



TQUK Level 2 Certificate in Design, Engineer, Construct. The Digital Built Environment (RQF) (603/1992/6)

Paper ID: NAYER - 11 Certificate

Assessment date: PASTPAPER2

Mark Scheme

Mark scheme information

This mark scheme is intended to support the valid and consistent marking of the examination paper identified above. This mark scheme includes:

- the total mark available for each question
- the individual subject content coverage of each question
- further considerations which could or should be followed.

Information for the marker

- All marking must be completed consistently, and the mark scheme must be applied fairly
- Markers should award full marks if the candidate deserves full marks
- Markers should be prepared to award zero marks if the candidate's response is not worthy of credit according to the guidance for that activity
- Crossed-out work should be marked unless the candidate has replaced it with an alternative response
- There are no marks for spelling, punctuation and grammar, therefore errors are not penalised
- Unless indicated, quotations and candidates' own words are acceptable.

Mathematics

- **(M)** = Method mark awarded for application of a correct method.
- **(CAO)** = Mark awarded for a correct answer only.
- **(FT)** = Follow-through – where an answer requires a number of calculations if the answer to the first calculation is incorrect, and this is carried into another calculation, the candidate should **not** be penalised in the second calculation.
- **(OE)** = or equivalent. Where an answer could be rounded up or down, for example, or where an alternative method could be used.

Key

SC	Subject Content Coverage (as identified in the Qualification Specification)
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Text in brackets	May be included but is not essential to be awarded the mark
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Grade boundaries:

C	33
B	46
A	59
A*	71

Q	Answer	Marks	SC
1a	<p><i>What does 'inclusive design' mean?</i></p> <p>Award 1 mark for a correct answer, for example:</p> <ul style="list-style-type: none"> • (the design is) useful and marketable to people with diverse abilities (1) • flexibility in use (1) • (the design) accommodates a wide range of individual preferences and abilities (1) • (the design is) easy to understand and use, regardless of experience, knowledge or language skills (1) • perceptible information (1) • necessary information is effectively communicated, regardless of sensory abilities (1) • tolerance for error (1) • (the design) minimises hazards and adverse consequences of unintended actions (1) • (the design) can be used efficiently and comfortably with minimal fatigue (1) • size and space for approach and use (1) • appropriate size and space is provided for all users to approach, reach and use the design, regardless of body size, posture or mobility (1). <p>Accept any other suitable response.</p>	1	1.3.3

Q	Answer	Marks	SC
1b	<p><i>Look at the Resource Document. The new Norwood Park facility is designed to be an inclusive sports centre, and it must comply with all safety regulations. Identify two inclusive features that should be included in its design.</i></p> <p>Award 1 mark for each correct answer that relates to inclusivity, up to a maximum of 2 marks. For example:</p> <ul style="list-style-type: none"> • accessible entrances and / or accessible exits (1) • visual and auditory alarm systems (1) • evacuation chairs / routes (1) • accessible toilets (1) • accessible changing facilities (1) • adjustable equipment (1). <p>Accept any other suitable response.</p>	2	1.3.3

Q	Answer	Marks	SC
1c	<p>State two benefits of the <i>Building Research Establishment Environmental Assessment Method (BREEAM)</i>.</p> <p>Award 1 mark for each correct benefit of BREEAM, up to a maximum of 2 marks.</p> <p>For example:</p> <ul style="list-style-type: none"> • improves energy (1) • improves resource efficiency (1) • reduces operational costs (1) • reduces environmental impact (1) • enhances occupant comfort / wellbeing (1) • increases property value / marketability (1) • demonstrates a commitment to sustainability (1) • boost reputation and compliance with regulations (1). <p>Accept any other suitable response.</p>	2	1.3.3

Q	Answer	Marks	SC
1d	<p>What is the 'right to light'?</p> <p>Award 1 mark for a correct answer, for example:</p> <ul style="list-style-type: none"> • legal principle in property law (1) • grants a property owner the right to receive natural light through defined openings, such as windows, without obstruction from neighbouring structures (1) • ensures that buildings receive sufficient daylight to maintain habitable or usable spaces (1). <p>Accept any other suitable response.</p>	1	1.3.3

Q	Answer	Marks	SC
2a	<p><i>Effective communication between the construction team members and the client can prevent mistakes from being made. Explain four reasons why.</i></p> <p>Award 1 mark for each correct answer, up to a maximum of 4 marks. For example:</p> <ul style="list-style-type: none"> • clear understanding of objectives / effective communication ensures that all team members and the client have a shared understanding / everyone understands the project's goals, timeline and expectations / it helps avoid ambiguity in specifications, reducing the risk of errors caused by misinterpretation (1) • timely problem-solving / open communication channels allow for early identification and resolution of issues or challenges before they escalate into major problems / quick feedback loops between the team and the client help them adapt to changes or unforeseen circumstances efficiently (1) • coordination among team members / regular updates and discussions ensure that all stakeholders are aligned and aware of their roles and responsibilities / it facilitates the synchronisation of tasks, reducing errors due to misalignment or overlaps (1) • accurate documentation / effective communication ensures that instructions, changes and decisions are clearly documented, minimising mistakes caused by outdated or incomplete information / proper records provide a reference point, ensuring accountability and clarity (1) • enhanced client satisfaction / keeping the client informed and involved through regular updates builds trust and ensures their requirements are met accurately / proactive communication with the client can prevent dissatisfaction by addressing concerns (1) • avoidance of costly rework / miscommunication often leads to errors in design, construction or material procurement, resulting in delays and additional costs / effective communication minimises these risks, ensuring the project stays on schedule and within budget (1) • fostering a positive team environment / clear and respectful communication enhances teamwork and reduces conflicts / a collaborative atmosphere improves morale and productivity, contributing to the overall success of the project (1). <p>Accept any other suitable response.</p>	4	3.1.1

Q	Answer	Marks	SC
2b	<p><i>Identify four issues that can cause a project to go over budget.</i></p> <p>Award 1 mark for each correct answer, linked to causing a project to go over budget, up to a maximum of 4 marks.</p> <p>For example:</p> <ul style="list-style-type: none"> • costly errors / expensive rework or repairs / not anticipating potential issues, which can result in expensive rework or repairs (1) • delays / not planning for risks can result in a lack of mitigation strategies being in place and this can cause delays if there are issues / delays often result in additional labour costs, extended equipment rentals and potential penalties for missing deadlines (1) • inefficient resource allocation / not using materials, labour and equipment efficiently / for instance, if there are weather-related disruptions, this can result in the spoilage of materials (1) • lack of a risk management plan / this can result in teams not being able to respond quickly and effectively / for example, not having contingency budgets and pre-approved alternative designs can lead to the derailing of the project financially (1) • legal and regulatory issues / not identifying compliance risks, such as breaches of building codes or environmental regulations, can result in fines, lawsuits, or forced modifications that could significantly increase project costs / not consulting with regulatory bodies and stakeholders can result in compliance-related disruptions (1) • client dissatisfaction / can lead to decreased client confidence and may cause disputes / unhappy clients are less likely to approve payments promptly and this can lead to costly litigation or claims (1) • lack of long-term cost efficiency / the project team may increase future maintenance and operational costs if they don't address potential problems during the planning phase / for example, not choosing energy-efficient systems during construction may result in higher energy costs over the building's lifecycle (1). <p>Accept any other suitable response.</p>	4	3.1.1

Q	Answer	Marks	SC
3a	<p><i>Identify one specialist who manages: detailed cost estimation, budgeting and the financial planning of a project.</i></p> <p>Award 1 mark for the correct answer:</p> <ul style="list-style-type: none"> • quantity surveyor (1) 	1	3.1.3

Q	Answer	Marks	SC
3b	<p><i>Identify one specialist who advises on operational and maintenance needs during the design phase.</i></p> <p>Award 1 mark for a correct answer, for example:</p> <ul style="list-style-type: none"> • facilities manager (1) • facilities consultant (1) • building services engineer (1) • sustainability consultant (1). <p>Accept any other suitable response.</p>	1	3.1.3

Q	Answer	Marks	SC
3c	<p><i>Identify one specialist who designs and integrates systems, such as solar panels or geothermal heating.</i></p> <p>Award 1 mark for a correct answer, for example:</p> <ul style="list-style-type: none"> • renewable energy consultant (1) • sustainability engineer (1) • mechanical engineers (specialising in renewable energy) (1) • electrical engineers (specialising in renewable energy) (1) • building services engineer (1) • environmental engineer (1). <p>Accept any other suitable response.</p>	1	3.1.3

Q	Answer	Marks	SC
4a	<p><i>Identify two procurement options that will have a positive environmental impact.</i></p> <p>Award 1 mark for each correct answer that links to a positive environmental impact, up to a maximum of 2 marks. For example:</p> <ul style="list-style-type: none"> ● energy efficiency: <ul style="list-style-type: none"> ○ choosing products that consume less energy (1) ○ choosing services that promote energy savings (1) ○ choosing services that consume less energy (1) ○ choosing products that promote energy savings (1). ● waste reduction: <ul style="list-style-type: none"> ○ purchasing materials that are recyclable (1) ○ purchasing materials that are reusable (1) ○ purchasing materials with minimal packaging or that are recyclable (1). ● sustainable materials: <ul style="list-style-type: none"> ○ selecting products made from renewable materials (1) ○ selecting products made from non-toxic materials (1) ○ selecting products made from sustainably-sourced materials (1). ● lower carbon footprint: <ul style="list-style-type: none"> ○ prioritising suppliers who minimise carbon emissions in their production (1) ○ prioritising suppliers who minimise carbon emissions in their transport (1) ○ prioritising suppliers who minimise carbon emissions in their logistics (1). <p>Accept any other suitable response.</p>	2	2.1.4

Q	Answer	Marks	SC
4b	<p>Identify two procurement options that will have a positive social impact.</p> <p>Award 1 mark for each correct answer that links to a positive social impact, up to a maximum of 2 marks. For example:</p> <ul style="list-style-type: none"> • fair labour practices: <ul style="list-style-type: none"> ◦ ensuring suppliers follow ethical labour practices (1) ◦ ensuring suppliers pay fair wages (1) ◦ ensuring suppliers provide safe working conditions (1). • community benefits: <ul style="list-style-type: none"> ◦ supporting local suppliers or businesses that employ local labour (1) ◦ supporting local suppliers or businesses that support community projects (1). • human rights: <ul style="list-style-type: none"> ◦ avoiding suppliers or products that contribute to human rights violations (1) ◦ avoiding suppliers or products that contribute to child labour (1) ◦ avoiding suppliers or products that contribute to exploitative working conditions (1). <p>Accept any other suitable response.</p>	2	2.1.4

Q	Answer	Marks	SC
4c	<p>Identify two procurement options that will have a positive economic impact.</p> <p>Award 1 mark for each correct answer that links to a positive economic impact, up to a maximum of 2 marks. For example:</p> <ul style="list-style-type: none"> • cost-effectiveness: <ul style="list-style-type: none"> ◦ while the upfront cost of sustainable products may sometimes be higher, their long-term operational savings make them more cost-effective over time (1). • supplier stability: <ul style="list-style-type: none"> ◦ building relationships with suppliers that are financially stable can reduce the risk of costly supply chain disruptions (1). • support for innovation: <ul style="list-style-type: none"> ◦ encouraging suppliers to innovate in environmentally-friendly technologies (1) or socially-responsible practices can lead to better products and services at competitive prices in the long term (1). <p>Accept any other suitable response.</p>	2	2.1.4

Q	Answer	Marks	SC
5a	<p><i>State one benefit of optimising performance in a building project.</i></p> <p>Award 1 mark for a correct benefit of optimising performance, for example:</p> <ul style="list-style-type: none"> ● increased efficiency (1) ● cost savings (1) ● higher quality (1) ● client satisfaction (1) ● sustainability (1). <p>Accept any other suitable response.</p>	1	4.1.1

Q	Answer	Marks	SC
5b	<p><i>Look at the Resource Document. Identify four technologies which could be integrated into the sports facility design to optimise energy performance.</i></p> <p>Award 1 mark for each correct answer linked to optimising energy performance, up to a maximum of 4 marks.</p> <p>For example:</p> <ul style="list-style-type: none"> ● solar panels (photovoltaic systems) (1) ● energy-efficient HVAC (heating, ventilation and air conditioning) systems (1) ● geothermal heating/cooling (1) ● temperature control with low environmental impact (1) ● LED lighting (1) ● smart energy management systems (EMS) (1) ● rainwater harvesting systems (1) ● building energy management systems (BEMS) (1) ● wind turbines (1) ● high-performance insulation (1) ● high-performance glazing (1) ● combined heat and power (CHP) systems (1). <p>Accept any other suitable response.</p>	4	4.1.1

Q	Answer	Marks	SC
5c	<p><i>Identify four potential issues associated with the build stage of a construction project.</i></p> <p>Award 1 mark for each correct answer linked to the build stage of a construction project, up to a maximum of 4 marks. For example:</p> <ul style="list-style-type: none"> • inaccurate cost estimation (1) • unforeseen expenses (leading to budget overruns) (1) • scope creep (1) • delays in construction timeline (1) <ul style="list-style-type: none"> ○ weather conditions causing delays (1) ○ delays from logistical issues (1) ○ delays from supply chain disruptions (1) ○ delays in obtaining permits or approvals from local authorities (1). • unforeseen ground conditions (1) <ul style="list-style-type: none"> ○ poor soil quality (1) ○ contamination (1) ○ archaeological finds (1). • changes in the design of the project during construction (1) • poor communication between the design team and construction team (1) / poor communication within the project team (1) • failure to implement proper health and safety protocols (resulting in accidents, injuries or fatalities) (1) • skilled labour shortages (1) • labour disputes or strikes (1) • inadequate quality control procedures (1) • local community opposition (1) • public opinion may influence project planning or design modifications (1) • insufficient local infrastructure (1) • damage from vandalism / theft / trespassing (1). <p>Accept any other suitable response.</p>	4	4.2.1

Q	Answer	Marks	SC
6a	<p>Look at the Resource Document. Calculate the total build cost of the sports facility (excluding additional costs). Use: total build cost = build cost per m² x internal floor area. You must show all your workings.</p> <p>Award 1 mark for the method (M) given correctly, for example:</p> <p>(total build cost) = £2,550 x 168.33 m² (1)</p> <p>Award 1 mark for the correct answer (CAO):</p> <p>£ 429,241.50 (1)</p>	2	1.1.3

Q	Answer	Marks	SC
6b	<p>Look at the Resource Document. Calculate the amount of money from the budget that will cover the internal fit-out costs. Use: fit-out costs = internal floor area x (build cost per m² x fit-out cost %). You must show all your workings.</p> <p>Award 1 mark for the method (M) given correctly, for example:</p> <p>(fit out costs =) 168.33 m² x (£2,550 x 0.22) (1)</p> <p>Award 1 mark for the correct answer (CAO):</p> <p>£94,433.13 (1)</p>	2	1.1.3

Q	Answer	Marks	SC
6c	<p>Look at the Resource Document. Calculate the total cost to build the new Norwood Park Sports Centre, including all additional costs. You must show all your workings.</p> <p>Award 1 mark for showing the method (M) used to calculate the total % additional costs. For example:</p> <p>(total % additional costs =) $22 + 15 + 12 + 6 + 15$ (1)</p> <p>Award a further 1 mark for the correct answer from this method (CAO):</p> <p>70 (1)</p> <p>Award 1 mark for showing the method (M) used to calculate the total additional costs. For example:</p> <p>(total additional costs =) $£2,550 \times 0.7$ (1)</p> <p>Award a further 1 mark for the correct answer from this method (CAO):</p> <p>£1,785 (1)</p> <p>Award 1 mark for showing the method (M) used to calculate the total costs. For example:</p> <p>(total costs =) $168.33 \times (£2,550 + £1,785)$ (1)</p> <p><u>Award a further 1 mark for the correct answer from this method or equivalent (OE):</u></p> <p>£729,710.55 (1) (CAO)</p>	6	1.1.3

Q	Answer	Marks	SC
7a	<p>Look at the Resource Document. Calculate the lumens needed for the function room. Use: $\text{lumens} = \text{lux} \times \text{area}$. You must show all your workings.</p> <p>Award 1 mark for showing the method (M) used to calculate the lumens needed.</p> <p>For example:</p> <p>(lumens =) $200 \times 98.51 \text{ m}^2$ (1)</p> <p>Award 1 mark for the correct answer from this method (CAO):</p> <p>19,702 (1)</p>	2	2.2.3

Q	Answer	Marks	SC
7b	<p>Look at the Resource Document. The building design for the Norwood Park Sports Centre includes smart LED lighting. The lighting uses 6-watt lamps. Each lamp provides a minimum of 400 lumens. Calculate the number of lamps required to light the function room. Use: $\text{total lamps} = \text{lumens} \div \text{lamp brightness in lumens}$. You must show all your workings.</p> <p>Award 1 mark for showing the method (M) used to calculate the total lamps needed.</p> <p>For example:</p> <p>(total lamps =) $19702 \div 400$ (1)</p> <p>Award the second mark for the correct answer from this method or equivalent (OE):</p> <p>49.255 (1) or 49 (1) or 50 (1)</p>	2	2.2.3

Q	Answer	Marks	SC
7c	<p><i>Identify two purposes of a Construction, Design and Management Plan.</i></p> <p>Award 1 mark for each correct answer, up to a maximum of 2 marks. For example:</p> <ul style="list-style-type: none">• ensuring health and safety (1)• legal compliance (1)• enhancing project efficiency (1)• improving worker welfare (1)• addressing sustainability / environmental concerns (1)• planning for the future (1). <p>Accept any other suitable response.</p>	2	2.3.4

Q	Answer	Marks	SC
7d	<p><i>Evaluate four sustainable and energy-efficient strategies that can be included in a building design to mitigate climate change.</i></p> <p>Award 1 mark for each strategy identified, linked to mitigating climate change, up to a maximum of 4 marks.</p> <p>Award 1 mark for an evaluation of each strategy identified, linked to mitigating climate change, up to a maximum of 4 marks.</p> <p>For example:</p> <ul style="list-style-type: none"> ● passive design strategies (1) <ul style="list-style-type: none"> ○ orienting the building to maximise natural light and solar gain in winter reduces the need for artificial lighting and heating (1) ○ using materials with high thermal mass helps absorb and store heat during the day and release it at night, reducing the need for heating and cooling (1) ○ designing the building to allow for cross-ventilation and air circulation can significantly reduce the need for mechanical cooling, especially in mild climates (1) ○ proper insulation reduces energy loss by preventing heat from escaping in the winter and keeping the building cool in the summer (1). ● strategic selection of energy-efficient building materials (1) <ul style="list-style-type: none"> ○ selecting materials with low environmental impact reduces the carbon footprint associated with manufacturing and transportation (1) ○ vegetated roofs and walls provide insulation, reduce urban heat island effects, improve air quality and reduce stormwater runoff (1) ○ using triple-glazed or low-emissivity ○ windows help reduce heat transfer, improving insulation and energy efficiency (1). ● renewable energy integration strategies (1) <ul style="list-style-type: none"> ○ installing photovoltaic panels on the roof or facades harnesses sunlight to generate electricity, reducing reliance on fossil fuels (1) ○ solar thermal systems can be used for water heating, providing a sustainable alternative to electric or gas water heaters (1) ○ in suitable locations, small-scale wind turbines can supplement energy needs, providing clean energy and reducing dependence on grid power (1) ○ geothermal heating and cooling systems use the stable temperature of the earth to regulate indoor climate, offering an energy-efficient solution for both heating and cooling needs (1). 	8	2.3.2

	<ul style="list-style-type: none"> ● HVAC systems strategies (1) <ul style="list-style-type: none"> ○ these systems help to recover heat from the exhaust air and transfer it to the incoming fresh air, improving energy efficiency in buildings that require mechanical ventilation (1) ○ VRF systems are highly efficient because they adjust the refrigerant flow according to demand, providing both heating and cooling while minimising energy use (1) ○ upgrading to high-efficiency heating and cooling systems, such as condensing boilers or energy-efficient air conditioning units, reduces energy consumption (1). ● strategic inclusion of smart technologies and building automation (1) <ul style="list-style-type: none"> ○ these devices can optimise temperature settings, adjusting heating or cooling based on occupancy patterns or weather forecasts, ensuring minimal energy use (1) ○ an EMS helps monitor, control and optimise energy consumption in a building, tracking usage patterns and making recommendations to reduce energy waste (1) ○ motion sensors, daylight sensors and occupancy sensors can ensure that lights are only on when needed, reducing energy use and extending the life of lighting systems (1). ● water conservation strategies <ul style="list-style-type: none"> ○ collecting rainwater for non-potable uses, such as landscaping and toilet flushing, reduces reliance on municipal water systems and lowers water treatment energy demands (1) ○ installing low-flow taps, showerheads and toilets reduces water consumption, which in turn reduces the energy required to pump, heat and treat water (1) ○ reusing water from sinks, showers and laundry for irrigation or toilet flushing reduces overall water demand and minimises wastewater discharge (1). ● sustainable landscaping strategies (1) <ul style="list-style-type: none"> ○ using drought-tolerant, native plants for landscaping reduces water usage and the need for fertilisers and pesticides, helping to preserve local ecosystems (1) ○ incorporating green spaces into urban designs can mitigate the urban heat island effect and provide natural cooling, which can reduce the demand for air conditioning (1). ● building envelope optimisation strategies (1) <ul style="list-style-type: none"> ○ insulating walls, floors and roofs with materials that prevent heat loss and gain enhances energy performance (1) ○ sealing gaps and cracks around windows, doors and joints reduces air leakage, enhancing the overall thermal efficiency of the building (1) 		
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	<ul style="list-style-type: none">○ using cool roofs or reflective materials that reduce heat absorption can minimise the need for air conditioning, especially in hot climates (1).● carbon neutral and net zero energy buildings strategies (1)<ul style="list-style-type: none">○ in cases where reducing emissions is not enough to achieve net-zero carbon, buildings can offset their emissions by supporting projects that reduce or sequester carbon elsewhere (1)○ these buildings generate as much energy as they consume over the course of a year through a combination of energy-efficient design and renewable energy generation (1). <p>Accept any other suitable response.</p>		
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Q	Answer	Marks	SC
8a	<p><i>Identify three investigations to complete during a feasibility study.</i></p> <p>Award 1 mark for each correct answer, up to a maximum of 3 marks. For example:</p> <ul style="list-style-type: none"> • executive summary (1) / overview of the proposed construction project (1) / objectives of the feasibility study (1) / key findings and recommendations (1) / summary of the viability of the project (1) • site analysis (1) / location suitability (1) / environmental considerations (1) / soil and geotechnical conditions (1) / zoning and land use (1) • technical feasibility (1) / design requirements (1) / construction methods (1) / material availability (1) / utilities and infrastructure (1) • financial feasibility (1) / cost estimates (1) / funding sources (1) / revenue projections (1) / profitability analysis (1) / cost sensitivity analysis (1) • legal and regulatory feasibility (1) / permits and licenses: required permits and approvals (1) / regulatory compliance (1) / land ownership and rights (1). • market feasibility (1) / demand analysis (1) / target market (1) / competitor analysis (1) • environmental impact assessment (1) / sustainability practices (1) / impact on ecosystem (1) / mitigation strategies (1). • risk assessment (1) / risk identification (1) / mitigation strategies (1) / contingency plans (1) • operational feasibility (1) / construction timeline (1) / labour and expertise (1) / supply chain (1) / health and safety (1). • stakeholder analysis (1) / key stakeholders (1) / stakeholder needs (1) / communication plan (1). • sustainability and energy efficiency (1) / energy use (1) / water efficiency (1) / waste management (1). <p>Accept any other suitable response.</p>	3	3.2.2

Q	Answer	Marks	SC
8b	<p><i>Identify six examples of how a construction project demonstrates compliance with building regulations.</i></p> <p>Award 1 mark for each correct answer linked to compliance with building regulations, up to a maximum of 6 marks. For example:</p> <p>Structural safety compliance</p> <ul style="list-style-type: none"> design and engineering approval: <ul style="list-style-type: none"> structural calculations and load-bearing assessments are submitted to Building Control (1) use of approved design codes (1). material and construction standards: <ul style="list-style-type: none"> structural elements (for example, steel beams, concrete slabs) are tested for strength and durability (1) regular site inspections by structural engineers (1). load testing and certifications: <ul style="list-style-type: none"> load-bearing tests are conducted on foundations, floors and roofs (1) final structural integrity report issued before occupancy (1). <p>Fire safety compliance</p> <ul style="list-style-type: none"> fire-resistant materials: <ul style="list-style-type: none"> installation of fire doors (1) fire-resistant walls (1) and protected escape routes (1) materials tested and certified (1). fire detection and suppression systems: <ul style="list-style-type: none"> smoke detectors and fire alarms installed (1) sprinklers installed in high-risk buildings (1). evacuation and risk assessments: <ul style="list-style-type: none"> fire escape routes with emergency lighting and clear signage (1) fire risk assessment carried out before approval (1). final testing and certification: <ul style="list-style-type: none"> fire drills and alarm system testing conducted (1) fire safety certificate issued upon final inspection (1). <p>Energy efficiency compliance</p> <ul style="list-style-type: none"> thermal performance and insulation: <ul style="list-style-type: none"> building fabric designed with appropriate U-values to reduce heat loss (1) insulation materials tested and certified (1). energy performance modelling: <ul style="list-style-type: none"> SAP (Standard Assessment Procedure) calculations submitted for residential buildings (1) SBEM (Simplified Building Energy Model) used for commercial buildings (1). renewable energy and efficiency testing: <ul style="list-style-type: none"> solar panels, heat pumps and efficient HVAC systems installed (1) 	6	3.2.3

	<ul style="list-style-type: none"> ○ air tightness test conducted ($\leq 10 \text{ m}^3/\text{h.m}^2$ at 50 Pa for new buildings) (1) ● certification and compliance reports: <ul style="list-style-type: none"> ○ Energy Performance Certificate (EPC) issued (1) ○ compliance with BREEAM or LEED sustainability standards (1). <p>Accessibility compliance</p> <ul style="list-style-type: none"> ● step-free access and facilities: <ul style="list-style-type: none"> ○ ramps (1) and lifts (1) installed with suitable gradients (1:20 or better) (1) ○ accessible entrances (1) and automatic doors provided (1). ● internal accessibility features: <ul style="list-style-type: none"> ○ widened doorways and corridors for wheelchair access (1) ○ accessible toilets, handrails and tactile paving included (1). ● testing and approval: <ul style="list-style-type: none"> ○ site inspections by accessibility specialists (1) ○ compliance audits and certification before occupancy (1). <p>Ventilation and air quality compliance</p> <ul style="list-style-type: none"> ● ventilation system design: <ul style="list-style-type: none"> ○ natural and mechanical ventilation systems designed to meet air quality standards (1) ○ fresh air supply meets 10 l/s per person in office buildings (1). ● air quality testing: <ul style="list-style-type: none"> ○ carbon dioxide (CO_2) levels tested (must stay below 1000 ppm in occupied spaces) (1) ○ HEPA filters installed in medical facilities (1). ● compliance checks and certification: <ul style="list-style-type: none"> ○ HVAC commissioning and balancing reports submitted (1) ○ ventilation performance certification issued (1). <p>Sound insulation compliance</p> <ul style="list-style-type: none"> ● soundproofing between spaces: <ul style="list-style-type: none"> ○ party walls and floors tested to meet minimum sound reduction requirements ○ acoustic insulation materials installed and tested (1). ● pre-completion testing: <ul style="list-style-type: none"> ○ airborne and impact sound tests performed in apartments and offices (1) ○ minimum airborne sound insulation of 45 dB achieved (1). ● certification and approval: <ul style="list-style-type: none"> ○ compliance certification issued by independent acoustic engineer (1) ○ test reports submitted to Building Control before final approval (1). <p>Health and safety compliance</p> <ul style="list-style-type: none"> ● risk assessments and safety plans: 		
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	<ul style="list-style-type: none"> ○ construction phase health and safety plan prepared before work begins (1) ○ method statements for hazardous tasks provided (1). ● on-site safety measures: <ul style="list-style-type: none"> ○ PPE (personal protective equipment) enforced (1) ○ site safety barriers, warning signs and emergency procedures in place (1). ● regular inspections and training: <ul style="list-style-type: none"> ○ routine HSE (Health & Safety Executive) audits carried out (1) ○ workers trained in fire safety, working at heights and first aid (1). ● final approval and certification: <ul style="list-style-type: none"> ○ occupational health and safety compliance certificate issued (1) ○ handover documentation includes safety manuals and emergency plans (1). <p>Accept any other suitable response.</p>		
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Q	Answer	Marks	SC
9a	<p><i>Define the term 'organogram'.</i></p> <p>Award 1 mark for a correct answer, for example:</p> <p>(An organogram is) a visual representation of an organisation's structure, (illustrating the hierarchy of roles, reporting relationships and the flow of authority and responsibility) (1).</p> <p>Accept any other suitable response.</p>	1	1.4.2

Q	Answer	Marks	SC
9b	<p><i>Identify three examples of how an organogram can benefit a design and build project.</i></p> <p>Award 1 mark for each correct answer, linked to the benefit to a design and build project, up to a maximum of 3 marks. For example:</p> <ul style="list-style-type: none"> • improved communication (1) • clearer hierarchy and reporting lines (1) • clearer roles and responsibilities (1) • better/clearer decision-making (1) • improved resource allocation (1) • improved succession planning (1) • improved efficiency and productivity (1) • improved change management (1) • improved training and onboarding (1) • clearer benchmarking and evaluation (1) • improved legal and regulatory compliance (1) • improved transparency (1) • improved clarity of structure (1). <p>Accept any other suitable response.</p>	3	1.4.2

Q	Answer	Marks	SC
10a (i)	<p><i>Identify the importance of feedback during a construction project.</i></p> <p>Award 1 mark for a correct answer, for example:</p> <ul style="list-style-type: none"> • feedback provides insights into the effectiveness of the project's planning / execution / (and) outcomes (1) • (by evaluating and incorporating feedback,) project teams can identify areas of success / areas that need improvement (1) • (can lead to) more efficient / cost-effective / high-quality outcomes in future projects (1). <p>Accept any other suitable response.</p>	1	1.4.2

Q	Answer	Marks	SC
10a (ii)	<p><i>Explain one way feedback can be used for improvements in future projects.</i></p> <p>Award 2 marks for an explanation of how feedback can be used to improve future projects. For example:</p> <ul style="list-style-type: none"> identifying strengths and weaknesses: feedback helps identify both successful strategies and areas where the project may have faced challenges (2) project managers can understand which aspects of the project are successful and which ones require changes, (by gathering input from various stakeholders) (2) improving processes and practices: teams can refine construction methods, improve safety practices and optimise resource allocation (2) feedback on construction delays or accidents might lead to the development of better safety protocols or more realistic scheduling practices for future projects (2) enhancing communication and collaboration: feedback can also identify gaps in communication between different teams. Understanding how these gaps affected the project can help establish better communication protocols for future projects (2) lessons learned sessions: post-project evaluations, allow project teams to gather feedback on every phase of the project. These sessions are essential for identifying mistakes and establishing actions for future projects (2) benchmarking and continuous improvement, the project team might establish more realistic timeframes based on previous experiences, after analysing feedback on project timelines (2) the team can consistently enhance their practices, achieving better results each time, by using a continuous improvement cycle (2). <p>Accept any other suitable response.</p>	2	4.1.3

Q	Answer	Marks	SC
10b (i)	<p><i>Define the term 'aesthetic experience' for the user.</i></p> <p>Award 1 mark for a correct answer, for example:</p> <ul style="list-style-type: none"> (aesthetic experience relates to) the overall visual appeal and artistic qualities of a space (1) (aesthetic experience) involves elements of design, colour, form, texture and harmony that create a pleasing or meaningful visual environment (1). <p>Accept any other suitable response.</p>	1	4.2.3

Q	Answer	Marks	SC
10b (ii)	<p>Give three examples of aesthetic experiences.</p> <p>Award 1 mark for each correct answer, up to a maximum of 3 marks. For example:</p> <ul style="list-style-type: none"> • design style and form (1): the overall architectural style, the building's proportions, shapes and design elements (1) • material and texture (1): the use of materials that add tactile value to the space, contributing to both aesthetics and physical comfort (1) • colour schemes and lighting (1): thoughtful use of colour and light to influence mood and functionality, such as warm tones for comfort or cool tones for productivity (1) • spatial layout (1): how spaces are arranged and organised to enhance functionality and movement while creating pleasing visual connections (1) • visual appeal (1): attention to artistic details such as artwork, furniture or landscaping, contributing to a holistic, enjoyable visual experience (1). <p>Accept any other suitable response.</p>	3	4.2.3

Q	Answer	Marks	SC
10c (i)	<p>Define the term 'sensory experience' for the user.</p> <p>Award 1 mark for a correct answer, for example:</p> <ul style="list-style-type: none"> • refers to the way individuals interact with their environment through the five senses – sight / sound / touch / smell / taste (1) • how the design elements in a space engage the five senses, influencing the user's comfort, mood and behaviour (1). <p>Accept any other suitable response.</p>	1	4.2.3

Q	Answer	Marks	SC
10c (ii)	<p>Give three examples of sensory experiences.</p> <p>Award 1 mark for each correct answer, up to a maximum of 3 marks. For example:</p> <ul style="list-style-type: none"> colours, lighting, proportions and overall visual aesthetic of the space (1) good visual design can set the mood, increase user comfort and even improve functionality (1) auditory sensory experience – sound quality significantly impacts the experience of a space. Acoustics are essential in determining how noise is controlled or amplified (1) well-designed acoustics can make an environment more comfortable, reduce distractions and improve communication (1) tactile sensory experience involves how materials, textures and surfaces feel when touched (1) the use of different materials smooth, rough, cold, warm can influence a person's emotional response to a space and contribute to their comfort (1) olfactory sensory experience pleasant or soothing scents can enhance comfort, while unpleasant odours can detract from the experience. Often, scent is used to create a memorable or calming environment (1) gustatory sensory experience less common in construction design, taste can play a role in environments such as restaurants, cafes or food courts (1) a combination of visual appeal, aroma and the overall ambiance can make the experience of tasting food more enjoyable (1). <p>Accept any other suitable response.</p>	1	4.2.3

End of Mark Scheme