5.9 COMPUTER STUDIES (451)

5.9.1 Computer Studies Paper 1 (451/1)

SECTION A

№	ANSWER	MARKS
1.	Ways in which computers are used in health care. — **Telemedicine**: A doctor can use a computer to treat a patient who is in a remote location (or the doctor could be in a remote location) — **Data analysis**: Performing laboratory analysis and to match samples — **Communication**: Computer network media are used to facilitate communication between stake holders in the health industry. — **Dedicated computers:** Health care equipment embedded with computers used to perform special functions — **Security:** computerized devices are used to provide surveillance of a health centre — Computers support **hospital information management system** that help to make accurate decisions — **Medical Imaging**: a high resolution image generation of human body First 2×1	2
2.	Operations that can performed on a file by the Operating System - Renaming - Creating - Moving - Copying - Finding/Searching - Compressing/Zip - Creating Shortcuts - Hiding - Restore/Recovery - Sorting - Saving - Backing/Archive - Matching - Merging - Replacing - Opening - Security - Printing - Closing - Viewing - Editing - Updating - Naming - Recycle bin/Emptying - Selecting - Decompress/Unzip - Encrypting - Allocating storage space/Address First 4×½	2
3.	Website A group of related web documents stored in a web server and linked together such that a user can jump from one section of a document to another section or to another file. **NB: Web page/Internet page/virtual space** 2 or 0	2

№	ANSWER	MARKS
4.	Reasons for enactment data protection laws by a government - The government being compelled to protect individual and organizational fundamental rights to personal information. - To safe guard privacy	2
5.	Cell Formats (a) 9022 111 000 - Custom format /Autonumber/Number/General (1 mark) (b) 31/10/2022 - Date Date/Time or Value (1 mark)	2
6.	Uses of image handles - Resizing the image - Increasing the image - Decreasing the mage - Rotating the image - Tilting the image - Stretching the image - Changing shape - Moving the image - Flipping over the image First 3×1	3
7.	Circumstance under which dry-run testing is performed. — When there is a need to identify manually the logic flaws in a program by using sample data to trace through it. **NB: To check for error** **- To check if program is working** **- Manual running of program** 2 or 0	2
8.	Ways in which data validation is implemented on an input form. — Using displayed comments to guide/alert a user. — Using controls which restrict the type of data to be entered. — Using error triggers to alert a user when wrong data is entered. — Using appropriate data type during the design of the table. **NB. Mark restricting points e.g. Data types, input masks, primary key, list boxes, field size, validation rules, required, lookups, format, caption, default value,** First 2 × 1	2
9.	Roles of a computer trainer in an organization. — Train workers to use computers hardware and software — Develop training materials — Evaluate learning outcomes — Establish learning needs — Provide user support **NB: Look for evidence of training** First 3 × 1	3

10. Electronic data processing modes

- — Real time processing
- — On-line processing
- — Time-sharing processing
- — Distributed processing
- — Batch processing/Offline
- — Interactive
- — Multiprocessing
- — Multiprogramming

First 3×1 — 3

11

Data collection	Data capture
It is a process of gathering original data from the source	It is the process of obtaining data in a computer in a sensible format.

NB. Look for evidence of collecting data against evidence of entering data

0, 2 or 4 — 4

12. Features of a GUI operating system.

(a) **Pointer**

— It is a symbol that appears on the display screen which is moved using pointing devices in order to select an object or a command.

NB. Accept device name/definition of pointing device

(2 marks)

(b) **Desktop**

— It is the area on the display screen where icons representing different programs are placed.

NB. Allow Starting point/first screen/welcome screen/homepage

(2 marks) — 4

№	ANSWER	MARKS
13.	Circumstances under which the following input devices are used (a) **Optical Character Reader** — Used when the text on a paper is to be instantly converted to machine readable formats. **NB. Allow evidence of direct capture/scan including examples of usage e.g. stick control** (1 mark) (b) **Optical Mark Reader** — Used when some detailed marks on a paper are to be recognized in a computer formats. **NB. Allow evidence of usage in Marking multiple choice questions, lottery tickets etc** (1mark)	2
14.	**Characteristics of an impact printer** - Produces noise while printing - There is physical contact with paper/striking - Has low consumable costs - Useful for bulk printing - Can print **multipart** copies - Has few colours - Has poor graphics - Low quality printouts/mono chrome - Is a character printer - Has slow printing speed - Has low resolution - Has few fonts/limited fonts - Has one size of font size - Has one type of font style	3
15.	Features of a Word Processor: (a) **Hyphenation** — It is a feature which allows a word to break lines between the syllables in order to have uniform spacing between words. **NB. Accept illustrations** (2 marks) (b) **Status bar** — It is the area at the bottom of word processing screen that can be made to display options such as page, number, word count, permission etc. **NB. Allow strip used for communication purposes** **Displays currently running tasks** (2 marks)	4
	TOTAL	**40**

SECTION B (60 Marks)

Question 16 compulsory and any other three

№	ANSWER	MARKS
16. (a)	(i) A – First Generation (1 GL)/Machine level/low level **1 mark** B – Fourth Generation (4 GL)/High level/SQL **1 mark**	**2**
	(ii) **A – Advantages of First Generation (1 GL)** — They are translation free — Can be directly executed by a computer — Programs written are executed very first — Programs written are executed efficiently by the CPU — The program written utilize the memory in an efficient manner because it is possible to keep track of each bit of data. - Stable/Hardly crashes First 2 × 1 **B – Advantages of Fourth Generation (4 GL)** — The program are machine independent/Portable — The program are easy to learn — Easy to understand — The languages provides better communication First 2 × 1	**4**

(b) **Pseudocode**

```
Start
Input TotalEmployee
Count= 0

While count  TotalEmployee
   Input Employee salary
   If salary ≥ 70,000then
       Increment = 5/100 ×  Employee salary
   Else if Employee salary > 50,000 Then
       Increment = 8/100 × Salary
   Else
       Increment = 10/100 × Salary
   End if

   New salary = Salary + Increment
   Count = Count +1
   Print Employee salary
   Print Increment
   Print New Salary
End while
Stop
```

Accept the correct use of any other loop construct

Marks award guide

Start/Stop 1
Input No of Employee 1 2
Decision (accept any two correct decision 1
Computing new salary (Salary+Increment) – **any one increment**
Looping – **any evidence of looping** 1
Output 1
Calculating New increment 1
Logic 1

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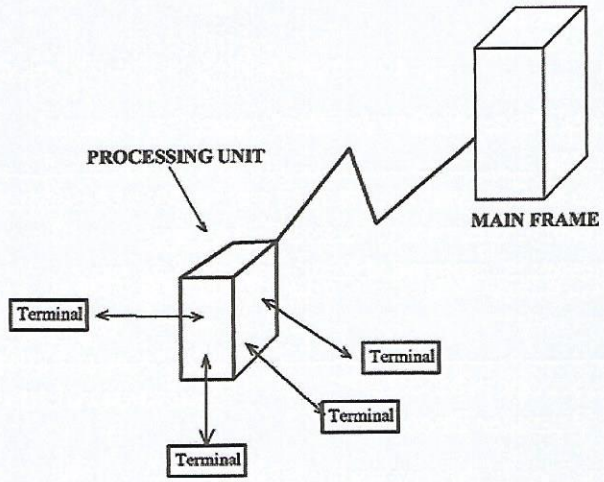
№	ANSWER	MARKS
17. (a)	Differences between Octal and Binary number system. **Octal** — Uses eight digits 0, 1, 2, 3, 4,5,6 and 7 — The maximum value of a single digit is 7 — Each position in a octal represents a specific power of 8 — uses less number of digits to represent a number — is base 8 — a digit is represented by three bits Any 2 x 1 **Binary** — Uses two digits 0 and 1 — The maximum value of a single digit is 1 — Each position in a binary represents a specific power of 2 — uses more number of digits (bits) to represent a number — is base 2 — each digit is represented by 1 bit **NB. One difference is enough for 4 marks** **Correct one sided fact award 2 marks** 0, 2 or 4	4
(b)	$23_{10} - 17_{10}$ (Using 8-bits one's complement) Converting to bits $23_{10} = 00010111_2$ $17_{10} = 00010001_2$ (1 mark) One's complement (17) = 11101110 (1 mark) Adding to 23 + 00010111 100000101 (1 mark) + 1 Answer 00000110 (1 mark) **NB. If eight bits have not been used then award a maximum of 3 marks**	4
(c)	Ways in which a graphic designer would use a computer — Use the computer to take photos to be inserted in the design — Use a graphics program to design graphics — Use a computer and a scanner to directly capture images — Use a computer to source graphics from the internet **NB. There should be evidence of working with graphics design** First 4 × 1	4

(d)	The Operating System could perform each of the following disk management — Disk formatting: preparing a disk to store data — Disk partitioning: Creating a logical storage block in a disk/Scan disk/Check disk — Defragmentation: rearranging scattered related data in order to consolidate on the used space — Disk diagnostics: establishing the health status of a disk — disk compression: Compact data space so as to create extra space — Data backup: Creating a copy of original data — Virus/malware scan, — Creating a startup disk — Disk cleanup First 3 × 1	**3**
18. (a)	Benefits a car selling company gains from e-commerce — Accessibility: the clients would be able to access the services from any part of the world. — Compliance with health requirement of social distancing hence reducing the risks of infections within the company. — The business would be conducted 24/7 from any parts of the world — Analysis of customer preference can easily made hence tailoring the business to customer needs — Analysis of customer behaviour so as to be able to easily predict the outcome of any event — Use the internet media to easily communicate with the customers — Sales campaigns can easily be run on the platform to attract more clients. **NB. Look for enhancement to the company** **(Accuracy, Speed, Security, Ease, Accessibility, Reliability)** First 3 × 2	**6**
(b)	Reasons why a system analyst would consider studying an existing system — In order to understand the organizational structure. — To determine the sources of data in the organization. — To establish the flow of data within the organization. — Accuracy and timelines aspect of the data handling process. — To establish the data storage mechanism. — To identify the type of data processing used. — To identify the reports being generated at various stages. — To establish user requirements. **NB. Check for challenges/problems and user requirements** **Also ensure the candidates answer is in respect of the current system** First 5 × 1	**5**

	Usability testing is mainly concerned with the ease in which a user could use the application. **NB. User friendly** (2 marks) Functional Testing is concerned with establishing whether the system is meeting its objectives. Workability of the system/performance (2 marks) Overall award 0, 2 or 4	4
19. (a)	Purpose of each of the following features in a spreadsheet chart. (i) Legend — It is a brief description of the data in the chart alongside each data items. **Accept the term KEY** **Accept illustrations** (2 marks) (ii) Data Series — It is a collection of data points which corresponds to the data within a single row. **Look for evidence of data used to plot chart** (2 marks) (iii) Data Marker — It is a symbol on the chart that represents a single value in the worksheet. **Look for evidence of value/symbol on the chart representing values** (2 marks)	6
(b)	Challenges that a school may experience after installing a computer network — Cost of installation: the school would be reeling from the expenses associated with the installation of the network — Maintenance cost: the school would have to incur extra expenses to ensure that the network is functioning as intended. This include hiring a personnel to manage it — Security for personal and school data from getting into wrong hands — Malicious software would easily spread from one computer to another through the network — Extra measures would be required to control access to information. **Guiding points are 1. Costs 2. Security 3. Social ethics 4. Skills** **NB. Accept any network related problem e.g. attenuation, server failure etc** First 3 × 2	6

(c)	Factors to consider when selecting the media for connectivity. — **Cost**: the cost of acquiring, installation and maintenance of the network. — **Transmission distance** – twisted pair, infrared and radio transmit only for short distance. Fiber optics can transmit for long distance. — **Security**: how data on transit — **Security of media**. — **Error rate**: the degree of susceptibility to interference by external factors such as magnetism. **Additional points** **NB. Accept points on authenticity, warranty, ease of handling, compatibility, system requirements, upgradability, portability, user needs, user friendliness** First 3×1	3
20. (a)	Functions of the following network protocols (i) **SMTP – Simple Mail Transfer Protocol** — It is used to transfer email over the network or internet. (1 mark) (ii) **FTP – File Transfer Protocol** — It is used to upload and download the files over a network (1 mark) (iii)**DNS** — It is used to resolve domain name to the IP address and vice versa. **(1 mark)**	3
(b)	(i) Characteristics of mesh topology — Every node in the network is connected to every other nodes/Point to Point — It is used in Wide Area Network to interconnect Local Area Networks — It is reliable since there are several routes to pass data — Failure of a node does not affect the network — Failure of a media does not affect the network — It is reliable — Uses many cable connections **NB. Accept illustration of mesh topology that is correctly labelled** Fist 2 × 1 (ii) Characteristics of Ring topology — Devices are connected in a closed loop. — All devices have equal access to media. — Devices waits for its turn to transmit data. First 2 × 1	4

№	ANSWER	MARKS
	Centralised Computing — It is a network design where processing is centralized and dumb terminals are used to request services from a mainframe. The mainframe is used to store all the data  Description @2 Drawing @2	4
(d)	Security threats: (i) Social engineering — It is a technique used by a hacker to steal data by using psychological manipulation combine with social scene. — Act of soliciting for software information from unsuspecting user (2 marks) **(ii) Vulnerability** — It is a weakness, design problem or implementation error in a system that can lead to unexpected or undesirable event regarding security system. — These are weak access points (2 marks)	4