input formats/screens, (2) designing the output formats/reports, (3) designing the file/database structure (other valid answers: designing the user interface, specifying the hardware/software needed, designing validation and security procedures).

Answer: (c) Two reasons for more than one test: (1) different types of tests (e.g. unit testing, then system testing) catch different kinds of errors, so one test alone may miss faults that another would find; (2) thorough testing under many different conditions/data sets gives confidence the system will work correctly and reliably once it goes live, reducing the risk of failures after implementation.

Answer: (d) Two advantages of breaking the program into modules: (1) each module can be written, tested and debugged separately, making errors easier to find and fix; (2) different modules can be written by different programmers at the same time, speeding up development (modules can also be reused in other programs).

Answer: (e) Additional hardware: (1) Printer — needed to produce hard-copy documents such as order confirmations and invoices. (2) Barcode reader/scanner — needed to quickly and accurately capture/input product or order codes without manual typing errors.

Answer: (f) Advantages of internet advertising: (1) reaches a much wider (even global) audience than local advertising; (2) generally cheaper than advertising through print, radio or television. Disadvantages: (1) not every potential customer has internet access, so some customers are missed; (2) online adverts can be ignored, blocked (ad-blockers) or viewed as untrustworthy/scam-like, reducing their effectiveness.

Answer: (g) Three items to consider when evaluating the system: (1) whether the system meets the original objectives/user requirements, (2) the system's performance — speed and accuracy of processing, (3) whether the system is reliable (how often it breaks down) and cost-effective (whether the expected savings/benefits were achieved).

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