KENYA NATIONAL EXAMINATION COUNCIL
KCSE, 2014

COMPUTER STUDIES PAPER 1 ANALYSIS

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3.9 COMPUTER STUDIES (451)

This was the **ninth time** the subject was tested under the revised syllabus. The subject is tested using a **theory paper**, a **practical paper** and a **project paper**. The project paper is usually developed by the Council but assessed in the schools by the subject teachers. The project marks are moderated and combined with the marks from the practical paper to make up to 100%.

3.9.1 CANDIDATES' GENERAL PERFORMANCE

The table below shows candidates performance in Computer Studies (451) examination in the years: 2011, 2012, 2013 and 2014.

Table 17: Candidates' Overall Performance in Computer Studies for the last four years

Year	Paper	Candidature	Maximum Score	Mean Score	Standard Deviation
2011	451/1	**7455**	100	52.76	16.77
	451/2&3		100	62.27	13.92
	Overall		**200**	**115.02**	**29.03**
2012	451/1	**8069**	100	54.59	17.48
	451/2&3		100	60.83	15.34
	Overall		**200**	**115.35**	**31.70**
2013	451/1	**9181**	100	49.28	17.48
	451/2&3		100	61.12	15.00
	Overall		**200**	**110.36**	**30.88**
2014	451/1	**10770**	100	52.91	16.03
	451/2&3		100	60.58	14.37
	Overall		**200**	**113.43**	**29.12**

From the table above, it can be observed that:

(i) Candidature has continued to grow year in year out.

(ii) Candidature increased from **9181** in **2013** to **10770** in **2014** representing **17.31%** increment.

(iii) Performance in ***paper 1 (451/1)*** improved significantly from a mean of **49.28%** in **2013** to **52.91%** in **2014**, representing **7.366%** improvement.

(iv) Performance in both the ***practical paper*** ***(451/2)*** and the project ***paper (451/3)*** dropped minimally from **61.12%** in **2013** to **60.58%** in **2014** representing **0.8835%** decline.

(v) Overall performance in the subject improved from a mean of **110.36** in the year **2013** to **113.43** In the year 2014 representing **2.782%.**

The questions which were reported to have been poorly responded to are briefly discussed below in view of pointing out the candidates' weaknesses and the proposed suggestions on the measures to be put in place in order to improve performance in future.

3.9.2 Computer Studies Paper 1 (451/1)

Section A

Question 1

State **one** function for each of the following elements of a computer system:

(a) hardware; (1 mark)

(b) software; (1 mark)

(c) liveware. (1 mark)

Candidates were required to state the functions of elements of a computer system.

Weaknesses

Majority of the candidates were defining the terms instead of stating the functions of the elements.

Expected responses

(a) Hardware: To perform tasks of inputting, storage, outputting, processing during data processing and communication.

(b) Software:
- Instructs the hardware/computer on what to do during data processing.
- Provides interface between hardware and liveware.
- Accept functions of software based category ie. system / application/working/uses.

(c) Liveware: Meant to design or operate a computer.

Advice to teachers

The teachers should clearly distinguish between functions and definitions of the elements of a computer system during instruction.

Question 5

Students of a school intend to elect their school captain by secret ballot. State **three** ways in which computers can be used to improve the election process. (3 marks)

The candidates were required to state ways in which computers can be used to improve an election process. This is an application question on emerging issues.

Weaknesses

Majority of the candidates were unable to state the ways in which computers improve an election process.

Expected responses

√ Registering voters/(faster);
√ Voter identification (accurate);
√ Actual voting;
√ Tallying process (speedy).

Advice to teachers

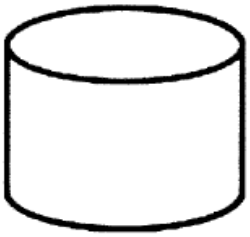
Teachers should explain to the learners the use technology in the day - to - day activities.

Question 8

Identify each of the following symbols as used in a system flowchart.

(a) 

(1 mark)

(b) 

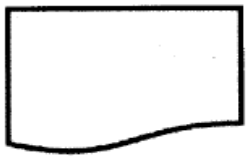
(1 mark)

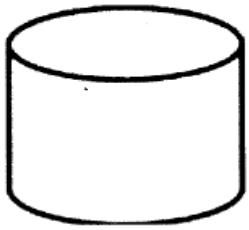
The candidates were required to identify the symbols as used in a system flowchart.

Weaknesses

Candidates were identifying the shapes rather than the symbols from the mathematical point of view e.g. a cylinder.

Expected responses

(a)  Report or documentation

(b)  Disk/ master file/ database

Advice to teachers

Teachers should clearly distinguish between mathematical figures and flowchart symbols.

Question 10

A computer user is unable to retrieve a file stored in a server in an organisation. State **three** reasons why the user would need to contact the network administrator. (3 marks)

The candidates were required to state the role of a network administrator with respect to storage of files in an organisation's server.

Weaknesses

Majority of the candidates were unable to recall the roles of a network administrator.

Expected responses

√ to confirm that the network services are running;
√ to confirm that the user is granted appropriate priviledge to access the network services/password/ authentication;
√ to confirm that the network infrastructure is in good condition;
√ to confirm that the files sought are in existence.

Advice to teachers

Teachers should outline clearly the roles of the different ICT professionals using real life examples.

Question 14

State **two** ways in which hardware failure is a threat to data security. (2 marks)

The candidates were required to state ways in which hardware failure is a threat to data security.

Weaknesses

Majority of the candidates were unable to stick to hardware and instead tailored their responses toward general data insecurity.

Expected responses

√ Data loss due to total system failure e.g. HD crash;
√ The experts called upon to repair can access critical/ valuable information;
√ Data recovery software may be used to make unauthorised backups.

Advice to teachers

Teachers should clearly explain to the learners the effects of hardware failure as a threat to data security

SECTION B

Question 17

(a) With the aid of a diagram, describe time sharing mode as used in computer data processing. (5 marks)

(b) A company's management has opted to use computers to process data. State **four** factors that the management needs to consider when selecting the company data processing mode. (4 marks)

(c) Explain the purpose of each of the following in system documentation:

(i) user manual; (2 marks)

(ii) sample data; (2 marks)

(iii) table descriptions. (2 marks)

Requirements

The candidates were required to:
i) Use a diagram to describe time sharing mode as used in computer data processing;
ii) State factors to be considered when selecting data processing mode;
iii) Explain the purpose of user manual, sample data and table descriptions in system documentation.

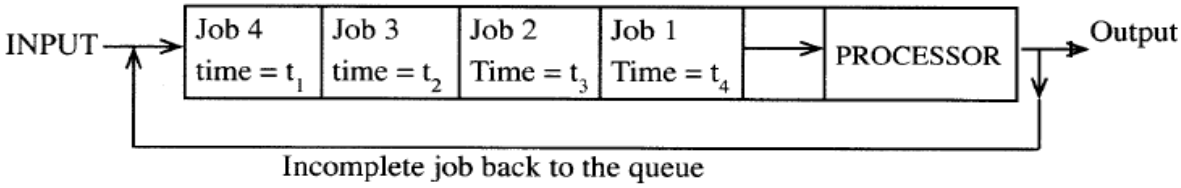
Weaknesses

Majority of the candidates avoided the question and those who attempted it were unable to diagrammatically describe the time sharing mode. They were also unable to recall factors considered when selecting data processing mode and the purposes of user manual, sample data and table descriptions in system documentation.

Expected responses

(a) **Time-sharing mode**

This is a processing mode in which a central processor serves two or more users with different requirements. The processor time is divided equally among the tasks in the queue. A user whose task requirements are more than is apportioned is send back to the queue. For example, four jobs requiring times t_1, t_2, t_3 and t_4 to complete is apportioned equal time in each round until when they are done.



(b) **Factors to consider when selecting data processing mode**

√ The optimisation of processing time;
√ The time factor required for decision arising from the processed data;
√ The ease of development, use and maintenance;
√ The control over the resources e.g. files, I/O devices e.t.c;
√ The need for the shared resources among several users who may afford purchasing their own facilities as in time sharing configuration;
√ The volume of work involved;
√ The cost of acquiring the relevant hardware, software, media e.t.c and the cost of maintenance;
√ The nature of the task to be processed.

(c) (i) **Purpose of user manual**
It is a documentation whose purpose is to help a user to use the system with little guidance.

(ii) **Purpose of sample data**
Before the system is implemented, it has to be confirmed that it is functional. Sample data is meant to be used to test whether the system is giving desired output.

(iii) **Purpose of table descriptions**
They are details of table structures that the system will require for the purpose of designing the actual tables.

Advice to teachers

Teachers should employ the use of diagrams to illustrate the different modes of data processing as opposed to theoretical approach. They also need to explain explicitly the factors considered when selecting data processing mode and the purposes of the various system documentation tools.

Question 18

(a) State the role of each of the following data communication devices:

(i) repeater; (1 mark)

(ii) router. (1 mark)

(b) **Figure 3** shows a network based on the bus topology.

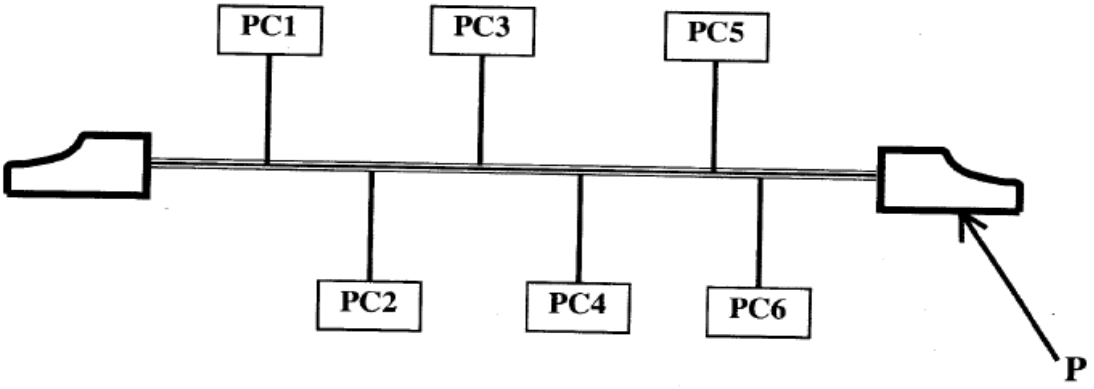


Figure 3

(i) Identify the component labelled **P**. (1 mark)

(ii) State the function of the component labelled **P**. (2 marks)

(c) Students of Neema Secondary School formed an environmental club with a goal of taking part in environmental conservation activities. Outline **three** ways in which they can use the internet to achieve this goal. (3 marks)

(d) (i) A company has three branches A, B and C where A is the headquarter. The local area network (LAN) at A is directly connected to the LAN at B and directly to the LAN at C. Explain **two** benefits of having the LAN at B also directly connected to the LAN at C. (4 marks)

(ii) State **three** ways in which a company can protect its computer network from hackers. (3 marks)

This was an application question in which the candidates were required to:

i) State the role of some repeater and router as data communication devices;

ii) Identify and state the function of component P on a network based on the bus topology;

iii) Outline the uses of internet;
iv) Explain the benefits of having LAN connected directly among regions;
v) Ways of protecting computer network from hackers.

Weaknesses

Candidates were unable to explain the roles of different data communication devices identify and state the function of terminator, outline the uses of internet, benefits of LAN and state the ways of protecting computer network from hackers.

Expected responses

(a) (i) **Repeater**
A device used to re-construct data signal during data transmission to its original strength/ amplify/boost/regenerate.

(ii) **Router**
- It is a device used to facilitate movement of data or packets between two or more LANS of different configuration (expansion of networks).
- Delivers a packet/data directly to destination computers.
- Interconnects different networks/provides network services.

(b) (i) The component P is the terminator.

(ii) Terminator in a backbone is used to prevent data signal from bouncing back/absorb signals.

(c) **Use of internet in environmental conservation club**

√ Source of knowledge on environmental matters;
√ Collaboration with peers from other schools or organisations;
√ Dissemination of information on what the club is doing;
√ Seeking for funding from sponsors.

(d) (i) **Benefits of linking branch B and C**

√ Speed of communication between B and C is increased since the traffic between the two branches can be re-routed through the link BC;
√ If either AC or AB is down, the three branches can still communicate;
√ If the HQ systems fail, the two branches B and C can communicate using this link.

(ii) **Ways to protect company network from hackers**
√ Changing password frequently
√ Use of encryption;
√ Use of data proxies;
√ Use of firewalls to filter unwanted packets;
√ User restriction e.g. passwords/ biometrics.
√ Use of complex password.

Advice to teachers

Teachers should explain the role of key data communication devices giving tangible examples. Students should be explained explicitly the components of a network based on the various topologies. Students should be exposed to hands on activities when handling the subtopic of internet as opposed to theoretical approach. Teachers should use real life experiences when explaining the benefits of LAN to the learners. Real life experiences should be used when teaching the ways of protecting computer network from hackers.