T-LEVELS | Institute for Apprenticeships & Technical Education

T Level Technical Qualification in Digital Support Services

Employer set project (ESP)

Core skills

Digital Infrastructure & Network Cabling

Mark scheme

SAMPLE

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T Level Technical Qualification in Digital Support Services
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Marking guidelines

General guidelines

You must apply the following marking guidelines to all marking undertaken throughout the marking period. This is to ensure fairness to all students, who must receive the same treatment. You must mark the first student in exactly the same way as you mark the last:

- the mark scheme must be referred to throughout the marking period and applied consistently; do not change your approach to marking once you have been standardised
- reward students positively giving credit for what they have shown, rather than what they might have omitted
- utilise the whole mark range and always award full marks when the response merits them
- be prepared to award 0 marks if the student's response has no creditworthy material
- do not credit irrelevant material that does not answer the question, no matter how impressive the response might be
- if you are in any doubt about the application of the mark scheme, you must consult with your team leader or the chief examiner

Guidelines for using extended response marking grids

Extended response marking grids have been designed to award a student's response holistically for the relevant task or question and should follow a best-fit approach. The grids are broken down into bands, with each band having an associated descriptor indicating the performance at that band. You should determine the band before determining the mark.

When determining a band, you should look at the overall quality of the response and reward students positively, rather than focussing on small omissions. If the response covers aspects at different bands, you should use a best-fit approach at this stage and use the available marks within the band to credit the response appropriately.

When determining a mark, your decision should be based on the quality of the response in relation to the descriptors. Standardisation materials, marked by the chief examiner, will help you with determining a mark. You will be able to use exemplar student responses to compare to live responses, to decide if it is the same, better or worse.

To support your judgement, the indicative content is structured in such a way that mirrors the order of the different points within the band descriptors. This will allow you to use the 2 in conjunction with each other by providing examples of the types of things to look for in the response, for each descriptor. In other words, the indicative content provides you with a starting point of possible examples and the bands express the range of options available to you in terms of the quality of the response. You should apply the standards that have been set at relevant standardisation events in a consistent manner.

You are reminded that the indicative content provided under the marking grid is there as a guide, and therefore you must credit any other suitable responses a student may produce. It is not a requirement either that students must cover all of the indicative content to be awarded full marks.

For some tasks, there is more than one piece of assessment evidence required. Whilst they are interconnected, markers should assess each piece of assessment evidence in its own right using the appropriate mark scheme to inform the marks awarded.

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Task 1

This task requires students to submit 2 pieces of assessment evidence. Whilst they are linked in terms of the task scenario, they should be marked independently of each other using the marking grids and indicative content detailed below.

Task 1: troubleshooting document

Band	Mark	Descriptor
3	5–6	The student provides a response to the task that: • has applied the correct solution to the fault and contains all/almost all of the technical elements required (in relation to the scenario of the brief)
2	3–4	The student provides a response to the task that: • has applied the correct solution to the fault and contains at least some of the technical elements required (in relation to the scenario of the brief)
1	1–2	The student provides a response to the task that: • has attempted a solution to the fault, though this may be incomplete and not fully resolve the issue, and contains minimal technical elements required (in relation to the scenario of the brief)
	0	No creditworthy material.

Indicative content

- The actual fault is that the MAC address has been set to block the tablet from connecting to the access point (AP), and once connected the wrong IP addresses are set.
- The AP should show the following changes to the settings and security configuration:
  - under security, the AP should be set to enable tablet based on MAC address not block
  - the IP address of the AP should be 192.168.10.200-210
  - the default gateway should be 192.168.10.254
  - DNS should be 192.168.10.1

Note: this list is not exhaustive; please credit any other valid tests the student may recommend.

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Test plan document

Band	Mark	Descriptor
4	13–16	The student provides a response to the task that: • has an excellent design with a highly logical structure that includes a wide range of elements and/or appropriate steps to test the suggested changes have resolved the fault • demonstrates an excellent understanding of faults (in relation to the scenario of the brief), supported by an excellent range of highly relevant tests • demonstrates an excellent understanding of testing (in relation to the scenario of the brief), supported by a comprehensive and highly detailed explanation of expected outcomes
3	9–12	The student provides a response to the task that: • has a good design with a mostly logical structure that includes most elements and/or appropriate steps to test the suggested changes have resolved the fault • demonstrates a good understanding of faults (in relation to the scenario of the brief), supported by a good range of mostly relevant tests • demonstrates a good understanding of testing (in relation to the scenario of the brief), supported by a clear and mostly detailed explanation of expected outcomes
2	5–8	The student provides a response to the task that: • has a reasonable design with some logical structure, though this may be underdeveloped, that includes most elements and/or appropriate steps to test the suggested changes have resolved the fault • demonstrates a reasonable understanding of faults (in relation to the scenario of the brief), supported by a reasonable range of some relevant tests (though may include some inappropriate tests) • demonstrates a reasonable understanding of testing (in relation to the scenario of the brief), supported by an explanation of expected outcomes that has some detail, though this may be underdeveloped
1	1–4	The student provides a response to the task that: • has a limited design with minimal structure that includes minimal elements and/or appropriate steps to test the suggested changes have resolved the fault • demonstrates a limited understanding of faults (in relation to the scenario of the brief), supported by a limited range of mostly irrelevant tests • demonstrates a limited understanding of testing (in relation to the scenario of the brief), supported by a minimal explanation of expected outcomes with limited detail
	0	No creditworthy material.

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Indicative content

Students may make different decisions when designing their test plan. Credit should be given for the clarity and appropriateness of the outlined steps in relation to the brief.

The test plan design features may include:

- consistent formatting
- clear and easy to understand structure (for example, fonts are easily readable)
- simple lists
- tables to lay out their tests/expected results/actual results which may include fields such as:
    - user details
    - test dates
    - computer specification and software
    - proposed tests
    - expected outcomes of tests
    - ability to record changes based on test outcomes
    - record of diagnosis
    - user acceptance of work completed

Students may propose a range of different steps to test the suggested changes have resolved the fault. When considering placement within the bands, consideration should be given to the appropriateness of the selected tests in context of the actual fault.

The types of tests proposed by students may include:

- ping test to AP
- tracert test to AP
- ipconfig
- attempt to connect to AP via wired connection
- alternative device able to connect to AP
- speed test

The expected outcomes of tests will vary depending on the types of tests proposed by students, but these may include:

- ping tests not reaching destination
- tracert tests not completing their route
- iIpconfig to verify IP address given to tablet
- attempt to connect to AP via wired connection to configure settings
- alternative device able to connect to AP
- speed test ranges

Note: this list is not exhaustive; please credit any other valid tests the student may recommend.

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Task 2

This task requires students to submit 2 pieces of assessment evidence. Whilst they are linked in terms of the task scenario, they should be marked independently of each other using the marking grids and indicative content detailed below.

Note: tasks 2, 3 and 4 assess English skills holistically. The AO4 English skills mark scheme is detailed after task 4, though it may be useful to refer to the mark scheme whilst assessing the tasks to support an appropriate, holistic judgement.

Interview

Band	Mark	Descriptor
3	5–6	The student provides a response to the task that: • demonstrates an excellent application of communication techniques when working with stakeholders to address specific requirements (in relation to the scenario of the brief) • demonstrates an excellent understanding of root cause analysis by constructing interview questions that are highly logical, highly relevant and facilitate a comprehensive gathering of information on the issues (in relation to the scenario of the brief)
2	3–4	The student provides a response to the task that: • demonstrates a reasonable application of communication techniques when working with stakeholders to address specific requirements (in relation to the scenario of the brief) • demonstrates a reasonable understanding of root cause analysis by constructing interview questions that have some logic, some relevance and facilitate some gathering of information on the issues (in relation to the scenario of the brief), though these may be underdeveloped
1	1–2	The student provides a response to the task that: • demonstrates a limited application of communication techniques when working with stakeholders to address specific requirements (in relation to the scenario of the brief) • demonstrates a limited understanding of root cause analysis by constructing interview questions that have minimal logic, minimal relevance and facilitate minimal gathering of information on the issues (in relation to the scenario of the brief)
	0	No creditworthy material.

Indicative content

The recorded interview captures the student questioning the head of IT.

The student's communication technique, as well as their ability to respond to information they receive during the interview, should be considered.

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The communication techniques demonstrated by the response may include:

- active listening
- use of open questioning
- negotiation
- use of clear and concise language (for example, terminology based on audience)

The questions asked by students will demonstrate their ability to analyse the key issues, in relation to the brief. Credit should be given for the quality of the questions asked in terms of how it helps to identify the root cause.

Questions related to identifying requirements may include:

- how many devices are you looking to support on the network?
- what encryption standards are recommended?
- should we include a guest network, and should it be used to collect email addresses?
- how long should a network session be?
- what security should be implemented?
- should Remote Authentication Dial-In User Service (RADIUS) or other approach be implemented?
- should the outside of the dealership be covered?

Note: the above is not an exhaustive list; credit should be given to other questions which elicit an appropriate response.

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Emails

Band	Mark	Descriptor
3	5–6	The student provides a response to the task that: • demonstrates an excellent understanding of how to communicate to different audiences in a digital support services context – this is supported by sustained application of relevant technical terminology (for the technical audience), and is contextualised (for the non-technical audience) in a comprehensive and highly detailed way • demonstrates an excellent application of analytical thinking and problem solving that identifies a wide range of issues, in relation to the scenario of the brief, in a comprehensive and highly detailed way
2	3–4	The student provides a response to the task that: • demonstrates a reasonable understanding of how to communicate to different audiences in a digital support services context – this is supported by some application of relevant technical terminology (for the technical audience), and contextualised (for the non-technical audience) with some detail • demonstrates a reasonable application of analytical thinking and problem solving that identifies some of the issues, in relation to the scenario of the brief, with some detail, though this may be underdeveloped
1	1–2	The student provides a response to the task that: • demonstrates a limited understanding of how to communicate to different audiences in a digital support services context – this is supported by minimal or no application of relevant technical terminology (for the technical audience), and is contextualised (for the non-technical audience) in a superficial way • demonstrates a limited application of analytical thinking and problem solving that identifies a minimal range of issues, in relation to the scenario of the brief, that has minimal detail
	0	No creditworthy material.

Indicative content

The 2 emails communicate to different types of audiences within a digital support services context. Credit should be given for how the student uses technical terminology according to the intended audience.

Different types of communication methods may include:

- informal or formal writing styles
- appropriate language used for the relevant audience:
- technical email:

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  - more direct, uses technical terminology and acronyms appropriately (for example, Power over Ethernet (POE) capability, RADIUS, virtual local area network (VLAN), authentication, WiFi)

- non-technical email:
  - more straightforward, descriptive of concepts and avoids technical jargon (for example, a separate WiFi network will need to be implemented to ensure that sales data and public traffic is kept separate)

Credit should be given for the appropriateness and number of issues discussed.

Potential issues, as related to the scenario, that may be identified through the application of analytical thinking and problem solving may include:

- lack of server redundancy
- weak signal strength
- power requirements of APs
- management console/administration for APs
- interference due to the nature of it being a car dealership

Note: this is not an exhaustive list; other concerns may be identified. Credit should be given for plausible network issues that are well explained and supported.

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Task 3

Alongside the main assessment evidence (project proposal which includes a network diagram), task 3 also assesses mathematics skills. The AO4 mathematics skills mark scheme is detailed after task 3.

Note: tasks 2, 3 and 4 also assess English skills holistically. The AO4 English skills mark scheme is detailed after task 4, though it may be useful to refer to the mark scheme whilst assessing the tasks to support an appropriate, holistic judgement.

Band	Mark	Descriptor
5	20–24	The student provides a response to the task that: • demonstrates an excellent understanding of network connectivity issues (in relation to the scenario of the brief) that is comprehensive and highly detailed • demonstrates an excellent understanding of how to resolve network connectivity issues and address business needs (in relation to the scenario of the brief) that is comprehensive and highly detailed • makes judgements on the equipment, software or cloud services required and associated costs to meet business needs that are comprehensive and highly relevant • demonstrates an excellent understanding of associated cyber security issues and how they could be mitigated (in relation to the scenario of the brief) that is comprehensive and highly detailed, supported by a network diagram that is comprehensive and highly detailed
4	15–19	The student provides a response to the task that: • demonstrates a good understanding of network connectivity issues (in relation to the scenario of the brief) that is clear and mostly detailed • demonstrates a good understanding of how to resolve network connectivity issues and address business needs (in relation to the scenario of the brief) that is clear and mostly detailed • makes judgements on the equipment, software or cloud services required and associated costs to meet business needs that are clear and mostly relevant • demonstrates a good understanding of associated cyber security issues and how they could be mitigated (in relation to the scenario of the brief) that is clear and mostly detailed, supported by a network diagram that is clear and mostly detailed

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Band	Mark	Descriptor
3	10–14	The student provides a response to the task that: • demonstrates a reasonable understanding of network connectivity issues (in relation to the scenario of the brief) that has some detail, though this may be underdeveloped • demonstrates a reasonable understanding of how to resolve network connectivity issues and address business needs (in relation to the scenario of the brief) that has some detail, though this may be underdeveloped • makes judgements on the equipment, software or cloud services required and associated costs to meet business needs that have some relevance • demonstrates a reasonable understanding of associated cyber security issues and how they could be mitigated (in relation to the scenario of the brief) that has some detail, though this may be underdeveloped, supported by a network diagram that has some detail
2	5–9	The student provides a response to the task that: • demonstrates a basic understanding of network connectivity issues (in relation to the scenario of the brief) that is sometimes unclear and lacks detail • demonstrates a basic understanding of how to resolve network connectivity issues and address business needs (in relation to the scenario of the brief) that is sometimes unclear and lacks detail • makes judgements on the equipment, software or cloud services required and associated costs to meet business needs that are sometimes unclear and irrelevant • demonstrates a basic understanding of associated cyber security issues and how they could be mitigated (in relation to the scenario of the brief) that is sometimes unclear and lacks detail, supported by a network diagram that is sometimes unclear and lacks detail
1	1–4	The student provides a response to the task that: • demonstrates a limited understanding of network connectivity issues (in relation to the scenario of the brief) that is mostly unclear with minimal detail • demonstrates a limited understanding of how to resolve network connectivity issues and address business needs (in relation to the scenario of the brief) that is mostly unclear with minimal detail • makes judgements on the equipment, software or cloud services required and associated costs to meet business needs that are mostly unclear and irrelevant • demonstrates a limited understanding of associated cyber security issues and how they could be mitigated (in relation to the scenario of the brief) that is mostly unclear with minimal detail, supported by a network diagram that is mostly unclear with minimal detail

SAMPLE

Band	Mark	Descriptor
	0	No creditworthy material.

Indicative content

An updated network diagram has been submitted that shows the proposed network update to resolve the connectivity issues. The ideas presented on the diagram may also be discussed in the proposal.

This may include:

- network topology
- placement of WiFi access points
- VLAN configuration
- WiFi speeds
- IP addresses/IP address schemes

Note: the above is not an exhaustive list; credit should be given to other suggestions as appropriate to the scenario of the brief.

The project proposal

The challenge to develop a solution that will support the dealership, and the technical challenges of coverage and the two types of users.

The potential WiFi issues discussed may include:

- WiFi standards – whether to opt for WiFi 6 or mainstream 802.11ac
- encryption standards for the network to support the range of devices
- segregation of the sales and public WiFi traffic
- providing coverage both within and outside the dealership
- authentication methods for the WiFi

Students may provide a range of different options to solve the WiFi challenges. When considering placement within the bands, consideration should be given to the appropriateness and number of points discussed.

Potential areas for discussion may include:

- implementation of a radius server to secure WiFi connection sales team and public traffic
- 802.11ax implementation throughout the dealership powered by POE

Students may make different decisions when proposing different equipment, software or cloud-based services. Credit should be given for the strength of their decisions and justifications.

Possible judgements may include:

- costing decisions will vary as students may offer different proposals to resolve the issues

However, costings should be included (please also assess mathematics skills and refer to the AO4 mark scheme, detailed below, to inform judgement) and may include:

- cloud-based monitoring of the WiFi or onsite management

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- capital costs for equipment such as dedicated switching for POE, access points, management appliance for the WiFi, and segment network
- potential costs for training of staff in the administration of the network
- additional threat vector for attack of the WiFi if not secured correctly

Students may provide different cyber security considerations based on their decisions.

Possible cyber security and mitigations may include:

- cyber security: external facing servers (VPN/email/web) located inside the local network

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Task 3: Mathematics skills (AO4)

Band	Mark	Descriptor
2	2	Mathematics skills presented in the task: • demonstrate a good understanding of numeracy skills which show accurate calculations and appropriate units
1	1	Mathematics skills presented in the task: • demonstrate a basic understanding of numeracy skills with calculations that may sometimes be inaccurate with some inappropriate units
0	0	No creditworthy material.

Indicative content

The project proposal includes costings for the proposed equipment, software or cloud services required for the project.

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Task 4

This task requires students to submit 2 pieces of assessment evidence. Whilst they are linked in terms of the task scenario, they should be marked independently of each other using the marking grids and indicative content detailed below.

Note: tasks 2, 3 and 4 assess English skills holistically. The AO4 English skills mark scheme is detailed after task 4, though it may be useful to refer to the mark scheme whilst assessing the tasks to support an appropriate, holistic judgement.

Task 4: testing method – audience testing (sample satisfaction survey)

Band	Mark	Descriptor
3	5–6	The student provides a response to the task that: • demonstrates an excellent understanding of testing methods, in relation to the scenario of the brief, that could measure the effectiveness of the solution in a comprehensive and highly detailed way
2	3–4	The student provides a response to the task that: • demonstrates a reasonable understanding of testing methods, in relation to the scenario of the brief, that could measure the effectiveness of the solution that has some detail, though this may be underdeveloped
1	1–2	The student provides a response to the task that: • demonstrates a limited understanding of testing methods, in relation to the scenario of the brief, that could measure the effectiveness of the solution in a minimal and superficial way
	0	No creditworthy material.

Indicative content

The required testing method for this task focuses on audience testing in the form of a sample satisfaction survey.

Credit should be given for the ability of the questions to determine whether the functionality fulfils the desired outcomes, as well as user satisfaction with the new network.

Students may include a range of questions with different areas of focus, such as:

- questions to measure customer satisfaction:
  - how satisfied are you with the new WiFi network setup?
  - how would you rate the ease of use when accessing resources?
- questions to measure network performance:
  - how would you rate the speed of the network?
  - are you able to connect to the WiFi and maintain a connection throughout the dealership?

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- how would you rate the stability of the connection?

Note: the above is not an exhaustive list; credit should be given to other suggestions as appropriate to the scenario of the brief.

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Task 4: post-project review

Band	Mark	Descriptor
3	5–6	The student provides a response to the task that: • demonstrates an excellent understanding of the key issues, possible solutions and security concerns (in relation to the scenario of the brief), supported by sustained application of relevant technical terminology appropriate for a technical audience • evaluates their own performance throughout the project in an excellent and highly detailed manner, supported by excellent explanations of actions taken and proposed solutions (in relation to the scenario of the brief)
2	3–4	The student provides a response to the task that: • demonstrates a reasonable understanding of the key issues, possible solutions and security concerns (in relation to the scenario of the brief), supported by some application of relevant technical terminology appropriate for a technical audience • evaluates their own performance throughout the project in a reasonable manner with some detail, though this may be underdeveloped, supported by reasonable explanations of actions taken and proposed solutions (in relation to the scenario of the brief)
1	1–2	The student provides a response to the task that: • demonstrates a limited understanding of the key issues, possible solutions and security concerns (in relation to the scenario of the brief), supported by minimal or no application of relevant technical terminology appropriate for a technical audience • evaluates their own performance throughout the project in a limited and superficial manner, supported by limited explanations of actions taken and proposed solutions (in relation to the scenario of the brief)
	0	No creditworthy material.

Indicative content

The project summary consolidates the key aspects of the project and may include:

- the key problem presented in the scenario
- proposed solution – this could include proposals such as:
  - placement of the APs
  - method of WiFi management
  - cost of the solution
  - security implemented
  - WiFi authentication

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Students may evaluate their own performance in a range of ways, which may include:

- discussion of strengths and weaknesses, as relevant to their own choices
- application of relevant reflective models, such as Gibbs' Reflective Cycle

Note: the above is not an exhaustive list; credit should be given to other appropriate evaluative approaches.

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Tasks 2, 3 and 4: English skills (AO4)

Band	Mark	Descriptor
4	4	English skills presented in the task: • demonstrate an excellent understanding of spelling, punctuation and grammar that is fully accurate • demonstrate an excellent ability to convey meaning in a fully clear and coherent manner
3	3	English skills presented in the task: • demonstrate a good understanding of spelling, punctuation and grammar that is mostly accurate • demonstrate a good ability to convey meaning in a mostly clear manner
2	2	English skills presented in the task: • demonstrate a reasonable understanding of spelling, punctuation and grammar that has some accuracy, though errors may be present • demonstrate a reasonable ability to convey meaning, though at times this may not be fully clear
1	1	English skills presented in the task: • demonstrate a limited understanding of spelling, punctuation and grammar that is mostly inaccurate • demonstrate a limited ability to convey meaning in a mostly unclear manner
0	0	No creditworthy material.

Indicative content

The student has submitted emails, a project proposal, survey and project summary. A holistic judgement should be made in terms of the quality of English skills throughout tasks 2, 3 and 4.

English skills may include:

- identifying relevant information from the brief and organising writing into an appropriate format (for example, paragraphs, bullet points)
- conveying meaning and information clearly and effectively, supported by language which is appropriate for the audience (for example, facilities manager – formal language)
- constructing complex sentences consistently and accurately
- using correct spelling, grammar and punctuation

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