

QUESTION 3.



4 (a) There are two types of RAM: dynamic RAM (DRAM) and static RAM (SRAM).

Five statements about DRAM and SRAM are shown below.

Draw a line to link each statement to the appropriate type of RAM.

Statement	Type of RAM
requires data to be refreshed periodically in order to retain the data	
has more complex circuitry	DRAM
does not need to be refreshed as the circuit holds the data as long as the power supply is on	
requires higher power consumption which is significant when used in battery-powered devices	SRAM
used predominantly in cache memory of processors where speed is important	



(b) Describe **three** differences between RAM and ROM.

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..... [3]

(c) DVD-RAM and flash memory are two examples of storage devices.

Describe **two** differences in how they operate.

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..... [2]

QUESTION 4.



2 (a) State **two** differences between Static RAM (SRAM) and Dynamic RAM (DRAM).

1

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2

.....[2]

(b) (i) Explain why a computer needs an operating system.

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.....[2]

(ii) Give **two** key management tasks carried out by an operating system.

1

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2

.....[2]

(c) New program code is to be written in a high-level language. The use of Dynamic Link Library (DLL) files is considered in the design.

Describe what is meant by a DLL file.

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.....[2]

QUESTION 5.



6 (a) Describe **two** differences between RAM and ROM.

1

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2

.....[2]

(b) State **three** differences between Dynamic RAM (DRAM) and Static RAM (SRAM).

1

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2

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3

QUESTION 6.



6 The fetch-execute (FE) cycle uses special purpose registers.

(a) The stages in the FE cycle are shown in register transfer notation.

MAR ← [.....]

PC ← PC + 1

..... ← [[MAR]]

..... ← [MDR]

(i) The steps shown in **part (a)** are incomplete.

Write the missing register names in the spaces in **part (a)**.

[3]

(ii) The third instruction [[MAR]] has double brackets.

State the purpose of the double brackets.

.....
[1]

(b) One stage of the FE cycle includes checking for interrupts.

State what is meant by an **interrupt**.

.....

[2]

(c) There are two types of RAM: dynamic RAM (DRAM) and static RAM (SRAM).

The following table shows **five** statements about DRAM and SRAM.

Tick (✓) **one** box in each row to indicate whether the statement applies to DRAM or SRAM.

Statement	DRAM	SRAM
Does not need to be refreshed as the circuit holds the data while the power supply is on		
Mainly used in cache memory of processors where speed is important		
Has less complex circuitry		
Requires higher power consumption under low levels of access, which is significant when used in battery-powered devices		
Requires data to be refreshed occasionally so it retains the data		

[5]

QUESTION 7.



4 Shazia is creating a computer program that will be released to the public. The program will be released as a video.

(a) Shazia uses a microphone to record a sound track for the video.

(i) Describe the internal operation of a microphone.

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..... [3]

(ii) The script for the sound track is printed using a laser printer.

Describe the internal operation of a laser printer.

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..... [3]

(b) The video is recorded using progressive encoding.

Describe **progressive encoding**.

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..... [2]

QUESTION 8.



6 Dominic uses a tablet computer to complete work. He records videos of his work for his colleagues to watch at a later date.

(a) The tablet computer has input and output devices.

(i) The table lists four devices built into the tablet.

Tick (✓) one or more boxes for each device to identify whether it is an input device, an output device or both.

Device	Input	Output
Touchscreen		
Webcam		
Microphone		
Fingerprint scanner		

[2]



(ii) An external speaker is plugged into the tablet computer.

The sequence of steps 1 to 7 describes the internal operation of the speaker.

The statements **A**, **B**, **C**, **D** and **E** are used to complete the sequence.

Letter	Statement
A	Changes in the audio signal cause the direction of the electrical current to change. This determines the polarity of the electromagnet.
B	The vibration creates sound waves.
C	An electric current is sent to the speaker.
D	The electromagnet is repelled by, or attracted to the permanent magnet.
E	The electric current passes through the coil.

Write **one** of the letters **A** to **E** in each appropriate row to complete the sequence.

1

2

3 The current in the coil creates an electromagnetic field.

4

5

6 The movement of the coil causes the diaphragm to vibrate.

7



(b) The tablet computer’s secondary storage is solid state (flash) memory.

(i) Give **one** reason why the tablet computer needs secondary storage.

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..... [1]

(ii) Describe solid state memory.

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..... [3]

(c) The tablet computer has RAM and ROM memory.

State the purpose of RAM and ROM memory in the computer.

RAM

ROM

[2]

(d) Dominic’s tablet captures a video of Dominic to send to other people. The video is made of a sequence of images and a sound file.

(i) Describe how the images and sound are encoded into a digital form.

Images

Sound

[4]



- (ii) The sequence of images and the sound file create a video. This is sent as a video stream. The video stream can use interlaced encoding or progressive encoding.

Describe the terms **interlaced encoding** and **progressive encoding**.

Interlaced encoding

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Progressive encoding

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[4]

- (e) Dominic sends his videos to his colleagues over the Internet using bit streaming.

- (i) Describe how the video is sent using bit streaming.

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[4]

- (ii) Circle either Real-time or on-demand to identify whether the video will be sent using real-time or on-demand bit streaming. Justify your choice.

Real-time / on-demand

Justification

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[2]



(iii) Describe the following video terms.

Temporal redundancy

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Spatial redundancy

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[2]

15
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QUESTION 9.



3 A hotel needs to record information about customers and their bookings.

(a) The hotel has two types of room: double and family. Each room has a unique room number.

The hotel stores information about the customers including their name, address and contact details.

When a customer books a room, they give the start date and the number of nights they want to stay. If a customer wants more than one room, each room must have a separate booking. Each booking has an ID number.

The hotel creates a normalised, relational database to store the required information. There are three tables:

- CUSTOMER
- ROOM
- BOOKING

(i) Complete the database design for the hotel by writing the attributes for each table.

CUSTOMER (.....
.....
.....)

ROOM (.....
.....
.....)

BOOKING (.....
.....
.....)

[3]

(ii) Identify the primary key for each table that you designed in **part (a)(i)**.

CUSTOMER

ROOM

BOOKING

[2]



(iii) Identify **one** foreign key in the tables that you designed in **part (a)(i)**.

Table name

Foreign key

(b) The hotel wants to use a Database Management System (DBMS) to set up and manage the database.

Describe, using examples, how the hotel can use the following DBMS tools:

Developer interface

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Query processor

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[5]

(c) The following table has four SQL scripts.

Tick (✓) **one** box in each row to identify whether the script is an example of a Data Definition Language (DDL) statement or a Data Manipulation Language (DML) statement.

Script	DDL	DML
CREATE TABLE FILMS		
SELECT FilmID FROM FILMS		
ALTER TABLE FILMS ADD PRIMARY KEY (FilmID)		
CREATE DATABASE MYDATA		

[2]