1.3 Secondary Storage: 30-minute Pack

OCR J277 · Calculators not allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Answer the following multiple-choice questions about secondary storage.

(a) Which of these is an example of optical storage? **(1)**

- ☐ A) Solid-state drive (SSD)
- ☐ B) Blu-ray disc
- ☐ C) Magnetic tape
- ☐ D) RAM

(b) Which characteristic best describes a solid-state drive compared with a magnetic hard disk drive? **(1)**

- ☐ A) Uses spinning magnetic platters
- ☐ B) Has a slower read/write speed
- ☐ C) Has no moving mechanical parts
- ☐ D) Has a lower typical cost per gigabyte

(Total for Question 1 is 2 marks)

---

2 Put these units of data in order of size, starting with the smallest: gigabyte, byte, terabyte, kilobyte, megabyte

(Total for Question 2 is 2 marks)

---

3 Describe how data is stored on a magnetic hard disk drive (HDD).

(Total for Question 3 is 3 marks)

© Revision Library | revisionlibrary.co.uk

4 Solid-state drives (SSDs) are increasingly used instead of magnetic hard disk drives.

(a) Explain how a solid-state drive stores data. **(3)**

(b) State two advantages of solid-state storage compared with magnetic storage. **(2)**

(Total for Question 4 is 5 marks)

---

5 A dashcam records video at a constant data rate of 8 megabits per second (Mbps). Calculate the amount of storage, in megabytes (MB), needed to store 15 minutes of continuous recording.

(Total for Question 5 is 4 marks)

---

6 A small shop owner is installing a CCTV system that records video continuously and automatically overwrites the oldest footage once the storage is full. Recommend a suitable type of secondary storage for the CCTV system's video recorder. Justify your answer by referring to at least two characteristics of storage.

(Total for Question 6 is 4 marks)

© Revision Library | revisionlibrary.co.uk

7 A company backs up its files onto magnetic tape cartridges, each with a capacity of 2.5 TB. The company needs to back up 18 TB of data. Show that 8 tape cartridges are needed.

(Total for Question 7 is 3 marks)

---

8 A secondary school is upgrading its computing suite. The new computers will mainly be used for editing large, high-resolution video files. Discuss the suitability of magnetic, optical and solid-state storage for this computing suite, and recommend which type of storage the school should use. Justify your recommendation.

(Total for Question 8 is 6 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 1.3 Secondary Storage: 30-minute Pack

Question 1

(a) B **B1**

(a) Answer: B) Blu-ray disc

(b) C **B1**

(b) Answer: C) Has no moving mechanical parts

Question 2

At least 3 of the 5 units placed in the correct relative order **B1**

All 5 units placed in the fully correct order cao **B1**

Answer: byte, kilobyte, megabyte, gigabyte, terabyte

Question 3

The disk has one or more platters coated in a magnetic material **B1**

A read/write head moves across the surface of the spinning platter(s) **B1**

The head magnetises tiny areas of the surface in different directions to represent binary 1s and 0s oe **B1**

Answer: Platters coated with magnetic material are spun at high speed; a moving read/write head magnetises small areas of the surface in one of two directions to represent 1s and 0s.

Question 4

(a) Data is stored electronically in flash memory/NAND memory chips oe **B1**

(a) There are no moving mechanical parts oe **B1**

(a) Data is stored as electrical charges in memory cells, representing binary values oe **B1**

(a) Answer: SSDs store data electronically in flash memory chips, using electrical charges in memory cells to represent binary 1s and 0s, with no moving parts.

(b) Faster read/write access speeds oe **B1**

(b) More durable/robust as there are no moving parts to be damaged by shock oe (accept: silent operation / lower power consumption) **B1**

(b) Answer: Faster access speeds; more durable/robust because there are no moving parts.

Question 5

Converts megabits per second to megabytes per second: 8 / 8 = 1 MB per second oe **M1**

Converts 15 minutes to seconds: 15 x 60 = 900 seconds **M1**

Multiplies data rate by time: 1 x 900 **M1**

900 MB cao **A1**

Answer: 900 MB

Question 6

Identifies a suitable storage device/technology, e.g. hard disk drive (HDD) oe (any storage type accepted if justified) **B1**

Valid justification point 1, e.g. large/high capacity needed to store continuous video footage oe **B1**

Valid justification point 2, e.g. relatively low cost per gigabyte for the large amount of storage required oe **B1**

Valid justification point 3, e.g. can reliably cope with being written to/overwritten continuously, with adequate write speed for continuous video oe **B1**

Answer: A hard disk drive (HDD): high capacity and low cost per GB suit continuous video recording, and it can withstand being written to and overwritten repeatedly.

Question 7

18 / 2.5 = 7.2 (cartridges) **M1**

Recognises that a cartridge cannot be shared/part-used, so the number of cartridges must be rounded up to the next whole number **M1**

8 cartridges, cso (printed answer must be reached by a correct method) **A1**

Answer: 8 cartridges

© Revision Library | revisionlibrary.co.uk

Question 8

Level 1 Basic, generalised statement(s) about one or more storage types, with little or no reference to the video editing scenario. A recommendation may be missing, unclear or unjustified. Little or no use of appropriate technical terminology. **1-2**

Level 2 Some relevant discussion of at least two storage types, referring to characteristics such as capacity, speed or cost, with limited application to the video editing scenario. A recommendation is given, but the justification is only partially linked to the scenario. Some appropriate technical terminology is used. **3-4**

Level 3 A detailed, well-structured discussion of all three storage types (magnetic, optical and solid-state), clearly applying relevant characteristics (e.g. capacity, speed, cost, durability, portability) to the video editing scenario. A clear, well-justified recommendation is given that is fully supported by the discussion. Appropriate technical terminology is used throughout. **5-6**

Indicative content:

- Magnetic (HDD): low cost per gigabyte and high capacity, but slower read/write speeds than solid-state, which may affect smooth editing/scrubbing of large video files
- Magnetic (HDD): has moving parts, so is more prone to mechanical failure and is less shock-resistant
- Optical (DVD/Blu-ray): relatively low capacity and slow read/write speed compared with the file sizes involved in video editing; more suited to distributing finished video than to active editing
- Solid-state (SSD): much faster read/write speeds, allowing smoother playback and editing of large, high-resolution video files
- Solid-state (SSD): no moving parts, so more durable/reliable, but typically more expensive per gigabyte than magnetic storage, so may offer less capacity for the same budget
- A justified recommendation, e.g. SSD, or a combination of SSD for active project files and HDD for archiving completed work, weighing speed benefits against cost/capacity

© Revision Library | revisionlibrary.co.uk