KASSU JET
COMPUTER STUDIES P1
THEORY
MARKING SCHEME

SECTION A (40 MARKS)

1. **List and describe four elements of a computer system   2 marks**
   a) **Software – all programs plus associated document**
   b) Hardware- all the physical parts of a computer
   c) User- end users , programmers etc
   d) Procedures- rules on how to go about data processing and use of the computer
   e) Data –raw facts and figures that are input into the computer

2. **Describe the following technologies as used in the computer generations and name the generation.**
   i) Thermonic valves – also known as vacuum tube .use vacuum tubes for circuitry to amplify, switch and modify a signal in a vacuum first generation
   ii) Artificial intelligence- this generation .mimic human behaviors and intelligence such as voice, movement etc.- fifth generation
   b) **Suggest two possible causes of data and program loss in computer**
   Power failure – under voltage or over voltage in a computer
   Computer viruses and worms – unwanted programs written to cause damage to programs and data

3. a) **Describe two functions of the CPU in a standard computer**
   - Stores programs and data being processed
   - Performs arithmetic calculations and make logical operations
   - Controls all operations of the computer and coordinates its parts
   b) **List two classifications of printers and give an example of each**
   - Classification according to speed- *Dot matrix printer , Daisy wheel printer etc*
   - Classification according to printing mode – *Thermal printer, inkjet printer etc*

4. **Define the term double – clicking as used in mousing**
   Tapping or pressing the left mouse button twice in quick successions

5. **The overtype key and delete key are both referred as editing keys. Explain how they are used.**
   ✓ *Overtype key – deletes characters one by one while typing in the same line*
   ✓ *Delete – deletes characters infront without replacing them*

6. a) **Identify the main stages of program development**
   i.   Problems recognition
   ii. Problem definition
   iii. Program design
   iv. Program coding
   v.   Program testing
   vi. Program implementation
   vii. Program maintenance

b) **Define the term program documentation**
Refers to information that serves to explain the purpose of a program

7. **List three program control structures examples**
- Sequencing
- Selection e.g if.. then, case.. of
- Iteration e.g repeat..Until, for .., while

8. **Distinguish between high level and low- level languages giving one advantage and one disadvantage of each of them**
High –level uses English –like statements and a programmer need no knowledge of the computer system they are run on
Low- level uses binary code and are machine dependent

9. **Explain the difference between the following commands as used in MS-DOS**
i. Dir/ p- list files and folders per page
ii. Dir/w –List files and column wise (per width)
b) **Write one command that can be used to format a diskette and copy system files t it 1 mark**
Format A:/S

10. **Differentiate between real time processing and batch processing giving examples were each could be used** 20 marks
Real time – data is received and processed so fast and the results returned so quickly that the process is instantaneous to the user.
Batch-data is accumulated and processed at a predetermined time. Once processing begins no amendments can be made

11. **Differentiate between Computer Aided Teaching and Computer Aided Learning.**
CAT-Computer software used by teachers to teach and prepare lessons for students
CAL- this is the use of computers to aid students in research and learning
Study the following worksheet and then answer the questions that follow:

b) The pass mark is 40%. Write down an IF function that will return two values, PASS or FAIL depending on the Total mark =if (j4>=40, "PASS," "FAIL")

13. What is a computer network?
A data communication setup that links computer, terminal, minis, mainframes and other devices so that the computer can operate independently but also share data and other services.

14. Describe three different types of computer network.
LAN-Links computer within the same site, e.g. a room, a building site typically within a radius of 100 metres
MAN- covers slightly a wider range, e.g. a campus site or a city.

WAN-Covers a wider range, can cover a whole country or even countries.

15. Describe five electrical safety precaution rules that should be observed in a computer room.
   - All cables should be correct for the equipment in use.
   - Don't let cables trail since they can trip a user or damage the equipment or get damaged.
   - Don't overload sockets. This can cause fires or damage computer.
   - Don't pour drinks onto the computer keyboard.
   - Don't wipe computers or monitors with a damp cloth when it is on.

SECTION B (60 MARKS)
Answer question 16 (Compulsory) and any other THREE questions from this section.

16. To maintain a strategic fit safaricom is introducing a tariff called the mega tariff that will lower costs to safaricom to safaricom calls and calls to other networks. Calls to safaricom networks will be charged according to the time of the day as listed below:
   -Between 8am to 12 noon-6 Kshs
   -Between 12 noon to 2 pm-0.8 Kshs
   -Between 2 pm to 6 pm-2 Kshs
   -Between 6 to 1 am-4 Kshs
   -Between 1 am to 8 am-1 Kshs

   Internal calls to other networks are charged at a fixed rate of 7 Kshs between 8am to 8 pm and to while international calls are charged at a rate of 25 Kshs between 8 am to 8 pm and Kshs 35 for the rest of the day. All calls are charged per minute usage.

   Mr. Wasswa Bbaale a business man who makes both internal and external calls would like to make maximum use of this tariff.
   (a) Write a pseudo code that would show him know the charges of calls with an appropriate label when he inputs type of call and the time where appropriate. Use a 24 hour clock.

START

        READ calltype
        CASE calltype OF
                "Safaricom":
                READ time
                CASE time OF
                      8 to12: charge=6
                      12 to14: charge=0.8
                      14 to 18: charge=2
                      18 to 1: charge=4
                      1 to 8: charge=1

                ENDCASE

        "Other Networks":
            Charge=7
        "International":
            READ time
            CASE time OF
                8 to 20: charge=25
            ELSE
                Charge=35
            ENDCASE
     ENDCASE
  PRINT "call on mega ongea now at,"charge,"shillings per minute on safaricom to", calltype,"calls"

STOP

Note: Award marks as follows
Input- ½ calltype, ½ time=1 mark
Output- ½ for output, ½ for appropriate label=1 mark
Logic – selection construct= $^1/_2$
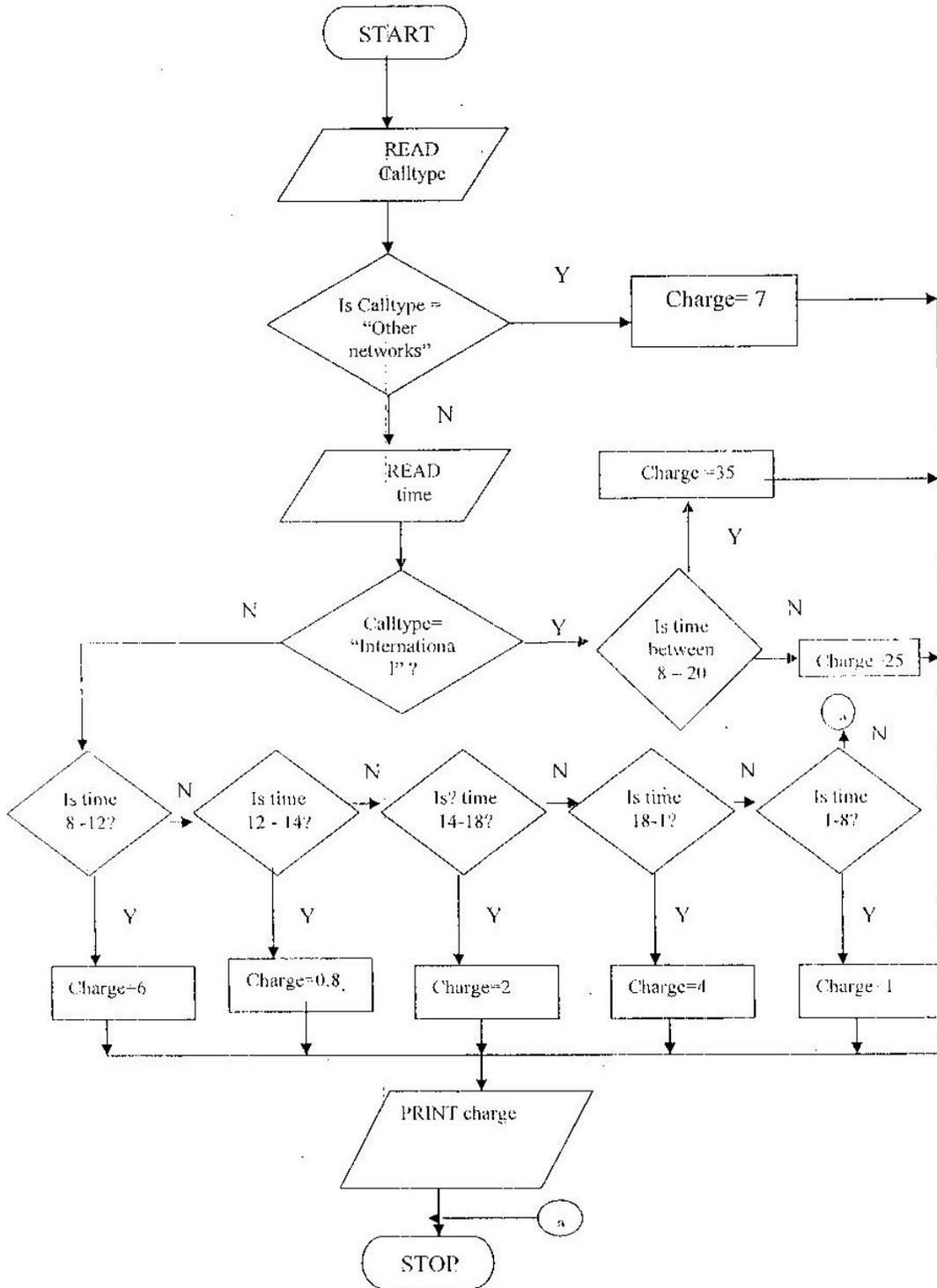Decision (proper branching)-1 mark for 3 correct selections – ½ for two selections =1 mark
Process

       -International calls-1
       -Calls to other networks – ½
       -Safaricom calls- 2½
Use of 24 hour clock- ½ Mark

(b)   Design a flowchart for the pseudocope in 16 (a) above   (7 marks)

```
                          ┌───────────┐
                          │   START   │
                          └─────┬─────┘
                                │
                          ╱─────┴─────╲
                         ╱    READ     ╲
                         ╲   Calltype  ╱
                          ╲───────────╱
                                │
                          ◇─────┴─────◇          Y      ┌───────────┐
                         ╱ Is Calltype =╲ ───────────▶ │ Charge= 7 │ ──────────┐
                         ╲  "Other       ╱             └───────────┘           │
                          ╲ networks"   ╱                                      │
                           ◇───────────◇                                       │
                                │ N                                            │
                          ╱─────┴─────╲          ┌───────────┐                 │
                         ╱   READ      ╲         │ Charge =35│ ───────────┐    │
                         ╲   time      ╱         └───────────┘            │    │
                          ╲───────────╱                ▲                  │    │
                                │                      │ Y               │    │
          N             ◇───────┴──────◇        ◇──────┴─────◇   N  ┌────────┐ │
    ┌──────────────────╱ Calltype=      ╲  Y   ╱  Is time     ╲ ──▶│Charge 25│ │
    │                  ╲ "International" ╱ ───▶ ╲ between       ╱    └────────┘ │
    │                   ◇──────────────◇        ╲ 8 – 20      ╱                 │
    │                                            ◇───────────◇                 │
    ▼                                                               ( a )  N    │
 ◇──────◇   N  ◇──────◇   N  ◇──────◇   N  ◇──────◇   N  ◇──────◇     ▲         │
╱ Is time╲───▶╱ Is time╲───▶╱ Is? time╲──▶╱ Is time╲───▶╱ Is time ╲───┘         │
╲ 8 -12? ╱    ╲ 12 - 14?╱   ╲ 14-18? ╱   ╲ 18-1? ╱    ╲ 1-8?    ╱               │
 ◇──┬───◇      ◇──┬───◇      ◇──┬───◇      ◇──┬───◇      ◇──┬───◇                │
    │ Y           │ Y           │ Y           │ Y           │ Y                  │
┌───┴────┐   ┌────┴────┐   ┌────┴───┐   ┌────┴────┐   ┌────┴───┐                │
│Charge=6│   │Charge=0.8│  │Charge=2│   │Charge=4 │   │Charge 1│                │
└───┬────┘   └────┬────┘   └────┬───┘   └────┬────┘   └────┬───┘                │
    │             │             │            │            │                     │
    └─────────────┴──────┬──────┴────────────┴────────────┴─────────────────────┘
                         │
                  ╱──────┴──────╲
                 ╱  PRINT charge ╲
                 ╲               ╱
                  ╲─────────────╱
                         │           ( a )
                  ┌──────┴──────┐
                  │    STOP     │
                  └─────────────┘
```

Note: award marks as follows
Correct symbols – ½
Start /stop symbols - ½
Input – ½
Output – ½
Correct logic – ½
Correct use of symbols – ½
Decisions
        -Based on calltype – ½
        -Based on safaricom to safaricom calls-2
        -Based on international calls- 1
        -Based on calls to other networks- ½

17.   (a)   Explain how an operating system controls I/O devices.   (2 marks)
                The operating system manages the use of input and output devices. This is
                done by the use buffers .The operating instructs input and output buffers to
                take inputs from an input device or to take outputs from the processor
                while the process using the input or output is suspended .when the
                process which needs the input is made active once again, the operating
                system will command the buffer to send data.

     (b)   Maintaining security is one of the functions of the operating system.
                Explain how the operating system maintains security.
                Maintaining security-in networks and larger computers each user is given
                a username or ID and passwords to gain access to the computer system.
                the operating system keeps a register of all the names so that the only
                persons with valid usernames or IDs passwords can access the system. The
                operating system keeps a log which records users logged in, the length of
                time each user stayed in the system and what they did.

     (c)   Distinguish between the following pairs of terms
     (i)   Indexed sequential and direct file organizations
                In direct access the computer can go directly to the record you want
                without reading the preceding records. For example,   to access a
                record, the computer goes directly to it without having to go through what
                is in in front of it. In indexed sequential file organization the records are
                stored in a particular order using a key file. However the file in which the
                records are stored contains an index that lists each record by its key field
                and identifies its physical location on the disk. The records in an indexed
                sequential file can either be accessed directly or sequentially (one after the
                other).
     (ii)   State any **TWO** factors to consider when selecting a data processing mode
             -       Link between applications
             -       Area of application
             -       Volume of data to be processed
             -       Urgency of output

(d) (i) Using appropriate examples, differentiate between distributed and
        centralized processing modes.   (3 marks)
        Distributed processing modes is a mode of processing where two or more
        geographically dispersed networked computers belonging to the same
        organization share all or some processing tasks whereas centralized
        processing is a mode of processing where a host computer (central
        computer) does all the processing tasks of the terminals (users) connected
        to it.

   (ii) State one advantage and one disadvantage of the processing modes in 17
        (d) (i) above   (2 marks)
        Distributed processing
        Advantage
        -There is less risk of system breakdown
        -Faster processing as there is a reduction of the load on the host computer.
        -Incase of data loss only a small portion of the data is lost.

        Disadvantage
        -Expensive due to extra equipment, personnel and communication links
        -Requires more sophisticated software to maintain data integrity.

        Centralized processing
        Advantages
        -The processor idle time is eliminated
        -User interaction is possible through the terminals
        -Queries are possible since files are held online

        Disadvantages
        -Not reliable with regard to data security
        -Response time is slow where there are many tasks
        -Users have no control over the central processor
        -When the processor is down all the operations are paralyzed

(e) (i) With reference to an operating system ,differentiate between formatting
        and partitioning   (2 marks)
        Formatting is preparing a disk so that the operating system can write
        information on it by defining the tracks and sectors. Partitioning a disk
        refers to the process of dividing a large physical disk into two or more
        logical drives (partitions).

   (ii) List any **TWO** types of user interface.   (1 mark)
        -Command line
        -Menu driven
        -Graphical user interface

(iii) Explain how each type of the user interface in e (ii) above operates

- Command line interface requires a user to enter a command by typing in the commands at the prompt
- Menu- driven interface allows a user to either use a mouse or cursor-movement keys to make a selection from a list of options (menus)
- Graphical user interface allows the use of graphics (icons), menus and simple keystrokes to choose a command.

18.　(a)　Using eight bits and two complement, subtract 78_{10} from 17_{10}. Give your answer in decimal notations.　　　(3 marks)
Convert the numbers to binary and make the bits equal-1 mark

78_{10}　-　1001110_2
17_{10}　-　0010001_2

Complement the negative number and add 1 to the ones complement

Complement of 01001110 = 　10110001　-　½ mark
Add 1　　　　　　　　　　　　$+$　　　1
　　　　　　　　　　　　　　10110010_2 -　½ mark

Add the two numbers　　　　00010001_2
　　　　　　　　　　　　$+$ 10110010_2
　　　　　　　　　　　　　11000011_2　　-　½ mark

Conversion to decimals (- 128 + 64 + 2 + 1) = - 61_{10}　½ mark

(c)　　　Convert 11011011111.1111_2 to:
(i) Octal　　　　　　　　　　　　　(2 marks)

Group the bits in to threes
011 011 011 111 .111 100　　-　　1 mark
　3　 3　 3　 7. 　7 4　　　-　　½ mark

= 3337.74_8　- ½ mark

(ii)　Hexadecimal　　　　　　　(2 marks)

Group the bits in to fours
0110 1101 1111. 1111　　- 1 mark
　6　 D　 F　 F　　　- ½ mark

= 6 DF 16　　- ½ mark

(iii) Decimal (2 marks)

110110111111.1111

$2^{10} + 2^9 + 2^7 + 2^6 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 + 0.5 + 0.25 +$
$0.125 + 0.0625$ - 1 mark

1024 + 512 + 128 + 64 +16 + 8 + 4 + 2 + 1 + 0.9375

$= 1759.9375_{10}$ - 1 mark

(d) Distinguish between TCP/IP and HTTP protocols.   (2 marks)
TCP/IP protocol is an internet protocol which allows operating systems
from different computers to communicate. HTTP protocol is an internet
protocol that governs how data travels between client and server
computers on the internet.

(e) (i) Distinguish between peer to peer client server LANS   (2 marks)
Client server LAN is a LAN that consists of requesting computers called
clients and a computer that provides services to the clients called the
server.
Peer to peer LAN is a LAN where all the computers on the network
communicate with one another directly without relying on the server.

(ii) Atieno was very happy when she bought a safaricom 2G modem for she
was   able to   easily connect her computer to the internet. After six
months she noticed it was taking her too long to connect to the internet
.State two possible causes of the problem.   (2 marks)
-        Many people may be using the same band
-        The bandwidth she is using is narrow.

19.   (a) (i) Explain any **TWO** causes of system change.   (2 marks)
-Errors in the system
-Change in user requirements
-Expansion /growth of the organization
-Technological changes
-Frequent failure of the system

(ii) Explain any **THREE** causes of system maintenance   (2 marks)
-High failure rate of the existing system
-Slowness of the system
-Complaints from users
-Lack of security
-High cost of maintenance

(b) (i) Use of questionnaire is one of the most popular fact finding methods .State any **TWO** advantages and **TWO** disadvantages of using this method to gather data.   (2 marks)

Advantages

-Most questionnaires can be answered quickly

-Responses can be tabulated and analyzed quickly

-It is an inexpensive method of fact finding

Disadvantages

-The number of respondents is usually low

-There is no guarantee that an individual will answer all the questions

-Questionnaires are inflexible.

(ii) Explain the importance of requirement specification phase of system development

It enables the systems analyst determine the equipments needed for the new system.

(c) Explain **TWO** reasons why a new system is tested before implementation.

-To detect and remove bugs (errors)

-To ensure the program works properly

-To ensure the program solves the intended problem

(d) (i) State **TWO** duties performed by a systems administrator

-Installing and configuring servers

-Installing and configuring application software

-Creating and maintaining user accounts.

-Backing up and restoring files

-Monitoring and improving system performance

-Configuring a secure system and maintaining system security.

(ii) The principal of a school is attempting to convince his staff to use CAL and CAI software .State one benefit and one limitation of using such software.   (2 Marks)

Benefits

-       They use multi media that make learning more interesting and interactive

-       Students can learn on their own and at their own pace even in the absence of a teacher.

-       Abstract concepts can often be explained more clearly with the use of a multimedia

Limitations

-       It reduces face to face interaction with others

-       Lessons are set in a predefined order and students can only -- follow in that order thus hindering creativity.

(e) State **ONE** advantage and **ONE** disadvantage of using expert systems in medicine (2 marks)

Advantages
- Experts can use the system to arrive at a faster, more accurate conclusion
- It can support a doctor who is doubtful of his decision because of lack of experience.

Disadvantage
- The system cannot learn from its mistakes
- Lack instinct and common sense which are essential for decision making

20. (a) Explain **THREE** types of communication links that may be used to get an internet connection.
- Dedicated links-this provides permanent connection to the Internet
- Remote network access-this provides access to the internet via satellite dish
- SLIP/PPP (serial line internet protocol /point-to-point protocol)-to get access to the internet, one must dial up an internet service provider which gives you access to the internet.

(b) (i) Differentiate between the internet and World Wide Web (2 marks)
The internet is a network of networks that connect computers across the world while the World Wide Web is a part of the internet that which stores information in multimedia form.

(ii) Technology has been blamed for polluting the environment .Explain how the computer technology has contributed to this. (2 marks)
- The use of solvents in the manufacturing of computers can harm the environment.
- Disposal of old and used computer parts are harmful to the environment because they do not decompose.

(c) A company that makes and sells vehicles receives orders from various clients .the Company wants to enter their orders in to a database. Study the table structure below and answer the questions that follow.

Field name	data type	field size
Order number	number	long integer
Order date	date/time	
Supply date	date/time	
Product code	text	5
Consumer ID	number	long integer
Customer FName	text	15
Customer Lname	text	20
Customer phone	number	long integer
Delivery address	text	30
Product type	text	15
Product name	text	10
Quantity ordered	number	long integer
Product prize	number	long integer

(i) Split the above table structure in to THREE tables and for each table identify an appropriate primary key.   (5 marks)

Order table

Order number	number	long integer
Order date	date/time	
Ordered quantity	number	long integer
Supply date	date/time	

Primary key: order number

Customer table

Customer ID	number	long integer
Customer FName	text	5
Customer LName	text	20
Customer phone	number	long integer
Delivery address	text	30

Primary key: customer ID

Product table

Product code	text	5
Product type	text	15
Product name	text	10
Product prize	number	long integer

Primary key: product code.