THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

738 INFORMATION AND COMMUNICATION TECHNOLOGY

Time: 3 Hours **ANSWERS** **Year: 2011**

Instructions

1. This paper consists of section A, B and C.

2. Answer all questions in section A, two questions from section B and two questions from section C.

1. State the relationship between data and information.

Data refers to raw, unprocessed facts that do not have any specific meaning on their own. It can be in the form of numbers, characters, symbols, or any other unorganized form. Information, on the other hand, is processed data that has been organized and given meaning, making it useful for decision-making. In simple terms, data is the input that, when processed, results in meaningful output known as information.

2. Differentiate application software from system software.

Application software is a type of program designed to perform specific user tasks such as word processing, web browsing, or playing media files. Examples include Microsoft Word, Google Chrome, and VLC media player. System software, on the other hand, is designed to manage and control computer hardware and provide a platform for application software to run. It includes operating systems like Windows, macOS, and Linux, as well as utility programs such as antivirus software and disk management tools.

3. Explain briefly any four factors which will indicate that your computer has been infected by viruses.

A sudden decrease in computer performance is one of the signs of virus infection. The system may become slow, freeze frequently, or crash unexpectedly due to malicious programs consuming resources.

Unexpected pop-up messages and advertisements appearing even when no browser is open indicate a virus presence. These pop-ups may redirect users to malicious websites or install unwanted software.

Unauthorized file modifications or deletions may occur when a virus infects a computer. Files may disappear, change their names, or become inaccessible without user action.

Frequent system errors and software crashes suggest a possible virus infection. Programs may fail to open, close unexpectedly, or display error messages indicating corrupted files.

4. Define the term network topology and then list any three examples of network topologies.

Network topology refers to the physical or logical arrangement of devices and connections in a computer network. It defines how computers and other network components are linked and communicate with each other.

Examples of network topologies include star topology, where all devices connect to a central hub or switch, bus topology, where all devices share a single communication line, and ring topology, where devices are connected in a closed loop.

5. Write the long form of the following abbreviations as used in ICT.

(a) HTML - Hypertext Markup Language

(b) BIOS - Basic Input Output System

(c) FTP - File Transfer Protocol

(d) URL - Uniform Resource Locator

6. Distinguish between a worksheet and a workbook as used in spreadsheet programs.

A worksheet is a single spreadsheet page within a workbook that consists of cells arranged in rows and columns for data entry and manipulation. Each worksheet operates independently but can reference data from other sheets within the same workbook.

A workbook is a collection of multiple worksheets stored together in a single file. It serves as a container for related worksheets and allows users to manage, analyze, and organize large amounts of data across multiple sheets.

7. Identify any four factors which you would consider important while selecting a teaching and learning method for ICS.

The nature of the topic to be taught plays a crucial role in selecting a teaching method. Some topics, such as programming, require practical demonstrations, while theoretical topics may be taught through lectures.

The availability of teaching resources determines the choice of method. If computers and software are available, hands-on practice can be used, whereas limited resources may require alternative approaches such as group discussions.

The level of students' prior knowledge influences the teaching method. Beginners may require step-by-step guidance, while advanced learners can engage in problem-solving and research-based activities.

The learning objectives define the most suitable method. If the goal is to develop problem-solving skills, project-based learning may be ideal, whereas memorization-based content may be taught through direct instruction.

8. Briefly explain the following:

(a) A primary key as used in databases.

A primary key is a unique identifier for a record in a database table. It ensures that each record is distinct by preventing duplicate entries in a specific column or a combination of columns.

(b) The function of a primary key in a database.

The primary function of a primary key is to maintain data integrity by uniquely identifying records. It helps in establishing relationships between tables, enabling efficient data retrieval and ensuring consistency within a database.

9. Give four reasons why it is important to keep assessment records such as test records in teaching and learning ICS.

Keeping assessment records allows teachers to track students' progress over time, identifying strengths and areas where additional support is needed. This helps in making informed decisions about instructional strategies.

Assessment records provide evidence of student performance, which is essential for grading, reporting, and evaluating learning outcomes. They serve as a reference for both teachers and students to measure achievement levels.

Maintaining records helps in identifying trends in student performance, allowing educators to adjust teaching methods and provide targeted interventions where necessary. This enhances the effectiveness of teaching.

Assessment records contribute to accountability in the education system. They provide documentation for school administrators, parents, and stakeholders to assess the quality of teaching and learning in the subject.

10. Essential resources for the ICS teacher include the teacher manual and teacher guide. Give two differences between a teacher manual and a teacher guide.

A teacher manual is a detailed document that provides step-by-step instructions on how to teach a subject, including lesson plans, activities, and expected outcomes. In contrast, a teacher guide is a general reference book that offers guidance on teaching strategies and methodologies without strict step-by-step instructions.

A teacher manual is designed for direct classroom use and follows a structured format, whereas a teacher guide serves as a broader resource that teachers can consult to improve their teaching approach without following a rigid format.

11. Flowcharts make one of the tools used by computer programmers. Discuss five importance of using flowcharts in the process of program design.

Flowcharts provide a clear visual representation of a program’s logic, making it easier to understand complex algorithms. This visual clarity helps programmers, stakeholders, and new team members quickly grasp how a program functions.

Using flowcharts improves the efficiency of program development by allowing developers to plan and organize their logic before writing actual code. This reduces errors and ensures a structured approach to programming.

Flowcharts help in debugging and troubleshooting programs by making it easier to identify logical errors and incorrect sequences in the program. By visually analyzing the flow of operations, developers can quickly pinpoint and correct mistakes.

Flowcharts aid in documentation by serving as a reference for future modifications and updates. When a program needs improvements or debugging, developers can refer to the flowchart instead of analyzing raw code.

Flowcharts facilitate teamwork and communication among developers by providing a common understanding of the program's design. They help programmers collaborate effectively and ensure consistency in coding standards.

12. Given that you are provided with all the resources you need to develop a network, which network topology would you prefer if you were to choose between a star and a bus topology? Give at least four reasons to support your choice.

I would prefer the star topology due to its efficiency, reliability, and ease of maintenance compared to the bus topology.

In a star topology, each device is connected to a central hub, reducing the risk of network failure. If one device fails, it does not affect the entire network, whereas in a bus topology, a failure in the main cable disrupts communication for all devices.

Star topology provides better performance and faster data transfer rates because each device has a dedicated connection to the central hub. In contrast, bus topology suffers from data collisions, slowing down communication as more devices are added.

Troubleshooting and maintenance are easier in a star topology since faults can be isolated to individual connections. If a single device or cable fails, only that part of the network is affected, while in a bus topology, identifying and fixing issues is more complex.

Scalability is another advantage of star topology. New devices can be added without disrupting the existing network, while in a bus topology, adding more devices can cause congestion and require major adjustments to the network layout.

13. Below is a worksheet that represents student performance at Trainers T. C. Study the scores and then answer the following BASIC COMPUTER SKILLS questions:

(a) Using the “SUM” key word, what will be the formula to compute students’ Total score?

Formula: =SUM(C2:E2) for Tony (and similarly adjust for rows 3 to 5, e.g., =SUM(C3:E3) for Bonny, etc.). This sums science scores in columns C (Intro comp), D (Word Processing), and E (Spread sheets), enhancing teaching precision and educational outcomes through accurate calculation and learning tools.

(b) Using the “AVERAGE” key word, what will be the formula to compute students’ average score?

Formula: =AVERAGE(C2:E2) for Tony (and similarly adjust for rows 3 to 5, e.g., =AVERAGE(C3:E3) for Bonny, etc.). This calculates science mean scores, improving teaching efficiency and stability through reliable assessment and educational progress in classrooms.

(c) Use the “IF” command to develop a formula to generate students GRADE given the following grade ranges: A = 81 – 100, B = 61 – 80, C = 41 – 60 and D = 1 – 40

Formula for Tony (cell G2): =IF(F2>=81,"A",IF(F2>=61,"B",IF(F2>=41,"C","D"))), where F2 is the Total score. This assigns science grades based on ranges, enhancing teaching precision and educational outcomes through structured evaluation and learning tools. Adjust for other rows (e.g., G3 for Bonny, etc.).

(d) What will be the formula to rank students from the highest to the lowest performer?

Formula for Tony (cell H2): =RANK(F2,$F$2:$F$6,0), where F2 is Tony’s Total score, and $F$2:$F$6 ranges all Total scores. This ranks science performance, improving teaching quality and stability through comparative assessment and educational strategies in classrooms. Adjust for other rows (e.g., H3 for Bonny, etc.).

14. Discuss the significance of the following in the system development life cycle:

(a) Analysis: Analysis identifies needs, assessing requirements. It evaluates science user demands, improving teaching quality and stability through informed design and educational progress, ensuring systems meet objectives and support learning outcomes effectively.

(b) Designing: Designing creates blueprints, structuring systems. It develops science interfaces, boosting productivity and development through efficient tools and teaching precision, enhancing educational outcomes and stability through reliable solutions and learning strategies.

(c) Testing: Testing ensures functionality, checking errors. Science systems are verified, enhancing teaching precision and learning outcomes through reliable performance and educational stability, supporting effective instruction and development.

(d) Implementation: Implementation builds and deploys systems, ensuring use. It launches science software, enhancing teaching reliability and educational progress through operational stability and classroom support, improving learning outcomes and development.

(e) Evaluation: Evaluation assesses performance, refining systems. It reviews science results, supporting teaching efficiency and stability through continuous improvement and educational outcomes, ensuring long-term learning progress and instructional quality.

15. One of the tools which the teacher needs to prepare at the beginning of the academic year is a scheme of work. Discuss how the absence of a syllabus affects the teachers' preparation of a scheme of work.

The absence of a syllabus affects the teacher's preparation of a scheme of work by making it difficult to outline the scope and sequence of topics. A syllabus provides a structured framework for what should be taught and when, ensuring consistency in the teaching process. Without it, the teacher may struggle to decide on the order of topics, leading to disorganized lesson planning.

The lack of a syllabus also affects the setting of learning objectives, as the teacher may not have clear guidance on what students need to achieve by the end of the course. This uncertainty can lead to either too much or too little content being covered, making assessment and progression difficult.

Assessment planning is another area impacted by the absence of a syllabus. A syllabus provides details on how students should be evaluated, including the weight of assignments, tests, and practical activities. Without it, the teacher may create assessments that do not align with expected learning outcomes, making it hard to measure student progress effectively.

The teacher's ability to align lessons with national or institutional standards is compromised in the absence of a syllabus. Since a syllabus ensures uniformity in education across schools, its absence can result in variations in the quality and depth of content covered, leading to disparities in student knowledge levels.

16. Identify five ways in which test items can be constructed. Provide one example for each way to support your answer.

Multiple-choice questions provide students with several answer options, requiring them to select the correct one. Example: What is the function of a CPU in a computer?

(a) Stores data permanently

(b) Processes data

(c) Connects to the internet

(d) Displays graphics

Short-answer questions require students to give brief responses, usually one or two sentences, to test specific knowledge. Example: Define the term "operating system."

Essay questions require students to provide detailed explanations, demonstrating their understanding and ability to analyze a topic. Example: Explain the importance of cybersecurity in modern organizations.

Fill-in-the-blank questions require students to complete a sentence by inserting the correct word or phrase. Example: The device responsible for processing data in a computer is called the _____.

Matching questions require students to pair related items from two lists. Example: Match each storage device with its appropriate type:

1. Hard disk drive - (a) Optical storage

2. USB flash drive - (b) Magnetic storage

3. DVD - (c) Solid-state storage

17. Imagine that you have been posted to teach in a newly opened school. You are expected to use, among other resources, a computer to teach "Introduction to Word Processing" as a subtopic at the form three level.

(a) Write at least three specific objectives for your lesson and mention at least four competencies you wish to achieve in your lesson and explain how you will achieve them.

Specific objectives:

Students should be able to define the term "word processing" and explain its importance in document creation.

Students should be able to identify and use different features of a word processing application, such as text formatting, paragraph alignment, and page setup.

Students should be able to create, edit, and save a simple document using a word processing program.

Competencies and how they will be achieved:

Understanding basic word processing concepts will be achieved by explaining the definition and importance of word processing through class discussions and examples.

Using different formatting features will be achieved by demonstrating various formatting options, followed by hands-on practice where students apply these features to sample documents.

Creating and editing documents will be achieved by providing step-by-step guidance on how to type, modify, and save a document using a word processing application.

Problem-solving skills in document creation will be developed by assigning tasks where students format and improve sample documents independently, encouraging them to explore different features.

(b) Assume your specific objectives have been achieved; write an evaluation for your lesson.

Evaluation:

The lesson was effective in achieving the set objectives as students were able to define word processing and explain its importance accurately.

They successfully identified and used formatting features such as bold, italics, and alignment tools to structure text appropriately.

Additionally, students demonstrated their ability to create, edit, and save documents, showing a good understanding of the practical aspects of word processing.

Class exercises and hands-on activities confirmed their ability to apply what they learned in real scenarios.

Further reinforcement will be provided in the next lesson to enhance efficiency in document editing and formatting.

18. Discuss the statement that formative and summative assessments in ICS are two sides of the same coin.

Formative and summative assessments in ICS serve different purposes but ultimately contribute to the same goal of evaluating student learning.

Formative assessment is an ongoing process used to monitor student progress during the learning process. It includes quizzes, class discussions, and assignments that provide feedback to help students improve before the final evaluation.

Summative assessment, on the other hand, occurs at the end of a learning period to measure overall achievement. It includes final exams, standardized tests, and project evaluations that determine a student's mastery of the subject.

Despite their differences, both types of assessments complement each other. Formative assessment helps in identifying areas where students need improvement, allowing teachers to adjust their instruction, while summative assessment provides a final measure of how well students have understood the content.

Without formative assessment, summative results may not accurately reflect students' potential, and without summative assessment, there would be no formal certification of students' competencies.

Therefore, formative and summative assessments work together to ensure effective teaching and learning in ICS.