THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATION COUNCIL
GRADE A TEACHERS' CERTIFICATE EXAMINATION

635   **INFORMATION AND COMMUNICATION TECHNOLOGY**

Time: 3 Hours.   **ANSWER**   **Year: 2012**

Instructions

1. This paper consists of sections **A**, **B** and **C.**

2. Answer **all** questions in sections A and **two (2)** questions from each sections B and C.

3. Mobile phones and unauthorized materials are **not allowed** in the examination room.

4. Write your **Examination Number** on every page of your answer **booklet(s).**

1. Give four reasons why depending on ICT alone for school management can be risky.

One reason is the risk of system failure. If the school's ICT infrastructure crashes due to hardware malfunction or software corruption, essential operations such as keeping student records or managing finances may come to a standstill.

Another reason is vulnerability to cyberattacks. Schools that depend only on ICT are exposed to hacking, malware, or phishing, which can compromise sensitive information like examination results or financial accounts.

A third reason is power and connectivity dependence. In areas where electricity and internet access are unstable, relying entirely on ICT can disrupt school management whenever outages occur.

Finally, over-reliance on ICT may reduce human oversight. Important management decisions may be left entirely to automated systems, increasing the chances of errors going unnoticed and reducing accountability.

2. Mention four ways in which the use of ICT may contribute to environmental pollution.

One way is through electronic waste. Old or damaged computers, printers, and mobile devices contribute to e-waste that pollutes the environment when not properly recycled.

Another way is energy consumption. ICT equipment such as servers, data centers, and computers consume large amounts of electricity, which may increase carbon emissions if the power is generated from fossil fuels.

A third way is harmful materials in ICT devices. Many electronic components contain toxic substances such as lead, mercury, and cadmium that can leak into the soil and water when discarded improperly.

Lastly, rapid technological upgrades encourage frequent disposal of old equipment, creating unnecessary waste and increasing environmental degradation.

3. State four differences between open-source software and proprietary software.

One difference is that open-source software is free to access, modify, and distribute, while proprietary software requires purchase and restricts modification.

Another difference is that open-source software usually has community-based support, where users share solutions, whereas proprietary software often provides official customer support from the company.

A third difference is that open-source software is transparent since its source code is available for inspection, while proprietary software keeps its source code secret.

Lastly, open-source software is more flexible and adaptable to different needs, while proprietary software is standardized and often cannot be customized easily.

4. Outline four reasons why data backup is necessary in educational institutions.

One reason is protection against data loss. Backup ensures that important academic records and administrative files can be recovered if computers are damaged or attacked by viruses.

Another reason is continuity of operations. If the main system fails, backups allow schools to restore data quickly and continue running smoothly without major interruptions.

A third reason is safeguarding against human error. Mistaken deletion of files by staff can be corrected by retrieving data from backups.

Lastly, backups provide legal and accountability benefits. Schools may be required to present past records during audits or disputes, and having backups ensures such data is always available.

5. Explain four challenges that arise when integrating ICT in teaching students with disabilities.

One challenge is lack of accessible devices. Many ICT tools are not designed with special features like screen readers for the visually impaired or voice recognition for those with physical disabilities.

Another challenge is the high cost of assistive technologies. Specialized devices such as braille displays or hearing aids linked to ICT systems are often too expensive for many schools to afford.

A third challenge is inadequate teacher training. Many teachers are not trained on how to use ICT effectively to accommodate students with disabilities, reducing the usefulness of the tools.

Lastly, infrastructure limitations can also hinder integration. Schools without proper internet, electricity, or modern facilities may struggle to provide ICT access to disabled students.

6. Give four reasons why computer ethics is important in the teaching profession.

One reason is to prevent misuse of technology. Teachers must model ethical ICT use to students by avoiding practices like piracy, plagiarism, or unauthorized software use.

Another reason is to protect student privacy. Teachers handle sensitive information such as grades and personal data, so ethical responsibility is needed to keep this data secure.

A third reason is to promote fairness. Ethical ICT use ensures that students are graded fairly without manipulation of electronic records.

Finally, computer ethics is important to build trust. When teachers act ethically in using ICT, they set a positive example for students and create confidence in digital education.

7. List four effects of poor network security in a school environment.

One effect is unauthorized access. Hackers may infiltrate the school's network and steal sensitive information such as exam results or financial records.

Another effect is disruption of services. Poor security may lead to denial-of-service attacks that interrupt communication, online classes, or administrative systems.

A third effect is spread of malware. Infected devices may transfer viruses through the network, damaging files and slowing down operations.

Lastly, poor network security can damage the school's reputation. If data breaches occur, parents and stakeholders may lose trust in the school's ability to safeguard information.

8. State four reasons why information overload can affect decision-making in organizations.

One reason is difficulty in filtering relevant information. When managers face too much data, they may struggle to identify which information is important for decision-making.

Another reason is increased stress and confusion. Overloaded with information, decision-makers may become overwhelmed, leading to poor judgment or delayed actions.

A third reason is the risk of overlooking critical details. Important facts may be buried under less significant data, leading to decisions based on incomplete understanding.

Finally, information overload can reduce productivity. Decision-makers spend more time analyzing large volumes of data, which slows down the process of reaching effective conclusions.

9. Mention four differences between analog communication and digital communication.

One difference is that analog communication transmits signals in continuous waves, while digital communication transmits signals in binary form (0s and 1s).

Another difference is that analog communication is more prone to noise and distortion, while digital communication is clearer and maintains quality over long distances.

A third difference is that analog devices such as radios and landline telephones have limited features, whereas digital devices like smartphones and computers support multiple services including text, video, and internet.

Lastly, analog communication systems are harder to encrypt, making them less secure, while digital communication allows encryption and is therefore safer for transmitting sensitive information.

10. Explain four reasons why developing countries face difficulties in adopting advanced ICT systems.

One reason is high costs of infrastructure. Developing countries often lack the financial resources to build advanced ICT systems, including high-speed internet, modern data centers, and reliable power supply, making adoption slow.

Another reason is shortage of skilled manpower. Many developing countries face a lack of well-trained ICT professionals who can design, install, and maintain advanced systems, leading to dependence on foreign expertise.

A third reason is weak policies and regulations. Without strong ICT policies, data protection laws, or investment frameworks, it becomes difficult to implement and sustain advanced ICT systems effectively.

Lastly, social and economic inequalities contribute to the challenge. A large portion of the population may not afford advanced ICT tools, creating a digital divide that prevents widespread adoption.

11. Analyse five challenges that face governments when introducing e-governance systems and propose how they can be addressed.

One challenge is lack of infrastructure. Many areas, especially rural ones, lack reliable internet and electricity, which makes it difficult for citizens to access e-government services. This can be addressed by investing in nationwide ICT infrastructure.

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Another challenge is digital illiteracy. Many citizens and even government employees do not have sufficient ICT skills to use e-governance platforms effectively. Training programs and public awareness campaigns can help overcome this.

A third challenge is cybersecurity risks. E-governance platforms store sensitive information, which makes them targets for hackers. Governments need to implement strong cybersecurity measures such as encryption and regular system audits.

A fourth challenge is resistance to change. Some government officials and citizens may prefer traditional paper-based systems. This can be addressed by gradual implementation and offering hybrid systems before fully digitizing.

Lastly, corruption can hinder progress. Some officials may manipulate e-governance systems for personal gain. Strong legal frameworks and transparent monitoring systems should be put in place to ensure accountability.

12. Discuss five reasons why computer literacy should be considered a basic skill in the 21st century.

One reason is that most jobs today require computer knowledge. From office work to banking, employees need computer literacy to perform daily tasks such as preparing reports and communicating through email.

Another reason is access to information. Computer literacy allows individuals to search, retrieve, and evaluate information online, which is essential for education, research, and decision-making.

A third reason is participation in digital economies. With e-commerce and online banking becoming common, people need computer skills to buy, sell, and manage finances effectively.

A fourth reason is personal communication. Computers and smartphones allow people to connect with family and friends through social media, video calls, and instant messaging, which has become a necessity in modern life.

Lastly, computer literacy helps in lifelong learning. Many educational programs are now offered online, and those without basic computer skills may be excluded from upgrading their knowledge and skills.

13. Explain five ways in which ICT has contributed to widening the gap between developed and developing countries.

One way is through the digital divide. Developed countries have advanced ICT infrastructure while many developing countries still struggle with basic access, widening inequality.

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Another way is in economic opportunities. Developed countries benefit from ICT-driven businesses such as artificial intelligence and robotics, while developing countries remain dependent on traditional industries.

A third way is education. Developed countries integrate ICT in all levels of learning, giving their students a competitive advantage in skills and knowledge compared to those in developing nations.

A fourth way is healthcare. ICT supports advanced medical technologies like telemedicine and electronic health records, which are widely available in developed countries but limited in developing ones.

Lastly, developed countries dominate global ICT innovation and patents, while developing countries remain largely consumers, which limits their role in shaping the global ICT economy.

14. "ICT is both a solution and a problem in modern society." With six points, assess this statement by providing arguments on both sides.

As a solution, ICT improves communication by enabling instant connection across the world through emails, video calls, and social media.

ICT also boosts economic growth by supporting e-commerce, online banking, and remote work opportunities that increase productivity.

Additionally, ICT enhances education by providing e-learning platforms and digital resources that make learning more accessible.

On the problem side, ICT can cause unemployment when automation replaces human labor in industries such as manufacturing and banking.

It also contributes to cybercrime, with hackers using ICT tools to steal data, commit fraud, or spread misinformation.

Finally, ICT can harm social life, as excessive use of social media and online entertainment isolates people and weakens face-to-face relationships.

15. Evaluate six reasons why cyber security is now considered a critical national issue in developing countries like Tanzania.

One reason is the protection of government data. Cyberattacks on government systems can compromise sensitive information about national security, policies, and citizens.

Another reason is the growth of online banking and mobile money. Cybercriminals increasingly target financial platforms, threatening people's savings and the stability of the economy.

A third reason is increased reliance on e-governance. As governments digitize services, they become more vulnerable to hacking, making cybersecurity essential.

A fourth reason is the spread of misinformation. Cybersecurity helps prevent fake news campaigns that can destabilize societies and influence politics.

A fifth reason is protection of businesses. Small and large enterprises rely on ICT for operations, and cyberattacks can result in loss of revenue and investor confidence.

Lastly, cybersecurity ensures international trust. Countries with strong cybersecurity attract more foreign investment and partnerships, while weak systems discourage investors due to risks.

16. The future of ICT is moving towards Artificial Intelligence (AI) and automation. Discuss six opportunities and six challenges this shift may bring to education and employment in Africa.

One opportunity is improved teaching through AI-powered tutors and learning platforms that provide personalized education to students.

Another opportunity is efficiency in administration, as AI can automate record keeping, scheduling, and reporting in schools.

A third opportunity is new job creation. AI industries will require developers, data scientists, and technicians, opening opportunities for African youth.

A fourth opportunity is enhanced healthcare training through AI simulations that prepare medical students for real-life cases.

A fifth opportunity is agricultural support, where AI can analyze weather and soil data to guide farmers.

A sixth opportunity is inclusivity, as AI tools like speech-to-text and translation can support students with disabilities or language barriers.

On the challenge side, AI may cause job loss as automation replaces traditional roles like clerks, drivers, and factory workers.

Another challenge is lack of skilled professionals, since many African countries do not have enough AI experts to sustain innovation.

A third challenge is high cost. Implementing AI systems requires large investments that most African schools and companies cannot afford.

A fourth challenge is dependency on foreign technology, which can limit local innovation and create digital colonialism.

A fifth challenge is ethical concerns, such as AI bias in decision-making and lack of clear accountability when systems make mistakes.

Lastly, there is the risk of widening inequality. Those with access to AI tools will advance quickly, while marginalized communities without resources will fall further behind.

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