



Cambridge Technicals

Engineering

Unit **24**: Project management for engineers

Level 3 Cambridge Technical Certificate/Diploma in Engineering
05873

Mark Scheme for January 2018

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

Annotation	Meaning
Tick	Valid point, mark awarded
Cross	Incorrect
Question mark	Response unclear
BOD	Benefit of doubt (mark awarded)
TV	Too vague (mark not awarded)
REP	Repetition (no additional marks awarded)
NAQ	Not answered question (incorrect focus)
L1	Level 1 response (identification)
L2	Level 2 response (explanation)
L3	Level 3 response (analysis)
L4	Level 4 response (evaluation)
CONT	Context (required for high L4 award only)

Subject-specific marking instructions

For Level of Response marked questions marked over 4 levels, the candidate can access at L1 or L2. In either case, they can analyse the point made and proceed directly to L3.

L3 analysis is required before L4 can be accessed.

Question		Answer	Marks	Guidance
1	(a)	<p>Responses may include:</p> <ul style="list-style-type: none"> • ensuring that the business need is valid • ensuring that the project is properly launched • ensuring that the project remains a viable business proposition • ensuring changes to the project are properly managed • ensuring risks are managed • establishing the project organisation, roles and reporting structure • ensuring the project is under control • approving key project deliverables • initiating and supporting the project process • resolving issues that are beyond the control of the Project Manager • resolving conflict • removing obstacles to progress • providing 'championship' for the project • providing business guidance to the Project Manager • acting as the link between the project, the business community and management decision making groups • acting as an arbitrator • making decisions that may be beyond the authority of the Project Manager • acting as chairperson of the Steering Committee. • ensuring the overall quality of the project. 	3	<p>One mark for each correct identification, to a maximum of three identifications.</p> <p>Do not award funding or suggest ideas.</p>

Question			Answer	Marks	Guidance
1	(b)	(i)	<p>Responses may include:</p> <ul style="list-style-type: none"> • objective feedback - factual, scientific, capable of being proven/disproven • subjective feedback - based on opinion/feelings/perceptions, not provable. <p>Exemplar response: e.g. Objective feedback is verifiable (1) whereas subjective feedback is based on someone's opinion (1).</p>	2	<p>1 mark for 'objective', plus 1 mark for 'subjective'.</p> <p>Do not award examples.</p> <p>Do not award 'based on numbers/statistics/data' as these relate to quantitative v qualitative data.</p>
1	(b)	(ii)	<p>Responses may include:</p> <ul style="list-style-type: none"> • identification of risks • severity of risks • likelihood of risk • identification of risk owners • control measures • review. 	3	<p>One mark for each correct identification, to a maximum of three identifications.</p>

Question		Answer	Marks	Guidance
1	(c)	<p>Use level of response criteria.</p> <p>Responses may include:</p> <ul style="list-style-type: none"> • planning • time management • decision-making • communication • monitoring • negotiation • delegation • leadership • team building • conflict management • information management. <p>Exemplar response: e.g. Tom will need to delegate (L1) because he cannot be in all of four countries at the same time (L2). Tom will also need to show excellent planning skills (L1) because the project is a large and complicated one (L2). If Tom's planning was not up to standard the project may not meet its 25% improvement target and the company may not be able to keep up with future demand (L3). Another skill Tom needs to use is communication (L1). This is because good communication helps to ensure that any issues encountered are dealt with as soon as possible (L2), minimising cost (L3).</p> <p>I think that communication is likely to be the most important skill that Tom needs to use to manage this project because there is potential for a large number of misunderstandings to occur due to the split geographical nature of his team and potential cross-cultural differences. In addition, Tom needs to manage a contractor who is an external stakeholder to Curtess Carbonate plc and this requires excellent communication to ensure that the contractor is fully onside and prioritises its work for the company (L4).</p>	12	<p>Level of response:</p> <p>Level 4: 10-12 marks Candidate evaluates the most important skills Tom needs to manage the project.</p> <p>Level 3: 7-9 marks Candidate analyses the skills Tom needs to manage the project.</p> <p>Level 2: 4-6 marks Candidate explains the skills that Tom needs to manage the project.</p> <p>Level 1: 1-3 marks Candidate identifies skills needed to manage a project.</p> <p>Do not responsibilities/activities.</p> <p>L4 Award 10 marks for a justified selection of skills (no context), e.g. important because</p> <p>Award 11 marks for a justified selection of skills (with context) e.g. important because ... with context. Context annotation required.</p> <p>Award 12 marks for a comparative, justified selection with context. E.g. more important than ... because with context. Context annotation required.</p> <p>NB two skills must have been considered before L4 is awarded.</p> <p>NB L3 required to enter L4 (see p.5 item 11).</p>

Question			Answer	Marks	Guidance
2	(a)		Indicative content: A contractor is an independent entity that agrees to provide a product or service to stated requirements.	1	One mark for a correct meaning.
2	(b)	(i)	Indicative content: Activity F: Installation of hardware.	1	For one mark.
2	(b)	(ii)	Indicative content: Activity E: Electrical work.	1	For one mark.
2	(b)	(iii)	Indicative content: Activity F: Installation of hardware.	1	For one mark.
2	(b)	(iv)	Indicative content: Activity C: Off-site management training.	1	For one mark.
2	(b)	(v)	Indicative content: 13 weeks.	1	For one mark.
2	(b)	(vi)	Indicative content: None, zero.	1	For one mark.
2	(b)	(vii)	Indicative content: 14 weeks.	1	For one mark.

Question		Answer	Marks	Guidance
2	(c)	<p>Responses may include:</p> <ul style="list-style-type: none"> • avoid bottlenecks • avoid workers being idle • can calculate slack time • better usage of slack time • minimise delays • can work out the minimum time for completion • more accurate monitoring of progress • identify the critical path in order to give it extra attention • can put additional resources on the critical path • minimise costs • reduce wastage • efficient ordering of tasks • better scheduling of resources. <p>Exemplar response: e.g. Critical path analysis will help Tom ensure that the meets the project deadlines (1).</p> <p>e.g. Critical path analysis will help Tom to identify the activities critical to the technological upgrade (CONT) (2).</p>	2	<p>Award two marks for a contextual explanation, CONT annotation required.</p> <p>Award one mark for a non-contextual explanation.</p> <p>Do not award 'monitoring progress' as this is given in the question.</p>

Question		Answer	Marks	Guidance
2	(d)	<p>Responses may include:</p> <ul style="list-style-type: none"> • political factors • economic factors • social factors • technological factors • legal factors • environmental factors • market conditions • competition • external stakeholders. <p>Exemplar response: e.g. TKT Systems Ltd may prioritise another contract over this one (1). This may lead to time creep on Curtess Carbonate plc's project (1).</p>	2 x 2	<p>One mark for each correct identification to a maximum of two identifications, plus one further mark for each of two explanations.</p> <p>Accept specific or contextual factors.</p> <p>Award first mark for any external factor, second mark must be for explaining impact on the outcome of the project.</p>
2	(e)	<p>Responses may include:</p> <ul style="list-style-type: none"> • comparison of actual with planned e.g. time creep, quality erosion, budget overrun • quality management • control techniques • regular meetings • frequent reporting • assign project team leaders • PERT chart. <p>Exemplar response: e.g. Tom could use frequent reporting (1) to help monitor the project. This would allow any issues to be identified quickly and at minimal cost (1). However, frequent reporting takes up a lot of time and may delay the completion of the project (1).</p>	2 x 3	<p>One mark for each correct identification to a maximum of two identifications, plus one further mark for each of two explanations and one further mark for each of two analyses.</p>

Question			Answer	Marks	Guidance
3	(a)	(i)	Indicative content: Type of research: Secondary Source of information: External	2	Up to two marks.
3	(a)	(ii)	Indicative content: Wastage rate of Curtess Carbonate plc = $11,049/368,300 \times 100$ = 3% (or 0.03) Wastage rate of Watson Drinks plc = $19,335/1,289,000 \times 100$ = 1.5% (or 0.015) The wastage rate at Watson Drinks is half that (50%) of the wastage rate at Curtess Carbonates. Exemplar response: e.g. The market leader's wastage rate is 1.5% (1). the wastage rate at Curtess Carbonate is 3% (1) which is double that of the market leader (1).	3	Up to three marks.
3	(a)	(iii)	Responses may include: <ul style="list-style-type: none"> • integrity of source • bias of source • relevance • out of date • accuracy. Exemplar response: e.g. The source may be biased (1) because the market leader wants to show itself in a good light on its website (1).	3 x 2	One mark for each correct identification to a maximum of three identifications, plus one further mark for each of three explanations. Criterion must be applicable to Watson Drinks plc's data. Context required for full marks.

Question			Answer	Marks	Guidance										
3	(b)	(i)	<p>Responses may include:</p> <ul style="list-style-type: none"> record gaps, inconsistencies, conflicts find a resolution for problems track errors alert to issues quickly can be reviewed to search for similar issues identifies issue owner. <p>Exemplar response: e.g. Issue logs document unexpected problems (1) and allows resolutions to be found as quickly as possible, minimising delays (1).</p>	2	Up to two marks for explanation. Allow development.										
3	(b)	(ii)	<p>Indicative content:</p> <p>The bar chart displays the percentage change in output for four countries. The vertical axis is labeled 'Percentage change in output' and ranges from -20 to 40 in increments of 10. A horizontal dashed line at the 25% mark is labeled '25% Target'. The bars are: China (15%), Germany (30%), Turkey (-5%), and UK (25%).</p> <table border="1"> <thead> <tr> <th>Country</th> <th>Percentage change in output</th> </tr> </thead> <tbody> <tr> <td>China</td> <td>15%</td> </tr> <tr> <td>Germany</td> <td>30%</td> </tr> <tr> <td>Turkey</td> <td>-5%</td> </tr> <tr> <td>UK</td> <td>25%</td> </tr> </tbody> </table>	Country	Percentage change in output	China	15%	Germany	30%	Turkey	-5%	UK	25%	6	<p>Two marks for each correct bar (magnitude and direction).</p> <p>One mark for a bar in the correct direction but of incorrect magnitude.</p> <p>Percentage labelling not required.</p> <p>NB No marks for calculating percentages if not drawn on the graph as the question is testing the candidates' ability to represent graphically.</p>
Country	Percentage change in output														
China	15%														
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Turkey	-5%														
UK	25%														

Question			Answer	Marks	Guidance
3	(b)	(iii)	<p>Responses may include:</p> <ul style="list-style-type: none"> • visit the site in China to see what is going wrong • hold meetings with management • discuss with workforce • consult with the IT contractors • conduct a survey • request additional assistance from the contractors • organise additional training where necessary. <p>Exemplar response: e.g. He should start by arranging a meeting with TKT Systems Ltd (CONT) and the on-site management team at the site in China (2).</p> <p>Tom needs to visit the site to investigate why the output levels at the China site has fallen (1).</p>	2 x 2	<p>Award two marks for a contextual explanation, CONT annotation required.</p> <p>Award one mark for a non-contextual explanation.</p>

Question		Answer	Marks	Guidance
4	(a)	<p>Responses may include:</p> <ul style="list-style-type: none"> benefit – focused feedback, official, more feedback received, conforms to protocol, face to face communication, body language can be assessed, two-way communication, clarification can be sought. limitation – may be less honest than informal feedback, needs scheduling, relies on availability of personnel, verbal, no direct written record, minutes need to be taken, subjective, costs. <p>Exemplar responses: e.g. One benefit of using a formal meeting to obtain feedback is that the feedback can be queried (1) because the meeting will allow for two-way communication (1).</p> <p>e.g. One limitation of using a formal meeting to obtain feedback is that the feedback is verbal (1), in order to keep a permanent record of the feedback it will need to be documented (1).</p>	2 x 2	<p>One mark for a correct identification of a benefit, plus one further mark for explanation.</p> <p>One mark for a correct identification of a limitation, plus one further mark for explanation.</p>
4	(b)	<p>Responses may include:</p> <ul style="list-style-type: none"> recognise its successes or failures identify its strengths and weaknesses identify lessons learned inform future work drive business improvement measure stakeholder satisfaction. <p>Exemplar responses: e.g. The contractor can identify lessons learned to improve its future performance when commissioned to install hardware and software (CONT) for another large organisation (2).</p> <p>e.g. TKT Systems Ltd could identify its weaknesses and use these to improve its future performance (1).</p>	3 x 2	<p>Up to two marks for each of three explanations.</p> <p>Two marks for a contextual explanation. One mark for a non-contextual explanation.</p>

Question		Answer	Marks	Guidance
4	(c)	<p>Responses may include:</p> <ul style="list-style-type: none"> • obtain final acceptance of project completion • produce the final project report • inform stakeholders of completion • debrief team • review lesson learned. 	3	One mark for each correct identification, to a maximum of three identifications.
4	(d)	<p>Responses may include:</p> <ul style="list-style-type: none"> • time strategies • cost strategies • quality strategies. <p>Exemplar response: e.g. Tom needs to incorporate cost controls (1) into his next project to try and ensure that the project does not overrun its budget (1).</p>	2 x 2	One mark for each correct identification to a maximum of two identifications, plus one further mark for each of two explanations.

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