

**SPEC PRE-MOCK**  
**451/1 - COMPUTER STUDIES – Paper 1**

**(THEORY)**

**March 2026 – 2½ Hrs.**

**MARKING SCHEME**

**Section A (40 Marks)**

**Answer all question in this section in the spaces provided**

1. Vasco a secretary at success path mock carries out her daily duties using computers and suffers wrist strain. State two ways she would reduce wrist strain. (2 mark)

- *Use ergonomic keyboard*
- *Use standard furniture*
- *Take regular breaks in between work.*

2. There are two booting processes of the computer. Explain the cold booting process (2 Marks)

*The computer starts by checking all its components to determine whether they are properly connected, functioning correctly and whether they are available for use. This process is called Power – on – self – test (POST). During this process, though the computer is on, it is not ready for use by the user but instead a special program called Basic Input Output System (BIOS) takes charge of the computer. The monitor displays information showing the status of each device being tested. If a device is faulty or missing, the process will halt and a message alerting the user is displayed on the screen. When the POST is over, the computer loads the operating system which allows the user to start using the computer. If the computer is password protected, it prompts the user with a screen that requires the user to provide the correct user name and a password before allowing the user to use them.*

*Explanation @ 2 Marks*

3. The manager of SPEC Co. Ltd. wishes to purchase an output device for the company. State three factors to consider when selecting the output device to purchase. (2 Marks)

- *Suitability of the application.*
- *The speed at which the output is required.*
- *Whether a printed version is required.*
- *The volume of the data.*
- *Cost of the method chosen as compared with the benefits to be derived.*

4. State **two** disadvantages of entering data using touch sensitive screens in tablet computers. (2 marks)

- *Fragile and can break easily*
- *Dirty screen not sensitive to touch*
- *Cannot be used by the physically challenged*
- *Loses sensitivity*

5. Due to the rapid change in technology, the world is slowly moving from the magnetic and optical storage devices to solid state storage devices.

- a. Define the term “solid state storage device” (1 Mark)

*Solid-state storage (SSS) is a type of computer storage media that stores data electronically and has no moving parts. Solid state storage is made from silicon microchips.*

*Definition @ 1 Mark*

- b. State any two advantages of solid state storage devices (2 Marks)

- a. SSDs require less power and produce far less heat than spinning hard disk drives or magnetic tape.*
- b. It has a faster rate of data transfer to and from the storage device*
- c. It is not affected by magnetism*
- d. Produce no heat*
- e. It is small in size and portable*
- f. It provides better performance and reliability over an HDD*

*Or any other correct response*

*Advantage @ 1 Mark*

*Total = 2 X 1 Mark*

*= 2 Marks*

6. Differentiate between HDMI and firewire interface cables (2 Marks)

*High Definition Multimedia Interface (HDMI) is the interface cable used for transmitting digital audio and video data from computer to a projector, TV or audio device.. Firewire interface also referred to as IEEE1394 is almost similar to a USB cable but has high transmission rate hence suitable for streaming video from digital cameras to a computer.*

7. Mr Karani games teacher at St. Cecilia girls school wants to invites several schools for Basketball tournament. She was advised to use mail merging technique to create invitation letters for the respective schools identified. State three benefits of this technique. (3 Marks)

- Uniform letters produced*
- Faster production of letters*
- Consistency in content produced.*
- Back up of letter and data source in the computer*
- Saves on storage space since individual letters do not have to be stored.*

8. In a relational database, it is important to identify and create relationships between the database objects. Mentioning the type of relationship, state circumstances under which each relationship is formed. (3 Marks)

- i. *One to one relationship – created when the relating field in both tables are primary keys*
- ii. *One to many relationship – created when the relating field in say table A is a primary key while the relating field in say table B is a foreign key or non – primary key*
- iii. *Many to many relationship – created when the relating field in both tables are not primary keys*

*Relationship @ 1 Mark*

*Total = 3 X 1 Mark*

*= 3 Marks*

9. Suggest any four application areas in which you would expect a supermarket retail manager to use the internet. (4 Marks)

- *Global marketing goods and services offered by the supermarket through the internet platforms.*
- *Sales of good to customer through e-commerce platforms.*
- *Communication with clients using emails and other internet apps*
- *Online payment of goods and services using credit cards.*

10. State the stages of system development life cycle in which each of the following activities that place. (3 Marks)

- (a) Staff training  
*System implementation*
- (b) Error correction  
*System Maintenance*
- (c) Cost effectiveness  
*System Analysis*

11. The use of ICT has affected every aspect of human life. State one disadvantage and two advantages of ICT on physical fitness in the society (3 Marks)

*Disadvantage*

- i. *It has led less fit people who spend most of their time on ICT related activities such as playing computer games and other ICT related activities*

*Advantages*

- i. *Embedded in the physical fitness machines to control the sequence of exercises*
- ii. *It can be used to train sportsmen and sportswomen on various games through recording and replaying video clips*

*Or any other correct response*

*Advantage/ disadvantage @ 1 Mark*

*Total = 3 X 1 Mark  
= 3 Marks*

12. The Internet is a massive network of networks that connects millions of computers together globally. Explain two ways through which an individual can access the internet. (2 Marks)

- *Through internet service providers. Internet Service Provider (ISP) is a commercial organization (or a company) that provides Internet connections, along with a set of support services usually for a fee. It maintains a Server that is directly connected to the Internet.*
- *Through online service providers. OSP is An Internet service that provides a wide range of content to its subscribers including Internet Access.*

13. State two ways in which ICT can be used to register a citizen for *huduma* number (2 Marks)

- *Capturing citizens' through keying devices and digital cameras etc.*
- *Using of biometrics to uniquely identify each and every individual being registered.*
- *Using databases to store the details of all data collected.*

14. Using the twos complement & 8 bit binary notation, perform the calculation  $15_{10} - 41_8$  leaving your answer in decimal number. (6 Marks)

15. Distinguish between a special purpose computer and a dedicated computer. (2 Marks)

*A special-purpose computer is designed to handle/accomplish a particular specific task only. Such computers cannot perform any other task except the one they were meant to do. A Dedicated computer is a general-purpose computer that is committed to some processing task; though capable of performing a variety of tasks in different application environments. E.g., the computer can be dedicated to carrying out Word processing tasks only.*

**Section B (60 Marks)**

**Answer question 16 and any other three from this section in the spaces provided.**

16. Below is a pseudocode for a program that is meant to be used for calculating the sum and average of all even numbers between 50 and 100 and display results.

1. *set sum = 0*
2. *for num = 0 to 100 do*
3. *num = num + 1*
4. *sum = num + sum*
5. *average = sum/count*
6. *end*
7. *print sum, average*

a. The pseudocode has four logical errors, identify and correct the errors. (8 Marks)

- a. *for num = 0 to 100 is an error because the even numbers should be between 50 and 100 should be corrected to be for num = 52 to 98*
- b. *num = num + 1 will not select even numbers to be added, should be changed to num=num +2*
- c. *a counter should be introduced to help count the even numbers and be used for calculation of average. Set count = 0 at the beginning, count = count + 1 should be added within the loop*
- d. *Average should be calculated outside the loop after the end for statement.*

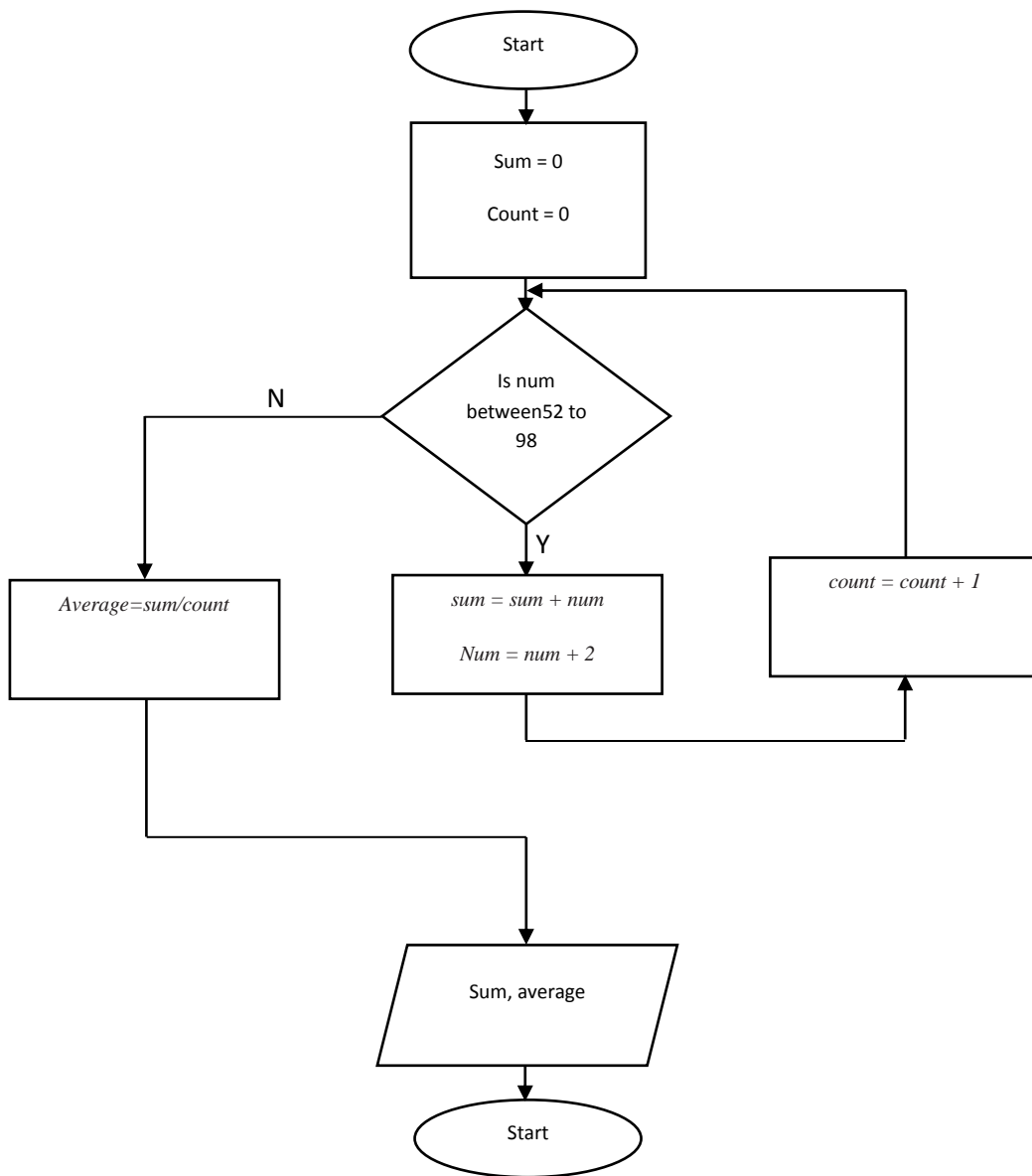
1. *set sum = 0, count = 0*
2. *for num = 52 to 98 do*
3. *sum = sum + num*
4. *num = num + 2*
5. *count= count +1*
6. *average = sum/count*
7. *end for*
8. *print sum, average*

*NB: The end statements should not be considered as a logical error. It is a syntax error.*

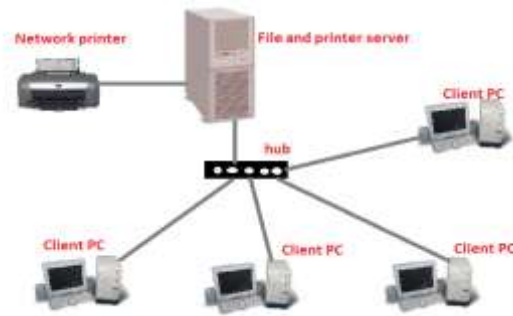
b. Draw a flowchart for the corrected version of the pseudocode in (a) above.

(7 Marks)

1. *set sum = 0, count = 0*
2. *for num = 52 to 98 do*
3. *sum = sum + num*
4. *num = num + 2*
5. *count = count + 1*
6. *average = sum/count*
7. *end for*
8. *print sum, average*



17. Study the diagram below of a school network and use it to answer the questions that follow.



a. Identify the network represented in the diagram (1 Mark)

*Client-Server network*

b. State any two advantages and two disadvantages of the above network (4 Marks)

***Advantages of Client-server network***

- *It offers a reliable centralized storage and sharing of files.*
- *It ensures high security of the network through access controls installed on the server.*
- *It is easy to monitor the network performance through the server.*
- *It is easy to solve network problems using the server.*
- *It's cheap to install software which can be done on the server alone instead of all computers on the network.*

***Disadvantages of client-server network***

- *It's more difficult to setup. This because of the complicated configurations associated with servers.*
- *Extra expenses on buying a server computer.*
- *Extra expenses on hiring a network administrator.*
- *The server is one point of failure. In case the server fails to work, the whole network comes to a standstill.*

*Or any other correct response*

*Advantage/ disadvantage @ 1 Mark*

*Total = 4 X 1 Mark*

*= 4 Marks*

c. Distinguish between multiplexing and demultiplexing as used in data transmission. (2 Marks)

*Multiplexing is the set of techniques that allows the combination and simultaneous transmission of multiple signals across a single data link while demultiplexing is the process of separating the multiplexed signal back to its original multiple channels on the receivers end.*

*Difference @ 2 Marks*

- d. State the importance of multiplexing during data transmission (1 Marks)

*To make efficient use of high speed telecommunications lines, some form of multiplexing is used. Multiplexing allows several transmission sources to share a larger transmission capacity.*

*Importance @ 1 Mark*

- e. Distinguish between packet switching and circuit switching of packets during transmission (2 Marks)

*Packet switching is a data transmission technique which involves transmitting and routing of data as packet segments sent rapidly and sequentially over a communication channel. By breaking the data into individual segments known as packets which are transmitted individually and then re-assembled when they reach the destination computer, If any are lost, they are re-sent by the originator. The recipient computer acknowledges receipt of packets to eliminate unnecessary re-transmissions while Circuit switching is A method of communicating in which a dedicated communications path referred to as a circuit or channel is established between two devices through one or more intermediate switching nodes before communication between the devices takes place.*

*Difference @ 2 Marks*

- f. Data is constantly under threat from everyone handling it and the larger society. Identify any two physical threats to data by the employees of the organization to its information system (2 Marks)

- *Unauthorized access into the computer facilities*
- *Physical theft of computer resources*
- *Sabotage*

*Or any other correct response*

*Threat @ 1 Mark*

*Total = 2 X 1 Mark*

*= 2 Marks*

- g. Mark, an employee of the institution used his computer to access his boss's computer to get some classified information and gave it to one of the clients at a fee.

- i. State the type of crime committed by Mark (1 Mark)

*Fraud  
Crime @ 1 Mark*

- ii. State two possible ways of protecting the data against the crime committed by Mark (2 Marks)

- *monitor e-mails to detect large data exports.*
- *Passwords required to enter or change the PC's BIOS*
- *Passwords required to enter a network*
- *Passwords required to start the operating system*
- *Passwords required to enter major software packages*
- *Local firewalls*

Or any other correct response

Protection @ 1 Mark

Total = 2 X 1 Mark

18. (a) Explain the difference between *freeware and open source softwares*. (4 marks)

*Freeware are software products that are freely made available to users. The users acquire them without paying for them. Open source software are those whose source codes are freely made available to users. Users can modify and distribute.*

- (b) Describe how operating systems handle the following in a computer system.

- i. Errors (2 marks)

*The operating system alerts the user of the occurrence of an error due to either hardware or software failure. The operating system gives suggestions on how to correct the errors.*

- ii. Interrupt (2 marks)

*When an interrupt is detected, the operating system will change the order of execution by attending to the source of interrupt first.*

(c).

i. State the meaning of the term fragmentation as used in disk management. (1 mark)

*Fragmentation refers to the condition of a disk in which files are divided into pieces scattered around the disk.*

ii. State two effects of fragmentation in a computer system. (2 marks)

- *wastage on disk storage space*
- *slow access to files*

(d). Explain the purpose of the following in a computer. (2 marks)

i. Cache memory

*Used to increase the speed of processing in the CPU*

ii. Output buffer

*Hold output data after processing*

*Or*

*Harmonizes the difference in speed between the output devices and the CPU*

(e). State **two** characteristics of Random Access memory. (2 marks)

- *RAM provides “Read and write” facilities*
- *RAM is a Volatile memory, i.e. the contents of RAM are usually lost (rubbed off) when the power supply or the computer is switched off.*
- *RAM forms the major proportion of Main storage – it contributes about 70% of the Internal memory.*
- *Stores data & programs temporarily during the times when they are needed in the Main memory.*

19. a. Data collection is a process of gathering data from all the relevant sources. List the data collection stages. (4 Marks)

- *Data Creation.*
- *Data Transmission.*
- *Data Preparation.*
- *Conversion of data from one medium to another.*
- *Input validation.*
- *Sorting.*
- *Control.*

b. Explain three advantages of time sharing as a data processing mode. (3 Marks)

- *Provides better services to users since the output is fast.*
- *The processor's idle time is utilized. This is because; the processor doesn't have to wait for the slower communicating peripherals.*
- *Files are held online, hence enquiries or file interrogation is possible.*
- *The user and the computer can communicate through the terminals connected to the central computer.*
- *It avoids duplication of software.*
- *Terminal users can benefit from the facilities of the central computer.*
- *It is helpful to small companies, which cannot afford to purchase a computer & the related facilities. The company can be served at a fee through time-sharing processing mode.*

c. Differentiate between a webmaster and a web developer. (2 Marks)

*A webmaster is someone who creates and manages the content and organization of a website, manages the computer server and technical programming aspects of a website or does both. A Web developer is a kind of programmer who specializes in the development of applications relating to the World Wide Web or distributed network applications, which typically run protocols like HTTP from a Web server to a client browser using associated programming languages like HTML/CSS, C#, Ruby and PHP*

d. Differentiate between automatic recalculation and what if analysis as used in spread sheet programs. (2 Marks)

*In spreadsheets, a mode in which all cells are recalculated whenever a value changes. Automatic recalculation ensures that the spreadsheet data is always up-to-date, but it may make working on the spreadsheet slower. What-If Analysis is the process of changing the values in cells to see how those changes will affect the outcome of formulas on the worksheet. Three kinds of What-If Analysis tools come with Excel: Scenarios, Goal Seek, and Data Tables.*

e. With aid of an example in each case, describe each of the following cell referencing methods.

i) Range reference (2 Marks)

*Range reference is a group or block of cells in a worksheet that are selected or highlighted. Also, a range can be a group or block of cell references that are entered as an argument for a function, used to create a graph, or used to bookmark data.*

ii) Referencing using labels (2 Marks)

*The labels are the column and row headings that identify the data in the worksheet. In the image that accompanies this article, rather than typing in the references B3:B9 to identify the data location in the function, use the heading label Expenses instead.*

20.

a. There are many systems developed some of which contrast each other. Distinguish between a conceptual and physical system. (2 Marks)

*A conceptual system is an orderly arrangement of independent ideas that is concerned with theoretical structures which may or may not have counterpart in the real world while a Physical system is a concrete operational system made up of people, material, machines energy and other physical things that can display activity or behavior.*

Difference @ 2 Marks

b. Every organization requires an information system.

i. Define an information system (1 Mark)

*An information system is a system that accepts data resources as input and processes them into information products as output.*

OR

*Information systems can also be defined as any organized combination of people, hardware, software, communications networks, and data resources that stores, retrieves, transforms, and disseminates information in an organization.*

OR

*Information systems can also be defined as an arrangement of people, data, processes, communication and information technology that interact to support and improve day-to-day operations as well as support the problem-solving and decision making needs of an organization.*

Definition @ 1 Mark

ii. Describe any three reasons why it is necessary for an organization to change its existing information system (3 Marks)

- ***New opportunities:*** *This includes the need for improvement of the quality of internal processes and service delivery in an organisation by introducing new services and products in the market. Eg a bank that sees the opportunity of offering services through the internet (e-banking or mobile phone (m-commerce))*

- **High failure rate of the existing system.** The current system maybe failing very often causing the organization to look for a better system.
- **Slow in processing.** The current system maybe slow in processing data.
- **Complaints from customers.** There may complain that the current system is not meeting their needs.
- **Decline in profits.** The current system maybe a lot of loss in terms of costs or time.
- **Errors and problems in the system.** The system may have many errors and there may be a need to come up with an error-free system or some undesirable circumstances that prevents the organisation from meeting its goals
- **High cost of maintenance.** The cost of maintaining the current system maybe rising tremendously and as a result there might be a need to reduce the cost through a system change.
- **Lack of security.** There might be security loop holes in the current system and under such conditions, the organization might request for another system which controls access of information in the system.
- **Directives.** This includes new requirements imposed by the government, management or external influences. For example, a new government may request all organizations to submit financial reports by a given date. This may cause an organization to implement a new Information System which is up to the required standards.

Or any other correct response

Reason @ 1 Mark

Total = 3 X 1 Mark

= 3 Marks

c. Testing systems after development is a very critical process in systems development. State any four test conditions to be covered for effective testing of the system. (4 Marks)

- Range errors e.g. in ages and dates*
- Format errors e.g. a digit in a name*
- Zero or negative values where only positive values are allowed e.g. quantity ordered should not be zero or negative*
- Non-integer values in numeric fields such as 'quantities'*
- Invalid combination of data*

Or any other correct response

Condition @ 1 Mark

Total = 4 X 1 Mark

= 4 Marks

d. With examples for each, Distinguish between a page layout based DTP software and graphical based DTP software (3 Marks)

1. Graphical based:

*They are specifically developed for editing & formatting graphic objects like pictures.*

*Examples;*

*Adobe Photoshop.*

*- Harvard graphic.*

*CorelDraw.*

*Graphic-based desktop publishers have superior capabilities for handling images such as setting resolution, brightness, contrast, cropping, and filling the images with colour.*

*2. Layout based:*

*They are specifically developed to create different page layout designs for text and pictures.*

*Examples;*

*Adobe PageMaker.*

*Microsoft Publisher.*

e. State two reasons why it is important to implement the use computers in the monitoring and control processes of industrial products (2 Marks)

- *Standardizations of products*
- *Reduction of wastes and rejects*

Or any other correct response

Importance @ 1 Mark

Total = 2 X 1 Mark

**This is the last printed page.**