

T Level Technical Qualification in Digital Production, Design and Development

Mark Scheme (Results)

Autumn 2022

Paper 2: The Business Environment

General Marking Guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Learners must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks if the learner's response is not rewardable according to the mark scheme.
- Where judgement is required, a mark scheme will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the mark scheme to a learner's response, a senior examiner should be consulted.
- Crossed out work should be marked unless the learner has replaced it with an alternative response.
- Accept incorrect/phonetic spelling (as long as the term is recognisable) unless instructed otherwise.

Points-Based Mark Scheme Guidance

Points-based mark schemes are made up of:

1. Mark scheme rubric
A mark scheme rubric instructs an examiner as to how each mark is awarded.
2. Example Responses
These demonstrate the type of acceptable responses that a student might provide and where each mark is awarded.
3. Additional marking Guidance
This informs examiners about any parameters which should be applied e.g., 'accept any other appropriate/alternative responses.'

Applying the points-based mark scheme guidance

Examiners should follow the mark scheme rubric and use the example responses as a guide for the relevance and expectation of the responses. Students must be credited for any appropriate response. Should candidates provide answers that meet the rubric but in an alternative order, credit should be given.

Levels-Based Mark Scheme Guidance

Levels-based mark schemes (LBMS) have been designed to assess students' work holistically. They consist of two parts:

1. Indicative content

Indicative content reflects content-related points that a student might make but is not an exhaustive list. Nor is it a model answer. Students may make some or none of the points included in the indicative content as its purpose is as a guide for the relevance and expectation of the responses. Students must be credited for any appropriate response.

2. Levels-based descriptors

Each level is made up of a number of traits which when combined together articulate the quality of response that a student needs to demonstrate. The traits progress across the levels to demonstrate the different expectations of each level. When using a levels-based mark scheme, the 'best fit' approach should be used.

Applying the levels-based descriptors

Examiners should take a 'best fit' approach to determining the mark.

- Examiners should first make a holistic judgement on which level most closely matches the student's response. Students will be placed in the level that best describes their answer. Answers can display characteristics from more than one level, and where this happens markers must use any additional guidance (e.g., weighting of traits) and their professional judgement to decide which level is most appropriate.
- The mark awarded within the level will be decided based on the quality of the answer and will be modified according to how securely all traits are displayed at that level:
 - Marks will be awarded at the top of that level if the student has evidenced each of the descriptor traits securely.
 - Where the response does not securely meet all traits, the marks should be awarded based on how closely the descriptor has been met.

Section A

Question Number	Answer	Mark
1(a)	<p>Award one mark for identification and one mark for an appropriate linked explanation/expansion up to a maximum of two marks.</p> <p>A business that provides a (physical) item (1) such as a factory or shop (1)</p> <p>Accept any other appropriate response.</p>	(2)

Question Number	Answer	Mark
1(b)	<p>Award one mark for each identified layer up to a maximum of two marks.</p> <ul style="list-style-type: none">• application (layer)• transport (layer)• internet (layer)• network (access) (layer)	(2)

Question Number	Answer	Mark
2(a)	<p>Award one mark for each of the following, up to a maximum of two marks.</p> <ul style="list-style-type: none">• Employee information/credentials/authentication details• Employee salary• Employee perks• Client lists• Trade secrets• Sales numbers• Customer information/credentials• News about pending restructuring. <p>Accept any other appropriate response.</p>	(2)

Question Number	Answer	Mark
2(b)	<p>Award one mark for each identification and one mark for an appropriate linked explanation/expansion up to a maximum of four marks.</p> <ul style="list-style-type: none">• Botnets (1) which hijack a computer (to perform other malicious activities) (1)• Distributed Denial-of-Service attacks (DDoS) (1) that overwhelm servers (1)• Hacking (1) to gain unauthorized access/steal information (1)• Malware (ransomware) (1) which damages files/ causes disruption (1)• Social engineering (pharming, phishing) (1) to fool people into divulging sensitive information (1)• Insecure Application Programming Interfaces (APIs) which allow backdoor access (1)• Use of ad-hoc or open networks (1) which do not run secure services (1)• Eavesdropping/man-in-the-middle attacks (1) which allow hackers to intercept data (1) <p>Accept any other appropriate responses.</p>	(4)

Question Number	Answer	Mark
3(a)	<p>Award one mark for each of the following linked points, up to a maximum of four marks.</p> <p>a network interface/connectivity is needed (in device) (1) allowing connection to the network/LAN (1) either wirelessly or cabled (1) allowing connection to a server (1)</p> <p>Accept any other appropriate responses.</p>	(4)

Question Number	Answer	Mark
3(b)	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.</p> <p>RAM is volatile (1), so any unsaved data is lost on power loss (1)</p> <p>RAM is changeable (1) as it supports READ/WRITE operations (1)</p> <p>Faster read and write speeds (compared to a hard drive) (1) so data held in memory can be processed faster (1)</p> <p>Accept any other appropriate responses.</p>	(4)

Question Number	Answer	Mark
3(c)	<p>Award one mark for identification and one mark for an appropriate linked explanation/expansion up to a maximum of two marks.</p> <p>Put in to context (1) to give meaning (1)</p>	(2)

Question Number	Answer	Mark
4	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.</p> <ul style="list-style-type: none"> Allows emulation (1) so the effectiveness of the tool on different platforms can be tested (1) Allows for isolation (1) so if the tool fails the host machine is not infected (1) Increases security (1) as features of the host machine can be hidden (1) <p>Accept any other appropriate responses.</p>	(4)

Question Number	Answer	Mark
5	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.</p> <ul style="list-style-type: none"> • CAD package (1) to produce a 2D/3D model of the shoe (1) • Digital art package (1) to produce a digital drawing/sketch of the shoe (1) • CAM (1) to make physical prototypes (1) • Social media (1) to identify target market/engage with customers (1) • Video editing software (1) could be used to mockup advertising campaign (1) • Use of VR/AR (1) to model prototype of shoe (1) • Using Forms/Spreadsheets (1) to gather/analyze customer feedback (1) <p>Accept any other appropriate responses.</p>	(4)

Question Number	Answer	Mark
6	<p>Award one mark for identification of the risk, one mark for an appropriate linked explanation of the risk and one mark for a further expansion, up to a maximum of three marks</p> <p>Cyberattack (1) such as a malware/hacking/DDOS (1) which would compromise sensitive information/degrade system performance (1)</p> <p>Failure to comply with regulations (1) which would result in fines (1) and damage the company reputation (1)</p> <p>System failure (1) which could cause loss of business (1) and damage company profits (1)</p> <p>Audience exclusion (1) which would limit potential customers (1) and harm sales (1)</p> <p>Emergence of rival services (1) that would steal customers (1) and harm sales (1)</p> <p>Rapid changes in technology (1) which would require investment (1) thus reducing profits (1)</p> <p>Accept any other appropriate responses.</p>	(3)

Question Number	Answer	Mark
7	<p>Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:</p> <p>Data warehousing</p> <p>A data warehouse is a central store of large amounts of data from many sources. This data is captured over a long time period, and it builds a historical record that can be invaluable to business analysts. A data warehouse stores data in a relational structure, using tables. A large amount of storage is required for data warehousing, but not as much as a data lake.</p> <p>Data lake</p> <p>A data lake is a used to store data in its native format. This format may be unstructured and could be a series of flat files. Data in a data lake typically needs to be wrangled before it can moved to a data warehouse. Data lakes require large amounts of storage and data capture methods.</p> <p>Data mining</p> <p>Data mining is used to get meaningful information from a data warehouse. Mining searches through a warehouse (drills down) to find patterns in data, and then builds models based on these patterns.</p> <p>Reporting</p> <p>Data reporting is the process of turning raw data into meaningful forms, such as tables or graphs, which can be used to make business decisions.</p> <p>Possible Evaluative Points</p> <p>Data warehousing</p> <ul style="list-style-type: none"> • Capture large amounts of data • But high storage requirements <p>Data Lake</p> <ul style="list-style-type: none"> • Can store data in raw/unstructured format • But must be wrangled before being used <p>Data Mining</p> <ul style="list-style-type: none"> • Can provide meaningful information which can aid decision making • But requires large amounts of processing <p>Reporting</p> <ul style="list-style-type: none"> • Can present data in a meaningful format • But some detail can be lost if not careful 	

	<p>Example Conclusion</p> <p>Data analysis tools help businesses gather their data into one location, then to organise this data, make sense of the data and present meaningful findings. They are drivers of change and allow companies to make better decisions. They require lots of resources in terms of storage. data capture machines and software development but the benefits they offer companies far outweigh the costs.</p>	(9)
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Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	<ul style="list-style-type: none"> • Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3) • Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2) • Demonstrates a basic evaluation which partially considers different factors/events and their relative importance, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	4-6	<ul style="list-style-type: none"> • Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3) • Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2) • Demonstrates a good evaluation which considers different factors/events and their relative importance, leading to a conclusion which is partially supported (AO3)
Level 3	7-9	<ul style="list-style-type: none"> • Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3) • Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2). • Demonstrates a thorough evaluation which comprehensively considers different factors/events and their relative importance, leading to a conclusion which is well supported (AO3)

Section B

Question Number	Answer	Mark
8(a)	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.</p> <ul style="list-style-type: none"> • Support HR (1) by seeing which employees need training in manual handling (1) • Support finance (1) by analysing shopping trends on a store by store basis (1) • Support shop managers (1) by allowing them to plan shift patterns plan around busy times of the day/year (1) • Support logistics (1) by monitoring stock/delivery needs at each store (1) • Support marketing (1) by allowing them to run advertising campaigns for seasonal products (1) • Research and Development (1) to identify plan new shop layouts (1) <p>Accept any other appropriate answer.</p>	(4)

Question Number	Answer	Mark
8(b)	<p>Award one mark for each of the following linked points, up to a maximum of three marks.</p> <p>The system would be used in one supermarket/department (1) allowing the system to be evaluated (1) and issues to be resolved (1) before implementing in all other supermarkets (1)</p> <p>Accept any other appropriate responses.</p>	(3)

Question Number	Answer	Mark
8(c)	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of two marks.</p> <ul style="list-style-type: none"> • Users are not limited to specific devices (1) so staff can check shifts etc. when away from the store (1) • System resources can scale automatically (elasticity) (1) as demand requires (1) • Cloud service provider servers have high redundancy (1) meaning this system will have less down time (1) <p>Accept any other appropriate responses.</p>	(2)

Question Number	Answer	Mark
8(d)	<p>Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:</p> <ul style="list-style-type: none"> • Data that is important to the supermarket such as sales, stock levels and staffing details can be stored in databases or data lakes. • Data dashboards can be used to present data such as slow selling items or items with little shelf life left can be presented as graphs or other visualisations. • These visualisations can help supermarket managers understand complex data and will allow them to make informed business decisions. • These tools are web based and therefore allow managers to access data away from their office • These tools are elastic and allow for expandability • DaaS is cloud based so reliability is likely to be improved 	(6)

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-2	<ul style="list-style-type: none"> • Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3) • Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2)
Level 2	3-4	<ul style="list-style-type: none"> • Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3) • Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2)
Level 3	5-6	<ul style="list-style-type: none"> • Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3) • Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2)

Question Number	Answer	Mark
9(a)	<p>Award one mark for each of the following linked points, up to a maximum of four marks.</p> <ul style="list-style-type: none"> • A new corporate image could be presented (1) through to rebranding (1) • Improving processes/performance (1) through adopting new technology (1) • Complying with legislation (1) by changing processes/policies (1) • Responding to competitors (1) by launching new services (1) • Responding to demand (1) by scaling system (1) • Responding to unforeseen events (1) by improving system resilience (1) • Responding to customer feedback (1) by improving service (1) <p>Accept any other appropriate response.</p> <p>NOTE do not accept provide better service - this is in the stem</p>	(4)

Question Number	Answer	Mark
9(b)	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.</p> <p>Increased (staff) productivity (1) because members can self-book classes (1)</p> <p>Improved security (of personal information) (1) because new system should comply with current legislation/guidelines (1)</p> <p>Improved communication (1) as customers can be provided with more up-to-date information (1)</p> <p>Reduced costs (1) because number of administration staff needed is reduced (1)</p> <p>Improved customer experience (1) because wait times are reduced (1)</p> <p>Improved management decisions (1) as meaningful data can be generated (1)</p> <p>Accept any other appropriate responses.</p>	(4)

Question Number	Answer	Mark
9(c)	<p>Award one mark for identification of the reason, one mark for an appropriate linked explanation and one mark for a further expansion up to a maximum of three marks.</p> <p>Continuity of service must be provided (1) to allow booking to continue (1) even in the event of unexpected faults (1)</p> <p>Minimising downtime (1) to allow for minimal disruption (1) to improve user experience / to maintain customer trust (1)</p> <p>Accept any other appropriate response.</p>	(3)

Question Number	Answer	Mark
9(d)	<p>Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:</p> <p>The evaluation may include:</p> <p>Human error</p> <p>Inside threat, Poor training, no malice intended, more likely</p> <p>Can be mitigated with training and better software design</p> <p>Malicious Employee</p> <p>Inside threat, Deliberate damage, might have in depth knowledge of software and can therefore work around precautions, low likelihood</p> <p>Mitigate by removing departing staff without working notice period</p> <p>Disguised Criminal</p> <p>External threat, will likely to be skilled, will target their attack</p> <p>Mitigate with adequate precautions/training</p> <p>Learner should also consider the severity of each identified threat. Allow for variation - credit sensible, supported judgements.</p> <p>Example conclusion</p> <p>The highest human threat occurs internally from malicious employees. They are likely to be very familiar with the system and are thus able to spot vulnerabilities and to take advantage of them. It could be difficult to deal with them through technological methods and therefore the best way to deal with them is to prevent them from getting access to the system. An easy way to do this is to pay them off and not let them work out any notice period. Monitoring methods can also be used such as audit trials and CCTV.</p>	(9)

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	<ul style="list-style-type: none">• Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3)• Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2)• Demonstrates a basic evaluation which partially considers different factors/events and their relative importance, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	4-6	<ul style="list-style-type: none">• Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3)• Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2)• Demonstrates a good evaluation which considers different factors/events and their relative importance, leading to a conclusion which is partially supported (AO3)
Level 3	7-9	<ul style="list-style-type: none">• Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3)• Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2).• Demonstrates a thorough evaluation which comprehensively considers different factors/events and their relative importance, leading to a conclusion which is well supported (AO3)

Question Number	Answer	Mark
10(a)	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.</p> <ul style="list-style-type: none"> Machine learning (1) produces recommendations based on customers' browsing history /purchase history (1) Capture transactional data (1) when each sale is completed (1) Collect user data (1) when users are registering for an account (e.g., usernames, email addresses) (1) <p>Accept any other appropriate responses.</p>	(4)

Question Number	Answer	Mark
10(b)	<p>Award one mark for each of the following linked points, up to a maximum of three marks.</p> <p>A new table/entity would be used (1) containing the customer key field (1) and the item key field (1) and appropriate relationships are defined (1)</p>	(3)

Question Number	Answer	Mark
10(c)	<p>Award one mark for each identification and one mark for an appropriate linked explanation, up to a maximum of four marks.</p> <ul style="list-style-type: none"> JSON has a simple syntax (1) which makes file parsing faster (1) thereby reducing wait times (1) JavaScript code has a built-in JSON conversion function (1) to convert JSON into string objects (1) thus speeding up development time (1) <p>Accept any other appropriate response.</p>	(3)

Question Number	Answer	Mark
10(d)	<p>Award one mark for each of the following linked points, up to a maximum of three marks.</p> <p>Data is mirrored (1) across multiple disks (1) creating redundancy (1)</p>	(3)

Question Number	Answer	Mark
10(e)	<p>Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:</p> <p>Discussion may include:</p> <p>Possession-based systems</p> <p>These systems make use of a code, which is either texted to the user's mobile phone or is generated automatically by a dedicated code generator.</p> <p>Advantages</p> <p>The amount of data transmitted between client and server is relatively small and so network speed is not critical.</p> <p>Disadvantages</p> <p>Some systems rely on a mobile phone signal and the user might be in a location with a weak signal. Also, if the user has forgotten their mobile phone/authenticator or the battery is dead then access to the system is not possible. If the user loses their phone/authenticator, then access is not possible and also potential security risks exist.</p> <p>Biometric systems</p> <p>These systems make use of features of the user such as their voice pattern or fingerprint</p> <p>Advantages</p> <p>They do not require any extra hardware such as a dedicated authenticator. Features are usually provided by modern smartphones. They are also far more secure as they rely on individual data that is hard to replicate.</p> <p>Disadvantages</p> <p>The user's machine might not have the required hardware such as a camera or microphone. Also, the amount of data transmitted from the client to the server during authentication is large.</p>	

	Example Conclusion Both methods offer an extra layer of user authentication. The best one to use depends on the degree of security desired and the typical network connection speeds.	(12)
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The 2nd trait (AO2) carries twice as much weighting as traits 1 & 3.

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-4	<ul style="list-style-type: none"> • Demonstrates a basic analysis of the situation by superficially breaking down the different aspects into component parts (AO3) • Demonstrates basic application of knowledge and understanding that is partially relevant to the context of the question (AO2) • Demonstrates a basic evaluation which partially considers different factors/events and competing points, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	5-8	<ul style="list-style-type: none"> • Demonstrates a good analysis of the situation by breaking down the different aspects into component parts (AO3) • Demonstrates good application of knowledge and understanding that is relevant to the context of the question (AO2) • Demonstrates a good evaluation which considers different factors/events and competing points, leading to a conclusion which is partially supported (AO3)
Level 3	9-12	<ul style="list-style-type: none"> • Demonstrates a thorough analysis of the situation by comprehensively breaking down the different aspects into their component parts (AO3) • Demonstrates comprehensive application of knowledge and understanding that is consistently relevant to the context of the question (AO2) • Demonstrates a thorough evaluation which comprehensively considers different factors/events and competing points, leading to a conclusion which is well supported (AO3)

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