T Level Technical Qualification in Digital Production, Design and Development

Mark Scheme (Results)

Autumn 2021

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)	Award **one** mark for each correctly identified method up to a maximum of **two** marks • human generated • artificial intelligence/machine learning • sensors • Internet of Things (IoT) • transactional data **Accept any other appropriate response** **Additional Guidance** Accept specific examples of human generated data such as interviews, surveys etc. Accept specific examples of sensor collected data.	**(2)**

Question Number	Answer	Mark
1(b)	Award **one** mark for each correctly identified layer, up to a maximum of **two** marks 1. Application 4. Transport	**(2)**

Question Number	Answer	Mark
1(c)	Award **one** mark for each correctly identified factor up to a maximum of **two** marks • adding additional features and/or services • diversification • scaling • rebranding • adoption of new technologies • changes in legislation/government policy • response to competition. • crisis (natural disasters, terrorism, cyber-attacks) • zero-day vulnerabilities • data corruption • system failures. • market demand • change in ownership/management • review of internal procedures • financial performance • relocation **Accept any other appropriate response**	**(2)**

Question Number	Answer	Mark
2(a)	Award **one** mark for each of the following linked descriptive points, up to a maximum of **two** marks. The primary key field in one table (1) is a foreign key field in another table (1) **Accept any other appropriate response** **Additional Guidance** Accept contextualised responses such as: User table linked to purchase table (1) through the use of customer number (1)	**(2)**

Question Number	Answer	Mark
2(b)	Award **one** mark for identification of a reason and **one** mark for each appropriate linked explanation/expansion, up to a maximum of **three** marks. Graphs can show pronounced trends (1) so that the owners could see if sales peaked at some specific period of the month (1). This would allow the owners to better plan stock levels/staffing (1) Graphs can show the correlation between variables (1) so if there was a relationship between the daily sales and the day of the week (1). This would allow the owners to manage staff/stock better (1) It's more user friendly (1) because you can see individual data more clearly (1) and how it compares to other data (1) **Accept any other appropriate response**	**(3)**

Question Number	Answer	Mark
2(c)	Award **one** mark for identification of a factor and **one** mark for an appropriate linked explanation/expansion up to a maximum of **two** marks per response (maximum total **four** marks)**:** The benefits must be clearly listed (and quantified if possible) (1) to see what value they would add to the bookseller (1) The drawbacks must be clearly listed (and quantified if possible) (1) to see what cost they would cause the company (1) The risks (1) that may affect the project's success (1) The constraints (1) to see what limitations are on the project (1) The dependencies (1) to see the relationship between different stages of project implementation (1) **Accept any other appropriate response** **Additional guidance** Allow specific examples for identification mark.	**(4)**

Question Number	Answer	Mark
3	Award **one** mark for identification of a reason and **one** mark for an appropriate linked explanation/expansion up to a maximum of **two** marks per response (maximum total **four** marks)**:** More flexibility for user interface design (1) as no physical button use is required (1) To provide intuitive interaction (such as pinch) (1) to zoom/expand screen sections (1) Orientation of the smartphone is unimportant (1) as the screen can be programmed to autorotate/the interface will automatically align with the orientation of the screen (1) Allows for a larger screen (on the device) (1) as smartphone would not need physical buttons/keyboard (1) **Accept any other appropriate response**	**(4)**

Question Number	Answer	Mark
4(a)	Award **one** mark for identification and **one** mark for an appropriate linked explanation/expansion up to a maximum of **two** marks, such as**:** A business that provides a non-physical item (1) such as a hairdresser or a video streaming service (1) **Accept any other appropriate response** **Additional guidance** Expected answer structure: Definition (1) example (1)	**(2)**

Question Number	Answer	Mark
4(b)	Award **one** mark for identification of added value and **one** mark for an appropriate linked descriptive point up to a maximum of **two** marks per response (maximum total **four** marks)**:** • engagement with stakeholders (1) through improved communication methods (1) • providing new services (1) through innovative developments (1) • increasing revenue / decreasing costs (1) through improved efficiency / access to new markets (1) • supporting (new) business practices (1) by allowing for better methods of working (1) • providing a better market environment (1) by using targeted digital marketing / by using analytical tools to establish features of the customer base (1) **Accept any other appropriate response** **Additional Guidance** Accept examples for identification mark (e.g. “robotics” for new business practices)	**(4)**

Question Number	Answer	Mark
5	Award **one** mark for identification of an application of the CIA and **one** mark for each appropriate linked explanation/expansion up to a maximum of **three** marks per response (maximum total **six** marks). Ensure confidentiality (1) by encrypting all data (1) so that if the data is stolen it is unusable (unless the decryption details are known) (1) Ensure confidentiality (1) by restricting access (to certain users) (1) by applying access rules/file permissions (1) Improve integrity (1) through the use of transaction/modification logs (1) will allow rollback of data to occur (1) Improve integrity (1) by using permissions (1) to prevent unauthorized modifications (to systems/data) (1) Improve availability (1) by building redundancy into hardware systems (1) to ensure that they are more fault tolerant (1) Improves availability (1) by updating software (1) to improve robustness of systems(1) **Accept any other appropriate response.**	**(6)**

Question Number	Indicative content:	Mark
6	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **IDEs** **Features of an IDE** User Interface designer to allows the developer to quickly build screens through selecting components from a library Code editing tool to allow for entering and amending code Editing features such as colour coded text, auto indentation to allow developers to quickly read and comprehend code Debugging tools to find run time and logical errors Syntax checking to highlight syntax errors Translation tools to compile/interpret code **Benefits of IDEs** Program development is faster at both coding and developmental testing stages IDEs allow for collaboration between a team Many IDEs have inbuilt project management tools such as check in/out and libraries of code Integration with code repositories aids collaborative working and version control Provides support for multiple programming languages which makes it easier when working on projects that require different languages e.g. programming front-end and back-end processes **Drawbacks of IDEs** The overheads, in terms of RAM and CPU usage can be high Not all languages have IDEs that support them The cost of IDEs can be prohibitive **Conclusion** Responses should include a conclusion that provides a considered decision as to the use of IDEs when developing software	**(9)**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	• 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 assessment which partially considers different factors/events and their relative importance, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	4-6	• 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 assessment which considers different factors/events and their relative importance, leading to a conclusion which is partially supported (AO3)
Level 3	7-9	• 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 assessment which comprehensively considers different factors/events and their relative importance, leading to a conclusion which is well supported (AO3)

Question Number	Answer	Mark
7(a)	Award **one** mark for identification of a device and **one** mark for an appropriate linked explanation/expansion up to a maximum of **two** marks per response (maximum total **four** marks) Microphone (1) to allow the toy to hear when someone is speaking (1) Button (1) to turn the device on or off (1) Speaker (1) to allow the toy to respond to the user (1) LED/Lights (1) to make eyes glow/cheeks flush (1) Display (1) to show device status (1) **Accept any other appropriate response**	**(4)**

Question Number	Answer	Mark
7(b)	Award **one** mark for identification of a benefit and **one** mark for an appropriate linked explanation/expansion up to a maximum of **two** marks per response (maximum total **four** marks) Mobile processors have lower power requirements (1) and so battery life of the toy is prolonged (1) Mobile processors run at lower operating temps (1) so no cooling fan is needed (1) Mobile processors are smaller (1) so toy can be smaller/more portable/lighter (1)	**(4)**

Question Number	Answer	Mark
7(c)	Award **one** mark for identification security concern and **one** mark for an appropriate linked descriptive point up to a maximum of **two** marks per response (maximum total **four** marks) A hacker could access the device (1) and listen to family conversations (1) When on the device is constantly listening (and feeding data back to its server) (1) leading to a lack of privacy The device could be hacked (1) and this would allow strangers to talk to their children (1) **Accept any other appropriate responses.**	**(2)**

Question Number	Indicative content	Mark
7(d)	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **Methods of Digital Marketing** • Search engine optimization to ensure that pages about the toy are ranked highly in search results • Email marketing to mail potential customers to market toy directly • Creation of digital content for adverts that could be placed on relevant web sites • Product listing ads, to list products at the top of a shopping related search • Use of methods such as Pay per Click or Pay per View ("pay per mile) – google ads • Website optimization by improving loading speeds, making the site mobile device friendly, using clickmaps to improve page design • Social media marketing campaigns, by paying to place promotional media on to news feeds of targeted social media users • Using analytical tools to track metrics such as the number of visitors to a site or the time spent on the site	**(6)**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-2	• 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	• 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	• 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
8(a)	Award **one** mark for identification of an accessibility feature and **one** mark for an appropriate linked descriptive point up to a maximum of **two** marks per response (maximum total **four** marks) The text size/screen layout/contrast (1) can be set to allow users visual impairment to access information on the screen (1) The language used(readability) should not be too complex (1) to allow users with cognitive issues to process the information (1) The complexity of choices per screen should be minimised (1) to allow users with cognitive issues to process the information (1) The screen layout should not be too cluttered (1) to allow users with fine motor control issues to access on screen components (1) Audio feedback (1) could be used to aid users with visual impairment (1) Allow users to set text size/screen layout/contrast (1) to aid those with visual impairment (1) Voice input (1) to aid users with visual/motor impairment (1) Multiple language options (1) to support users who have a first language other than English (1) **Accept any other appropriate response.**	**(4)**

Question Number	Answer	Mark
8(b)	Award **one** mark for identification of a benefit and **one** mark for an appropriate linked explanation/expansion up to a maximum of **two** marks per response (maximum total **four** marks) Staffing needs are less (1) as no one is needed to record an order (1) Upselling can be improved (1) as the machine can automatically present current offers to customers (1) Improved inventory control (1) as stock levels are dynamically altered when a sale is made (1) (Potentially) reduces errors in orders (1) so better customer satisfaction (1) Order immediately sent to kitchen (1) so customer throughput is higher (1) Reduces staff-customer contact (1) thus improving hygiene/safety considerations (1) **Accept any other appropriate response.**	**4**

Question Number	Answer	Mark
8(c)	Award **one** mark for identification of a threat and **one** mark for each appropriate linked explanation/expansion, up to a maximum of **three** marks. Man in the middle attack/Eavesdropping attack (1) which occurs when the payment details are being transmitted to the café server (1) due to an attacker making an independent connection between the self service machine and the kitchen computer (1) Electronic pickpocketing (1) by covertly placing additional hardware (1) on the self-service machine that will skim payment details (1) **Accept any other appropriate response.**	**3**

Question Number	Indicative content	Mark
8(d)	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **The evaluation may include:** **Description** Data mining is used to find patterns and relationships withing large data sets. Typically this data is held in a data warehouse and data mining is the process of 'drilling' down into this data to make use of it. Data mining is a step beyond a simple analysis of the data **Techniques** Data warehouse contents are analyzed to look for similarities and grouping in historical data. Techniques such as Clustering and Anomaly detection can be used. Rule learning is than applied to establish formal relationships between data Predictions modelling can then be applied to predict future outcomes, this can be done through statistical techniques or increasingly through the use of AI methods such Machine learning and Neural Networks **Advantages of Data mining** Can find relationships between data that humans did not even realize existed, let alone understood – finds unknow unknowns. Has many benefits for companies such as increasing sales, cutting costs and reducing risks. **Disadvantages of Data mining** Like all modelling data mining does not give a perfect description of the data, but an abstracted view. With the lack of human interaction in most mining techniques then the chance of unintended consequences increases greatly.	**9**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-3	• 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 assessment which partially considers different factors/events and their relative importance, leading to a conclusion which is superficial or unsupported (AO3)
Level 2	4-6	• 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 assessment which considers different factors/events and their relative importance, leading to a conclusion which is partially supported (AO3)
Level 3	7-9	• 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 assessment which comprehensively considers different factors/events and their relative importance, leading to a conclusion which is well supported (AO3)

Question Number	Answer	Mark
9(a)	Award **one** mark for identification of a benefit and **one** mark for each appropriate linked explanation/expansion, up to a maximum of **three** marks. Engineers would be able to access the latest documents (1) on their mobile devices when visiting sites (1). This will ensure that any changes made will be reflected in the documents accessed on site (1) Engineers will be able to work on the latest document version (1) whilst away from the office (1). This will ensure that all changes are made to the most recent version (1) Engineers can work collaboratively (1) on the same document (1) and any modifications are shared instantly amongst all document owners (1) Backups are automatically made (1) so there is no risk of losing documents (1) due to human error (1) **Accept any other appropriate response.**	**3**

Question Number	Answer	Mark
9(b)	Award **one** mark for identification of a reason and **one** mark for each appropriate linked explanation/expansion, up to a maximum of **three** marks. Limited range of applications (1) as SaaS tend to only offer a limited range of common office applications (1) so specialist apps would not run on SaaS platforms (1) Specialist design packages can require high performance computers (1) delays communicating with a remote server (1) could slow down performance speeds (1) Lack of control of software (1) which could force Beown to use the latest release (1) of a common office application which could cause incompatibility issues with files created in older versions (1) Lack of control (1) would not allow modifications to office packages (1) resulting in Beown losing customizations already done (1) Ongoing costs (1) could be more expensive (long term) than cost of single purchase (1) which impacts on profits (1) Engineers may not always be able to access software (1) as they would need an active internet connection (1) which may not be available on construction sites (1) **Accept any other appropriate response.**	**(3)**

Question Number	Answer	Mark
9(c)	Award **one** mark for identification of a reason and **one** mark for an appropriate linked explanation/expansion up to a maximum of **two** marks per response (maximum total **four** marks) **Rule 1** To force users to change their passwords regularly (1) so that compromised password would only be usable for a limited time (1) **Rule 2** Password complexity (1) to ensure that passwords are not easy to guess Using a range of characters gives more permutations (1) making brute force attacks more difficult (1) **Accept any other appropriate response.**	**(4)**

Question Number	Answer	Mark
9(d)	Award **one** mark for identification a way to limit access and **one** mark for an appropriate linked descriptive point up to a maximum of **two** marks such as: File access permissions can be used (1) which determine whether a user can view and/or read a file (1) **Accept any other appropriate response.**	**(2)**

Question Number	Indicative content:	Mark
9(e)	**Learners might refer to some/all of the following in their responses, but learners should be rewarded for other pertinent contextualised answers:** **Discussion may include:** **Human Risk** Human risk to data can be both accidental or malicious Accidental damage could be due to employee error. This can be guarded against by using techniques such as action confirmation dialog boxes, automatic backups of all files, keeping previous version backups which allow for roll=backs if any data is lost. Deliberate damage can occur via viruses, hackers or employee espionage/sabotage. Methods of prevention include the use of Anti-Virus Software, encryption of files, automatically disabling all inserted removable storage media and monitoring of employee activity. **Technical Risk** Technical risk can come from hardware failure or from software failure/logical errors. Hardware failure would generally not be a problem as cloud storage providers would have multiple sites and a fault in one machine/location would be dealt with by a seamless switch to another location. As Beown adapt some of the application software they use in house stringent tests should be done to make sure that the adaptions work as intended and have to unintended consequences. Also a version control policy on all data files should be enforced **Physical Risk** This can come in the form of fires/floods/theft of hardware etc. This would not impact on Beown as all their data is now held in the cloud not on site, so for example a fire would have drastic consequences on the ability of Beown to operate effectively for some time, but would not present a risk to their data as it is held off-site. Also reputable cloud provides have many sites which mirror each other and any physical damage to one site would not affect any other sites. **Conclusion** The physical risk is minimal as is the human risk. The main risk comes from Beown's adaption of bought software and this risk can be minimized by using stringent testing of any software modifications and also by using strict version control of all data files used by this software.	**(12)**

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-4	• 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	• 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	• 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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