

Cambridge International AS & A Level

INFORMATION TECHNOLOGY**9626/31**

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.

This document consists of **12** printed pages.

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.

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
	Benefit of the doubt
	To indicate where a key word/phrase is missing
	Incorrect
	Indicate a point in an answer
	Ignore subsequent work
	Statement/points are linked
	Maximum number of marks that can be awarded
	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.
	To indicate a point that has already been made or was given in the question
	Indicates that work/page has been seen including blank answer spaces and blank pages.
	Correct
	Too vague
	Indicate a point in an answer

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.

Question	Answer	Marks
1(a)	FOUR from: • Use of FTP client / web browser with FTP URL (on device / laptop / computer) • User types in / enters FTP address / URL of website / FTP server / site • FTP client sends request to server • (Request sent) on port 21 • Server responds to / accepts request from client • Connection established / set up (between FTP client and server) • In active mode server responds with / opens data connection / starts connection on port 20 • In passive mode client / server negotiate the data connection port to be used / client starts data connection on negotiated port if behind a firewall (1st) username / password credentials (usually) required (1) anonymous mode / no username / password for files that are publicly available (1) • File transferred as continuous stream of data / in blocks / compressed data.	4
1(b)	TWO from: • HTTP does not require additional software / is built into web browser so always / already available // no need for FTP client software / application to be installed / used (1st) so less software on device / no need to set up FTP client (which can be difficult) (1) • HTTP may not require login(s) // FTP requires login with personal details / anonymously lengthy (1st) so setup / access / overall time taken (for access) is reduced (1) • HTTP not blocked by firewalls // firewalls can block FTP connections (1st) so download may not be possible (1) • HTTP is not timed out // FTP connections can be dropped / stopped if they appear / are too long for the rules (1st) so connections fail / files are not completely downloaded / have to be restarted (1)	2

Question	Answer	Marks
2	FOUR from: Max TWO from: • (Both) used when designing a network // used in design stage (1st) to reduce / remove redundant connections / loops (1) used to specify how the devices communicate (1) • Both are needed for maintenance / update / installation. Max FOUR from: • Physical topology describes how / where / layout of the devices / links are actually / made • Physical (topology) needed when / used to add devices / find faults in network • Logical network describes / shows how / where / ways that the data flows (in a network) • Logical (topology) to find / solve software / transmission problems.	4

Question	Answer	Marks
3	SIX from: • (Switch) acts as a bridge / join (between the sections) (1st) so frames / packets / data can pass from section to the next / other sections (1) • (switch) examines all (incoming) frames / packets / data to determine destination device (1st) sends frames / packets / data only to port connected to destination device (1) if destination device / port not recognised / not known sends to all ports so frame / packet / data is not lost (1) • Frame / packet / data is (fully) regenerated before sending onwards (1st) no degradation in frame / packet / data loss (1) • Can compensate for different bandwidth / rate of data transfer on different sections of LAN • Can confine frames / packets / data to section of sender / recipient (1st) so manage network traffic / bandwidth (1) • Can be used to monitor network traffic (1st) TWO from these expansions: all frames / packets / data can be copied (to another port / administrator device) (1) for later analysis (1) to detect unauthorised frames / packets / data on the network (1).	6

Question	Answer	Marks
4(a)	THREE from: • Develop an understanding of the need for the data mining • The goals of the data mining are decided • Decisions are made on what information / data is required • Benefits of the data mining are assessed • The risks / costs to the business are assessed • The success criteria of the data mining are agreed • A plan is created / list of data-mining tools / resources to be used / tasks to carried out is decided.	3
4(b)	THREE from: • Data collected from sources relevant / available to business / needs • Collect sufficient data to ensure it has required trends / patterns • Ensure quantity / amount collected is manageable (in the time / resources allowed) • Describe the data (in a report) / valid example e.g. fields / number of records / format • Assess the data for quality / valid example e.g. validity / accuracy / completeness / consistent.	3

Question	Answer	Marks
5	FOUR from, e.g.: • Used to manage pain (1st) because it distracts from the actual / fear of pain (1) • Used during procedures / chemotherapy (1st) because it provides a calming / stress reduction environment (1) • Used to explain / show / demonstrate procedures (1st) to enhance the understanding by patient (1) to enable / allow informed consent (1) • Used in rehabilitation / physical therapy / recovery from injury / stroke / Parkinson's disease (1st) because it provides immediate feedback on exercises / treatment (1) • Used in training / teaching of medical professionals (1st) valid example e.g. because it allows practice without involving real patients (1)	4

Question	Answer	Marks
6(a)	FOUR from: • All task lengths shown correctly • Task 5 shown concurrent with tasks 2 and 3 • All dependencies / predecessors shown correctly • Longest / critical path shown • Valid / appropriate labels.	4
6(b)(i)	ONE from: • Acts as a visual overview of the schedule • Changes to schedule can be shown clearly • Milestones can be shown.	1
6(b)(ii)	ONE from: • Requires skill / expertise to create / use • Can be time-consuming to update • Not all details of tasks / activities can be shown // may be difficult to show all activities of (complex) project • Large projects may be too difficult / complex to manage on a (single) Gantt chart // may need to go over several pages • Difficult to / cannot allow for contingency time.	1

Question	Answer	Marks
7	EIGHT from: Max TWO from: <i>Definition / description of method:</i> - Dividing software into component parts and developing each into a prototype - Prototypes developed / tested until completely functional - Combined into final prototype / complete application. <i>Pros:</i> Max SIX from: - Requirements specification is considered at beginning (1st) all customer / client / developer requirements known at outset (1) so no unexpected changes (1) - Problems / mistakes / errors on one component do not affect others during development (1st) so do not slow / affect / development project times (1) so good for developing lengthy / large applications (1) - Working components are developed early on project / cycle (1st) can be shown to customer / client user (1) increased customer / client satisfaction / interest / involvement (1) - Requirements can be changed / amended / altered more readily / easily (1st) at any stage in development (1) more flexible development / less costly than other methods (1) - Suited to use of new / emerging technologies (1st) software can adapt as technology evolves (1) increased sales / end-user interest / early adopters (1) <i>Cons:</i> Max SIX from: - Detailed planning / designing needed at outset (1st) more time taken at start (1) added costs at start (1) - Increased complexity of project / development process (1st) more difficult to manage project (1) increased risks of errors / bugs (1) - Tracking / monitoring progress is more difficult (1st) due to multiple / several increments / features developing simultaneously (1) more difficult to identify problems / correct errors (1) - More communication needed between team members (1st) increased workload / time needed off-task (1) increased development time (1) - Increase in time needed for testing (1st) testing repeated at each incremental stage (1) increased costs / delay in completing development (1) ONE mark is available for a valid conclusion.	8

Question	Answer	Marks
8	SIX from: • Hiding / revealing objects / selected areas of an image • Selecting colours in an image that they can be replaced with another colour • Combining two (or more) images (1st) so only part of one image appears in the combined image (1) so part of one image does not appear in the combined image (1) • Make parts of image transparent / add transparency layer (1st) TWO from: • creating a cut-out effect (1) to hide parts of image // only some part of image are visible (1) to allow other layers to be seen (1) • Remove / cover noise / blurred areas (1st) improve image quality (1) • Blend two (or more) images together (1st) ONE from: • use / with a gradient mask (1) fade one image into another (1) • Create 'special' effect (1st) valid example of special effect e.g. vignette / edges blurred (1).	6

Question	Answer	Marks
9(a)	FOUR from: • Follows on / uses report from alpha testing • Uses a version (of software / app) ready for use by end-users // uses final version • Carried out by (selected) end-users (1st) not employees of developer / company (1) away from developer premises / company buildings / own environment / in real-life situations (1) • Does not require specialised equipment / testing equipment • Checks reliability / security / robustness // does not check code • (Usually) does not take a long time • Problems found are corrected and a new beta version produced.	4
9(b)	TWO from, e.g.: • It is time consuming to identify beta testers • Feedback may not be complete / same from each tester • Feedback may not cover all aspects of the app / comparing results may be difficult • Managing / keeping track of large numbers of testers can be difficult / requires cost / time / effort by developer • Beta testers must be trusted to keep app (details) confidential / business secrets are not leaked / lost to competition / copyright not breached • App / version must be stable enough for testers to use.	2

Question	Answer	Marks
10(a)	TWO from: - Combine data with other data - Deletes fields / records / anonymise information / destructive data transformation / valid example e.g. changing specific ages into age ranges, by removing names - Changing data from one format to another / standard form / using same / standard format / aesthetic data transformation / valid example - Restructuring / reorganising entities in a database / structural data transformation - Normalisation of data for use in relational databases.	2
10(b)(i)	ONE from: (Data is) exactly what is needed for the analysis (Data) matches the rules / definitions set for the analysis.	1
10(b)(ii)	THREE from: - Accurate / true / correct values (throughout) // all inaccurate data removed - Consistent / same every time it is found / present / throughout / in every instance - Complete / all necessary data present // all incomplete data removed - All irrelevant data removed - Uniform use throughout / in every instance - No corrupt data present - No unnecessary replication.	3

Question	Answer	Marks
11	Six from: Max SIX from: - HTML element assigned to <code>id</code> (in line 6) is read - JS code enclosed in <code><script></code> tags - Const statement declares <code>var a</code> // <code>var a</code> sets text for intro to name <code>= prompt()</code> used to create dialog / input box(es) (1st) user must interact / enter name before page carries on / dialog box is a blocking function / JS will not move on without user input / interaction (1) <code>(prompt() dialog)</code> box appears twice // one box for given name and one box for family name - Names assigned to variables / Given name assigned to <code>GName</code> / Family name assigned to <code>FName</code> (Line 11) combined name passed to HTML for display / interpretation by browser Max THREE from: <code>innerHTML</code> / line 11 used to combine / concatenate variables (1st) use of <code>+</code> (as concatenation) (1) no quotes around vars (1) order of var determines order of display (1) <code>" "</code> used to insert space between vars.	6

Question	Answer	Marks
12	SIX from: Max ONE from: - Valid definition / description of CGI e.g. computer-generated imagery that creates two-dimensional (2D) / three-dimensional (3D) objects that appear to move on screen. <i>Benefits:</i> Max FOUR from, e.g.: - Director has more freedom for creativity - Removes / reduces need for difficult / complex / impossible camera angles - Can use any camera angle / direction - Any (imaginable) scene / action can be created - No restrictions on action / lighting / colours - Scenes can be changed / amended / corrected during post-production - Without need to gather actors / film crew / go on location again - Reduces time taken for live filming - Reduces need for locations / actors / film crew <i>Drawbacks:</i> Max FOUR from, e.g.: - Requires highly skilled technicians - Increased costs of post-production - Requires skilled director to make full / competent use of CGI / system - Results can look poor / unrealistic if not created properly / carefully / skilfully - Can look artificial / unrealistic when combined with real-life action - Reduced viewer satisfaction / interaction / involvement / belief - May fail to comply with well-known / accepted 'laws of physics' / perceived normal action / movements - Reduced involvement / less use of real-life actors / film crew - Loss of (some) acting skills / reduced employment.	6