OCR GCSE (J277)

Module B: Memory and storage

Workbooklet mark scheme · 8 parts · 163 marks

Contents

Part	Topic	Marks
B1	Primary storage, RAM and ROM: mark scheme	20
B2	Virtual memory: mark scheme	20
B3	Why computers need secondary storage: mark scheme	20
B4	Magnetic, optical and solid state storage: mark scheme	20
B5	Choosing storage: mark scheme	21
B6	Cloud storage: mark scheme	20
B7	Units of data storage: mark scheme	21
B8	Calculating file sizes: mark scheme	21
	Total	**163**

MODULE B MEMORY AND STORAGE · B1

Primary storage, RAM and ROM: mark scheme

~25 minutes · 20 marks · OCR J277 spec 1.2.1

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative words; **//** separates alternative statements for the same mark. Words in (brackets) are not needed for the mark. "..." links a point to the one before it. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.1	(Main) memory that is directly accessed by the CPU // memory that holds the data and instructions currently in use	**1**	Max 1. Accept "RAM, ROM (and cache)" only with a description. Do not accept "storage inside the computer" (NE) or any answer describing long-term storage of files.
1(b) J277 1.2.1	To hold the data / instructions (programs) currently in use / that the CPU needs (e.g. the booking being shown) ... because the CPU can access it directly // the CPU cannot work directly from secondary storage ... it is fast (to access), so the CPU is not kept waiting / the terminal responds quickly To hold the start-up instructions (so the terminal can boot)	**2**	1 mark per bullet, max 2. "Faster" needs a comparison or a consequence (NE alone). Do not accept "when secondary storage is full".
2 J277 1.2.1	Lost when power off: RAM Start-up (boot) instructions: ROM Directly accessed by the CPU: Both CPU can write new data while a program runs: RAM	**4**	1 mark per correct row. 2+ ticks in a row = 0 for that row.
3(a) J277 1.2.1	(Parts of) the operating system (The parts in use of) the check-in program / app The booking reference typed in // the guest's booking details The data for the screen display / the key card to be printed	**2**	1 mark per bullet, max 2. Must be things in use at this moment. Do not accept "all the bookings" / "every program" / "all files". Do not accept "start-up instructions / BIOS" (ROM).

QUESTION	ANSWER	MARKS	GUIDANCE
3(b) J277 1.2.1	The start-up / boot instructions // BIOS / bootstrap (loader) ROM is non-volatile, so the instructions are kept when the power is off // ROM is read only, so the instructions cannot be changed / deleted (by accident)	**2**	1 mark for what, 1 mark for reason. Award the reason mark even if "what" is wrong, as long as the reason is a correct property of ROM. Do not accept "the operating system" for what is stored. Do not accept "ROM is permanent" alone (BOD if linked to no power).
4 J277 1.2.1	RAM is volatile but ROM is non-volatile // RAM loses its contents when power is off, ROM keeps them RAM can be read from and written to but ROM is read only // RAM contents can be changed, ROM contents (normally) cannot RAM holds the programs / data currently in use, ROM holds the start-up instructions RAM usually has a larger capacity than ROM	**2**	1 mark per bullet, max 2. Each difference must give both sides (e.g. "RAM is volatile" alone = 0). Do not accept uses only without a comparison. Accept answers that state one side and clearly imply the other (e.g. "only RAM is volatile").
5(a) J277 1.2.1	To store frequently used data / instructions ... so the CPU does not have to fetch them from RAM (each time) ... because cache is faster to access than RAM // so instructions are processed / fetched faster	**2**	1 mark per bullet, max 2. Do not accept "data just used / about to be used" without "frequently". Do not accept that cache stores files or acts as extra RAM when RAM is full (that is virtual memory).
5(b) J277 1.2.1	It is (directly) accessed by the CPU // it holds data / instructions currently in use by the CPU	**1**	Do not accept "it is inside the computer" or "it is fast" alone (NE).
6 J277 1.2.1	RAM is volatile, so its contents are lost when the power goes off ... (so) the guest's check-in data / booking details (not yet saved) are lost // the check-in must start again ROM is non-volatile, so its contents / the start-up instructions are kept during the power cut When the power returns the CPU runs the start-up / boot instructions from ROM ... which load the operating system (from secondary storage) into RAM	**4**	1 mark per bullet, max 4. For full marks the answer must cover both RAM and ROM. Do not accept "ROM saves the data" or that RAM's contents are moved into ROM. Do not accept that the operating system is loaded from ROM into RAM.

Total: 20 marks

MODULE B MEMORY AND STORAGE · B2

Virtual memory: mark scheme

Mark scheme · ~25 minutes · 20 marks · OCR J277 spec 1.2.1

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative words; **//** separates alternative statements for the same mark. Words in (brackets) are not needed for the mark. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.1	(An area / part of) secondary storage / the hard drive / SSD ... ... used as (if it were) (extra) RAM // used when RAM is full	**2**	Max 2. Do not accept "storage used when memory is full" without naming secondary storage (NE). Do not accept "extra RAM chips" / "part of the CPU".
1(b) J277 1.2.1	RAM is limited in size // 8 GB may not be enough RAM may become full with the (four) programs (and their data) open at once Virtual memory gives extra space so more programs / data can be open // so another program can be loaded Stops the computer crashing / refusing to open programs when RAM is full	**3**	1 mark per bullet, max 3. At least one point should be applied to the scenario (several large programs open). Do not accept "to store files" / "for backup".
1(c) J277 1.2.1	Data for the spreadsheet, which has not been used for two hours	**1**	2+ ticks = 0 marks. The saved project files are already on secondary storage: they are not virtual memory (a confusion noted in OCR examiners reports).
2 J277 1.2.1	(The operating system) uses / sets aside part of secondary storage as virtual memory Data / programs (in RAM) not currently in use are identified ... ... and moved / transferred from RAM to virtual memory This frees space in RAM The photo editing program is loaded into (the freed space in) RAM When the moved data is needed again it is moved back into RAM (and other data may be moved out)	**4**	1 mark per bullet, max 4. Paging is not required at GCSE: credit correct use but do not require it. Do not accept "the photo editor runs from virtual memory" / "the CPU uses data in virtual memory". Do not accept "primary storage" in place of RAM for the move back.
3 J277 1.2.1	Keep files when switched off: False Moved back into RAM when needed: True Part of the CPU: False Slower to access than RAM: True	**4**	1 mark per correct row. 2 ticks in a row = 0 for that row.

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) J277 1.2.1	Virtual memory is on secondary storage, which is slower to access than RAM Data must be moved back into RAM before the CPU can use it Lots of data is swapped / moved back and forth between RAM and virtual memory, which takes time	**2**	1 mark per bullet, max 2. Do not accept "virtual memory is slower" without saying it is on secondary storage / slower to access than RAM (NE). Do not accept "it is further away" (NE).
4(b) J277 1.2.1	More programs / data can be held in RAM at once ... ... so less / no virtual memory is needed // less data is swapped to and from secondary storage ... so less time is spent transferring data // the CPU gets the data it needs from RAM (which is faster to access)	**2**	1 mark per bullet, max 2. Do not accept "RAM is faster" alone (NE).
5 J277 1.2.1	The program (and its data) always fits in RAM // RAM never becomes full ... ... so no data would ever need to be moved out of RAM // virtual memory would never be used It only runs one (small) program // never opens other programs So it would give no improvement // could only add cost / use storage for no benefit	**2**	1 mark per bullet, max 2. "No" / "it would not improve it" alone scores 0: the "no improvement" mark needs a reason (RAM never full / VM never used). Must be applied to the barrier system.

Total: 20 marks

MODULE B MEMORY AND STORAGE · B3

Why computers need secondary storage: mark scheme

20 marks · OCR J277 spec 1.2.2

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative words; **//** separates alternative statements for the same mark. Words in (brackets) are not needed for the mark. "..." means the point depends on the one before. NE = not enough. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.2	(Non-volatile) storage that keeps data / programs / files long-term // permanently // when the power is off	**1**	Must convey long-term / permanent / kept without power. Allow "storage other than RAM / ROM, used to store data permanently". Do not accept "storage used when RAM is full" (that is virtual memory). Do not accept "storage for backups" alone. "Extra storage" alone NE.
1(b) J277 1.2.2	RAM: Primary Solid state drive: Secondary ROM: Primary USB flash drive: Secondary	**4**	1 mark per correct row. 2+ ticks in a row = 0 for that row.
2(a) J277 1.2.2	Operating system Applications / programs / apps (e.g. the route / map software) (Delivery) photos (Recorded) signatures / delivery records Route data / maps	**2**	1 mark each, max 2. Mark first two answers only. Do not accept "the BIOS / boot program" (stored in ROM). "Data" / "files" alone NE.
2(b) J277 1.2.2	To store data / photos / signatures / programs long-term // permanently ... because it is non-volatile // RAM is volatile ... so data is not lost when the tablet is switched off / the battery runs out RAM is too small (4 GB) to hold all the programs and files // secondary storage has a larger capacity (64 GB)	**2**	Max 2. Max 1 for an answer not applied to the tablet. Do not accept "to back up data" without long-term / permanent (no BOD). Do not accept "used when RAM is full".
3 J277 1.2.2	Only used when RAM is full: False Non-volatile: True Only needed for backups: False Larger capacity than RAM: True	**4**	1 mark per correct row. 2+ ticks in a row = 0 for that row.

QUESTION	ANSWER	MARKS	GUIDANCE
4 J277 1.2.2	The morning version / the last saved version (without the new rooms) will be available ... because it was saved to secondary storage, which is non-volatile // secondary storage keeps data without power The three new rooms / unsaved changes are lost ... because they were only held in RAM // they had not been saved to secondary storage ... and RAM is volatile // RAM loses its contents when power is lost	**3**	Max 3. Do not accept "the whole plan is lost". Do not accept "the changes are in ROM". Allow "hard drive / SSD" for secondary storage.
5 J277 1.2.2	RAM is volatile ... so programs / files would be lost when the computer is switched off ... so they would have to be reinstalled / recreated each time // the user would have nowhere to save their work RAM has a (much) smaller capacity than secondary storage ... so it could not hold all programs / files at once RAM is (much) more expensive per GB ... so enough RAM to hold everything would cost too much	**4**	Max 4. "RAM is faster" earns no mark (it is a reason to use RAM, not against it). "RAM is small" alone NE without a comparison to secondary storage or to the files.

Total: 20 marks

MODULE B MEMORY AND STORAGE · B4

Magnetic, optical and solid state storage: mark scheme

~25 minutes · 20 marks · OCR J277 spec 1.2.2

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative words; **//** separates alternative statements for the same mark. Words in (brackets) are not needed for the mark. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1 J277 1.2.2	Blu-ray disc: Optical Hard disk drive: Magnetic SD card: Solid state Magnetic tape: Magnetic USB memory stick: Solid state	**5**	1 mark per correct row. 2+ ticks in a row = 0 for that row.
2 J277 1.2.2	No moving parts: True Optical disc larger capacity than HDD: False HDD cheaper per gigabyte than SSD: True Unlimited number of writes: False	**4**	1 mark per correct row. 2 ticks in a row = 0 for that row.
3(a) J277 1.2.2	How much data it can store / hold	**1**	Accept the amount of storage space. Do not accept "how big it is" / "size" alone (NE: could mean physical size).
3(b) J277 1.2.2	How well it resists (physical) damage // how well it survives being dropped / knocked / heat / wear	**1**	Do not accept "how long it lasts" alone (NE). Do not accept "how reliable it is".
3(c) J277 1.2.2	Solid state has no moving parts ... ... so a knock / drop is less likely to damage it A hard disk drive has moving parts (spinning disk / moving head) ... ... which can be damaged / break if it is knocked / dropped (while running)	**2**	1 mark per bullet, max 2. Second and fourth points depend on the point before them. Do not accept that solid state lasts forever / has unlimited life. Component detail (platters, heads) is not required for J277 but correct detail is not penalised.
4(a) J277 1.2.2	Cheap (to buy / per disc) Light / small / portable // easy to post Enough capacity for one film Can be read on many devices / DVD players Can be read-only // the film cannot be changed / deleted by mistake	**2**	1 mark each, max 2. Mark first two answers only. Do not accept "fast".

QUESTION	ANSWER	MARKS	GUIDANCE
4(b) J277 1.2.2	Scratches / damaged easily (in the post) Slower to read data (than HDD / SSD) Low capacity (compared with HDD / SSD) Office computers may not have an optical drive Can be lost / broken in the post	**1**	Mark first answer only.
5 J277 1.2.2	Speed: SSD reads / writes data faster ... ... HDD reads / writes data slower Cost: HDD is cheaper per gigabyte ... ... SSD costs more per gigabyte Capacity: HDD usually gives more capacity for the same cost ... ... SSD gives less capacity for the money Moving parts / durability: HDD has moving parts (spinning disk) ... ... SSD has no moving parts so is more durable / less easily damaged by knocks Type: HDD stores data magnetically ... ... SSD stores data electronically / in flash memory Other valid pairs: SSD smaller / lighter / uses less power / silent ... HDD larger / heavier / noisier	**4**	Mark in pairs: 1 for the point about one device, 1 for the matching point about the other; max 2 per difference, max 4. A single comparative sentence that clearly covers both ("an SSD reads and writes data faster than an HDD") gets 2. "Faster" with no comparison or without saying at what = NE. Do not accept "SSD lasts forever".

Total: 20 marks

MODULE B MEMORY AND STORAGE · B5

Choosing storage: mark scheme

~25 minutes · 21 marks · J277 spec 1.2.2

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative words; **//** separates alternative statements for the same mark. Words in (brackets) are not needed for the mark. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.2	Row 1: speed Row 2: portability Row 3: capacity Row 4: reliability	**4**	1 mark per row. 2+ ticks in a row = 0 for that row.
1(b) J277 1.2.2	How well the device survives (physical) damage / knocks / drops / heat // how robust/tough it is // how long it lasts when used/handled	**1**	Do not accept "how reliable it is" (that is reliability). "Strong" alone is NE.
2(a) J277 1.2.2	Solid state (e.g. SSD) Justification, max 3: No moving parts… …so more durable / not damaged if the backpack/laptop is knocked or dropped while travelling Small / light / thin… …so easy to carry between theatres / fits in a laptop // portable Fast(er) read/write speed (than magnetic/optical)… …so large lighting plans open quickly in rehearsals Low power use, so the laptop battery lasts longer away from a socket	**4**	1 mark for solid state, then max 3 for justification. Magnetic or optical chosen = 0 for the whole part. Accept SSD / flash. "Faster" with nothing saying what is faster at, or faster than what, is NE. Justification must be linked to the technician/laptop for full marks; generic points max 2.
3(a) J277 1.2.2	Magnetic (e.g. hard disk drive / magnetic tape) Justification, max 3: High capacity… …so it can hold many terabytes of scans Low(er) cost per gigabyte (than solid state)… …so it suits the small budget The server is never moved, so low durability/portability (moving parts) does not matter Reliable for long-term storage // read/write speed is good enough for opening scans	**4**	1 mark for magnetic, then max 3. Accept HDD / hard disk. Solid state chosen: 0 for choice, but allow max 2 for valid linked justification (e.g. high capacity, fast access) — do not accept "cheaper" for solid state. Optical chosen = 0 for the whole part. "Cheap" alone is NE: need cost per gigabyte or link to the budget.

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) J277 1.2.2	One advantage, explained: Low cost per disc / per gigabyte… …so the band can make many copies cheaply to sell Light / thin / small… …so cheap and easy to post / carry to concerts Enough capacity for one album… …so each disc holds the whole album Read-only discs cannot be accidentally changed/deleted… …so the album stays as recorded	**2**	Mark in pairs: 1 for the advantage, 1 for its link to the band. Mark the first advantage only.
4(b) J277 1.2.2	One disadvantage, explained: Low durability / scratches easily… …so discs may be damaged in the post / at concerts and fail to play Needs an optical drive (to read it)… …which some buyers' computers/devices may not have Slow(er) read speed (than solid state)… …so copying the album onto a device takes longer Low capacity (compared with magnetic/solid state)… …so extra content (e.g. videos) may not fit on one disc	**2**	Mark in pairs. Mark the first disadvantage only. Do not accept "it breaks" alone (NE).
5(a) J277 1.2.2	Row 1: False Row 2: True Row 3: True Row 4: False	**4**	1 mark per row. 2 ticks in a row = 0 for that row. Row 1: solid state has a limited number of write cycles; it does not last forever.

Total: 21 marks

MODULE B MEMORY AND STORAGE · B6

Cloud storage: mark scheme

20 marks · OCR J277 spec 1.3.1

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative answers. Words in (brackets) are not needed for the mark. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.3.1	Services / resources provided remotely / by another organisation / on (someone else's) remote servers accessed over the internet e.g. storage / software / processing	**2**	1 mark per bullet, max 2. Do not accept "in the sky" / "online storage" alone for both marks: storage alone as an example is 1 mark max.
1(b) J277 1.3.1	Survey photos: Storage Word processor in a browser: Software 3D model calculations: Processing	**3**	1 mark per correct row. 2+ ticks in a row = 0 for that row.
2(a) J277 1.3.1	Physical servers: True Only on the uploading device: False Any internet connection, including mobile data: True User does not control security: True	**4**	1 mark per correct row. 2+ ticks in a row = 0 for that row.
3(a) J277 1.3.1	Can be accessed from anywhere with an internet connection / on any device (1) ... architects can open drawings on building sites / staff in all three offices can use the same drawings (1) Easy to share / collaborate (1) ... architects in different cities can work on the same drawing / no need to copy drawings between offices (1) Storage can be increased easily / scalable (1) ... as the practice makes more drawings it can buy more space without buying new drives (1) Provider (usually) handles backups (1) ... drawings are not lost if an office drive fails (1) Provider handles maintenance / security updates (1) ... the practice does not need its own staff to look after the hard drives / servers (1) No need to buy / own the storage hardware (1) ... saves the cost of a hard drive in each office (1)	**4**	Mark in pairs: 1 for the advantage, 1 for the explanation in context. The second mark depends on the first. Do not award the same advantage twice. Accept "access anywhere" only with internet implied or stated.

QUESTION	ANSWER	MARKS	GUIDANCE
3(b) J277 1.3.1	Needs an internet connection (1) ... architects cannot open drawings on a site with no signal / if an office connection fails, staff cannot work (1) The practice does not control the security (of its data) / relies on the provider's security (1) ... if the provider is hacked, drawings could be stolen (1) Ongoing cost / subscription (1) ... the practice must keep paying for the storage every month / year (1) Less control over the data / the provider controls where and how it is stored (1) ... drawings could be lost or unavailable if the provider has a fault / goes out of business (1) Upload / download speed depends on the connection (1) ... large drawing files may take a long time to open (1) Data could be hacked / stolen / intercepted (1) ... which the practice has no control over // drawings could be seen by others (1)	**4**	Mark in pairs as 3(a). Do not accept "less secure" / "poor security" alone (NE): the point is that the user does not control the security (OCR examiners' report, June 2025). Do not accept "needs Wi-Fi": any internet connection works.
4(a) J277 1.3.1	Can be used from any device / anywhere with an internet connection Nothing to install / no storage space used on own computer Updates are done by the provider / always the latest version Work can be shared with clients easily	**1**	Any one. Mark first answer only.
4(b) J277 1.3.1	Remote servers are more powerful / have more processing power than the editor's computer ... so the video is processed faster The editor's own computer is free to do other work while it is processed The editor does not need to buy an expensive / powerful computer	**2**	1 mark per bullet, max 2. "Faster" alone (without saying what is faster / why) = NE.

Total: 20 marks

MODULE B MEMORY AND STORAGE · B7

Units of data storage: mark scheme

21 marks · OCR J277 spec 1.2.3

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative answers. Words in (brackets) are not needed for the mark. The J277 specification (v3.1, 2026) uses 1 KB = 1,000 bytes and states that use of 1,024 for conversions and calculations is acceptable: the 1,024 answers are given in the Guidance column and earn full marks.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.3	4 (bits)	**1**	Correct answer only.
1(b) J277 1.2.3	0.5 GB	**1**	0.5 GB = 500 MB; the others are 3 MB, 2 MB and 4 MB. The same box is largest using 1,024. 2+ ticks = 0.
1(c) J277 1.2.3	8 bits = 1 byte 1,000 KB = 1 megabyte / MB 1,000 GB = 1 terabyte / TB 1,000 TB = 1 petabyte / PB	**4**	1 mark per row. Accept full name or abbreviation. Do not accept binary-prefix names (mebibyte / MiB, tebibyte / TiB, pebibyte / PiB): not J277 terms. Lower-case "b" for byte = NE (bit).
2(a) J277 1.2.3	nibble, byte, kilobyte, gigabyte, terabyte, petabyte	**2**	2 marks: all six in the correct order. 1 mark: one pair of neighbouring units swapped, or one unit out of place with the rest in the correct order. Order given largest to smallest = 0.
3(a) J277 1.2.3	32,000 ÷ 8 (= 4,000 bytes) then ÷ 1,000 / 32,000 ÷ 8,000 4 (KB)	**2**	1 mark working, 1 mark answer. Correct answer with no working = 2. Accept 1,024: 4,000 ÷ 1,024 = 3.90625 KB; accept 3.9 / 3.91. Award the working mark for ÷ 8 shown even if the second step is wrong. Do not award the working mark for × 8.
3(b) J277 1.2.3	2,500 (GB)	**1**	2.5 × 1,000. Accept 2,560 (2.5 × 1,024).

QUESTION	ANSWER	MARKS	GUIDANCE
3(c) J277 1.2.3	0.75 (GB)	**1**	750 ÷ 1,000. Accept ¾. Accept 750 ÷ 1,024 = 0.732421875; accept 0.73 / 0.732.
3(d) J277 1.2.3	6 × 1,000 × 1,000 / 6 × 1,000,000 6,000,000 (bytes)	**2**	1 mark working, 1 mark answer. Correct answer with no working = 2. Accept 1,024: 6 × 1,024 × 1,024 = 6,291,456 bytes. Award the working mark for one correct step (6,000 KB / 6,144 KB) if the final answer is wrong.
4(a) J277 1.2.3	2 TB	**1**	1.5 TB is more than 1 TB and less than 2 TB. 2+ ticks = 0.
5(a) J277 1.2.3	Computers are made of (millions of) switches / transistors / logic gates ... which have only two states / on and off Two states can be represented by 1 and 0 / binary (So) all data must be converted to binary for the computer to process / store it	**2**	1 mark per bullet, max 2. "Computers only understand binary" alone = NE.
6(a) J277 1.2.3	One byte = two nibbles: True 1 PB = 1,000 GB: False KB larger than MB: False 1 GB = 1,000,000 KB: True	**4**	1 mark per correct row. 2+ ticks in a row = 0 for that row. Row 2: 1 PB = 1,000 TB = 1,000,000 GB. Row 4: 1 GB = 1,000 MB = 1,000 × 1,000 KB.

Total: 21 marks

MODULE B MEMORY AND STORAGE · B8

Calculating file sizes: mark scheme

21 marks · OCR J277 spec 1.2.3

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative words; **//** separates alternative answers. Words in (brackets) are not needed for the mark. In calculations, the working marks are for the stages shown and the last mark is for the correct answer; a correct answer with no working gets full marks. Dividing by 1,024 instead of 1,000 is accepted at any unit step, and an allowance for metadata may be added (both allowed by spec 1.2.3).

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 1.2.3	Image: colour depth × image height (px) × image width (px) Sound: sample rate (Hz) × duration (s) × bit depth Text: bits per character × number of characters	**3**	1 mark per row. Factors in any order. Accept "number of pixels" for height × width; "bits per sample" for bit depth; "length / time (in seconds)" for duration.
1(b) J277 1.2.3	Bits	**1**	Do not accept bytes.
2(a) J277 1.2.3	4 × 400 × 500 // = 800,000 bits ÷ 8 // = 100,000 bytes 100 (KB)	**3**	Full working: 4 × 400 × 500 = 800,000 bits; 800,000 ÷ 8 = 100,000 bytes; 100,000 ÷ 1,000 = 100 KB. Accept 97.65625 / 97.7 / 97.66 (÷ 1,024). Third mark for the correct final answer (a correct answer with no working scores full marks).
2(b) J277 1.2.3	200 (KB)	**1**	8 × 400 × 500 = 1,600,000 bits = 200,000 bytes = 200 KB. FT: double their answer to 2(a). Accept 195.3125 / 195.3 (÷ 1,024).
3(a) J277 1.2.3	16,000 × 25 × 8 // = 3,200,000 bits ÷ 8 // = 400,000 bytes 400 (KB)	**3**	Full working: 16,000 × 25 = 400,000 samples; × 8 = 3,200,000 bits; ÷ 8 = 400,000 bytes; ÷ 1,000 = 400 KB. Accept 390.625 / 390.6 / 390.63 (÷ 1,024).

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) J277 1.2.3	16 × 2,500 // = 40,000 bits ÷ 8 // = 5,000 bytes 5 (KB)	**3**	Full working: 16 × 2,500 = 40,000 bits; ÷ 8 = 5,000 bytes; ÷ 1,000 = 5 KB. Accept 4.8828125 / 4.88 / 4.9 (÷ 1,024). Do not award the first mark for 8 × 2,500 (wrong bits per character).
5(a) J277 1.2.3	One icon: 8 × 50 × 40 // = 16,000 bits // = 2,000 bytes × 10 // = 160,000 bits // = 20,000 bytes (for all 10) 20 (KB)	**3**	Full working: 40 × 50 = 2,000 pixels; × 8 = 16,000 bits; ÷ 8 = 2,000 bytes; × 10 = 20,000 bytes; ÷ 1,000 = 20 KB. Steps may be done in any order. Accept 19.53125 / 19.5 / 19.53 (÷ 1,024). 2 KB (one icon only) scores max 2.
6(a) J277 1.2.3	2 GB = 2,000 MB // 2,000 ÷ 5 400 (photos)	**2**	Accept 409 (2,048 ÷ 5 = 409.6, using 1,024, rounded down). Do not accept 409.6 or 410 for the answer mark (part of a photo cannot be stored). Accept a lower whole number if a stated metadata allowance is used.
6(b) J277 1.2.3	1 mark per bullet, max 2: Metadata is extra data (about the photo) stored in each file // e.g. width, height, colour depth ... so each file is larger (than 5 MB) ... so fewer photos fit (than calculated) // fewer than 400	**2**	Max 2. Do not accept "metadata stores the colour of each pixel". "More photos fit" scores 0.

Total: 21 marks