**FORM FOUR COMPUTER STUDIES EXAM– MARKING SCHEME**

1. State any three differences between data and information. (3 Marks)

|  |  |
| --- | --- |
| **Data** | **Information** |
| 1. Unprocessed (raw) facts or figures.
2. Not arranged.
3. Does not have much meaning to the user.
4. Cannot be used for decision-making.
 | 1. It is the end-product of data processing (processed data)
2. Arranged into a meaningful format.
3. More meaningful to the user.
4. Can be used to make decisions.
 |

1. Give any two precautionary measures considered to ensure the safety of computers in a computer laboratory (2mks)
* ***Cover with dust covers when not in use***
* ***Proper furniture***
* ***Stable power supply***
* ***Burglar proofing the room***
1. Explain the following features of a word processor (3mks)
2. Wordwrap

**Ability of a word processor to move text to the next line if it cannot fit in the current line.**

1. Textwrap

**The ability of a word processor where text surrounds graphics**

1. Thesaurus

**A dictionary that contains word with the same meanings(synonyms) and word with opposite meanings(antonyms)**

1. List the steps that you would use to correct wrongly spelt words in a document using the spell-checking feature. (3mks)
* ***Make sure automatic spelling and grammar checking are turned on.***
* ***Type in the document.***
* ***When the spelling checker encounters a word it doesn't recognize, it determines the words in its dictionary that are similarly spelled and displays a list of those words with the most likely match highlighted.***
* ***Right-click a word with a wavy red or green underline, to get a list of correct alternative words to choose from.***
* ***From the list, click the correct command or the spelling alternative you want.***

*Award ½ mrk each, maximum of 3mrks*

1. Differentiate between the hardware and software components of a computer giving an example of each (4mks)

***Hardware are tangible / physical parts of a computer e.g. Mouse, keyboard etc. while software are programs / instructions that run and manage the computer e.g. operating system, office softwares etc.***

*Award 1mrk each for correct definition and 1 mrk for an example, maximum of 4mrks*

1. Name any two types of graphs that are supported by spreadsheets (2mks)

***Bar graph***

***Line graph***

***Pie chart***

***Column graph***

7.(a) Define relationship in database? (2mks)

***An association between two or more related tables in a database.***

(b)A computer vendor has recommended the use of a computer database to your school for student information .Explain to the Board of Governors what is a database. (1mks)

* ***It is a collection of information related to a particular subject or purpose.***
* ***A collection of related data or information grouped together under one logical structure.***
* ***A logical collection of related files grouped together by a series of tables as one entity.***

*8.(a) Name any three Functions of a database* ( 3 mks)

* ***Creates or constructs the database contents through the Data Manipulation Languages.***
* ***Interfaces (links) the user to the database contents through Data Manipulation Languages.***
* ***Ensures the growth of the database contents through addition of new fields & records onto the database.***
* ***Maintains the contents of the database. This involves adding new records or files into the database, modifying the already existing records & deleting of the outdated records.***
* ***It helps the user to sort through the records & compile lists based on any criteria he/she would like to establish.***
* ***Manages the storage space for the data within the database & keeps track of all the data in the database.***
* ***It provides flexible processing methods for the contents of the database.***
* ***Protects the contents of the database against all sorts of damage or misuse, e.g. illegal access.***
* ***Monitors the usage of the database contents to determine the rarely used data and those that are frequently used, so that they can be made readily available, whenever need arises.***
* ***It maintains a dictionary of the data within the database & manages the data descriptions in the dictionary.***

b) Give two examples of database systems (2mks)

* ***Microsoft Access. \* FoxPro.***
* ***Dbase III Plus \* Paradox.***
* ***Oracle. \* Informix \* Ingress.***
* ***Progress. \* Sybase. \* SQL Server.***

9.State two advantages of using two’s complement. (2 marks)

**Two’s complement has only one value for zero**

**The range of values represented by two’s complement is extended by one**

(b) State any two characteristics of a computer infected by a virus(2 marks)

* It is taking longer time to start up;
* It is often hanging;
* Applications are taking longer to load;
* Unwanted random messages popping up;
* Firewall disabled;
* Reduced file size, encryption of files, loss of data etc.

10.A firm intends to purchase new software. List three items that should accompany the software. (3mks)

* ***Documentation (user manual)***
* ***Warranty***
* ***Installation key***

11. Explain the meaning of each of the following computer crimes: - (3mks)

***(i) Hacking - is an attempt to invade the privacy of a system, either by tapping messages being transmitted along a public telephone line, or through breaking security codes & passwords to gain unauthorized entry to the system data and information files in a computer****.*

*(****ii) Fraud - is the use of computers to conceal information or cheat other people with the intention of gaining money or information.***

***(iii)Piracy - making illegal copies of copyrighted software, data, or information either for personal use or for re-sale.***

12.List down 3 similarities between a normal calculator and a computer. (3 marks)

* Both have memory
* Both accepts inputs
* Both perform arithmetic calculations
* Both display results
* Fast

13.(a) The accounts department of a secondary school is using a system that generates invoices that are printed in triplicate using carbon papers.

Name one type of printer suitable for this task. (1mrk)

* ***Dot matrix printer (character printer)***
* ***Daisy wheel printer (character printer)***
* ***Drum, chain or band printer. (line printers)***
1. Give a reason for your answer I (a) above. (1mrk)

***They are useful for low-quality carbon copy printing of text, or printing text on continuous sheets of paper.***

 (b) Identify three hardware considerations to be made before installing an operating system. (3mrks)

* ***RAM capacity***
* ***disk space (memory capacity)***
* ***processor capacity and speed.***

14.(a) State any two advantages and two disadvantages of an email over the Traditional Paper Mail/‘Snail Mail’ (4 marks)

**Advantages of emails**

* It is very fast to communicate using emails.
* It is almost free i.e. cheap
* It is convenient to access from any internet enabled device anywhere anytime
* Easy to send one mail to many recipients by use of carbon copies
* Mail can be saved for future retrieval
* Easy to send and reply mails. It doesn’t require a lot of training to browse.
* Mails can easily be forwarded to another recipient
* Document created using other application can easily be attached to the mail etc.
* Reliable if all email etiquette and netiquette is observed.

**Disadvantages of emails**

* Security of message may not be guaranteed – due to tapping while on transit.
* Not yet accessible to everybody due to the connectivity limitations such as lack of infrastructure and the cost of calling being high.
* Requires some ICT literacy to use and enjoy
* It is boring to read ‘junk mails’ that are unsolicited as spam

15.Differentiate the term portability in both hardware and software. (2mrks)

***Portability in hardware is the ability to a hardware part of a computer from one location to another while portability in software refers to the ability of the software to be installed in two or more machines and work with ease or minimal or no errors.***

**SECTION B (60 MARKS)**

**Answer question 16 (compulsory) and any other three questions.**

16.(a)(i)Name the following types of programming languages. ( 3 Marks)

MOV AX 01

MOV BX 02

ADD AX BX

**Int x ,y,z,p,q,t**

***if* ( a > b ) *then***

**x = y + z ;**

**p = q + t**

***else***

**x = y – z ;**

**p = q \* t**

***endif***

**10111011011101101110110111010111011011101101110101110110111011011101011101101110**

 (i)\_\_\_\_\_\_\_\_\_\_\_ (iii)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (ii)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. Assembly Language
	2. Procedural Language
	3. Machine Language

(b)State One Advantage and one disadvantage of each of the a(i) above. ( 6 Marks)

 Assembly Language

***Advantages***

1. ***It is much easier to learn assembly language instructions than machine code instructions. But it is still fairly hard to remember the instructions.***
2. ***Programs written in assembly language can run faster and use up less memory than programs to do the same job written in a high-level language.***

***disadvantages:***

1. ***Each model of computer has its own assembly language associated with it.***
2. ***Assembler programming still requires great attention to detail and hence remains both time consuming and tedious.***

***Procedural Languages***

***Advantages***

* ***Supports modularization***
* ***Easy to locate and debug errors***

***disadvantages:***

* ***Slow code execution***
* ***Takes huge memory space***

 ***Machine Language***

***Advantages***

* ***Faster code execution***
* ***Takes small memory***

***disadvantages:***

* ***Easy to make errors when writing code***
* ***Difficult to locate and debug errors***

(c) (i)State and explain three types of program development errors ( 3 Marks)

* ***Syntax-Errors which occur as a result of violation of programming languages rules***
* ***Execution-Errors which occur when the program could not be able to carry out commands i.e dividing a variable by Zero, Infinite loop***
* ***Logical-Errors which occurs as a result improper logic/Algorithm***

 (ii)Study the flow chart below and of F when N=3. ( 3 Marks)



17. (a) define the following terminologies as used in data representation. (3mrks)

***Word – these are two or more bytes or a group of bits that the computer recognizes and executes (processes) at a time.***

***Nibble – it’s a group of 4 bits. Half a byte***

***Byte – a group of 8-bits***

(b)**Complete the following table (9 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Binary** | **Octal** | **Decimal** | **Hexadecimal** |
| 1010111 | **127** | **87** | **57** |
| **11111111** | 377 | **255** | **FF** |
| **1000111001000** | **10710** | 4552 | **11C8** |
| **1111100010** | **1742** | **994** | 3E2 |

( c) using two’s compliment, perform the following binary arithmetic leaving the answer in decimal notation. (use 8bits) (3mrks)

54 - 29

54 – 29 = (+54 )+(-29)

***54 rem***

***2 27 0 29 rem 11101 to ones compliment***

***2 13 1 2 14 1 00011101 =11100010***

***2 6 1 2 7 0 convert to two’s compliment***

***2 3 0 2 3 1 11100010 + 1 = 11100011***

***2 1 1 2 1 1 ADD 00110110 + 11100011***

***2 0 1 2 0 1 (1) 000110012***

***5410 = 1101102 2910 = 111012 overflow bit is ignored***

18. (a) distinguish between the following pairs of terms (6marks)

 (i) data verification and data validation

***data verification is the process of checking & ensuring that data has been transcribed/ written out correctly while data validation is the process of preventing wrong data from being processed***

 (ii) data encryption and passwords

***data encryption is the process of scrambling data into a form that only authorized sender and receiver can read during transmission or storage while passwords are combination of characters that prevents unauthorized users from opening and changing a document.***

 (iii) dry run and bug.

***Dry run is also called desk check – is going through the program written down on paper before coding it to check for errors while bug is an error.***

(b) Explain any three change over strategies (9 Marks)

**Types of Change Over Strategies**

1. **Direct /Straight Change Over**
* Conversion is done by abandoning the old system and the new system takes effect immediately
* It is less expensive and faster to implement
* It is however very risky way to do things, and typically only used if it is the only alternative
* It puts the company in a do or die situation since there is no reverting back
1. **Parallel Change Over**
* The old and new system are run side by side until the new one is proven to be reliable
* It’s a low risk approach to conversion and allows a company to compare returns from the two systems
* It is however expensive to keep both systems running and takes longer to implement,
1. **Pilot Change Over**
* The new system (whole) is implemented out, but only in one part of the organization which could be a department.
* Once it works smoothly in the pilot, it is rolled out to the rest of the remaining departments in the organization
* It’s lower in cost than the parallel approach, but has more risk (especially for the pilot part of the organization)
1. **Phased Change Over**
* The new system is implemented gradually, in piece meal for over a period of time, but in all departments
* The entire process is broken down into steps, and once the first step works, the next is added
* It is an expensive scheme, but low risk
* In general, the pilot and phased approaches are preferred for their balance of cost and risk.
* Pilot works best when many different people do similar tasks in different locations.
* Phased approach works best when people are doing different operations

19.(a) State any three Advantages and any two Disadvantages of Computer Networks (6 marks)

**Advantages of Computer Networks**

1. Resource Sharing
2. High reliability/Fault tolerance
3. Cost Effectiveness
4. Scalability
5. Remote communication

 Disadvantages of Computer Networks

1. The cost of installing the equipment is greater.
2. A network manager is required to run the system.
3. If the server fails, all the workstations are affected.
4. Since data is shared there is greater need for **security.**

**(b) With aid of a diagram, explain the following Transmission Impairments (9 marks)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Error** | **Explanation** | **Illustration** |
| 1 | **Attenuation** | Signal strength falls off with distance |  |
| 2 | **Distortion** | Various frequency components of a signal will arrive at the receiver at different times causing the signal to change its form or shape |  |
| 3 | **Noise** | Refers to unwanted signals inserted between the transmitter and receiver e.g. crosstalk |  |

20. (a) (i) list four stages of data collection (2mrks)

***Data creation***

***Data preparation***

***Conversion***

***Validation***

***transmission***

(ii) describe two types of data processing methods (2mrks)

***Manual data processing – using paper and pen***

***Mechanical data processing – processing using mechanical devices***

***Electronic data processing – processing using electronic devices***

(b) explain the following file organization methods (4mrks)

 (i) sequential file organization

***the records are arranged within the file serially one after the other; in sequential file organization, the records are stored in a particular order sorted using a key field; hence, there is a relationship that exists between adjacent records and the key fields.***

(ii) serial organization method.

***records in a file are stored one after the other in the order they come into the file without any particular sequence. The records are not sorted in any way on the storage medium, and there is no relationship that exists between adjacent records.***

(c) (i) define an operating system (1mrk)

***Refers to a set of programs that run and manage the basic operations of the computer system. These programs are loaded into the main memory when the computer is turned on and remain there until the computer is turned off.***

(ii) briefly explain how an operating system: - (4mrks)

 controls I/O devices - ***The operating system controls all the input and output devices, including the ports which act as the interfaces between the Operating system and the input/output devices; it handles all the instructions that pass between them and the processor. It also controls how your application software interfaces with your computer hardware.***

 maintains security - ***In networks and larger computers, each user is given a username or ID and password to gain access to the computer system. The operating system keeps a register of all these names so that only persons with valid usernames or IDs and passwords can access the system. This prevents access by hackers and unauthorized persons. it also keeps a log of records of which users logged in, the length of time each user stayed on the system and what they did. Administrators can check the log for breaches and abuse of resources.***

 (d) Explain the difference between a primary key and an index key as used in database. (2mrks)

***Primary key is a unique identifier of a record in a table while an Index key is a field that is used to speed up searching and sorting of records in a table.***