G12 ECZ COMPUTER STUDIES P1 2014 SOLUTIONS

Grade 12 ECZ Computer Studies Paper 1, 2014 (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

Joint Examination for the School Certificate
and General Certificate of Education Ordinary Level

COMPUTER STUDIES 7010/1

Tuesday 21 OCTOBER 2014

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

For Examiner. Use

1 Explain the meaning of the following computer terms, giving examples where necessary.

(a) Keyboard .....

..... [2]

(b) Live Data.....

..... [2]

(c) E-learning .....

..... [2]

(d) End-user .....

..... [2]

(e) Pilot changeover .....

..... [2]

(f) Cyber crime .....

..... [2]

2 Gamma Super market has decided to change from manual (paper) based system to a computerised system.

(a) Give **three** tasks that are carried out during the analysis stage.

1 ..... [1]

2 ..... [1]

3 ..... [1]

(b) State **one** disadvantage to the supermarket of changing to a computerised system.

..... [1]

(c) Suggest a suitable method the supermarket can use to change over to the new system. Give a reason for your answer.

Method ..... [1]

Reason .....

..... [1]

For Examiners Use

3 A car manufacturing company uses a website to advertise its products. Customers can find information about this website using a search engine.

(a) Give **two** advantages of using a search engine to find products on the company's website.

1 ..... [1]

2 ..... [1]

(b) Customers who visit the company website can also make orders on-line. Give **one** advantage and **one** disadvantage of on-line orders to the customer.

Advantage ..... [1]

Disadvantage ..... [1]

(c) Give **two** ways the company can protect the data for its customers when they make orders online.

1 ..... [1]

2 ..... [1]

4 Engineers and teachers of industrial arts subjects use Computer Aided Designs (CAD) software in their works.

(a) Give **three** characteristics of a Computer Aided Design (CAD) package.

1 .....

..... [1]

2 .....

..... [1]

3 .....

..... [1]

(b) Give **two** uses of CAD software.

1 .....

..... [1]

2 .....

..... [1]

(c) State **three** examples of hardware required for a CAD system.

1 ..... [1]

2 ..... [1]

3 ..... [1]

(d) Describe **one** situation where CAD software is used apart from construction design.

.....

..... [1]

5 **(a)** Match the definitions on the left to the correct term on the right using arrows.

Check if student age is in the range 11 to 12	Verification
Computer generated operation of a chemical process	Validation
Software that looks for information based on certain keywords	Search Engine
Typing in a password twice to ensure it is correct	Simulation

[4]

(b) State **one** application which uses

(i) Real-time processing .....

..... [1]

(ii) On-line processing .....

..... [1]

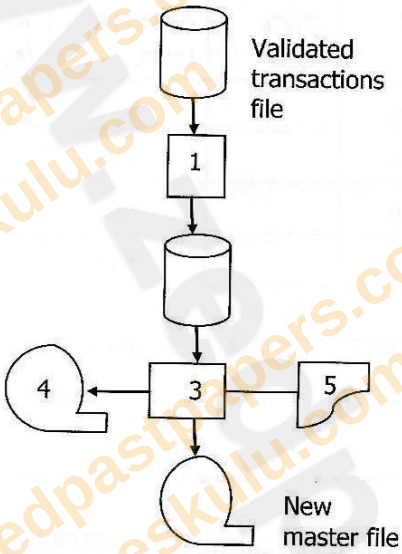
(c) Give the difference between a Real-time processing system and an on-line processing system.

.....

..... [2]

For Examiners Use

6 **(a)** The Systems flowchart represents a batch update of a payroll master file stored on magnetic tape. Use the words provided to fill in the missing information. Write your answers in the blank spaces.



Sorted Validated Transaction File
Old Master File
Update
Error Report
Sort

1 _____
2 _____
3 _____
4 _____
5 _____

[5]

(b) Describe the consequences of system failure of a real-time air traffic control system.

.....

.....

[2]

7 **(a)** Give **two** examples of situations where data can be collected using sensors.

1 ..... [1]

2 ..... [1]

(b) Most cell phones are fitted with digital camera called a webcam. Give **two** uses of this camera on the phone.

1 ..... [1]

2 ..... [1]

8 Besa and company use a spreadsheet program to monitor the sales of fuel at their filling station. Study the diagram below and answer the questions that follow.

	A	B	C	D	E	F	G
1	FUEL	OPENING STOCK	NEW STOCK	CLOSING STOCK	STOCK SOLD	COST PER LITRE	TOTAL AMOUNT (K)
2	Engine oil	1 500	5 000	3 500		8.16	
3	Kerosene	4 200	20 000	8 700		3.52	
4	Diesel	15 300	70 000	33 900		7.62	
5	Petrol	20 500	3 400	10 100		9.42	
6	TOTAL						

(a) Write the data type contained in cell F2.

..... [1]

(b) Write the formula that needs to be placed in cell E2 to calculate the STOCK SOLD for engine oil.

..... [2]

(c) Write the formula that needs to be placed in cell G2 to calculate the TOTAL AMOUNT sold for Engine oil.

..... [2]

(d) Explain how the company can create a pie chart using the columns headed FUEL and TOTAL AMOUNT (K).

.....

.....

..... [2]

For Examiners Use

9 Many schools are networking their computers.

(a) (i) Give **three** advantages of networking a set of computers.

1 ..... [1]

2 ..... [1]

3 ..... [1]

(ii) Give **one** reason why viruses can spread quickly on a network.

..... [1]

(b) One secondary school has decided to use network computers with wireless capability.
Give **two** advantages and **two** disadvantages of using wireless systems.

Advantages

1 ..... [1]

2 ..... [1]

Disadvantages

1 ..... [1]

2 ..... [1]

(c) At another school, the network specialist has decided to upload the teaching and learning materials on the internet rather than printing a series of hard copies.
Give **two** reasons why the specialist has chosen to do this.

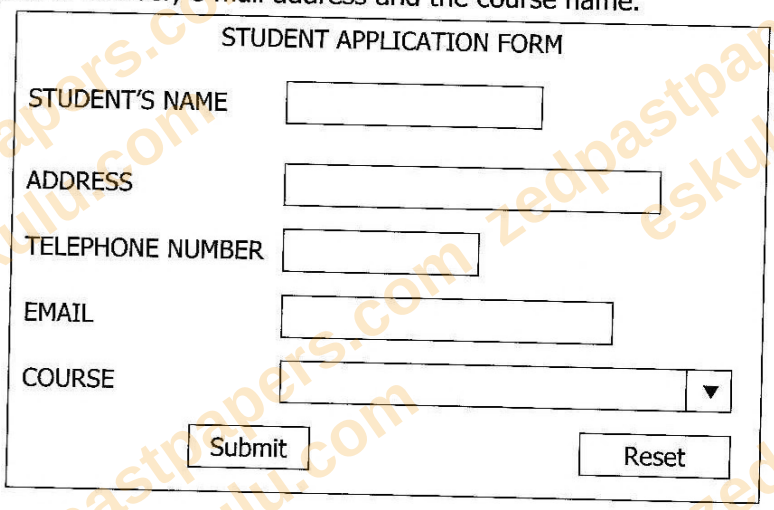
1 .....

..... [1]

2 .....

..... [1]

10 A college offers courses which students access on an on-line system. Students log on to the system from their homes to choose their courses. In order to get enrolled for a course, a student needs to complete an on-line application form which includes the student's name, address, telephone number, e-mail address and the course name.



(a) Give **one** example of an application software that can be used for this purpose apart from Database Management software.

..... [2]

(b) State **two** other features that can be added to this form.

1 ..... [1]

2 ..... [1]

(c) State **one** reason why the COURSE field has a pull down menu.

.....

..... [1]

(d) List **two** other fields that can be added to the form.

1 ..... [1]

2 ..... [1]

(e) What is the purpose of the Reset button on the form?

.....

..... [1]

For Examiners Use

11 In a school chemistry laboratory, a teacher uses a multimedia system to present a lesson to a group of pupils.

(a) State any **two** important features of a multimedia system which distinguishes it from an ordinary computer system.

1 ..... [1]

2 ..... [1]

(b) Give **one** suitable hardware device apart from the computer and **one** application software that can be used to present a lesson in multimedia format.

Hardware device ..... [1]

Application software ..... [1]

(c) Give **two** reasons why multimedia systems are becoming popular in presenting scientific experiments.

1 .....

..... [1]

2 .....

..... [1]

12 Mabutulusi is an IT expert of a newly opened bank. He suggested to management the introduction of Automated Teller Machines (ATMS).

(a) State **two** reasons why Mabutulusi recommended ATM machines.

1 .....

..... [1]

2 .....

..... [1]

(b) State the **input**, **processing** and **output** that takes place on an ATM terminal.

Input ..... [1]

Processing ..... [1]

Output ..... [1]

(c) State **two** security features of an ATM facility.

1 ..... [1]

2 ..... [1]

13 In the near future, most of the work done by human beings will be taken over by robots.

(a) Give **two** advantages and **two** disadvantages of using robots.

Advantages

1 .....

..... [1]

2 .....

..... [1]

Disadvantages

1 .....

..... [1]

2 .....

..... [1]

(b) State **two** typical scientific industrial applications of robots.

1 ..... [1]

2 ..... [1]

(c) Give **two** major differences between a human being and a robot in performing tasks.

1 .....

..... [2]

2 .....

..... [2]

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Question Q1. Explain the meaning of the following computer terms, giving examples where necessary: (a) Keyboard [2] (b) Live Data [2] (c) E-learning [2] (d) End-user [2] (e) Pilot changeover [2] (f) Cyber crime [2]

(a) A Keyboard is an INPUT device with keys (letters, numbers, symbols) used to type text, data and commands into a computer.

(b) Live Data is REAL, actual data used in an operational/working system (as opposed to test data), where any errors have real consequences for the organisation.

(c) E-learning is the use of computers and the internet to deliver teaching/learning materials and lessons to students remotely, without needing to be physically present in a classroom.

(d) An End-user is the person for whom a computer system or piece of software is ultimately designed, and who actually uses the finished system to perform tasks (as opposed to the programmer or systems analyst who built it).

Answer: (e) Pilot changeover is a method of changing to a new system where the new system is introduced in ONE branch, department or section first (the 'pilot' site) while the rest of the organisation continues using the old system, before the new system is rolled out everywhere else.

(f) Cyber crime is any illegal or criminal activity carried out using computers, networks or the internet — e.g. hacking, online fraud, identity theft, or spreading malware.

Question Q2. Gamma Super market has decided to change from manual (paper) based system to a computerised system. (a) Give three tasks carried out during the analysis stage. [3] (b) State one disadvantage to the supermarket of changing to a computerised system. [1] (c) Suggest a suitable method the supermarket can use to change over to the new system. Give a reason. [2]

(a) Three analysis-stage tasks: interviewing staff and observing how the current manual system works; examining existing documents/records used in the current system; and distributing questionnaires to staff/customers to gather requirements for the new system.

(b) One disadvantage: the high COST of buying new hardware, software and training staff to use the new computerised system.

Answer: (c) Method: PARALLEL RUNNING. Reason: running the old manual system and the new computerised system side-by-side for a period allows their results to be compared, so any errors in the new system can be caught and corrected while the supermarket still has the old system as a safe fallback.

Question Q3. A car manufacturing company uses a website to advertise its products. Customers can find information about this website using a search engine. (a) Give two advantages of using a search engine to find products on the company's website. [2] (b) Give one advantage and one disadvantage of on-line orders to the customer. [2] (c) Give two ways the company can protect the data for its customers when they make orders online. [2]

(a) Two advantages of a search engine: it lets customers find specific products quickly without browsing the whole website; and it ranks results by relevance, saving the customer time.

(b) Advantage: the customer can order goods conveniently from home at any time (24/7), without travelling to a shop. Disadvantage: the customer cannot physically inspect/try the goods before buying them.

Answer: (c) Two ways to protect customer data online: using ENCRYPTION (e.g. SSL/HTTPS) to secure data as it is transmitted over the internet; and requiring strong passwords/authentication and using firewalls to prevent unauthorised access to the customer database.

Question Q4. Engineers and teachers of industrial arts subjects use Computer Aided Design (CAD) software in their works. (a) Give three characteristics of a CAD package. [3] (b) Give two uses of CAD software. [2] (c) State three examples of hardware required for a CAD system. [3] (d) Describe one situation where CAD software is used apart from construction design. [1]

(a) Three characteristics of a CAD package: it can produce very accurate 2D/3D drawings; it allows designs to be easily edited/modified without redrawing from scratch; and it allows the design to be rotated and viewed from different angles.

(b) Two uses of CAD software: designing building/architectural plans; and designing machine parts or engineering components.

Answer: (c) Three hardware examples for a CAD system: a graphics tablet/digitizer; a high-resolution monitor; and a plotter (or high-quality printer) for producing precise printed drawings.

(d) CAD software is also used in fashion/clothing design, or in designing a company's product packaging/logo, since it allows precise, easily-editable designs outside of construction/architecture.

Question Q5. (a) Match the definitions on the left to the correct term on the right: 'Check if student age is in the range 11 to 12', 'Computer generated operation of a chemical process', 'Software that looks for information based on certain keywords', 'Typing in a password twice to ensure it is correct' — against Verification, Validation, Search Engine, Simulation. [4] (b) State one application which uses: (i) Real-time processing [1] (ii) On-line processing [1] (c) Give the difference between a Real-time processing system and an on-line processing system. [2]

Answer: (a) 'Check if student age is in the range 11 to 12' -> Validation (a range check). 'Computer generated operation of a chemical process' -> Simulation. 'Software that looks for information based on certain keywords' -> Search Engine. 'Typing in a password twice to ensure it is correct' -> Verification.

(b)(i) Real-time processing example: an air traffic control system (must respond to aircraft position data instantly). (ii) On-line processing example: a bank ATM transaction / airline ticket booking system.

Answer: (c) A Real-time processing system must respond to input IMMEDIATELY, within a guaranteed maximum time, because any delay could be dangerous or catastrophic (e.g. a safety-critical system). An On-line processing system processes transactions interactively as they occur, but without such a strict, safety-critical timing guarantee — a short delay is acceptable.

Question Q6. (a) The Systems flowchart represents a batch update of a payroll master file stored on magnetic tape. Use the given words (Sorted Validated Transaction File, Old Master File, Update, Error Report, Sort) to fill in the missing information (labelled 1-5 on the diagram: 1=process before the second data store, 2=data store after process 1, 3=process combining the sorted file and an input, 4=output branching left from process 3, 5=input feeding into process 3 from the right). [5] (b) Describe the consequences of system failure of a real-time air traffic control system. [2]

Answer: (a) 1 = Sort; 2 = Sorted Validated Transaction File; 3 = Update; 4 = Error Report; 5 = Old Master File. (The Validated Transactions File is first SORTED into the Sorted Validated Transaction File, which is then used to UPDATE the Old Master File, producing the New Master File plus an Error Report of any rejected records.)

(b) If a real-time air traffic control system fails, controllers lose the live, up-to-the-second data on aircraft positions needed to keep planes safely separated — this could lead to aircraft collisions and loss of life, since there is no time to fall back on manual methods.

Question Q7. (a) Give two examples of situations where data can be collected using sensors. [2] (b) Most cell phones are fitted with a digital camera called a webcam. Give two uses of this camera on the phone. [2]

(a) Two examples of sensor data collection: an automatic street-lighting system (using a light sensor to detect darkness); and a burglar alarm system (using a motion sensor to detect intruders).

(b) Two uses of a phone's camera: making video calls (video conferencing); and taking photos/selfies or recording video.

Question Q8. Besa and company use a spreadsheet program to monitor sales of fuel. Columns: A=FUEL, B=OPENING STOCK, C=NEW STOCK, D=CLOSING STOCK, E=STOCK SOLD, F=COST PER LITRE, G=TOTAL AMOUNT (K). Row 2 = Engine oil: Opening 1500, New 5000, Closing 3500, Cost/litre 8.16. (a) Write the data type contained in cell F2. [1] (b) Write the formula for cell E2 to calculate STOCK SOLD for engine oil. [2] (c) Write the formula for cell G2 to calculate TOTAL AMOUNT sold for Engine oil. [2] (d) Explain how the company can create a pie chart using the columns headed FUEL and TOTAL AMOUNT (K). [2]

(a) The data type in cell F2 is a REAL number (decimal/currency number, e.g. 8.16).

Answer: (b) Stock Sold = Opening stock + New stock – Closing stock, so the formula for E2 is: =B2+C2-D2

Answer: (c) Total Amount = Stock Sold x Cost per litre, so the formula for G2 is: =E2*F2

(d) To create the pie chart: select (highlight) the FUEL column (A2:A5) and the TOTAL AMOUNT column (G2:G5) together — holding Ctrl to select the two non-adjacent columns — then use the Insert menu to choose Chart, select the Pie Chart type, and follow the chart wizard to insert it.

Question Q9. Many schools are networking their computers. (a)(i) Give three advantages of networking a set of computers. [3] (ii) Give one reason why viruses can spread quickly on a network. [1] (b) One secondary school has decided to use networked computers with wireless capability. Give two advantages and two disadvantages of using wireless systems. [4] (c) At another school, the network specialist has decided to upload teaching and learning materials on the internet rather than printing hard copies. Give two reasons why. [2]

(a)(i) Three advantages of networking: it allows sharing of resources like printers and scanners between many computers; it allows sharing/central storage of files and data; and it allows computers to communicate easily with each other (e.g. via email or messaging).

(ii) Viruses spread quickly on a network because the computers are interconnected and constantly share files and resources, so an infected file can automatically pass from one computer to many others.

Answer: (b) Advantages of wireless: no cabling is needed, making installation cheaper and easier; and it allows mobility, letting users connect from anywhere within signal range. Disadvantages: the signal can be weaker/less reliable than a wired connection; and it is more vulnerable to being intercepted/hacked by unauthorised users nearby.

(c) Reasons to upload materials rather than print: it saves the cost of paper and printing; and the materials can be easily updated/corrected once online, with all students seeing the latest version immediately.

Question Q10. A college offers courses students access on-line, via a Student Application Form with fields for Student's Name, Address, Telephone Number, Email, Course (drop-down), and Submit/Reset buttons. (a) Give one example of application software (apart from Database Management software) that can be used for this purpose. [2] (b) State two other features that can be added to this form. [2] (c) State one reason why the COURSE field has a pull down menu. [1] (d) List two other fields that can be added to the form. [2] (e) What is the purpose of the Reset button on the form? [1]

(a) Web-authoring/form-design software (e.g. a form built using HTML, or a dedicated online form-builder application) could be used instead of Database Management software.

(b) Two other features that could be added: a 'Help' button/link giving instructions on filling in the form; and validation error messages that appear if a field is filled in incorrectly.

Answer: (c) The COURSE field uses a pull-down (drop-down) menu to RESTRICT the student to only the valid, currently-available course options, reducing typing errors and ensuring only a recognised course name is submitted (a form of validation).

(d) Two other fields that could be added: Date of Birth; and Gender (also acceptable: NRC number, previous qualifications).

(e) The Reset button clears all the data the student has entered into the form's fields, returning them to blank/default, allowing the student to start filling in the form again from scratch.

Question Q11. In a school chemistry laboratory, a teacher uses a multimedia system to present a lesson. (a) State two important features of a multimedia system which distinguish it from an ordinary computer system. [2] (b) Give one suitable hardware device (apart from the computer) and one application software that can present a lesson in multimedia format. [2] (c) Give two reasons why multimedia systems are becoming popular in presenting scientific experiments. [2]

(a) Two distinguishing features of a multimedia system: it combines several media types together (text, graphics, sound, video, animation) in one presentation; and it requires extra hardware, such as a sound card/speakers and a high-quality graphics card, to handle this rich content.

Answer: (b) Hardware device: a projector (or good-quality speakers). Application software: presentation software (e.g. Microsoft PowerPoint).

(c) Two reasons multimedia is popular for scientific experiments: it allows dangerous experiments to be shown/simulated SAFELY through video or animation, without any real risk to pupils; and it can make abstract or microscopic processes visible and easier to understand, and can be paused/replayed for better learning.

Question Q12. Mabutulusi is an IT expert of a newly opened bank. He suggested to management the introduction of Automated Teller Machines (ATMs). (a) State two reasons why Mabutulusi recommended ATM machines. [2] (b) State the input, processing and output that takes place on an ATM terminal. [3] (c) State two security features of an ATM facility. [2]

(a) Two reasons for recommending ATMs: they allow customers to withdraw money 24 hours a day without needing a human bank teller, improving convenience; and they reduce queues and workload for bank staff, saving the bank the cost of employing more tellers.

Answer: (b) Input: the customer inserts their card and enters their PIN and the amount requested via the keypad. Processing: the system verifies the PIN and checks the account has sufficient balance, then updates the account balance. Output: the requested cash is dispensed, along with a printed receipt/mini-statement.

(c) Two ATM security features: a required PIN number known only to the account holder; and CCTV cameras monitoring the ATM area (also acceptable: the card being retained after repeated failed PIN attempts).

Question Q13. In the near future, most of the work done by human beings will be taken over by robots. (a) Give two advantages and two disadvantages of using robots. [4] (b) State two typical scientific/industrial applications of robots. [2] (c) Give two major differences between a human being and a robot in performing tasks. [4]

Answer: (a) Advantages: robots can work continuously (24 hours a day) without getting tired, increasing productivity; and they can perform dangerous tasks (e.g. handling toxic chemicals or extreme heat) without risking human life. Disadvantages: they are expensive to buy, program and maintain; and they cause unemployment by replacing human workers in factories.

(b) Two industrial applications of robots: welding/assembling car parts on a factory production line; and handling hazardous materials in a laboratory (also: spray-painting car bodies, packaging/sorting products).

(c) Two differences: humans can THINK and make independent decisions, adapting to unexpected situations, whereas a robot can only follow its pre-programmed instructions and cannot adapt beyond its programming; and humans get tired and need rest, whereas a robot (given power and maintenance) can work continuously without fatigue.

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