Cambridge International AS & A Level

INFORMATION TECHNOLOGY **9626/32**

Paper 3 Advanced Theory **May/June 2025**

MARK SCHEME

Maximum Mark: 70

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the May/June 2025 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **16** printed pages.

[Turn over

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors 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
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.

Annotation	Meaning
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

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	indicates the maximum number of marks that can be awarded
( )	the word / phrase in brackets is not required, but sets the context

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

Question	Answer	Marks
1(a)	**FOUR** from: • Set of instructions used to program the 3D printer / instructions created for the printer // CAD / software used to create instructions / design / model // uses computer-generated images // physical object scanned into software // software version of object • Instructions / image / (computer) model sent (to printer) • Printer prepared with (required) (raw) materials / plastics / metal powders / binding solutions e.g. titanium, nylon, concrete • Material heated to liquefy / prepare it to allow it to go through print nozzle • Thin layer of material sprayed / extruded through nozzles • Layers deposited / added in succession to build up object / printed from bottom up • Object cleaned / refined after printing to remove excess material • Material hardens / cools down / fused together • Removal of support / construction pegs	4

Question	Answer	Marks

1(b)	**FOUR f**rom:
	e.g.:
	• Creation of external prosthesis/limbs/casts (1st)
	  – that exactly match patient requirements/fit dimensions/bespoke (1)
	  – reduced (long term) costs (1)
	• Creation of (internal) implants/bones/cranial plates/teeth/artificial blood vessels (1st)
	  – that exactly fit patients (1)
	  – use for training purposes (1)
	  – do not have to wait for real organs / parts /donors (1)
	  – to assist in regeneration / replace real / faulty ones (1)
	• Creation / use of instrumentation / tools / machinery (1st)
	  – Use by surgeons / use as guides during surgery / to ensure exact location of surgery / implantation of devices (1)
	• Bioprinting (1st)
	  – to assist in regeneration / replace real / faulty ones (1)
	• Creation of custom lenses for glasses / contact lenses (1st)
	  – that exactly match patient requirements/fit dimensions (1)
	• Creation of customised medicines / drugs (1st)
	  – to individual patients (1)
	• 'On demand' / remote creation of drugs / drug capsules
		4

2(a)	**TWO** from: • The physical locations / arrangements of nodes / devices • The physical connections / wires / cables / wireless links between nodes / devices • The logical connections between nodes / devices • The flow of data (through the network) (1st) – regardless of the physical connections / follows the logical connections	3

Question	Answer	Marks
2(b)	**THREE** from: *Network architecture shows:* • The design / structure (of the network) • The types of physical components (on the network) • How the components function / are configured to work together • The services provided (on the network) • The protocols used for communications / services • type of transmission // (specify) wired / wireless connections	3
3	**SIX** from: • Contains / uses a WNIC (to provide Wi-Fi connectivity) • Uses radio (waves / signals) • Transmits beacon packets (1st) – informing WNICs in devices of its presence (1) • Wireless devices scan for available WAPs • Carry name of network / SSID for identification by user • Carry details of the radio frequencies / type / format of wireless network in use • SSID can be hidden / blank to hide network from (casual) users • Uses wireless protected access (WPA) security • WAP asks for passphrase / code / password when device requests connection • WAP rejects connection if incorrect passphrase // if correct connection is allowed • WAP uses passphrase / code to generate (encryption) keys • Keys are one-off / not re-used for other connections • (end-to-end) encryption of data (during transmission) • All connecting devices use same security method as WAP • Enterprise networks have central control of WAP security • (Provides / has) backhaul with sufficient bandwidth for all connected devices	6

Question	Answer	Marks
4	*Command word: Analyse - examine in detail to show meaning, identify elements and the relationship between them.* **SIX** from: Max **FIVE** if only **TWO** tools mentioned: Max **THREE** named tools from, max **THREE** per tool: • (Magnetic) lasso (tool) / free / direct selection (tool) (1st) **TWO** from: • Irregular area marked out (1) • Used to mark out area in an image (1) • Pointer placed at start of area / mouse clicked at start (1) • Button held down while moving around the area (1) • Mouse clicked at end (1) • Area is selected for copy / cut (1) • Magic wand / fuzzy / quick selection (tool) (1st) **TWO** from: • Makes automatic selection of area (1) • Works on edges / sharp changes in colour (1) • Pixel is selected by user (1) • (tool) selects all adjacent pixels of similar colour (1) • Produces contiguous area (similar to flood fill) (1) • Cut-out (tool) (1st) **TWO** from: • Used for removing / cutting section of image (1) • Area drawn by e.g. Magic wand / lasso (tool) (1) • Leaves a space / hole / blank area (1) • Section cut can be pasted into another / new image (1) • Crop (tool) (1st)	6

Question	Answer	Marks
4	**TWO** from: • Removes unwanted areas (1) • From edges of images (1) • Marked out by straight lines / rectangular area (1) • Masking (tools) (1st) **TWO** from: • Used to cover / overlay area (1) • Change the opacity / transparency of area (1) • Using alpha channel / layer (1) • Mask is a layer on top of image area (1)	

Question	Answer	Marks
5	*Command word: Discuss – write about issues(s) or topic(s) in a structured way.* **EIGHT** from: Max **SIX** from: *Benefits:* e.g.: • Allows use of mobile devices in (almost) any location • Have a large area coverage • Users are not restricted to wired / fixed locations • Enables users to move about while connected • So can communicate while travelling • Can work while travelling / away from office / home • Can be used to find your location • Using GPRS / internet (facilities / services) • Can access internet / entertainment services while mobile • Valid example of use e.g. use of social media Max **SIX** from: *Drawbacks:* e.g.: • connectivity issues / problems / lack of coverage (1st) cannot communicate (1) • risk of theft / robbery of mobile device (1st) more likely than when at home / in office (1) • security of data is at higher risk (1st) compared to fixed / cabled / in office / at home connection (1) • can lead to wasting time (1st) distraction of social media / gaming / gambling (1) • cost of use / connection is higher than fixed (1st) may restrict use / impact on other life choices (1) creates digital divide (1)	8

Question	Answer	Marks
6	**SIX** from: • analysis of the end-product / determine what has been created • defining the test strategy • aim of testing • what is to be tested • the types of tests to be carried out / what kind of testing • specifying who is to carry out the tests • specifying when the tests will be done • create / choose the test data • specifying the criteria for pass / fail of the tests • specifying the criteria for suspension of testing • create a means to record the test / test results // draw the table • writing the test schedule	**6**

Question	Answer	Marks

7	**SIX** from:
	b FIVE from:
	Similarities:
	• both are graphical representations
	• Both show tasks (needed to complete a project)
	• Both show the order of tasks
	• Both show milestones in a project
	• Both have start / end points
	• Both show timings
	• Both used arrows / arrowed connectors to show flow of a project
	• both can show the critical path through a project
	• both show dependencies
	
	Max **FIVE** from:
	Differences:
	• activity-on-node diagram shows tasks at the node (1st)
	  – in boxes (1)
	  – containing timings (1)
	• activity-on-arrow diagram shows milestones at the nodes (1st)
	  – in circles (1)
	• activity-on-arrow diagram shows tasks on the arrows
	
	Max **FIVE** from:
	Comparisons:
	• **Activity-on-node** diagrams focus on the tasks whereas **activity-on-arrow** diagrams focus on the milestones
	• Is only one PERT chart for the project with **activity-on-node** // can have multiple sub-PERTS with **activity-on-arrow**
	• Calculating critical path is easier with **activity-on-node**
	• **Activity-on-node** diagrams are less cluttered / easier to read / understand / interpret (than **activity-on-arrow** diagrams)
	• **Activity-on-node** diagrams are easier to insert tasks / amend / change / add to (than **activity-on-arrow** diagrams)
		6

Question	Answer	Marks
8(a)	**TWO** from: • Key frames used • Sets <u>start</u> and <u>end</u> positions of object • Software / automatically creates frames (in between the key frames)	2
8(b)	**FOUR** from: • Key points / positions marked on original shape are mapped to key points / position on new shape • Relocates/ moves pixels • Forward mapping • Each / every pixel in shape mapped / matched to (equivalent) pixel in new shape • Reverse mapping (1st) with a sample / selection of pixels in new shape (1) • Selected pixels used as start point / pixels in forward mapping • When all pixels mapped (1st) (software) creates intermediate images / shapes (1) with gradual distortion of original shape into new shape (1) • Pixels in old shape faded out / new shape faded in	4

Question	Answer	Marks
9(a)	**TWO** from: • used in logical operations • to determine equality / inequality (1st) between variables / values (1) • returns TRUE / FALSE as the result of the comparison	2
9(b)	**FOUR** from: • === returns TRUE if (both) the <u>value</u> and <u>the type</u> are equal / the same returns FALSE if either is unequal / not the same • !== returns TRUE if the value is not equal or the type is not equal returns FALSE if either is equal / the same	4

Question	Answer	Marks
10(a)	**TWO** from: • A shared database • (Copied / replicated) to all members / users • Is decentralised • All copies synchronised / updated at every transaction	**2**
10(b)	**TWO** from: • A record of every transaction • A timestamp for every / each transaction • A unique cryptographic signature (linked to every / each transaction)	**2**

Question	Answer	Marks
11	*Command word: Discuss – write about issues(s) or topic(s) in a structured way.* **EIGHT** from: *Content areas could include:* *e.g.:* • Determines links / relationships / trends • In large datasets (of customer activities / products / services) between products used by customers so used in marketing of other bank / financial products • Increases sales by targeting of products based on customer choices / preferences / activity • Risk analysis discover trends / relationships / links between customer activity on credit / debit cards discover fraud / fraudulent / illegal activity / financial transactions • Used in credit scoring analyse customer activity over many accounts / time to determine reliability of customer management of customer financial portfolios…discover trends in stock / share values (over time) allocate capital / resources / money in trading of e.g. stocks and shares maximise profits for bank / customers • Investment banking discover suitable investments predict trends in value of investments • Privacy / security of personal information issues • Costs involved	**8**