18.0 COMPUTER STUDIES (451)

The year 2006 KCSE Computer Studies syllabus was tested using three papers. Paper 1 (451/1), theory paper worth 50 marks, paper 2 (451/2) a practical paper worth 25 marks and a project paper (451/3) worth 25 marks.

The theory paper tests the whole syllabus. Paper 2 (451/2) tests abilities in ***database, spreadsheet, desktop publishing and word processing***. Unlike the previous years, the paper comprises of two compulsory questions set from any two of the packages listed above. Paper 3 (451/3) is a project which is handled in ***database***.

18.1 GENERAL CANDIDATES' PERFORMANCE

The table below shows performance in computer studies in the year 2006.

Table 21: Candidates' Overall Performance in Computer Studies in the Year 2006

Year	Paper	Candidature	Maximum Mark	Mean Score	Standard Deviation
2006	1		50	25.76	18.22
	2		50	28.79	16.77
	Overall	**4,181**	**100**	**54.50**	**32.00**

18.2 PAPER 1 (451/1)

Questions whose performance was poor in Computer Studies paper 2 (451/2) are briefly discussed below.

Question 6 (a)

What is an Internet Service Provider?

Candidates were required to define an internet service provider(ISP).

Weaknesses

Many candidates seemed not to have an idea what an internet service provider is. They defined it as software rather than a company. This is usually caused by lack of proper coverage of the syllabus coupled with lack of exposure to ISP. In the process of teaching a visit to an ISP Company is important if the concept is to be understood properly.

Expected Response

An Internet Service Provider (ISP) is a company or organization that offers internet access or an ISP is a server that offers internet services.

Question 7

Differentiate between COM ports and LPT ports.

In this question candidates were required to differentiate between COM and LPT ports.

Weaknesses

Candidates confused the word COM for computers. Others tried to differentiate them physically. Instructors need to give practical lessons and open serial and parallel buses associated to the two so that the students can see for themselves the parallel (many cables) and serial.

Expected Responses

COM ports are for serial communications while LPT ports are for parallel communication. COM ports are slow in communication while LPT parts are faster. COM ports have 9 pin holes while LPT ports have 25.

Question 9

Explain the following software terms:

(a) portability
(b) modularity.

Candidates were required to explain the software terms, "***Portability***" and "***Modularity***".

Weaknesses

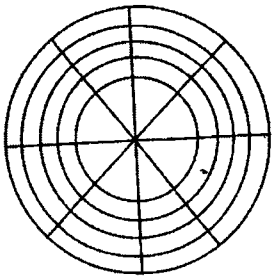
Many of the candidates could not explain modularity. The rest understood portability to mean carrying from place to place. The responses given by candidates indicate a lack of clear understanding of the terms. This is caused by poor tuition or complete lack of tuition altogether. Teachers and students are reminded that the examination will be set on any topic of the set syllabus and **all** topics **must** be given fair coverage.

Expected Responses

- **Portability**: The ability to run a program in different platforms.
- **Modularity**: Ability of a program to be broken into smaller programs which handle specific tasks.

Question 15

The diagram below shows a formatted plate surface of a storage disk.



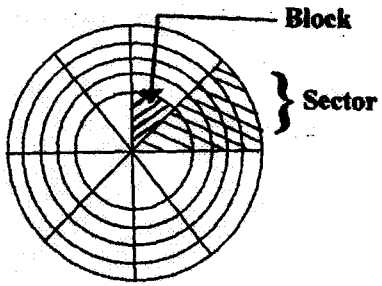
Shade and label:
(a) one sector
(b) one block

Candidates were required to shade and label one sector and one block on a diagram of a formatted flat surface of a storage disk.

Weaknesses

Most candidates did not shade and label as required. Those who attempted this question confused sector with block and therefore shaded wrongly. Teachers should teach the topic on storage media thoroughly. Difficult but important areas must be allocated more time. Evaluation is absolutely necessary after a topic has been covered. Remedial teaching should be organized for low achievers where necessary.

Expected Response



Question 17

(a) *One of the functions of an operating system is job scheduling.*
Explain what is meant by job scheduling.

(b) *List and explain three types of* ***user interfaces.***

(c) *Describe the following categories of software:*

(i) *firmware*

(ii) *proprietary software.*

(d) *A new company XYZ intends to go into the business of desktop publishing.*
Advise the company on ***three*** *computer hardware system specification features to consider as a measure of enhancing performance.*

Candidates were required to explain the term job scheduling, list three (3) types of user interfaces, describe firmware and proprietary categories of software and give three computer hardware specification features that would enhance performance.

Weaknesses

While there was fair/good performance in parts a, b and d of the question, in part (c) of the question, candidates performed poorly. Some candidates extracted their answers from the question i.e. firm from firmware. Others responded to the question simply as ***"hardware"*** and ***"software"***. For proprietary software, many candidates gave the definition of vendor or in-house applications. It should be noted that **NOT** all hardware specifications contribute to enhancement of performance.

Advice to Teachers

Teachers need to be thorough in this area and show/teach students that proprietary software is a subject of in-house developed applications and that there is need to differentiate the two.

Teachers also need to illustrate the importance of each hardware specification to a system so that the students can grasp these fully.

Expected Responses

(a)

- The scheduler decides which of the jobs is to be allocated to the CPU for processing.
- Allocating CPU time to jobs.
- Sequencing of jobs in a queue.
- Prioritizing of tasks.

(b)

- Command prompt/line interface is a form of interface between the operating system and the user in which the user types commands by using a special command language.
- Menu driven interface operating system is a program that uses menus to present/list choices of commands and available options.
- GUI operating system display format to enable the user to choose commands, start programs and see lists of files and other options by pointing to pictorial representations (icons, WIMPS).

(c) (i)

- Firmware are language translators resident in ROM and used for immediate access by the user of the system.
- Software on ROM or embedded permanently or semi-permanently.
- Software buried on a microchip.

(ii) Proprietary software is privately owned software and can only be used under conditions. Needs a licence to be used.

(d)

- High processor speed.
- High primary memory capacity.
- High/enough secondary memory capacity.
- High resolution output devices.
- Data bus bandwidth.

18.3 Paper 2 (451/2)

This paper comprised two questions. Question 1 was based on ***spreadsheets*** while question 2 was based on ***databases***. Candidates were required to attempt all questions using the respective software packages.

Question 1

The worksheet below is a sample of a fees register of Mambo Yote Secondary School.

MAMBO YOTE SECONDARY SCHOOL
FEES REGISTER

ADM NO	NAME	ADDRESS	TOWN	AMOUNT PAYABLE	FEES PAID	FEES BALANCE	
2001/3	Onyango, S.	350	Kisumu	30000	15000		
2001/10	Kamau, J.	22	Kabete	35000	30000		
2001/1	Said, H.	9000	Mombasa	21000	21000		
2001/2	Cheptoo, R.	23000	Eldoret	29000	20000		
2001/9	Nafula, W.	11	Busgoma	64000	10000		
2001/7	Nyambane, E.	226	Kisii	34250	40000		
2001/6	Mwari, T.	992	Meru	33000	16000		
2001/8	Kamene, G.	1	Kitui	22000	10000		
2001/4	Ole, D.	Private Bag	Kajiado	18000	8000		
2001/5	Wanjiku, P.	52000	Nairobi	50000	10000		

In this question candidates performed poorly in questions ***a, c, d and g (i) (ii) (iii)***

Question 1 (a)

Create a workbook to store the information and save it as FEES REGISTER.

Candidates were required to create a workbook and type the data given, then save it with the given name.

Weaknesses

Some candidates made errors in data entry by writing wrongly spelt names and entering wrong data. Candidates were required to have been keen on the accuracy of the data including punctuation and spacing between words. Teachers may have failed to tell candidates that any error at data entry will always be carried on to the final results hence "***Garbage in Garbage Out***" (GIGO). Candidates who are fully aware of this would be very keen on the data entry especially when the data to be entered is in the question.

Question 1 (c)

Use the IF function to declare the following remarks about a student:

- *"proceed" if the fees balance is less than or equal to ¼ of the amount payable*
- *"see Principal" if the fees balance is more than ¼ but less than or equal to ½ of the amount payable*
- *"send home" if the fees balance is more than ½ of the amount payable.*

This question required the candidates to use a formula with **IF** function to insert a remark for each record.

Weaknesses

Some candidates typed wrong formula, while others did not attempt the question at all. Others, typed part of the formula. A few added the remark manually (that is, without typing the formula). The candidates should have typed a formula such as:

=IF (G6<=0.25 * G6, "Proceed", IF (G6<= 0.5 * G6 "See principal", "Send Home"

Such a formula would place the remark for row 6 in column H. This formula would then have been copied to the rest of the cells where a remark is needed but within the same column. Some teachers seem not to be teaching them about the use of the functions stipulated in the syllabus.

Question 1 (d)

Use a function to count the number of students who should:

(i) proceed
(ii) see the Principal
(iii) be sent home.

This question required the candidates to use a function to count the remarks in the remarks column.

Weaknesses

Some candidates did not write labels for the count results, hence examiners could not tell what they had counted. Some entered the wrong formula, others entered the values manually.

Expected Response

The formula below would count all the remarks that are "Proceed" in the range H6 to H15

= Countif(H6:H15, "proceed")

Once the value is generated, a label indicating what has been counted e.g. "Those who should proceed" should be inserted somewhere near the value generated. Likewise for send home and those who should see the Principal, that is:

= countif(H6:H15, "See Principal")

= countif(H6:H15, "Send Home")

Advice to Teachers

Provide adequate exercises to candidates on the use of functions and formulae.

Question 1 g (i), (ii), (iii)

(i) *Rename the current worksheet as MAIN.*

(ii) *Copy the entire MAIN worksheet to a blank sheet and rename the new sheet as HOME.*

(iii) *Filter the HOME worksheet so as to display the students who came from towns starting with letter" K" and have a fee balance exceeding Sh. 10,000.*

These questions required the candidates to rename the current worksheet and then copy the contents to a new sheet called home and finally filter the worksheet home with the given criteria.

Weaknesses

Candidates renamed the initial workbook fees register and called it "Main" instead of renaming the current worksheet to Main. Some candidates copied the workbook and renamed it to home instead of copying the worksheet to a new sheet in the same workbook. Other candidates were unable to display the required records due to a filter error. This was due to defining wrong criteria.

Expected Responses

i) Candidates should have renamed the worksheet labelled say ***"Sheet1"*** to ***"Home"*** and not rename the workbook labelled fees register.

ii) Candidates should have copied the worksheet ***"Main"*** to a new blank sheet and renamed the sheet as ***"Home"***.

iii) Candidates should have involved the filter and then defined the criteria beginning with K and > 10,000 on the Town and fees balance columns respectively.

Teachers should teach candidates data management in spreadsheets.

Question 2

Byte Computer Services is a company with numerous branches in East Africa. In order to monitor the performance of the branches and that of the cities in which the branches are located, a database to organise the information is required.

This question tested the candidates' ability to use database packages and designing of a database.

Weaknesses

Weaknesses were found in questions ***2 d (iii), f (iii)*** and ***g (i)*** even though a good number of candidates performed very well in this question. A general weakness was also noted among some candidates who used spreadsheets to attempt the database question.

Question 2 d (iii)

In the STORES table, swap the fields CITY with BRANCH.

This question required the candidates to swap two fields in a table i.e. City and Branch.

Weaknesses

Some candidates renamed the fields and had the Branches being referred to as Cities and vice versa. This was against the swapping expected.

Expected Response

The candidates were required to transfer the City column to the Branch column and the Branch column to the City column.

Teachers should guide the candidates during class sessions on how to handle such swapping.

Question 2 f (iii)

Compute the total sales and place it below the SALES (SHS) column and change its font size to 13.

This question required candidates to enter a formula in the report to compute the total sales.

Weaknesses

Some candidates did not attempt this question and those who did typed the formula at the wrong place hence generating an error. Others typed it wrongly.

Expected Response

Candidates were required to type the formula

= sum([sales(shs)]) at the report footer section just below the sales(shs) column. A label was supposed to be added bearing the words "total sales"

Teachers should guide the candidates during class sessions on how to generate summaries and subtotals in a database report or form.

Question 2 g (i)

Insert a header BYTE COMPUTER SERVICES PERFORMANCE in the report having font size 19 and centre it across the page.

This question required the candidates to input the header given.

Weaknesses

Some candidates entered the wrong header, others allowed the default header to remain and some could not format the header as required in the question.

Expected Response

Candidates should have opened the report in design mode and modified the header using the formatting facility available in the database package.

Teachers should advise their candidates to pay attention to the requirements of the questions before attempting them.

In general, for both questions, it has become common that some candidates attempt a database question using a spreadsheet package and others attempt a spreadsheet question using a database package. Much as the question may seem answered, teachers should advise their candidates that each package is testing a different skill from the other and they should therefore not do it that way.

18.4 PAPER 3 (451/3)

BABATI URBAN COUNCIL REVENUE COLLECTION SYSTEM

Babati Urban Council is a local authority that is entrusted with the provision of services to its residents.
Some of the services provided are:

- *housing*
- *garbage collection and disposal*
- *sewerage services*
- *licensing of businesses*
- *maintenance of Council property*

To provide the above services, the Council raises funds through the following:

A: House Rent

The Council rents out residential houses at the following monthly rates:

Single room	*Ksh. 500.00*
One bedroomed	*Ksh. 1,500.00*
Two bedroomed	*Ksh. 2,500.00*
Three bedroomed	*Ksh. 3,500.00*

B: Garbage Collection

Residents pay for garbage collection as follows:

Initial registration fee	*Ksh. 500.00*
Monthly subscription	*Ksh. 100.00*

C: Licensing of Businesses

Businesses and institutions located within the Council attract the following annual rates:

General shop	*Ksh. 3,000.00*
Hardware shop	*Ksh. 4,500.00*
Private institutions	*Ksh. 10,000.00*
Miscellaneous businesses	*Ksh. 2,500.00*

D: Market Charges

Each vendor who transacts business in the open air markets pays Ksh. 50.00 per day.

E: Sewer Services

To be connected to the main sewer line, residents pay the following:

Initial connection fee	*Ksh. 3,500.00*
Annual subscription fee	*Ksh. 3,000.00*
Or	
Monthly subscription fee	*Ksh. 300.00*

F: Parking Fees

All vehicles and carts parked within the urban centres attract the following daily charges;

Car	*Ksh. 100.00*
Pickup	*Ksh. 200.00*
Lorry	
Ksh. 500.00	
Cart	*Ksh. 30.00*

The Council carries out data processing activities manually. There is an urgent need to computerise the Council's activities.

Develop a well-documented computerised system that will handle revenue collection for the Council.

This paper comprised of a question to be answered within seven months through developing of a computerized system. The system was supposed to be well documented using the laid down structure of computer project documentation. The project for the year 2006 was based on an urban council's revenue collection system. Candidates were required to study the question and understand the various ways that the Urban Council uses to raise funds. They were then required to develop a computerized system for the council. The system was supposed to be well documented and to be in a position to handle all the revenue collection specified in the question paper.

Weaknesses

Most candidates had weaknesses in identifying the stages in system development, while others who could identify the stages performed poorly in analysis and design stages. These weaknesses were noted from the poor performance in the section on feasibility where a big number of candidates had no mention of the feasibility report analysis. This indicated that the candidates were not familiar with the contents of the analysis phase of system development. Quite a good number of candidates also portrayed weaknesses in designing files and in validating input data. Some candidates lacked knowledge about the contents of the appendix.

Expected Responses

18.4.1 Candidates were supposed to use the skeleton stipulated in the teachers marking scheme to come up with the report structure. Candidates should have included the following in their analysis stage.

- Problem definition.
- Overview of the current system. This can be done by use of a diagram and some write-up.
- Limitations of the current system. Limitations are mostly common for most manual systems.
- Benefits of the proposed (computerized) system. These were supposed to justify the development of the computerized system.
- Feasibility Analysis Report: Candidates should have included their own assessment of how feasible the system was. Feasibility can be based on resources both economic and technical or operational capabilities. The schedule can also be mentioned under schedule feasibility.

18.4.2 Candidates were supposed to assess the available data to come up with design of the files. The file design required that candidates design the tables or file structure to contain the data as well as the input screens and output screens for entering and displaying the data respectively. A general table structure would include the following:

- Name of the table.
- List of field names for each table.
- Data types for each field.
- Length of a field entry (optional).
- Remarks or comments if required (optional).

18.4.3 **Validation:** Candidates were supposed to design their system in such a way that the computer can validate input by enforcing rules to detect erroneous data. Though some validation is enforced by the software used, (such as programming languages or database management systems) candidates were required to identify areas which were vulnerable to error and help the user to reduce chances of making mistakes during input.

18.4.4 **Appendices:** Candidates should have inserted the code listing or any other documents obtained during data gathering into the appendices. If the code is inserted into the appendix, reference is given in the appropriate place in the report with some one page or so about the coding stage.

18.5 ADVICE TO TEACHERS

18.5.1 Teachers should assist the candidates to interpret the project question.

18.5.2 They should observe how their candidates are carrying out the development of the project in each phase.

18.5.3 They should promote independence in project development by ensuring that each candidate's work can only be accessed by him/herself and not by any other candidate.

18.5.4 They should avoid doing the project for any candidate as well as discourage the candidates from contracting others to do the project for them.

18.5.5 They should use the project guidelines from the syllabus.