OCR
Oxford Cambridge and RSA

Cambridge Technicals

Engineering

Unit **24:** Project management in engineering

Level 3 Cambridge Technical Certificate/Diploma in Engineering
05822 - 05825

Mark Scheme for June 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.

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)**		Responses may include: • ensuring that the business need is valid • ensuring that the project is properly launched • ensuring that the project remains a viable business • ensuring the overall quality of the project • supporting the project manager (Sitar) • committing resources e.g. physical, technological, human • securing/provide funding • facilitating cross functional working • check project completion on time • monitor project is completed to budget.	**2**	One mark for each correct identification, to a maximum of two identifications. Do **not** award vague answers.
1	**(b)**		Responses may include: • physical • technological • human.	**3**	One mark for each correct identification, to a maximum of three identifications. Accept specific or contextual examples e.g. tools, computers, technicians (max 1 per category). 'Materials' and 'material resources' TV.
1	**(c)**		Responses may include: • budget • timescales for budget spend • costings • unit costs • total costs • pricing • sources of finance. Exemplar response: e.g. The financial plan should include details of the allocated budget (1). This is so that the project can be managed within reasonable cost constraints (1).	**2 x 2**	One mark for each correct identification to a maximum of two identifications, plus one further mark for each of two reasons.

Question			Answer	Marks	Guidance
1	**(d)**	**(i)**	Indicative content: A stakeholder is a person, group or organisation that has an interest in/is affected by/can impact the business.	**1**	For one mark. Do **not** award 'involved in the business' as this does not apply to all stakeholders.

Question			Answer	Marks	Guidance

1	(d)	(ii)	Use level of response criteria.
			
			Responses may include:
			• low interest, low power i.e. general public
			   o monitor, ignore, inform after completion
			• high interest, low power i.e. NEAB, production workers, suppliers
			   o keep informed, communicate
			• low interest, high power i.e. customers, press, shareholders
			   o keep satisfied, avoid confrontation, massage egos, manage expectations, supply important decisions/information, collect feedback
			• high interest, high power i.e. steering committee
			   o manage closely, take suggestions seriously, listen to viewpoint, negotiate, prioritise, pay more attention, get them on side, regular reports/updates
			Exemplar response:
			
			e.g. The National Energy Advisory Body has high interest in the project but low power (L1). This means that they should be kept informed (L2). So that it can provide expert feedback to help progress the project (L3)
			Customers, on the other hand, have relatively low levels of interest but high power (L1). This means that their needs must be satisfied (L2). If Lavin plc fails to meet the needs of customers they are likely to switch to a different brand of washing machine, lowering the company's revenue and profits (L3).
			I recommend Sitar to allocate the vast majority of resources to those stakeholder groups that have the greatest power and influence as this should minimise the risk of the project being jeopardised (L4).
				12	Level of response:
					
					Level 4: 10-12 marks
					Candidate evaluates how Sitar should manage the stakeholders of the project.
					
					Level 3: 7-9 marks
					Candidate analyses way(s) to manage the stakeholders of the project.
					
					Level 2: 4-6 marks
					Candidate explains way(s) to manage the stakeholders of the project.
					
					Level 1: 1-3 marks
					Candidate identifies stakeholder interest/power levels.

Question			Answer		Marks	Guidance
2	**(a)**		Indicative content:		**6**	One mark for each correct entry in table, to a maximum of six marks.
			Aesthetic damage	**302**		
			Safety concerns	**22**		
			Machine not working properly	**274**		
			Poor energy/water efficiency	**142**		
			Unacceptable noise/vibration	**199**		
			Other	**61**		

Question			Answer	Marks	Guidance
2	**(b)**		Responses may include: • integrity of source • bias of source • relevance • complexity • degree of detail • some data five years old • quality of data • accuracy • reliability • importance • need a balance viewpoint • need to consider the positives • other feedback is needed for a full picture • complaints may have been categorised incorrectly • defects may be self-diagnosed • not all complaints are valid • not all complaints are reported. Exemplar responses: e.g. The data lacks detail (1). It only gives the complaint, it does not give enough detail to work out the cause of the problem with the washing machines (1). e.g. Complainants may have complained on more than one platform (1) duplicating/distorting numbers (1). e.g. Social media issues could be very subjective (1) compared to the others which are handled by service team or helpline (1).	**2 x 2**	One mark for each correct identification to a maximum of two identifications, plus one further mark for each of two explanations.

Question			Answer	Marks	Guidance
2	**(c)**	**(i)**	Responses may include: • they have first-hand use of the product • they are the customer, purchasing power • reputation • end users need to be satisfied with the product • repeat purchases • account for 30% of revenue • fall in revenue • negative effect on cashflow • reduced profit • need a balance view of situation • to check customer satisfaction levels • to check product durability • may have suggested improvements. Exemplar response: e.g. Dissatisfied customers will no longer purchase machines (CONT) made by Lavin plc (2). e.g. If the company ignores its end users it may experience a fall in revenue (1).	2	Award two marks for a contextual response. Award one mark for a non-contextual response.

Question			Answer	Marks	Guidance
2	(c)	(ii)	Responses may include: • meetings/interviews • questionnaires • surveys • focus groups • forums. Exemplar response: e.g. Focus groups (1) One advantage of a focus group is that the company can ask additional questions to really probe the participants (1). A disadvantage of the method is that holding all of the sessions is time consuming (1).	2 x 3	One mark for each correct identification to a maximum of two identifications, plus one further mark for each of two advantages and each of two disadvantages. Do **not** award 'observations' as these do not give feedback from end users. Advantage/Disadvantage of **method** required. Do **not** award advantages/disadvantages of collecting primary data or of having feedback data.
3	(a)		Indicative content: <table><tr><td>Qualitative</td><td>Quantitative</td><td>✓</td></tr></table>	1	For one mark.

Question			Answer	Marks	Guidance
3	(b)	(i)	Indicative content: A = **24** F = **2** J = **20**	3	One mark for each correct answer, to a maximum of three marks.

Question			Answer	Marks	Guidance

3	(b)	(ii)	Indicative content:
			
			Node 6 EST = **26**
			     LFT = **57** (OFR applies (incorrect duration F))
			
			Node 7 EST = **58**
			     LFT = **58**
			
			Node 5 EST = **13**
			     LFT = **54** (OFR applies (incorrect duration J))
				6	One mark for each correct answer, to a maximum of six marks.
					
					OFR applies to the LFT of Nodes 5 and 6.

3	(c)		Responses may include: • compare overall progress to plan • check each critical task is started on time • compare actual duration of task with schedule • shows minimum time for completion of each stage • shows the most efficient order tasks should be completed in • check timings • check for delays • be proactive if getting behind. Exemplar response: e.g. The timing of project outcomes should be compared with the plan (1) to see whether the project is on schedule to complete on time (1). If there is evidence that the project is falling behind then Sitar should move spare resources from where there is plenty of slack, say from developing the new quality control system to finding alternative component suppliers (1).	3	Up to three marks for explanation. Allow development. Do **not** award 'monitor' – that is the wording of the question.

Question			Answer	Marks	Guidance
3	**(d)**		Responses may include: • more realistic time frame • when likely to finish the project • average time for project completion • in real life things go wrong • CPA figures are virtually impossible to achieve • better human resource management with realistic time frame • improved resource management due to closer match with reality. Exemplar response: e.g. Using PERT would give Sitar a more realistic completion time for each of the stages (1). This would allow her to better motivate her team, rather than risk building in failure (1).	**2**	Up to two marks for explanation. Allow development.

Question			Answer	Marks	Guidance
3	**(e)**		Responses may include: • contact the supplier as soon as possible • find out why the supplier intends to delay the delivery • try and negotiate/reach a compromise • delay the payment • find a different supplier • communicate the delay to appropriate team members • reschedule other tasks while awaiting the delivery • update the planning schedule • create/refer to contingency plan • accept the delay • wait for the delivery • concentrate on other (critical) tasks • institute a penalty clause. Exemplar response: e.g. Sitar should try and negotiate an earlier delivery time with the supplier (1). If this is not possible she should inform team members who are affected (1) so they can reschedule their time (1).	3	Up to three marks for explanation. Allow development.

Question			Answer	Marks	Guidance
3	**(f)**		Responses may include: • poor target setting • incorrect estimate of task durations • bottlenecks • falls behind schedule • slippage goes unnoticed • corrective action is not taken/taken too late • corrective action taken too late in • resources not available at required times • resource availability needs to be rearranged • increase costs • time creep. Exemplar responses: e.g. If Sitar does not have good information management skills then the project may fail to complete on time (2). e.g. If Sitar does not realise that corrective action needs to be taken until late in the project, then the cost of any corrective action which needs to be taken will increase (2). e.g. If Sitar did not have good information management skills she might fail to order essential resources on time (1).	2	Award two marks for answers which consider the impact on the **outcome** of the project. Award one mark for answers which consider the impact on the **operation** of the project.

Question			Answer	Marks	Guidance
4	**(a)**	**(i)**	Responses may include: • emphasis on all stakeholder viewpoints • less focus on profit • returns for shareholders satisfactory but not excessive • to be trusted by society • importance of public perception • spend more time communicating with general public • improved the quality of the research • improved the quality of the outcomes • focused corrective action towards social issues • thorough investigation of safety and environmental concerns e.g. energy efficiency, risk of fire • objectives conflict with profit maximisation • quality fixes rather than fixing at minimum cost • increased project costs • increased ongoing costs • budget allocated to CSR instead of project. Exemplar response: e.g. Lavin plc's emphasis on corporate responsibility is likely to have increased the costs of the project (1) because it is likely to pay its suppliers decent prices for the components it buys (1) because of the company's desire to be seen to uphold human rights (1).	3	One mark for each point of explanation. Allow development. NB: company is – • respected for upholding human rights • valued for its social contribution • known for its humanitarian charity work • known for better use of the world's resources.

Question			Answer	Marks	Guidance
4	(a)	(ii)	Responses may include: • organisational aims and objectives • the scale and scope of the project • resource availability e.g. physical, technological, human • inadequate workforce e.g. low skilled, poor training • poor leadership • poor planning • insufficient research • lack of funding.	3	One mark for each correct identification, to a maximum of three identifications. Accept specific examples e.g. poor product testing.
4	(b)		Responses may include: • feeling valued/psychological benefit • assess contribution they have made • find out how well project went • interested in outcomes/what was achieved • assess company response to the issues they raised • understand that the project is finished • judge whether participation was useful • help to decide whether to participate in similar research in the future • inform future purchase decisions.	2	One mark for each correct identification, to a maximum of two identifications. Must be benefits to **end-user** rather than to the company. Do not award 'what they could have done better'.

Question			Answer	Marks	Guidance
4	**(c)**	**(i)**	Responses may include: • formal e.g. meetings, questionnaires, reports, issue logs. • informal e.g. chat, pop-ins, working breakfast/lunch, casual conversation. Exemplar responses: e.g. A formal method which Sitar could use to obtain subjective feedback on her own performance is a written questionnaire (1). This would allow time for stakeholders to give a considered response (1). However, producing a good question is difficult to do and there would be no opportunity to ask for clarification if the questions did not work as well as she expected (1). e.g. An informal method which Sitar could use to gain feedback from team members is to ask them what they thought of her management of the project during casual conversation (1). Such impromptu meetings are likely to give less considered (1), but possibly more honest responses (1).	**2 x 3**	One mark for a formal method and one mark for an informal method, plus one further mark an advantage of each method and one mark for a disadvantage of each method. Advantages/Disadvantages of **method** required. Do **not** award advantages/disadvantages of getting feedback.

Question			Answer	Marks	Guidance
4	**(c)**	**(ii)**	Responses may include: • establish rapport • active listening • motivational techniques • attend group gelling exercises • management training course • establish group goals • show empathy • build team member confidence • develop effective communication systems • encourage teamwork with management training exercises • run group gelling events • communicate/talk with them • spend time with them • judicious use of praise. Exemplar response: e.g. Sitar could improve her team building skills by using exercises to encourage members of the group to work as a team (1). These could include a joint exercise to build a bridge or make a raft to help the entire team cross a river (1).	**2 x 2**	One mark for each correct identification to a maximum of two identifications, plus one further mark for each of two descriptions. NB Description, rather than explanation, required. How rather than why required. Accept answers relating to Sitar improving her team building skills or Sitar bonding the project team.

Question			Answer	Marks	Guidance
4	**(d)**		Responses may include: Exemplar response: • investigate remaining causes of stakeholder dissatisfaction • identify existing weaknesses • learn from mistakes • implement future performance reviews • review supply chain sourcing • regularly review systems e.g. quality control, logistics • improve training • develop expertise • update documentation • review procedures. e.g. The project steering committee could use the final project report to identify weaknesses that remain within the organisation (1), in order to focus resources on areas which need improvement (1). The project steering committee could use the final project to work out the root cause of the washing machine problems (1) so that future models can be improved (1).	2	One mark for a correct identification, plus one further mark for explanation. Accept specific answers e.g. improving components, improving the washing machines, improving delivery/logistics.

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