THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

137 INFORMATION AND COMPUTER STUDIES

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2020**

Instructions

1. This paper consists of TEN questions.

2. Answer all questions in section A and one question from section B.

1. (a) Why a smart phone is an example of a computer? Give three points.
A smartphone qualifies as a computer because it processes input using a CPU and outputs results using a screen and sound. Secondly, it can store and retrieve data through internal and external memory just like computers. Lastly, smartphones allow the installation and running of application software such as browsers, games, and utilities, indicating programmability.

(b) Explain how RAM, ROM and CPU interact with each other during the booting process of the computer system.
When the computer is powered on, the CPU accesses the instructions stored in ROM to initiate the basic startup routines including the POST test. ROM then directs the CPU to load the operating system from the storage device into RAM. After the OS is loaded into RAM, the CPU continues to execute system operations from RAM since it is faster and volatile, enabling real-time processing.

2. The following part of the worksheet shows the computer items supplied by a King Investment Company (KIC). Study the worksheet carefully and answer the questions that follow:

(a) Which steps would you follow to bold the numbers in the column S/N?
First, select the entire column containing the S/N values. Then go to the formatting toolbar and click on the bold (B) button, or press Ctrl + B on the keyboard.

(b) What are the formatting features applied in the cells containing the words Sub Total, VAT and Grand Total?
The formatting features applied include bold text formatting and possibly cell shading to distinguish the cells for summary calculations.

(c) What is the cell reference of the following terms:
(i) VAT – D8
(ii) Quantity – B2
(iii) Grand Total – D9

(d) What formula can you use to calculate the total price per unit of the item power supply and VAT which is 18% of Sub Total?
To calculate the total price of the power supply: =B3*C3
To calculate VAT: =18%*D7 or =0.18*D7

3. The headmaster of Fijo secondary school is encouraging his teachers to use Multimedia in teaching and learning processes in order to facilitate effective students' interaction with the learning materials. As an ICT expert, if you were consulted to propose the multimedia resources:

(a) What are the six minimum requirements you would propose for Fijo secondary school?
The school should have desktop or laptop computers, multimedia projectors, internet connectivity, sound systems (speakers and microphones), digital content (educational videos and animations), and basic software such as presentation tools (PowerPoint).

(b) What are the four characteristics of a good multimedia system you would recommend to support Fijo secondary school management?
It should support multiple media types like audio, video, and animation. It should offer user-friendly interfaces for ease of navigation. It must be interactive to enable learners to engage with the content. Lastly, it should support high storage capacity and fast data processing.

(c) Why integrity and confidentiality are important features in data security?
Integrity ensures that data is accurate and unaltered during storage or transmission. Confidentiality ensures that sensitive data is accessed only by authorized individuals, preventing information leaks and breaches.

(d) How can you differentiate adware from spyware as applied in computer network security?
Adware is software that displays unwanted advertisements often without user consent but may not collect user data. Spyware, on the other hand, secretly monitors user activity and collects sensitive data such as passwords without permission.

(e) Suppose you are typing an assignment in a college computer laboratory and you discover that all computers cannot open some .docx files and display pop-up windows asking to convert the copies. As an IT expert:
(i) State two possible causes of the stated problem.
First, the computers may lack a program capable of opening .docx files, such as Microsoft Word or LibreOffice. Second, the installed software might be outdated and incompatible with the .docx file format.

(ii) Suggest two necessary measures that should be taken to prevent such problems.
Install a modern office suite that supports .docx files. Also, regularly update the software applications to support newer file formats and eliminate compatibility issues.

5. Aikite secondary school is organizing a fundraising for her PCCB group. The school wants to use a secondary card for the event.

(a) Identify a hardware that can be used to insert a photo in a card.
A flatbed scanner or a digital camera can be used to capture and insert photos into the card design.

(b) Briefly explain four features to be considered in order to create quality cards.
The card should have high-resolution images for clarity. It must include correct and error-free information. A good card uses attractive and readable fonts. Finally, it should be printed on durable material with good color contrast.

(c) Identify the following types of relationships as used in database design.
(i) Student ----> Registers with ----> Books is a many-to-many relationship
(ii) Student ----> Registers with ----> Book is a many-to-one relationship

(d) How do the relationships given in part (c) differ from each other?

The many-to-many relationship allows each student to register multiple books and each book to be registered by many students. In contrast, many-to-one implies that many students can register a single book, but each book belongs to only one student.

(e) When a database design is not perfect, it becomes a bad dream to database administrators. As an expert, identify the forms of normalizations in Figure 1, 2 and 3 by giving one reason.

(i) Figure 1 is Unnormalized Form (UNF) because it contains repeating groups and redundant data like multiple course names in the same field.
(ii) Figure 2 is Second Normal Form (2NF) since partial dependency has been removed but still contains composite keys.
(iii) Figure 3 is Third Normal Form (3NF) because each field contains atomic values and no transitive dependency exists.

6. (a) What hardware requirements will you suggest for a computer to be used as a multimedia studio? Describe three items to support your answer.
I would suggest a high-performance CPU (like Intel i7 or above) to handle video processing. A powerful GPU (such as NVIDIA RTX series) for rendering and editing graphics. And large RAM (minimum 16GB) to support smooth multitasking during audio/video editing.

(b) Boogp Movies is planning to establish a multimedia studio using High Definition (HD) for recording, editing and displaying movies. As an IT expert:
(i) Explain the concept of High Definition.
High Definition refers to video resolution that is significantly higher than standard definition, typically 720p, 1080p or above. It provides better clarity and detail.

(ii) Describe the criteria for determining High Definition video. Give two points.
The video resolution must be at least 1280×720 pixels. The frame rate should also be high, typically 30 fps or more for smoother playback.

(iii) Describe two benefits of using High Definition in movie making.
It provides clearer, sharper images which enhance viewer experience. It also supports modern digital distribution standards such as streaming and Blu-ray.

(c) Mr. John is an ICS teacher of ABC College who has been asked to design a webpage.
(i) What basic tools must he install in his computer to accomplish this task?
He should install a text editor (e.g. Notepad++ or VS Code), a web browser (e.g. Chrome or Firefox), and optionally a local server environment (e.g. XAMPP) for testing.

(ii) Mention any two programs which can be used to help write HTML.
Notepad++ and Adobe Dreamweaver.

(iii) Using the information in the question, develop a webpage using HTML codes.

```
<!DOCTYPE html>
<html>
<head>
  <title>Welcome to My Page</title>
  <style>
    body {
      font-family: Arial, sans-serif;
      background-color: #eef;
      text-align: center;
      padding: 40px;
    }
    h1 {
      color: #004080;
    }
    .info {
      font-size: 18px;
      margin-top: 20px;
    }
    img {
      margin-top: 30px;
      width: 200px;
      height: auto;
      border: 3px solid #004080;
      border-radius: 10px;
    }
  </style>
</head>
<body>
  <h1>Welcome to My Page</h1>
  <div class="info">
    <p><strong>Student Name:</strong> John K.</p>
    <p><strong>Course:</strong> Web Development & HTML</p>
  </div>
  <img src="student.jpg" alt="Student Image">
</body>
</html>
```

9. Computers have intense application in almost all sectors of work known to human being. However, computer application sometimes brings desirable and undesirable effects. Justify this statement by giving three desirable and three undesirable effects of computer application to human health.

Desirable Effects:

The use of computers in medical diagnosis has greatly improved human health. Machines such as MRI, CT scans, and diagnostic software rely on computer systems to accurately detect diseases early, allowing for timely treatment and saving lives.

Computers promote mental stimulation and cognitive engagement through educational software, games, and problem-solving platforms. These help in developing critical thinking and decision-making skills, especially in children and young adults.

Health monitoring systems that use computers, such as smartwatches and fitness trackers, help users keep track of their heart rate, calories burned, sleep patterns, and more. This encourages a healthier lifestyle and enables early warning signs of illness to be detected.

Undesirable Effects:

Prolonged use of computers causes eye strain and vision problems. Conditions such as Computer Vision Syndrome (CVS) are common among individuals who spend hours in front of screens without breaks.

Excessive computer usage contributes to a sedentary lifestyle. Lack of physical activity leads to obesity, back pain, and posture-related health issues due to extended sitting and poor ergonomics.

Computer addiction and overexposure to screens can lead to mental health issues such as depression, anxiety, and social isolation. The constant use of social media or online gaming platforms, especially among teenagers, can disturb sleep patterns and reduce real-world interactions.

10. You have been invited to educate ICS students on the evolution of programming languages. As an ICS teacher, analyze five generations of computer programming language which will be included in your presentations.

First Generation (1GL): Machine Language
This generation involved programming using binary code (0s and 1s). It is the lowest level of programming, directly understood by the computer hardware. Although it executes very fast, it is extremely difficult to write, debug, and understand.

Second Generation (2GL): Assembly Language
Assembly languages use mnemonic codes (like MOV, ADD) instead of binary. It is still low-level and hardware-specific, but more readable than machine code. Assemblers are used to translate this into machine language. It is used in system-level programming and embedded systems.

Third Generation (3GL): High-Level Language

This generation introduced more abstract languages like C, FORTRAN, Pascal, and Java. These languages are closer to human language, easier to write, debug, and understand. They are portable across multiple platforms and are still widely used today.

Fourth Generation (4GL): Very High-Level Language
These languages are designed to be even more user-friendly, often used in database queries and report generation. Examples include SQL, MATLAB, and Oracle Forms. They reduce development time and require less coding.

Fifth Generation (5GL): Artificial Intelligence Languages
Fifth generation languages focus on problem-solving using AI techniques. They use constraints and logic programming instead of traditional algorithms. Examples include Prolog, LISP, and Mercury. These are used in expert systems, robotics, and natural language processing.