

Kenya Certificate of Secondary Education (K.C.S.E)

NAME..... INDEX NO.....

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451/1

COMPUTER STUDIES PAPER 1

(THEORY)

JULY/AUGUST 2024

TIME: 2 ½ HOURS

Instructions to Candidates

- (a) Write your name and admission number in the spaces provided above.
- (b) This Paper consists of two sections **A** and **B**.
- (c) Answer **ALL** the questions in section **A**.
- (d) Answer **question 16 (compulsory)** and **any other three** questions from section **B**.
- (e) **All** answers should be written in the spaces provided.
- (f) This paper consists of **12 printed pages**. Candidates should check to ensure that all pages are printed as indicated and no questions are missing

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Section	Questions	Candidate's score
A	1- 15	
B	16	
	17	
	18	
	19	
	20	
	TOTAL SCORE	

SECTION A:

ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED

1. Describe three component of a spreadsheet functions (3mks)
- ✓ **Equal sign(=) : mark the beginning of a function**
 - ✓ **Function Name: describe the activity to be performed**
 - ✓ **Argument the range of value to be acted upon**

Award 1 mark each max 3

2. (a) Identify the devices labeled A and B. (2mks)



A- RAM Module
B-CPU

- (b)Identify two characteristic of device labeled A. (2mks)

- ✓ It is volatile: loses data when the power is turned off
- ✓ It is directly accessible by the CPU
- ✓ Has limited storage capacity
- ✓ Holds processes currently undergoing execution by the CPU or awaiting execution
- ✓ Data stored in RAM is accessed or retrieved or read randomly
- ✓ Used to hold instructions and data needed by the processes being executed by the CPU

3. Describe 3 functions of repeaters. (3mks)

- ✓ Regenerates/reconstruct data signals
- ✓ Retransmit data signals
- ✓ Extends network distance
- ✓ Amplifies data signals

4. Convert the following binary number 1101.01_2 to decimal. (2mks)
- $$(1*2^3) + (1*2^2) + (0*2^1) + (1*2^0) + (0*2^{-1}) + (1*2^{-2})$$
- $$8+4+1+0.25=13.25_{10}$$

5. Describe the following database features (2mks)
-

(i) Macros

✓ **A feature used to automate frequently performed procedures.**

(ii) Programming module

✓ **It is a feature which automates more complex operations that cannot be achieved using the macros.**

6. Describe two ways of creating text in a Microsoft Publisher. (2mks)

✓ **Using text tool –Ms-publisher provide a text box which act as text tool**

✓ **Using text frame- by using text frame or by converting any object created with drawing tool except the line.**

7. (a) The formula =M30+Q20 was typed in cell R15 and then copied to cell M24 of a spreadsheet. Write the formula as it appears in cell M24. (2mks)

=H39+L29

(b) Briefly explain the following terms as used in spreadsheet. (2mks)

(i) Cell- **An intersection between a row and a column**

(ii) value- **Numbers that can be manipulated mathematically.**

8. Study the following pseudo code and answer the questions that follow.

```
Start
  N = 0
  X = 0
  While N < 3
    Repeat
      X = X + 1
    Until X = 2
    N = N + 1
  End while
Stop
```

Determine the value of N and X. (3mks)

X = 2

N = 2

9. Explain the meaning of the following terms as used in computer data transmission. (2mks)

(a) Simplex transmission

✓ **Data is transmitted in one direction only.**

(b) Half duplex transmission

✓ **Data is transmitted in two directions but only in one direction at a time.**

10. Explain any two ways in which computers have been made user-friendly for persons that are physically challenged. (2mks)

- ✓ **Use of voice recognition devices for the handicapped**
- ✓ **Use Braille**

11. Name any four mechanical devices that were used for counting before electronic computers (2mks)

- ✓ **Abacus**
- ✓ **Pascaline**
- ✓ **Slide rule**
- ✓ **Weaving loom**

12. State two ways in which internet enhances business (2mks)

- Provides a platform for advertisement of business products
- Internet provides convenient means of transaction and EFT
- Internet and e-commerce provide convenient way of shopping even for rare products since one does not have to travel to the physical premise
- Businesses that are based online have exposure to a worldwide market hence may have high turnover rate
- E-commerce platforms and websites enable businesses to sell products and services worldwide, 24/7.
- Online advertising platforms (such as Google Ads, Facebook Ads) allow businesses to target specific demographics, interests, and behaviors.
- Businesses can interact with customers through various online channels, including social media, live chat, and email, improving customer service and satisfaction.
- The internet provides numerous tools for remote collaboration, such as video conferencing (Zoom, Microsoft Teams), project management software (Trello, Asana), and cloud storage (Google Drive, Dropbox)

13. Use diagram below to answer question that follows.

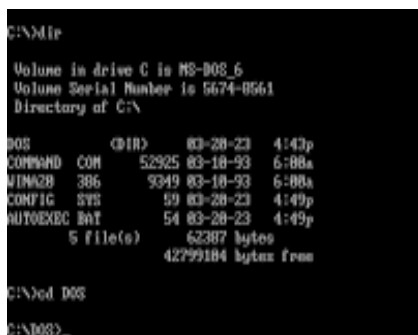


Fig 1



fig 2



fig3

(i) Identify the type of operating system represented in Figure 1, 2 and 3 (3marks)

- ✓ **FIG 1- command line**
- ✓ **FIG 2-GUI**
- ✓ **FIG 3- menu driven**

(ii) State four advantages of the operating system represented in Figure 1 (2marks)

- ✓ **It does require a lot of storage space/consume fewer system resources than GUI**
- ✓ **Available for free**
- ✓ **It is faster**
- ✓ **Have direct access to most hardware devices**
- ✓
- ✓ **Enables users to write scripts to automate repetitive tasks**
- ✓ **command line environment can be accessed remotely, making it a valuable tool for system administration and remote troubleshooting.**

14. Give two reasons why a company may prefer a tailor-made software over vendor-off the shelf software. (2mks)

- ✓ **The solutions it offers give the greatest depth, and flexibility possible in meeting the needs of an organization.**
- ✓ **The software developer delivers and installs the software and trains the end users in the use of the new software.**
- ✓ **They perform tasks that the general-purpose software cannot perform.**
- ✓ **This kind of software can be quickly changed when the needs of the organization change, since the source code belongs to the company**

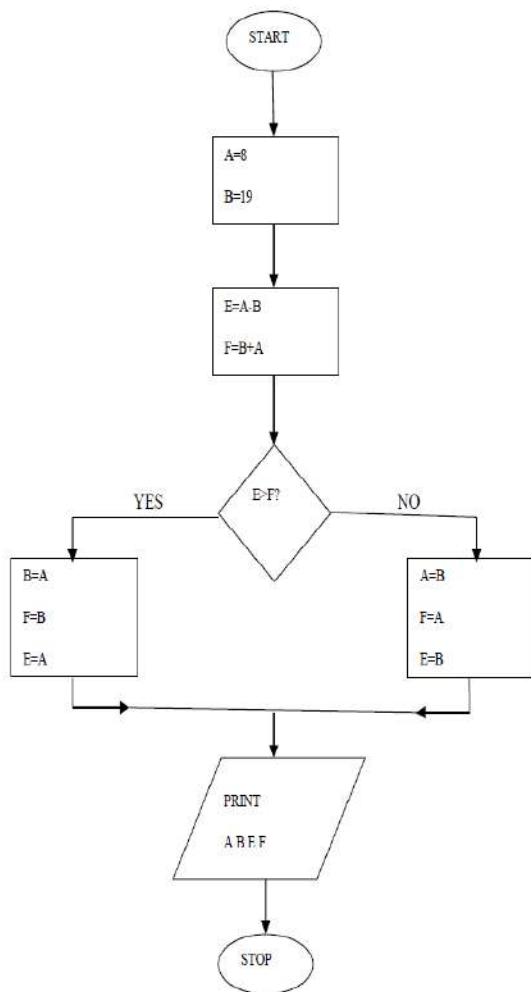
15. List four functions of an anti-virus program in a computer (2mks)

- ✓ **Prevent computer virus from attacking computer.**
- ✓ **Delete virus from the computer.**
- ✓ **Detect the existence of a virus in a computer.**

SECTION B (60 MARKS)

**ANSWER QUESTION 16 (COMPULSORY) AND ANY OTHER THREE QUESTIONS
FROM THIS SECTION**

16.(a) Study the flowchart in figure 2 below and use it to answer the questions that follow.



(i) Write a pseudo code for the flowchart in figure above (5mks)

(iii) Begin
Initialize A=8, B=19, E=A*B and F=B+A
IF E>F THEN
 B=A
 F=B
 E=A
ELSE
 A=B
 F=A
 E=B
ENDIF
PRINT A, B, E, F
End.

(ii) Name the control structures used in the flowchart. (1mk)

✓ **Sequence**

✓ **Selection**

(iii) Determine the value of A, B, C and F.(show your working) (4mks)

**A=19, B=19
E=19 and F=19**

(b) An airline uses an information system whereby if a passenger at station A books a plane seat, this transaction is immediately shown at stations A and B such that no other passenger can book the same seat.

(i) Name this data processing mode. (1mk)

✓ **Real time processing**

(ii) State two advantages of this data processing mode. (2mks)

✓ **Provides accurate, up-to- date information and hence better services based on a true situation.**

✓ **It is fast and reliable**

✓ **Information readily available for instant decision making.**

✓ **Provides immediate control/ information/feedback.**

(c) Explain the following system characteristics (2mks)

(i) System entropy

- ✓ *Refers to slow deterioration of the system due changes in user requirements, management policies and improvement in technology*
- ✓ *It is the natural degradation of a system over time*

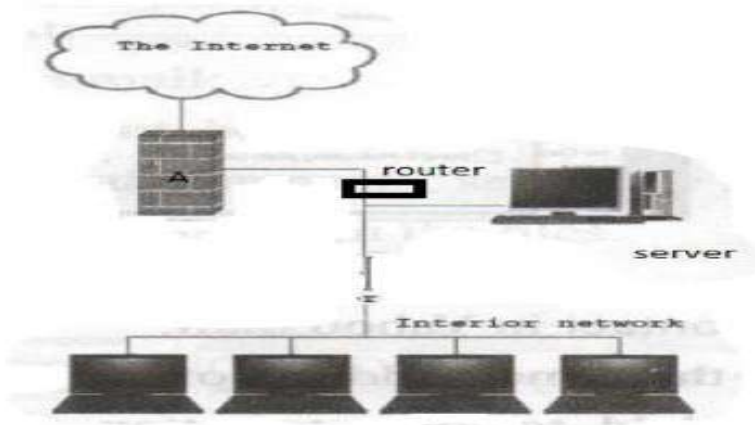
Causes of system entropy

- *Inadequate testing*
- *Lack of documentation*
- *Changing requirements*

(ii) Sub-systems

- ✓ **This means that, a system does not exist alone, but it is composed of subsystems, which are also made up of other subsystems**
- ✓ **Is a system that is part of a larger system**

17. (a) The diagram below shows a layout of computers networked to access the internet. Use the diagram to answer the questions that follow.



- i. Name device labeled A (1mk)
 - ✓ **Firewall- a filters some information from the internet**
 - ii. State one two functions of the device labeled server (1mk)
 - ✓ **Providing resources to other devices on the network/services requests from clients**
 - iii. Name any two transmission media that can be used to transmit internet to the server. (3mks)
 - ✓ **Coaxial cable**
 - ✓ **Fiber optic**
 - ✓ **Twisted pair cable**
 - iv. Explain any two challenges that can be faced by interior network user. (2mks)
 - ✓ **Security and privacy issues**
 - ✓ **Spread of malicious software**
 - v. Name the network topology used above (1mk)
 - ✓ **Star topology**
- (b) State four roles of a network Administrator. (2mks)
- ✓ **Track network usage and keep a log of people used the network.**
 - ✓ **Design the network**
 - ✓ **Secure the network against unauthorized access.**
 - ✓ **Troubleshoot network related problem.**
- (c) State any three ways of ensuring efficient back up of data. (3mks)
- ✓ **Making regular backup**
 - ✓ **Backup on removable media**

- ✓ **Keeping backup media in separate location**
- ✓ **Setting up automatic backup intervals**

(d) State Two advantages of the network topology named in (v) above (2mks)

- ✓ **If one computer goes down the rest of the computers can still be used**
- ✓ **No disruption when connecting or removing devices OR**
- ✓ **Easy to add or remove devices**
- ✓ **Easy to install and configure**
- ✓ **Easy to troubleshoot**

18. (a) John is a first-year student at JKUAT. He is expected to login his student portal to access online assignments. State three ways in which he would prevent virus from infecting his computer. (3mks)

- ✓ **Scan removable storage devices before use.**
- ✓ **Scan email attachments for virus before opening them.**
- ✓ **Browse smart.**
- ✓ **Install antivirus and update regularly.**

(b) Define the following terms. (2mks)

(i) computer fraud

- ✓ **Use of computer to conceal information or cheat other people with the intention of gaining money or information**
- ✓

(iii) Industrial espionage

- ✓ **Spying on a competitor to get information that can be used to cripple the competitor**

(c) Pesa Company has offices in Nairobi and Kampala connected in a network. The management is convinced that someone is illegally gaining access to the data in their computers. State three ways in which the company can overcome this problem. (3mks)

- ✓ **Encryption.**
- ✓ **Firewalls.**
- ✓ **User profiles/passwords/user.**

- ✓ **Limit the number of log-in attempts.**
- ✓ **Audit trail/tracking.**
- ✓ **Physical protection of computers**

(d) Kagumo High school wanted to setup a network connectivity to be used in school. State three internet connectivity requirements that the school must have to get the connection. (3mks)

- ✓ **Internet Service Provider**
- ✓ **Transmission media**
- ✓ **Modem**
- ✓ **Internet software**
- ✓ **Communication node (Computer)**

(e) Explain two ways in which the use of internet could make reporting of corruption easier. (4mks)

- ✓ **Interactiveness: the internet-based technology enables real-time dialogue hence instantaneous reporting of cases;**
- ✓ **Outreach: the technology allows the coverage of wide areas/can be reported from anywhere;**
- ✓ **Social mobilisation: It is easy to use technology to create a network with people or organisations with similar concerns;**
- ✓ **Anonymity: With use of the technology, it has become easy to report corruption cases without being known;**
- ✓ **Security: The message sent reaches the destination with less risk of being intruded.**

19. (a) The information in figure 3 below is maintained by the patron of wildlife club in a school. Study it and answer the questions that follow.

Name	Class	Admission Number	Membership Number	Group
Isack	2W	8432	WS001	Serengeti
James	4E	8011	ET001	Tsavo
Karis	1A	9560	AT002	Tsavo
Caleb	3V	8331	VM001	Mara
Godana	4C	8102	CA002	Amboseli
Alexander	3A	8307	AS001	Serengeti
John	2E	8470	EN002	Nairobi
Luke	1H	9610	AH001	Aberdare
Oloo	1C	9550	CT001	Tsavo
Mark	2V	8500	VM002	Mara

(i) State the most appropriate primary key for the list. (1mk)

✓ **Membership Number**

(ii) State the most appropriate data types for the fields (2mks)

(a) Admission number

✓ **Number/text**

(b) Membership number.

✓ **Memo/ Alphanumeric /text**

(iii) If a database was to be created for the list; forms, tables, queries and reports are likely to be used. State the purpose of each of these objects. (2mks)

✓ **Forms: Are graphical interfaces that resemble an ordinary paper form used to either enter data into or view data from a database.**

✓ **Tables: Are database structures organized into rows and columns and used to hold related data**

✓ **Queries: Are statements used to extract, change, analyze or request for specific data from one or more tables.**

✓ **Reports: Are summaries generated from underlying tables or queries**

(iv) How many field values are in the list? (1mk)

✓ **5 fields**

(v) How many records are in the list? (1mk)

✓ **10 records**

(b) A trader uses a spreadsheet program to calculate profits.
 The figure below shows the spreadsheet.

	A	B	C	D	E	F
1	Items	Cost price	Selling price	Profit per item	Items sold	Total profit
2	Item 1	305	350	45	32	1440
3	Item 2	100	120	20	45	900
4	Item 3	200	220	20	32	640
5	Item 4	107	130	23	89	2047

(i) Which row contains labels only? (1mk)

✓ **Row 1**

(ii) Write the formula that has been entered in cell F2. (2mks)

✓ **=product(D2,E2)**

(c) State three features of fifth generation computers. (3mks)

- ✓ **Use of expert system.**
- ✓ **Support the use of natural language**
- ✓ **Support distributed computing**
- ✓ **Support artificial intelligence and voice recognition.**
- ✓ **Support parallel processing**
- ✓ **Small in size? portable**
- ✓ **Superior hardware and software**
- ✓ **consume less power**

(d) Differentiate between DVD RW and CD R. (2mks)

- ✓ **DVD RW – data can be recorded and erased many times**
- ✓ **CD R - allows for data to be recorded once after which it becomes read only**

20. a) List four stages of data collection. (4mks)

- ✓ **creation**
- ✓ **transmission**

- ✓ preparation
- ✓ media conversion
- ✓ input validation
- ✓ sorting

b) Describe three arithmetic errors that may occur during computerized data processing. (3mks)

- ✓ **Truncation error**
Results due, to shortening or leaving out part of a number or a word.
- ✓ **Rounding off error**
Arising by approximating a number by replacing it with a number that has fewer significant digits or one with zeros for its ending digits.
- ✓ **Overflow error**
Occurs when the results of a computation is larger than the allocated memory space.
- ✓ **Underflow error**
Type of error occurs when the output is low small to be represented in the chosen format.

(c) Work out $32_{10} - 19_{10}$ using 8-bit two's complement

(5mks)

Rewrite as $32_{10} + (-19_{10})$

Find the binary equivalent of $19_{10} = 00010011_2$

Find the ones complement of $00010011_2 = 11101100_2$

Add 1 to $11101100_2 = 11101101_2$

Find the binary of $32_{10} = 00100000_2$

Add $11101101_2 + 00100000_2 = (1)00001101_2$

Ignoring the overflow $= 00001101_2$

(d) Work out $1011101_2 + 101100_2 - 1111101_2$

(3mks)

$1011101_2 + 101100_2 = 10001001_2$

$10001001_2 - 1111101_2 = 00001011_2$

Correction

Answer -0001100