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INFORMATION AND COMMUNICATION TECHNOLOGY

0417/12

Paper 1 Theory

May/June 2024

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use an HB pencil for any diagrams, graphs or rough working.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **16** pages. Any blank pages are indicated.

- 1 Circle **two** items of internal memory. - Chapter 1 Types and Components of Computer Systems

Actuator

Cloud

DVD

Memory stick

Printer

RAM

ROM

Sensor

- Prolonged use of IT equipment
Chapter 5 - The effects of using IT, Chapter 8 - Safety and Security [2]
- Physical safety

- 2 Complete each of the following sentences which relate to health and safety issues when using ICT equipment.

- (a) Trailing leads in a computer room can cause Tripping hazard Ch 8

[1]

- (b) Continual typing on a keyboard can cause Repetitive Strain Injury (RSI) Ch 5

[1]

- (c) Staring at a computer screen for long periods of time can cause Eye strain Ch 5

[1]

- (d) Spilling water onto computer equipment can cause Electrocution Ch 8

[1]

- 3 Remotely logging in to a college computer system requires two-factor authentication. Chapter 8 - Safety and Security - Security of data - Protect data

- (a) Explain what is meant by two-factor authentication. eg Password, OTP
- Adds another layer of security
 - requires two methods to prove who a user is

Others :

- It is a security method
- Form of security to protect the resources that a user can access

[2]

(b) State **two** examples of methods that could be used as part of two-factor authentication.

Example 1 Username and password

Example 2 Biometrics

Others: Receive / send a code you have to enter by email (SMS, OTP)
Phone number / email address, Security token

[2]

Chapter 5 - The effects of using IT

- 4 Vehicles can contain microprocessor controlled devices to improve transport safety. For example when a vehicle approaches a road speed sign the microprocessor sends an alert to the driver.

Discuss the positive and negative effects of using microprocessor controlled devices in transport safety.

Positive

- Can avoid accidents
- Keep people walking on the road safe
- Helps to prevent human error
- Travel can become safe

Negative

- Error messages could distract the driver
- Very expensive system to setup
- The ever present fear of hacking into the vehicle's control

System

- Very expensive to maintain

[6]

- 5 One difference between a command line interface (CLI) and a graphical user interface (GUI) is that a GUI takes up more memory.

User Interface

- (a) State **two** other differences between a CLI and a GUI.

- 1 The user has to type in commands while GUI is more user friendly; icons are used to represent applications
- 2 In CLI, the user has to learn a number of commands to carry out operations while in GUI it is a WIMP (Windows Icons Menu and Pointing device) system

[2]

- (b) State **two** other types of user interface.

- 1 dialogue-based
- 2 gesture-based

[2]

- 6 (a) Explain what is meant by electronic conferencing.

Others

- This is a Communication System
- A Structured discussion between two or more people
- This is carried out virtually / over the Internet which includes video, web and audio

[2]

- (b) State, giving a reason for your choice, the hardware required to set up an electronic conference.

Others

Router

- to connect to the internet

Computer / Smartphone

- to connect the peripherals used in the conference

Speaker / headphones

- so participants can listen to others in the conference

Microphone

- to capture the audio of the participants

Monitor

- to view the participants / contents (slides)

[4]

Chapter 1 - Types and Components of Computer Systems

Types of Computer

- 7 A college principal has decided that students can use mobile devices to take notes in lessons. Some students use laptop computers whilst others use smartphones.

- (a) Describe the benefits and drawbacks of using laptop computers rather than smartphones for this purpose.

Benefits

- It has a large screen making it easier to read the notes
 - The software used is more compatible with other devices
 - More ports on a laptop which transfer of data easy
- Others - It has separate keyboard which makes it easy to type in data

Drawbacks

- Laptops are less portable
- Others - More difficult to take pictures using a laptop

Smartphones can use 4G/5G/mobile data

[4]

Chapter 7 - Systems life cycle (Design phase)

- (b) There are safety issues related to bringing laptop computers into the college. The Network Manager has decided to produce a paper-based certificate for students to prove that their laptop computer is safe to use.

Describe the main features that should be considered for the design of this certificate.

- Font style should be easy to read
 - Make good use of white space so data fills the certificate
 - Make good use of colours to make it easy to read
 - All information needs to be clearly visible
- Others - Use of tick boxes to make data entry quicker

[4]

Chapter 1 : Types and Components of Computer Systems -

Extended Reality

- 8 (a) Explain the differences between virtual reality (VR) and augmented reality (AR).

VR is Completely Computer generated world while AR Combines both the virtual and real world

VR requires a headset / goggles while AR can be accessed with a Smartphone

others VR only enhances a fictional reality while AR Creates a new layer on top existing reality [2]

- (b) Discuss the impact of augmented reality (AR) on everyday life.

- Interactive gaming could allow people to have a better experience of the game

- It allows for rescue and safety operations, giving people the opportunity to interact with the environment and try rescue procedures

- It can help people connect with others to improve communication skills

- The user can try on clothing electronically so you can see what the clothes look like before buying

- Used in walk through systems to give a greater experience for users

- Allow us to interact with various characters in real-time but not necessarily the real life

others - Could damage social relationships as it removes face to face interaction [6]

Chapter 6 - ICT Applications

9 Explain the following components of an expert system.

(a) User interface

- method by which the expert system interact with a user
- It allows interaction through dialogue boxes, command prompts or other input method
- The questions being asked usually only have yes/no answers and are based to previous responses

[3]

(b) Knowledge base

- It's a repository of facts
- It stores all the knowledge about an area of expertise obtained from a number of expert resources
- Collection of objects and attributes
- Contains the rules base

others

[3]

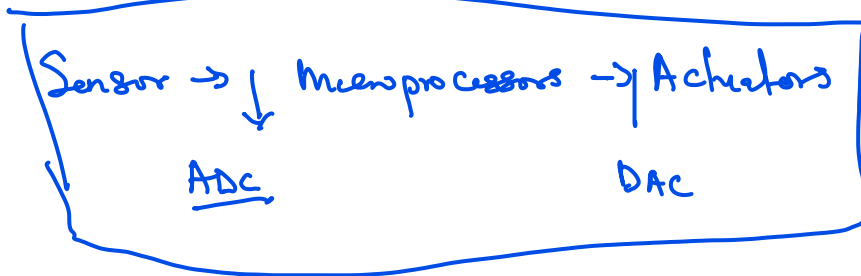
Chapter 5 - The effects of using IT

- 10 Cars can have sensors at the front and rear of the vehicle to detect obstacles.

Describe how the sensor detects an obstacle and sends the data to the microprocessor when parking the car.

- Data are sent back to the sensor
- The sensors scan continually
- The sensor captures the reflected data
- The sensor captures analogue data
- The data from the sensor is sent by the Analogue to Digital Converter (ADC)

[4]



Chapter 7 - The Systems Life Cycle

- 11 A company with many branches is implementing a new system. The manager is planning to implement the new system either by pilot changeover or parallel running.

(a) Contrast pilot changeover and parallel running.

Pilot changeover / running

Offers

- Each branch is implemented separately
- Costs are reduced as only one branch is affected at a time
- If there is an error in the new system only one branch is affected
- The changeover is easier to manage

Parallel running

Offers

- Both systems operate together until the old system is removed
- Staff can be trained on the whole system gradually
- More time consuming to enter data in two systems
- If the new system fails, the old system is ^{still} available as a backup

- It is more expensive as two sets of staff are needed

[5]

(b) When the system is implemented, technical documentation is produced.

State **three** components that would be included in the technical documentation.

- 1 Purpose of the system
- 2 System flowcharts
- 3 Programming language used

Chapter 7 - The Systems Life Cycle
- Documentation

[3]

12 One of the risks when entering a password into a system is shoulder surfing.

- Security of data

(a) Explain what is meant by shoulder surfing.

- a form of data theft where criminal steal personal information from a victim when using Automated Teller machine
- Some body watching you key in data such as your PIN
- Some body listening in when you are giving credit or debit card detail over the phone

[2]

Chapter 8 - Safety and Security

(b) Give **two** security improvements that could be made to reduce shoulder surfing.

- 1 Use biometrics
- 2 Use Contactless cards

Others - Cover the key pad when entering the password / pin

[2]

- 13 When a person changes their password they are asked to verify that it has been entered correctly by re-entering the password.

Chapter 15 - Proofing

- (a) State what this type of verification is called.

Double (data) entry

[1]

- (b) The keyboard used to enter the password is an input device.

Explain the differences between input and output devices.

Chapter 1 - Types and Components of Computer Systems

- An Input device is any device that allows users to enter data into a computer directly while an output device takes the information and puts it into human readable format
- An input device can send data to another device while an output device is capable of receiving data from another device
- An input device receives command from its users and data to process while output devices are needed by a computer so that it can share results of its processing with a human.
- An input device is controlled by the user while output device is controlled by the computer.

[4]

Chapter 2: Input and output devices

- (c) State the direct data entry device that is used to read the following types of data.

(i)



QR
Quick Response Scanner / reader

1 Direct Data Entry

[1]

(ii)



977135120128602

Barcode reader

[1]

(iii)



Magnetic stripe reader

[1]

(iv)



RFID (Radio Frequency Identification) reader

[1]

Chapter 3 - Storage Devices and media

14 State **three** advantages of using solid state storage devices rather than magnetic storage devices.

1 faster data transfer speed

2 faster data access time

3 Have a lower power consumption

others - Have no moving part, they are thin
- More robusts

[3]

Chapter 8 : Safety and Security

- E. Safety

15 Explain why data protection legislation is required.

- Protects personal data

- Helps to prevent personal data being misused by third parties

- Protects the rights of the data subject

- Provides best practice rules for organisations to follow on how to use personal data

[4]

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