Pearson Edexcel International Advanced Level

Time 2 hours

Paper reference **WIT11/01**

Information Technology

International Advanced Subsidiary/Advanced Level
UNIT 1

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name,
  centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question*.
- Calculators are **not** allowed.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

Pearson

Answer ALL questions. Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Mikhail is setting up a local area network (LAN) for his business.

The LAN will only be used by Mikhail and five employees.

(a) Mikhail could connect devices on the LAN using WiFi or Ethernet.

(i) Give **one** advantage of Ethernet over WiFi for connecting devices on a LAN.

(1)

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(ii) Give **one** advantage of WiFi over Ethernet for connecting devices on a LAN.

(1)

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(b) The completed LAN uses a client-server network model, with six PCs connected to a server via a switch.

(i) Identify the statement that **only** applies to a client-server network model.

(1)

☒ **A** A network of computers where services must be requested from an internet service provider

☒ **B** A network of computers where any computer can provide services to any other computer

☒ **C** A network of computers where services must be requested from one computer

☒ **D** A network of computers where all services are provided over the internet

(ii) A network may be connected by a hub, a router or a switch.

Identify the statement that **only** applies to a switch.

(1)

☒ **A** A device that connects parts of a network together

☒ **B** A device that accepts data from one computer and sends it to another computer

☒ **C** A device that accepts data on multiple input ports and sends it to the correct output port

☒ **D** A device that reads the IP address on data packets and forwards the packet to that IP address

(c) Mikhail connects his laptop to the LAN. He uses media access control (MAC) addressing to prevent unauthorised mobile devices connecting to the LAN.

(i) State where the laptop's MAC address is held.

(1)

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(ii) Describe how MAC addressing can be used to prevent unauthorised mobile devices connecting to the LAN.

(2)

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(d) Mikhail's employees often need to transfer large video files over the network.

The Ethernet cables connecting the LAN are rated at 10 gigabits per second.

(i) Construct an expression to show how long it should take, in seconds, to transfer a 20 gibibyte file.

You do **not** need to do the calculation.

(3)

(ii) In practice, file transfer speeds do not reach 10 gigabits per second.

Give **two** reasons why file transfer speeds do not reach 10 gigabits per second in this cable network.

(2)

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(e) The LAN uses hardware and software firewalls.

(i) State where the hardware firewall is located.

(1)

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(ii) State where a software firewall is located.

(1)

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(Total for Question 1 = 14 marks)

2 Alex is a university student, studying biology. He has joined an online community to help his studies.

(a) (i) Describe what is meant by an **online community**.

(2)

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(ii) Explain **one** way that membership of the online community could benefit Alex.

(2)

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(b) Online communities have operating costs.

Give **two** ways in which an online community could be monetised.

(2)

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(c) The online community stores personal data about its members online and must obey data protection laws.

(i) Describe what is meant by **personal data**.

(2)

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(ii) Members can change some of their personal data when logged in to their account.

Give **one** way in which a member could protect their account from unauthorised access.

(1)

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(iii) Explain **one** way that the people who run the online community could protect members' data from unauthorised access.

(2)

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(d) Many educational organisations such as schools and universities provide online learning environments that are used locally and remotely.

Alex's university biology course includes fieldwork.

One fieldwork task is to study plants in their natural habitat in an area 500 km from the university.

He needs to work on other parts of his course whilst he is away and meet deadlines.

His accommodation has internet access but there are no university staff or support services on site.

The university provides an online learning environment for all students.

Discuss how the online learning environment could help Alex.

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(Total for Question 2 = 17 marks)

3 A school purchases 30 desktop PCs for its network.

The PCs come with system software but no applications software.

(a) (i) State the purpose of system software.

(1)

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(ii) State the purpose of applications software.

(1)

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(b) One role of an operating system is to manage security.

Explain **one** way in which an operating system could manage security in the school's network.

(2)

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(c) The Head of IT wants to install an art package on the desktop PCs.

She is considering three different licensing options:

- multiple user

- institutional

- network.

Discuss the suitability of these licensing options for the school.

(6)

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(Total for Question 3 = 10 marks)

4 Maira organises a video-gaming league, where teams of players compete against each other in online battles. Each team plays every other team twice, once in a defending role and once in an attacking role.

Each player belongs to one team.

Each player may create and own multiple characters.

Maira is creating a database to store the information needed.

These four entities will be used in the database:

Team (Team_ID, Team_name, Team_email, League_position, Points, Battles_fought)

PlayerPersonal (Player_ID, Team_ID, Player_name, Player_email)

PlayerCharacter (Character_ID, Player_ID, Character_name, Character_role, Gender, Species, Level)

Battle (Battle_ID, Defence_team_ID, Attack_team_ID, Battle_date, Battle_time)

(a) Here is a partially completed entity relationship diagram for this database.

Complete the diagram to show:

- primary keys, underlined
- foreign keys, with an asterisk
- relationships.

(6)

Team

Battle

Battle_ID
Defence_team_ID*
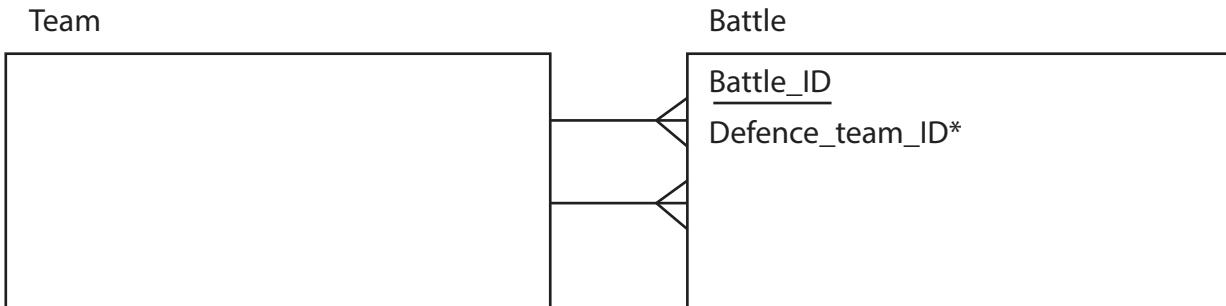
PlayerPersonal

PlayerCharacter

(b) When a player wants to play the online game they must log in to their account.

If a player has forgotten their password, they must start a 'change password' process.

Clicking on the 'forgot my password' button starts the process.

The player must then:

- enter their email address

- enter their date of birth

- click the 'change password' button.

The system then checks the email address and date of birth against stored records.

If a match is found a random password is generated and emailed to the player.

If a match is **not** found an error message is generated and the player must try again.

Here is a partially completed flowchart.

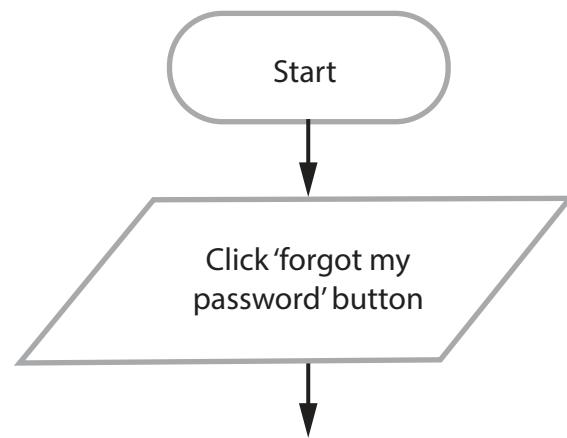Complete the flowchart to show how the 'change password' process works.

(6)

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                    └──────┬──────┘
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                           ▼
                  ╱─────────────────╲
                 ╱   Click 'forgot my ╲
                ╱    password' button  ╱
                ╲───────────┬────────╱
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(Total for Question 4 = 12 marks)

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5 A multinational travel company has produced a smartphone app.

The app gives users information about places such as tourist attractions, restaurants, and local services near to their current location.

It uses location awareness to know the present location of the user.

A pressure group has claimed that the app invades the user's privacy by using location awareness.

Evaluate the balance between giving information **to users** and collecting information **about users**.

Your evaluation should include:

- an outline of location awareness technologies that may be used by the app
- the types of information that could be provided to the user by allowing the app to use location awareness
- moral and/or ethical issues with using location awareness in this way
- your conclusion.

(12)

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(Total for Question 5 = 12 marks)

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6 The country of Varma Loko has several large towns, joined by a toll road.

Every vehicle has a passive RFID tag with a unique ID, linked to the driver's account.

Each entry to the toll road has a check point. It uses a radar set to detect if a vehicle is present or not.

When a vehicle is detected at a check point its tag ID is read. The barrier is then raised to allow the vehicle to pass and dropped again afterwards.

Drivers are charged a fixed toll each time they pass through a check point.

The system updates the driver's account by adding the toll charge.

Drivers must pay into their account at a physical payment point.

(a) Describe how the passive RFID system works.

(3)

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(b) Draw a dataflow diagram for the system.

(12)

(Total for Question 6 = 15 marks)

TOTAL FOR PAPER = 80 MARKS

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