CAMBRIDGE
International Education

Cambridge International AS & A Level

INFORMATION TECHNOLOGY **9626/32**

Paper 3 Advanced Theory **May/June 2026**

MARK SCHEME

Maximum Mark: 70

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

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General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
BOD	Benefit of the doubt
λ	To indicate where a key word/phrase is missing
✗	Incorrect
~~	Indicate a point in an answer
ISW	Ignore subsequent work
LNK	Statement/points are linked
MAX	Maximum number of marks that can be awarded
NAQ	Not answered question
Off-page comment	Allows comments to be entered at the bottom of the RM marking window and then displayed when the associated question item is navigated to.
REP	To indicate a point that has already been made or was given in the question
SEEN	Indicates that work/page has been seen including blank answer spaces and blank pages.
✓	Correct
TV	Too vague
⌇	Indicate a point in an answer

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Mark scheme abbreviations

/ separates alternative words / phrases within a marking point
// separates alternative answers within a marking point
underline actual word given must be used by candidate (grammatical variants accepted)
max, if available, indicates the maximum number of marks that can be awarded
( ) the word / phrase in brackets is not required, but sets the context
(1st) indicates that this mark has to have been awarded to be able to award the dependant marks denoted with (1)

Note: No marks are awarded for brand names of software packages or hardware.

Notes for examiners:

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Question	Answer	Marks
1	**SIX** from: • HTML element assigned to id (in line 6) is read // '`QPname`' assigned to `id` is read / in HTML • JS code enclosed in <script> tags • QP number assigned to / contents of `var a` (in line 9) • QP name is assigned to `var b` / (in line 10) • Variables read in line 11 / by `document.getElementById("QPname").innerHTML`) • Order of (displayed) variables set by order in line 11 • `QPname` passed to HTML (for display / interpretation by browser). Max **THREE** from: • InnerHTML / line 11 used to combine / concatenate / join / adds variables • Use of + (for concatenation) • No quotes around variables • Order of variable determines order of display • `"  "` used to insert space between variables (to make it more presentable).	**6**

Question	Answer	Marks
2(a)	**FOUR** from: • AR alters / changes perception / view / appearance of real world • AR overlays / merges / integrates computer-generated content over / into external / real scenes. • VR replaces real world with computer-generated images / simulations • AR scenes are real / actually exist • VR simulations do not exist in the real world • AR technology requires external sensors to capture live environment input • AR needs a camera // VR has no need of a camera • AR needs / may need a microphone // VR has no need of a microphone • AR requires (smart) glasses // AR (may) not require (special) headset / googles // VR uses / requires headset / goggles.	**4**
2(b)	**TWO** from: • Valid example of use e.g. alert to dangers / assist in finding victims / in medical procedures / placement of heart monitors / insertion of catheters / 'drips' into veins / overlays on models / cadavers / overlay of anatomical features / surgical details on real patient as guidance / guidance / instructions. • Valid example of user e.g. doctor / first responder / trainer.	**2**

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Question	Answer	Marks
3(a)	**FOUR** from: • To act as an intermediary so individual school computers / staff / students / users are not identified by external servers • To record access requests so that student / staff internet activities can be analysed • To monitor access requests so that student / staff internet activities can be controlled • Can be used for content filtering to block inappropriate material • To reduce the number of requests for same / resources which reduces load on network / to reduce network / internet traffic • Caches of frequently requested data can be stored on proxy so that access time is reduced // pre-cache of resources.	**4**
3(b)	**TWO** from, e.g.: • If the proxy server fails / is overloaded, then the internet services are not available • Can be expensive / time-consuming to maintain / monitor / admin / setup costs • Requires regular maintenance / updating • Can reduce network performance / increase access time to internet resources / services • Cached resources may become out of date / not be updated • Require sufficient storage for the cache / requested.	**2**

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Question	Answer	Marks
4(a)	**ONE** from: • Sender / sending device is not notified of reception of (IP) packet by recipient / receiving device • Does not guarantee delivery of data packets • Does not guarantee error-free data transmission • Packets may arrive in wrong order.	**1**
4(b)	**TWO** from: • No fixed / set route between sender and recipient • Sender has no information / data about the location of recipient (on the network) • Packet is transmitted / sent out to find its own way to recipient across network • Packets sent independently • Packets may arrive in any order • Sending device does not wait / know if recipient device is ready to receive the packet / recipient device exists on the network • Sending device / node relies on other devices / nodes to route packet to destination.	**2**
4(c)	**ONE** from: • (A connection is not set up so) no authentication is needed (between sender and receiver) • Better use of available bandwidth of network (because packets do not follow same route) • Higher security (because packets do not follow same route) • Can be used on low bandwidth connections.	**1**

Question	Answer	Marks
5(a)	**THREE** from: • Direct / continuous / fixed link between two devices / between the sending and receiving devices • Connection is maintained for whole session • Many / multiple short sections of network joined / connected together by switches into direct / continuous circuit / route • Routers configured so that data travels along same / continuous path between sending / receiving / two devices // valid description of a virtual circuit • Circuit used only for the set purpose of connecting the sender / receiver / two devices.	**3**
5(b)	**ONE** from: • (More) secure (as has exclusive use of the connection) • Makes full use of the available bandwidth (of the connection).	**1**

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Question	Answer	Marks
6	**FIVE** from: • Needed when value required is not suitable / cannot be stored in source file (1st) value changes with time / value not known until merge (1) • Needed when a different value is required each time the merge is run (1st) valid example / explanation e.g. need to insert (new / next) date of meeting into a standard invitation / personal note for each recipient (1) • Use of FILL_IN / ASK field (1st) so a default prompt / message in the document is set (1) can be set to prompt once per merge to remind user / not proceed until information is entered (1) can be set to prompt for every document / recipient to ensure personal / customised information is entered. (1)	**5**

Question	Answer	Marks
7(a)	**TWO** from: • The durations / timings of each task • The dependencies / predecessors of each task.	**2**
7(b)	**THREE** from: • AOA: milestones/events are shown on the node // AOA focus is milestone/event rather than task • AOA: timings are shown on the arrow // AON timings at nodes • AOA: no separate start / end nodes // AON always has start / end nodes • AOA: (may) have dummy dependencies (for complex tasks) // AON: no dummy dependencies • AOA: large quantity of data written on the arrow (1st) more difficult to interpret (1) appear cluttered because there is a large amount information written on the chart (1).	**3**

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Question	Answer	Marks
8(a)	**THREE** from: • Explanation / description of / show how the software works so that end-users can use it effectively / properly / to carry out tasks • Explanation / description of / show all the available features so that end-users can make full use of the software • Explain / how to deal with faults / problems / troubleshooting so that support costs / time are reduced / end-user can solve (common) problems without support from company • Details / instructions of installation / setup procedures for first-time use so that end-users can get started with the software • System requirements (for installing / running the software).	**3**
8(b)	**THREE** from: • To help sell products to potential customers // establish a market presence • By showing brand / software product / features (to customers) • To outline the strategy to be used for marketing the software / advertising • Overview of / identity target market / audience • To provide a service level agreement (SLA) • That establishes / sets out (mutually) agreed service levels between developer / client / customer. • To define the work / tasks / deliverables / timelines / responsibilities associated with a particular project / contract • Set clear expectations between developer and supplier • Used for reference during the development / project. • To show the requirements / criteria for selecting a supplier / vendor (request for proposal (RFP)) • (Includes) a statement of work (SOW).	**3**

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Question	Answer	Marks
9(a)	**THREE** from: • Number of bits used to hold / store information about each (primary) colour is the colour depth / bit depth of each pixel (1st) 8 bits per colour gives 256 values / 256 bits per colour gives 16 777 216 / 16 million colours (1) • A greater range of colours uses more bits so the size is increased • A lower / restricted range uses fewer / less bits so the size is reduced • Additional channels / bits used for transparency (of a colour) can increase size.	**3**
9(b)	**THREE** from: • Greater colour depth / more bits per pixel results in higher quality image • Reduced colour depth / less bits per pixel results in lower quality image • Greater colour depth / more bits results in a more realistic image / photographic images • Reduced colour depth / less bits results in a less realistic image / photographic images More bits / greater colour depth may need more compression so results in artefacts / generational degradation.	**3**

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Question	Answer	Marks
10(a)	**FOUR** from, e.g.: • To determine what goods / items customers buy together (1st) so that they can place / display the items close together in stores / online on same web page / suggest 'customers also bought' (1) to encourage more / increase sales (1) • To determine which goods / items sell well / poorly (1st) to adjust inventory / increase availability of popular items / drop unpopular items (1) • To determine which goods / items at different times / seasons (1st) to target advertising campaigns (1) to adjust stock / availability of goods / items (1) • To determine which demographics buy particular goods / items (1st) to target advertising campaigns (1).	**4**
10(b)	**FOUR** from: • Does not reveal / show the significance of the extracted information • Does not pinpoint / indicate the causes of (any) found relationships in the data • Does / cannot predict the activities of individuals • Only shows trends in activities of large groups of individuals • Requires a (very / extremely) large / vast quantity of data (1st) to produce / output meaningful information (1) • (Large) quantity of data available may be overwhelming / so large as to be unmanageable • Time consuming / takes too long (in the timescales / resources available / allowed) • Costs may be prohibitive // can be expensive • Requires large amount of computing power / use of mainframe / supercomputers / high performance computers / large amount of storage • Too small dataset / quantity of data (1st) (leading to) erroneous / wrong decisions (1) • Anomalies / inaccuracies / false assumptions / data may be out-of-date / biased (1st) (leading to) erroneous / wrong decisions (1) • Raises privacy / ethical concerns (in banking / healthcare / retail) (1st) where personal data is mined (1) • Public do not know when / if their data is mined / used for data mining (1st) cannot make informed decisions about use of their data (1).	**4**

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Question	Answer	Marks
11	**SIX** from, e.g.: • Use of a smart device e.g. smart watch to provide / collects information about / track body function / activities uses sensors to observe / monitor wearer's health during e.g. sports / exercise data used by valid example of a health carer e.g. healthcare professionals / doctors / nurses during procedure / patient recovery • Data can be sent to remote / other devices / smartphones // (patients / subjects) do not have to be tethered to bedside machines / stay in one place to provide real-time information storage of data for later analysis • Used to monitor patients continuously (1st) valid example e.g. elderly / bed-ridden persons (1) • To provide alerts by monitoring body parameter of people at risk (1st) if value / reading is outside pre-set value (1) valid example of parameter monitored e.g. children subject to seizures / blood pressure / blood sugar level (1) • Use of smartglasses (with AR) by surgeons / student doctors (1st) valid example e.g. to assist in medical procedures / training (1).	**6**

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Question	Answer	Marks
12	**EIGHT** from: Max **SIX** from: *Vector images:* • Best suited to distinct / sharp-edged / blocks of colours • Use for the icons / logos • Colour gradients / merging colours / shades of colours not well represented / displayed • Not suitable for images that must look realistic / photographs // makes photographs look cartoonish • Are scalable without loss of quality // resolution / quality maintained when scaled • (Can be) small(er) file size • Load / download faster • Images represented by code / instructions / mathematical notations / calculations // made of shapes / objects • Code / svg script can be directly inserted into html / JavaScript code • File can be highly compressed with no loss of quality • Increased processing needs / overheads by browser • Requires a modern / up-to-date web browser // not all browsers can use vector graphics Max **SIX** from: *Bitmap images:* • Can have millions of colours / shades • Comprised of pixels • Suitable for realistic / natural images / photographs • Edges / blocks of colour / shapes can blend / merge • Files (can be) very large • Compression (may be) required / built into file type • Compression can affect quality of image • Decompression in web browser uses processing time / adds to processing time / overheads • Can be downloaded using inter-laced scan so image can be seen before while file is still downloading • Resolution / quality reduced / pixelated when zoomed (in) / enlarged / scaled (up) • Edges can become blocky / corrugated / zig-zagged / stair-cased • Not suitable for high quality logos / icons • Can be used in any / legacy / old browser.	**8**

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