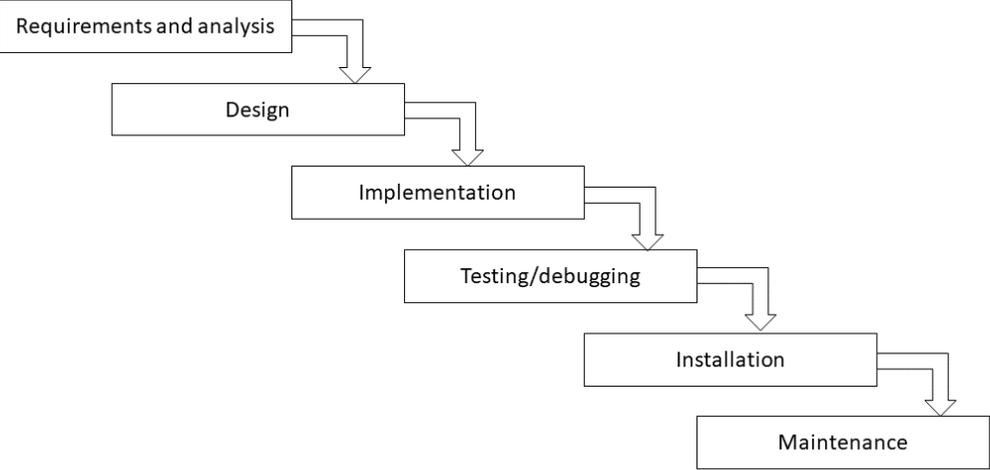# Mark Scheme (Results)

Summer 2023

Pearson Edexcel International Advanced Level
In Information Technology (WIT13) Paper 01

Question number	Answer	Additional guidance	Mark

1 (a) (i)	Award **one** mark for any of the following up to a maximum of **two** marks:
	
	    1. Gantt chart (1)
	    2. Critical path analysis (CPA) (1)
	    3. Precedence table (1)
	    4. Pert chart (1)
		Award other tools such as examples of project planning software, decision tree, PERT tree, Kanban, PDM (Precedence Diagram Method)
		
		Do not award methods of project management (agile, waterfall) or features of them
		
		Do not award general tools (flowcharts), productivity tools (spreadsheets), or communication tools (video conferencing)
			2

Question number	Answer	Additional guidance	Mark

1 (a) (ii)	Award **one** mark for any of the following:
	
	    • Achievable (1)
	    • Attainable (1)
	    • Accessible (1)
		Accept words with equivalent meanings beginning with the letter 'a'
		
		Do not award accurate, as it is equivalent to Specific, which is the 'S'
			1

Question number	Answer	Additional guidance	Mark
1 (a) (iii)	Award **one** mark for any of the following: • Criteria/outcomes for project success are clearly set out (1) • The chances of success are improved (1) • So that the progress of the project can be monitored (1)	Accept equivalent Do not award responses that are tied to the other individual letters, rather than the project, e.g. realistic, time-bound	1

Question number	Answer	Additional guidance	Mark
1 (b)	Award **one** mark for any two items in the correct order ignoring omissions. OR Award **two** marks for all four items in the correct order. Correct order: - Design - Implementation - Testing/debugging - Installation Example: Requirements and analysis Design Implementation Testing/debugging Installation Maintenance	Award subject-specific equivalent expressions, such as coding for implementation and deployment for installation Award if no arrows/lines but order is clear. Ignore additional steps	**2**

Question number	Answer	Additional guidance	Mark
1 (c)	Award up to **two** marks for a linked explanation such as: • The application platform (the cloud) and all its software/hardware dependencies are abstracted away/removed (1) because a container consists of the exact runtime environment and dependencies required by the application itself (1) • The runtime environment on the cloud doesn't matter (1) because the containerised product is released with its very own runtime environment (1) • Containerisation will ensure bugs will not be introduced when the completed software product is loaded onto the cloud servers (1), because the code, together with all the configuration files and libraries it needs, is encapsulated within the container in its own independent runtime environment (1)	Do not award responses about security	**2**

Question number	Answer	Additional guidance	Mark
1 (d)	Indicative content: Benefits in context: - Could save lives caused by accidents in live training - Could save time because pilots/engineers can be trained while the aeroplane is being built - Could avoid costs of damage to aeroplanes in live training - Could practice take-offs/landings at airports around the world, without physically visiting them - Could simulate a wide range of aeroplanes/control configurations/equipment changes - Could be reused to train as many pilots/engineers as needed - Could simulate emergency situations without putting either the aeroplane or personnel at risk - Could be programmed to provide authentic responses through haptic devices Drawbacks in context: - Would be expensive/costly to design and build the training machine - Would need experts to bring the different hardware devices (headsets, displays, haptic) together - Might be expensive to produce the required software to control the machine - May not replicate the full experience of being in an aeroplane because the controls may physically feel different - Personnel could experience bad side-effects such as dizziness or nausea when using the VR equipment		**6**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a superficial and unbalanced discussion.
Level 2	3–4	• Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies. • Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.
Level 3	5–6	• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a balanced and fully developed discussion.

Example:

Using a VR flight trainer will allow trainees to safely practice flying a plane, making dangerous and risky manoeuvres that would be too unsafe in real life. As physical planes are not required, it means they don't need to be removed from paying customers for training. Planes require fuel which can be expensive, so using VR, should reduce overall costs related to physical planes.

A VR flight trainer can simulate environments like storms and dust that are rare, which a trainee will not experience in a real training flight. That means they can be prepared for unlikely but dangerous scenarios. A VR flight trainer can also simulate system failure and malfunction, like a wing engine exploding or losing control of the wings, so that trainees can prepare for them. They can do this safely with no risk to a real plane or real people.

However, the VR experience would be inauthentic and unable to simulate the experience of flying perfectly, as it cannot be equal to actually sitting a cockpit in the air. A simulation may not give feedback like G-forces or tilting when turning. This will leave a gap in the knowledge of trainees.
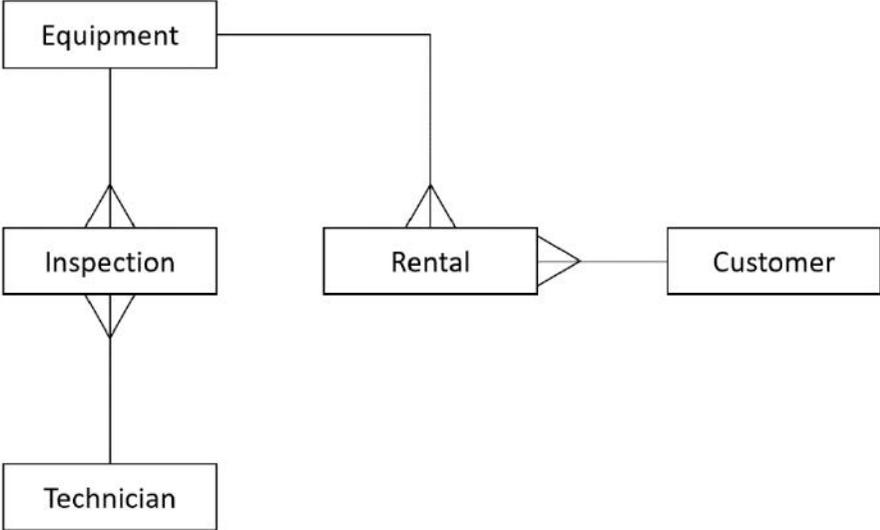
Furthermore, the VR experience may cause trainees to develop habits specific to the flight trainer, such as depending on oversights to cheat during practice. The VR simulation may have left out controls that are present in a real cockpit.

VR requires expensive hardware, computers, control panels, and experts to write and maintain it.
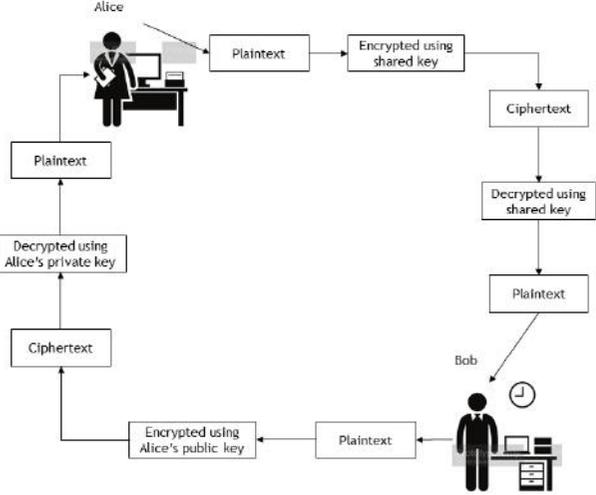
Overall, the benefits outweigh the negatives.

Question number	Answer	Additional guidance	Mark
2 (a)	Award up to **two** marks for a linked explanation such as: • Data consistency is increased / anomalies from insert/update/delete are reduced (1) because the DBMS rules ensure related data is changed together (1) • Data integrity/completeness is increased (1) because tables ensure all related data is stored together/in one location/in one table only (1)	Do not award responses about accuracy or up-to-date	**2**

Question number	Answer	Additional guidance	Mark
2 (b) (i)	Award **one** mark for each correct cell: <table><tr><td>Information</td><td>Valid data</td><td>Invalid data</td><td>Validation type</td></tr><tr><td>Equipment names</td><td>Paddleboard Kayak Fishing canoe</td><td><blank></td><td>Presence check (1)</td></tr><tr><td>Rental period in hours</td><td>1 to 24</td><td>30</td><td>Range check (1)</td></tr></table>	Allow length check for first cell Allow coded responses, such as required == True, NOT NULL, BETWEEN 1 AND 24.	**2**

Question number	Answer	Additional guidance	Mark
2 (b) (ii)	Award **one** mark for any of the following: • **Booking/rental entity (1)** • **Inspection/service entity (1)** • **1:M relationship type from Equipment to Rental (1)** • **1:M relationship type from Customer to Rental (1)** • **1:M relationship type from Equipment to Inspection (1)** • **1:M relationship type from Technician to Inspection (1)** Example: 	Accept equivalent names Accept equivalent notations for relationship types If more than one line between two entities, do not award either	6

Question number	Answer	Additional guidance	Mark
3 (a) (i)	Award **one** mark for any of the following: • (Public/encryption) key value of the owner (1) • Identity/unique ID/name of the owner (1) • Identity/unique ID/name of the issuer/certificate authority (1) • Digital signature of the issuer/certificate authority (1) • Serial number of the certificate (1) • Expiry date (1)	Date is given in the question Do not award user as equivalent to owner/issuer	**1**

Question number	Answer	Additional guidance	Mark
3 (a) (ii)	Award **one** mark for any of the following up to a maximum of **two** marks: • A Certificate Authority is an organisation that issues the certificate (1) • A Certificate Authority maintains a list of certificates that have been issued (1) • The Certificate Authority verifies that the entity/business registering the certificate is who they say they are (1) • A Certificate Authority maintains a list of certificates that have been revoked/expired (1) • A Certificate Authority determines if a certificate is authentic/valid (1)		**2**

Question number	Answer	Additional guidance	Mark
3 (b)	Award **one** mark for any of the following: 1. Plaintext originating any instance (1) 2. Plaintext terminating any instance (1) 3. Order on symmetric (plaintext, key, ciphertext, key, plaintext) (1) 4. Order on asymmetric (plaintext, key, ciphertext, key, plaintext) (1) 5. Bob uses the same shared key to decrypt (1) 6. Public key identified on asymmetric (1) 7. Private key identified on asymmetric (1) 8. Public key used to encrypt and private key to decrypt (1) 9. Indication that asymmetric keys belong to Alice (1) Example: 	Award 'message/data' as 'plaintext' when in boxes closest to Alice or Bob where plaintext should be Award 'encrypted message' as ciphertext Do not award 'different/same' to mean 'public/private' Do not award example plaintext or example ciphertext Allow follow through on plaintext and ciphertext as long as clear Ignore extraneous/extra boxes and contents	**9**

Question number	Answer	Additional guidance	Mark
4 (a) (i)	Award **two** marks for a linked explanation such as: • Fields 1 and 2 could be used to identify lapsed customers (1), so that they can be targeted for offers/calls/retention devices (1) • Fields 7 and 8 could be used to identify poor customer service (1), so that more agents could be added (1) • Fields 1 and 6 could be used to identify that a customer has attempted to contact company (1), so that the volume of contacts can be monitored/to have agents make personal contact (1) • Fields 1 and 7 could be used track which customers are waiting longest (1) to prioritise the order of answering the calls (1)	Answers should be structured to identify fields and the named piece of information to be derived (1) and what it is used for (1) Do not award 'improve customer service' alone, as expansion Do not award field numbers alone Where only a single field is given, but there is an expansion that fits, award 1 mark	2
Question number	Answer	Additional guidance	Mark
4 (a) (ii)	Award **two** marks for a linked explanation such as: • Fields 1, 4, and 5 could be used to synchronise marketing activities (1), so that duplicate offers are not sent to customers (1) • Fields 1, 2, and 3 are used to upsell/cross sell (1), so that customers are given suggestions for additional purchases/services (1) • Fields 1, 2, 3 are used to identify customers not visiting the stores in a long time (1), so that they can be sent advertisements for products of interest to them (1)	Answers should be structured to identify fields and the named piece of information to be derived (1) and what it is used for (1) Do not award 'improve marketing' or 'send promotional materials' alone, as expansion Do not award field numbers alone Where only two fields are given, but there is an expansion that fits, award 1 mark	2

Question number	Answer	Additional guidance	Mark
4 (b)	Award **one** mark for each correct cell:		**4**

	eover method
The accountants at every retail store will use both the existing accounting software and the new accounting software for the next month.	Parallel (1)
Head office will switch the records it holds for the stores in Liverpool to the new system and leave the records of the other stores on the existing system. It will switch the records of the other stores to the new system when the new system is working correctly.	Pilot (1)
The retail stores will use the new electronic point of sale machines but will continue to use the existing purchasing system for another three months.	Phased (1)
The purchasing department at head office will close for a week so that the existing software is removed and the new software is installed on all computers in the department at the same time.	Direct (1)

Question number	Answer	Additional guidance	Mark
4 (c)	Indicative content: Risk management: - Risk management is the process to monitor and evaluate how well an organisation secures its assets, data, and systems. - A risk management policy would include: - identification of potential risks/types of risks - categorisation of risks (low, medium, high, acceptable, unacceptable, etc.) - identifies ways to monitor risks - sets out responses to risks and who is responsible for responding - defines a schedule for the review of policies Disaster recovery: - A disaster recovery policy would be used in the event of natural disasters, accidental or malicious damage which causes loss of data. - A disaster recovery policy would include: - a process for making backups - a procedure for storing backups off-site - a process for restoring data from backups - a procedure for obtaining new facilities - a procedure for obtaining new equipment - identification of key personnel and their roles in recovery		**6**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a superficial and unbalanced discussion.
Level 2	3–4	• Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies. • Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.
Level 3	5–6	• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a balanced and fully developed discussion.

Example:

A recovery plan and risk management are carried out so that the business can resume its operations and return to their normal functioning without major (or minimal) loss of resources and budget.

Risk management is used to analyse potential risks and disasters that could occur. It involves going thorough checks of the IT system to find potential threats. It also involves creating a plan that states the necessary steps to be taken in case a risk arises, who is responsible for what and how employees need to respond. All risk management policies are updated and reviewed regularly. Policies may also include practice by drills so everyone involved is well aware of what to do in the case of a disaster.

Disaster recovery policies allow a business to know the necessary steps to be taken in the event of a disaster to keep the company running. They prepare for both kinds of disasters: logical (company hacked and resources stolen or malware infiltrated the system) and physical (earthquake leading t destruction of data centre/building). The company must prepare for the bringing online of parallel/hot sites and transfer of processes. Responsibilities and roles of individual involved are noted (who is responsible for backup, who starts servers etc).

This is all important to ensure business continuity and reduce effects of a disaster.

Question Number	Answer	Additional Guidance	Mark
5	Award **one** mark for any of the following up to a maximum of **twelve** marks: 1. Order table (1) 2. Stock table (1) 3. Stock table primary key (stock id) (1) 4. Stock table foreign key (manufacturer id) (1) 5. Customer table (1) 6. Customer table primary key (customer id) (1) 7. Manufacturer table (1) 8. Manufacturer table primary key (manufacturer id) (1) 9. Fully normalised (correct tables, no missing fields, no extra primary or foreign keys (1) **Five-table solution** 10. Item table primary key (order id, item number / order id, stock id) (1) 11. Item table foreign key (order id) (1) 12. Item table foreign key (stock id) (1) **Four-table solution** 10. Order table primary key (order id) (1) 11. Order table foreign key (customer id) (1) 12. Order table foreign keys (stock id) (1) **Five-table solution**	Award any naming convention Do not award across both possible solutions To be considered a table, there must be at least one field Primary keys must have an underline only Foreign keys must have an asterisk only	12

Five-table solution

tbl_order	order_id	date	customer_id*

tbl_item	order_id*	item_number	stock_id*	quantity

OR

tbl_item	order_id*	stock_id*	quantity

tbl_stock	stock_id	stock_name	mfg_id*

tbl_customer	customer_id	customer_name

tbl_manufacturer	mfg_id	mfg_name

Five-table solution using parenthetical format
tbl_order (order_id, date, customer_id*)
tbl_item (order_id*, item_number, stock_id*, quantity) / tbl_item(order_id*, stock_id*,
quantity)
tbl_stock (stock_id, stock_name, mfg_id*)
tbl_customer (customer_id, customer_name)
tbl_manufacturer (mfg_id, mfg_name)

Four-table solution

tbl_order	order_id	stock_id*	quantity	customer_id*	date

tbl_stock	stock_id	stock_name	mfg_id*

tbl_customer	customer_id	customer_name

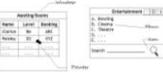| tbl_manufacturer	mfg_id	mfg_name

Four-table solution using parenthetical format
tbl_order (order_id, stock_id*, quantity, customer_id*, date)
tbl_stock (stock_id, stock_name, mfg_id*)
tbl_customer (customer_id, customer_name)
tbl_manufacturer (mfg_id, mfg_name)

Question number	Answer	Additional guidance	Mark
6 (a)	Award **one** mark for any of the following: 1. Two context related windows (1) 2. An icon (1) 3. A menu (1) 4. A pointer (1) 5. Any two correct labels (1) 6. All four labels correct (1) Example: 	Responses must fit into the context of the conference centre. Do not award boxes with just 'menu' or 'icon' as text inside the box. The information should be relevant to the context of the conference centre. Icons should look like icons, not buttons/boxes If an item is not awarded, then do not award corresponding label	**6**

Question number	Indicative content	Additional Guidance	Mark
6 (b)	Responses should be in the context of the screen designs supplied Rule 1: Strive for consistency • The fonts are in different locations on each screen • There is a mixed choice of fonts, even on the same screen • The size of the fonts is mixed, even on the same screen • Text is green in some places and red in others • The overall design is not consistent Rule 2: Seek universal usability • The choice of stylised fonts may make it difficult for people with reduced vision to read • The small fonts (welcome, account) may make it difficult for people with reduced vision to read • The mix choice of red and green for colours may restrict those with colour-blindness • The overall design is not universally usable Rule 3: Offer informative feedback • There is one instance of informative feedback (find a movie) where the number of characters left in the text box is counted down • There is no indication of what happens when the user clicks somewhere they're not supposed to • The overall design lacks consideration for helping the users if they make errors Rule 4: Permit easy reversal of actions • There is one instance of a 'back' key being provided (account screen), which will help users move through the screens. • There is one instance of a 'backspace' key being provided (find a movie), which will help users enter a movie name • The overall design could be improved to allow the user to correct any errors they make Conclusion • The current design is incomplete • The current design does not meet the requirements of the four rules for user interface design	Conclusion does not need to be a separate point, but may be inferred from discussion	**12**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–4	• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a response that lacks development. • Demonstrates limited awareness of competing arguments. • Conclusion, if present, is generic or unsupported.
Level 2	5–8	• Demonstrates knowledge and understanding, which is mostly relevant and may include some inaccuracies. • Applies understanding to make some coherent connections and a partially developed response. • Demonstrates some awareness of competing arguments, but this may be unbalanced, and partially supports conclusion with evidence.
Level 3	9–12	• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a fully developed response. • Demonstrates an awareness of competing arguments and supports conclusion with evidence.

Example:

Good interface design makes the user experience more enjoyable, is comfortable to use and allows a wide range and groups of people to use the interface, i.e. is accessible and ergonomic.

Rule 1: Strive for consistency

This interface does not meet this rule as its design components are not consistent. In the first window, the text font for 'movies', 'sports, and 'accounts' is different from each other eventhough the options are part of the same general menu.

To meet Rule 1, the developer should change all of them to one suitable font to maintain consistency and be easy on the eyes.

The interface also does not follow consistency with its 'back' and 'next' buttons on the second and third screen. The location of both buttons that carry out similar functions is different and can be confusing to users. The developer should put buttons that go to the previous or next page in a similar position so its not confusing and users can easily navigate through the interface.

It also does not show consistency in font sizes on first and second window. The entire title 'Welcome screen' should be one font size and in window 2 all text should also be the same font size.

Rule 1: Seek universal usability

The interface does not follow this rule with its choice in font and background colours. In the first window, the interface uses the combination of the colours red and green. This does not seek universal usability because visually impaired people such as those with red-green colour blindness will find it very difficult to navigate the interface. The developer should take this into account and change font and background colours to those suitable for all and with better contrast to make it accessible.

The developer should also make titles and subtitles to be in larger font sizes to be easier to spot and read properly.

Rule 3: Offer informative feedback

The interface meets this rule when it provides information to users to easily navigate the system.

For example, in the first window, it asks the user to make a choice guiding them on how to view the information they would like to view.

The interface also provides informative feedback with the 'back' and 'next' buttons informing the user what to click to change pages hence meeting the rule.

It also follows this rule when it informs the user how many characters they have left in their search.

Rule 4: Permit easy reversal of actions

The interface allows the user to go back to a page in case they want to change something or make another decision. However, the buttons are located in different positions and users may find it hard to locate them hence unable to reverse any action. The buttons should be put in similar places and where they can easily be spotted to fully meet this design rule.

Additionally, there is also a backspace button to allow users to easily edit text entered in case they made a mistake allowing for easy reversal.

Overall, the interface meets some rules only and in order for it to be a good and accessible interface design, some changes as stated in the recommendations above need to be made.