Pearson Edexcel

Mark Scheme (Results)

Summer 2024

Pearson Edexcel GCE
In Design & Technology: Product Design (9DT0)
9DT0/01

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Summer 2024
Question Paper Log Number 79759
Publications Code 9DT0_01_2406_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

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Question number	Answer	Mark
1(a)	Any two of the following heat treatments:- 1. Annealing (1) 2. Normalising (1) 3. Tempering (1) Do not accept quenching	**(2)**

Question number	Answer	Mark
1(b)	Any two explanations that include a correct reason and a linked justification of why the reason makes carbon steel a suitable material to use. 1. Carbon steel is hard (1) so the cutting edge will remain sharp / will not easily damage / be durable / require less frequent sharpening (1) 2. Carbon steel has high strength (1) meaning that the chisel will not deform / remain rigid / it will retain its desired shape (1) 3. Carbon steel can have different carbon contents (1) allowing the properties to be tailored to the requirements of the blade(1) Any other appropriate response	**(4)**

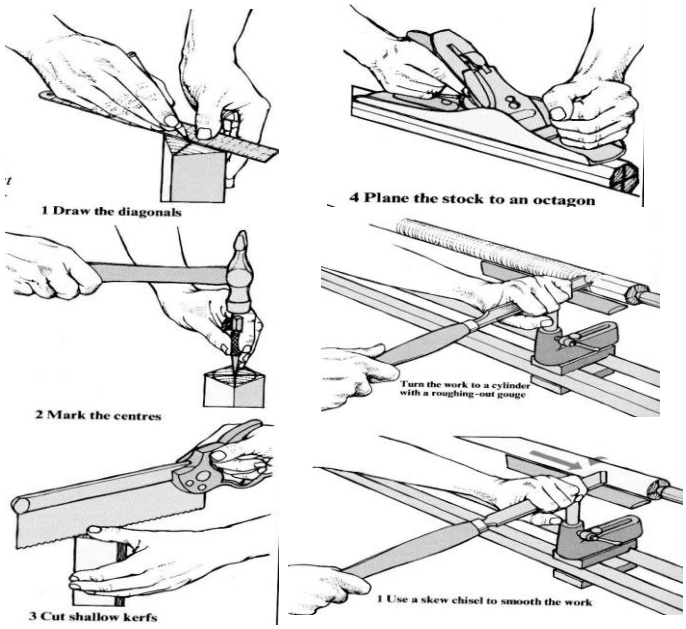
Question number	Answer Additional guidance	Mark
1(c)	Any explanation that includes the identification of any benefit (1) and linked justifications of why that is a benefit (1+1): 1. Polypropylene is a tough material (1) it will not break/shatter/fracture (1) so has good impact resistance / providing durability / safety in use (1) 2. Polypropylene has a soft feel / is a warm material (1) improving the comfort / ease of use (1) ensuring a firm grip / good tool control (1) 3. Polypropylene can be moulded into complex shapes (1) allowing an ergonomic design to be easily produced / with grips (1) allowing the tool to be used, with comfort, for extended periods of time / reducing the risk of injury (1) 4. Polypropylene will not split or break with extensive use (1) because it is a durable material (1) due to its fatigue resistance (1) 5. Polypropylene can be coloured (1) making the tool more visible (1) allowing colour coding for identification (1) 6. Polypropylene is shock absorbent (1) which is effective when the chisel is hit with a hammer/mallet (1) reducing the risk of injury to the user / fatigue (1) 7. Polypropylene can be moulded onto the blade (1) so is unlikely to come loose in use (1) improving safety / ensuring longevity (1) Any other appropriate response	**(3)**

Question number	Answer	Mark
2(a)	Any two of the following benefits: 1. Speed / ease of use / production (1) 2. Bonds well / strong bond (1) 3. Rapid set / can be moved immediately (1) 4. Cramps / holding devices not needed (1) 5. Can be automated (1) 6. Can join dissimilar materials (1) 7. Can flow to fill gaps / spaces (1) 8. Accurate glue distribution / placement (1) 9. Reduces wastage / glue can be reheated (1) 10. Can come in a range of colours / clear (1) 11. Relatively inexpensive (1) Any other appropriate response	**(2)**

Question number	Answer	Additional Guidance	Mark
2(b)	In order for the candidates to solve the problem, they will need to recognise that each of the following stages are required. <u>Method 1</u> Stage 1 (calculate the cost per glue stick £9.44 / 16 = £0.59 (1) Stage 2 (calculate the cost per week) 500 x £0.59 = £295.00 (1) Stage 3 (calculate new weekly cost) £295.00 + (£295.00 x 30/100) = £383.50 (1) Stage 4 (calculate weekly cost of waste) £383.50 x 12/100 = £46.02 (1) Stage 5 (calculate total cost of waste over 52 weeks) £46.02 x 52 = £2,393.04 (1) <u>Method 2</u> Stage 1 (calculate sticks used per year) 500 x 52 = 26,000 (1) Stage 2 (increase by 30%) 26,0000 + (26,000 x 30/100) = 33,800 (1) Stage 3 (calculate number of wasted sticks) 33,800 x 12/100 = 4056 (1) Stage 4 (calculate the cost per glue stick £9.44 / 16 = £0.59 (1) Stage 5 (calculate cost of waste) 4056 x £0.59 = £2,393.04 (1)	Accept alternative methods / orders of correct working out. Error carried forward should be applied. Award full marks for correct answer only. SC award 4 marks for £2,454.40 Based on 5 packs per week	**(5)**

	Method 3 Stage 1 (calculate 'new' sticks per week) 500 + (500 x 30/100) = 650 (1) Stage 2 (calculate sticks per year) 650 x 52 = 33,800 (1) Stage 3 (calculate number of boxes) 33,800 /16 = 2,112.50 (1) Stage 4 (calculate wasted boxes) 2,112.50 x (12/100) = 253.50 (1) Stage 5 (calculate cost of waste) 253.5 x £9.44 = £2,393.04 (1) Method 4 Stage 1 (calculate increased production) 500 x 1.3 = 650 (1) Stage 2 (calculate number of glue sticks wasted per week) 650 x 0.12 = 78 (1) Stage 3 (calculate how many packs wasted per week) 78 / 16 = 4.875 (1) Stage 4 (calculate number of packs wasted in 52 weeks) 4.875 x 52 = 253.5 (1) Stage 5 (calculate cost of waste) 253.5 x 9.44 = £2,393.04 (1) Method 5 Stage 1 (calculate sticks/year) 500 x 52 = 26,000 (1) Stage 2 (increase by 30%) 500 x 1.3 = 650, then 650 x 52 = 33,800 (1) Stage 3 (calculate number of packs/year) 33,800 / 16 = 2112.50 (1) Stage 4 (total cost per year) 2112.50 x 9.44 = £19,942.00 (1) Stage 5 (calculate cost of waste) 19,942.00 x 0.12 = £2,393.04 (1)		

Question number	Answer	Mark
3(a)	A valid explanation with linked justification: 1. Fine / tight / straight / even / dense grain (1) allows for a good finish / fine detail / machines well (1) 2. Interlocking grain reduces the risk of splitting / cracking / splintering during turning (1) because Mahogany is a hard material (1) 3. Mahogany has relatively few knots/blemishes (1) which would reduce the strength of the turned spindle / reduce the risk of an accident during manufacture (1)	**(2)**

Question number	Answer	Mark
3(b)	Award marks as follows (maximum 4 marks): 1. Marking centre / diagonals (1) 2. Cutting along the diagonals to embed drive centre / punch centre (1) 3. Plane to an octagonal section / to remove corners (1) 4. Mounting the workpiece in the lathe / between centres (1) 5. Positioning the tool rest (1) 6. Workpiece/mahogany rotates (1) 7. Initial cut using roughing-out gouge/insert (1) 8. Smooth with a skew chisel/insert (1) 9. Sanding (1) 10. Parting-off (1)  If no sketch, a sketch without labels or incorrect order award a maximum of three marks.	**(4)**

Question number	Answer	Additional guidance	Mark
3(c)	Any two explanations that include identification of a reason (1) and linked justifications of that reason (1) + (1). 1. Mahogany grows in tropical regions / equatorial rain forests (1) meaning it is transported large distances to market (1) thus increasing carbon emissions / impacting on the carbon footprint (1) 2. Logging of mahogany has led to deforestation (1) causing loss of animal habitats / damaging ecosystems (1) and leaving barren land that is not replanted / reducing oxygen regeneration/CO_2 absorption (1) 3. Despite being protected by law / ethics (1) the value of the timber is so great (1) that illegal logging occurs (1) 4. Mahogany is a hardwood / comes from a deciduous tree (1) so is slower growing than softwoods (1) therefore cannot be considered as an easily renewable resource / is a finite material (1) 5. When produced commercially as a monocropping operation (1) the acid soil associated with the growth of mahogany (1) doesn't support ecosystems so the forests are almost devoid of wildlife / reduces biodiversity (1)	Do not accept repeated justification.	**(6)**

Question number	Answer	Mark
4(a)	Any three of the following benefits up to a maximum of 3 marks: 1. Frees up skilled staff / utilises time / for other work (1) 2. Bought in components may be cost effective / can bulk buy (1) 3. Bought in components are quality checked (1) 4. Reduces development time / time to market (1) 5. Allows complex components to be used that they cannot produce in-house (1) 6. May be readily available from multiple sources / interchangeable (1) 7. Can utilise overseas producers / manufacturers (1) 8. Standardised parts are proven and tested in use (1) 9. Easier / cheaper for consumers to obtain replacement parts (1) 10. Reduces manufacturing time (1) 11. Inventory levels are lower (1) 12. Standard sizes when designing / planning (1) 13. Reduced tooling requirements (1) 14. Reduced facility requirements (1) Any other appropriate answer.	**(3)**

Question number	Answer	Mark
4(b)	An outline covering any 6 of the following points: 1. Reduces the need to maintain stocks of materials/components (1) 2. Reduces wastage of material (1) 3. Reduces the need for multiple handling / materials distribution (1) 4. Allows for specific scheduling of specialist components (1) 5. Materials arrive at the production line in order of use / need (1) 6. Reduces overordering (1) 7. Reduces the amount of capital tied up in materials (1) 8. Improves the efficiency / productivity / cost of the manufacturing process (1) 9. Just the right quantity of materials / components present at any time (1) 10. Well organised manufacturing environment (1) 11. Improves cash flow (1) 12. Improves flexibility / customisation of customer orders (1) 13. Improves customer satisfaction (1) 14. Reduction in storage space requirements (1) 15. Frees up space for other manufacturing purposes (1) Any other appropriate answer.	**(6)**

Question number	Answer	Mark
4(c)	Any two of the following: 1. Reduce process cycle time / improve speed of production (1) 2. Reduce pollution / waste (1) 3. Increase customer satisfaction / meet user requirements (1) 4. Increase profits (1)	**(2)**

Question number	Answer	Mark
4(d)	This question asks candidates to discuss how the circular economy will reduce the impact of manufacturing activity on the environment and promote sustainability. Candidates might refer to the following in their responses: • Minimisation of waste, and energy leakage • 5Rs principles; reduce, reuse, refurbish, repair and recycle. • Slowing, closing and narrowing material and energy loops • Contrast to a linear economy which is a 'take, make, dispose' model of production • Increase in repairability of designs • Move away from the 'built in obsolescence' culture • Products designed to be long lasting and durable • Futureproofing designs • Increased focus on upcycling • A shift from fossil fuels to renewable energies • Emphasises 'cradle to cradle' approach • Optimisation of systems • Circular framework • Approach taken to deal with the end of the cheap oil and fossil fuels era • Transition to a low carbon economy • Prioritisation of regenerative resources • Use waste as a resource • Designing out waste from processes • Designing for a lifetime and extended future use • Preserving and extending what is already made • Collaboration to create joint value • Incorporation of digital technologies to track and optimise resource use • Circular business models • Increase in recycling, associated costs and benefits • Requirement for recycling infrastructure • Positive support from governments and environmental pressure groups • Investment in waste recovery systems • Increased use of repair and upgrade programmes including buyback programmes and supporting logistics • Retains raw materials for future generations use • Retains the potential for future generations to meet their needs	**(9)**

Level	Mark	Descriptor
	0	No rewardable materials
Level 1	1 – 3	• Superficial discussion that considers a narrow range of factors, demonstrating limited understanding. • Partial application of understanding to the context of the question.
Level 2	4 – 6	• Coherent discussion that makes some relevant links between a sufficient range of factors, demonstrating competent understanding. • Generally sound application of understanding to the context of the question.
Level 3	7 - 9	• Comprehensive discussion that makes effective links between a wide range of factors, demonstrating thorough understanding. • Considered and effective application of understanding to the context of the question.

Question number	Answer	Additional Guidance	Mark
5(a)	<u>Method 1</u> Stage 1 (calculate area of full rectangle) **(1)** (8+12) x (8+4) = 240m^2 Stage 2 (calculate area of rectangular cut out) **(1)** 8 x 2 = 16m^2 Stage 3 (calculate area of triangular cut out) **(1)** 4 x 4 / 2 = 8 m^2 Stage 4 (calculate area of floor) **(1)** 240 – 16 – 8 = 216m^2 Stage 5 (shown to 1dp) **(1)** Area = 216.0m^2 <u>Method 2</u> Stages 1/2 (rectangle 1) 8 x 10 = 80m^2 (rectangle 2) 8 x 12 = 96m^2 (rectangle 3) 4 x 8 = 32 m^2 2 marks for all 3 correct rectangles 1 mark for 2 correct rectangles Stage 3 (triangle) **(1)** 4 x 4/2 = 8m^2 Stage 4 **(1)** 80 + 96 + 32 + 8 = 216m^2 Stage 5 (shown to 1dp) **(1)** Area = 216.0m^2	Accept alternative methods of correct working out. Error carried forward should be applied. Award full marks for correct answer only (to 1DP). SC 216 seen award 4 marks	**(5)**

Question number	Answer	Additional Guidance	Mark
5(b)	Method 1 Stage 1 (calculate paint required to complete two coats) **(1)** (216/12) x 2 = 36 litres Stage 2 (calculate number of cans of paint required) **(1)** 36/5 = 7.2 = 8 cans Stage 3 (cost of paint) **(1)** 8 x 48 = £384.00 (accept £384) Method 2 Stage 1 (calculate coverage of 1 can) 12 x 5 = 60m^2 Stage 2 (calculate number of cans for 2 coats) (216 x 2)/60 = 7.2 = 8 cans Stage 3 (cost of paint) **(1)** 8 x 48 = £384.00 (accept £384) (Note work with candidates own floor area under ecf as a substitution for 216)	Accept alternative methods of correct working out. Error carried forward should be applied (including from part (a) ie work with the candidates own figure for area). Award full marks for correct answer of £384 or using their own starting point for the floor area.	**(3)**

Question Number	Answer	Mark
6(a)	Any two of the safe working practices: 1. Check blade tension / movement / damage (1) 2. Use a guard / adjust the blade guard and top guides as close as possible to the workpiece (1) 3. Use of a push stick for straight cuts / narrow workpiece (1) 4. Replace blunt blades to avoid having to use too much forward force (1) 5. Keep fingers / thumbs well clear of blade (1) 6. Tie back long hair / secure loose clothing / remove gloves (1) 7. Check position and operation of emergency stop / kick stop (1) 8. Switch off immediately if a blade breaks / becomes jammed / requires clearing (1) 9. Use a slide fence for cross cuts (1) 10. Always keep the workpiece flat on the table (1) 11. Only cut materials that can be fully supported on the bed of the table/do not cut cylindrical materials (1) 12. A marked exclusion zone around the machine should **be clear of people before starting work**. (1) 13. Use extraction equipment (1) 14. Only used by trained operatives (1) 15. Switch off after use (1) 16. Lower blade guard after use (1) 17. Avoid working alone / work under supervision (1) 18. Ensure the area around the machine is clean and clear of clutter / debris (1) Any other appropriate response.	**(2)**

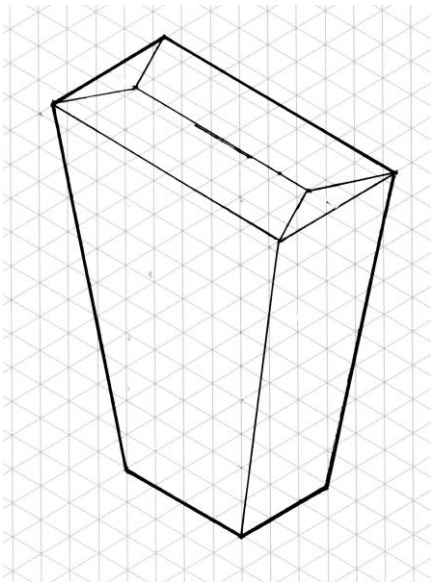
Question number	Answer	Mark
6(b)	Any two explanations that include identification of a consideration (1) and linked explanations of that consideration (1) + (1). 1. Intended use of the product is central to the design (1) to ensure the product meets the specification (1) in order to fulfil user requirements in its intended use/environment (1) 2. The functionality of the product / what functions does it need to perform / how the user interacts with the product (1) the product needs to usefully perform to the specified level/use / have appropriate ergonomics / safety (1) in order to be effective in meeting user requirements (1) 3. Is the product innovative/a new approach to addressing a problem (1) by using new methods/materials/technologies/new approaches (1) to improve performance/cost/durability/ease of use (1) 4. Authentic design approach (1) so that all aspects of the design process are valued (1) and the user is the true focus of design (1) 5. Use of focus groups (1) to gather opinions and feedback (1) in order to drive design improvements (1)	**(6)**

Question number	Answer	Mark
6(c)	This question is about the consequences of non-compliance with health and safety legislation as they would apply to a manufacture. Creditworthy responses will make connections which show understanding of factors that need to be considered, going beyond general knowledge. Candidates might refer to the following in their responses: • Requirements for a safety policy • Risk assessments • Method statements • Safety officer requirements • Union representation • Staff training and certification • Authority of the safety officer • Ultimate responsibility of owners / directors • Role of the Health and Safety Executive (HSE) • Improvement notices (HSE) • Prohibition notices (HSE) • Withdrawing approvals, licences or exemptions (HSE) • HSE cautions • Prosecution – unlimited fines or imprisonment • Company reputation • Difficulties recruiting new employees • Blacklisting / loss of consumer confidence • Negative publicity / reputation loss • Difficulties obtaining employers liability insurance • Increased costs to the company	**(6)**

Level	Mark	Descriptor
	0	No rewardable materials
Level 1	1 – 2	• Superficial discussion that considers a narrow range of factors, demonstrating limited understanding. • Partial application of understanding to the context of the question.
Level 2	3 – 4	• Coherent discussion that makes some relevant links between a sufficient range of factors, demonstrating competent understanding. • Generally sound application of understanding to the context of the question.
Level 3	5 - 6	• Comprehensive discussion that makes effective links between a wide range of factors, demonstrating thorough understanding. • Considered and effective application of understanding to the context of the question.

Question number	Answer	Mark
6(d)	Any two of the following risk assessment parts 1. Identification of potential hazards (1) 2. Identification of people at risk (1) 3. Control measures / risk mitigation / preventative measures (1) 4. Responsibilities for implementation (1) 5. Review dates (1) Do not accept severity or likelihood of risk as these are deemed to be covered by the stem ie level of risk.	**(2)**

Question number	Answer	Additional Guidance	Mark
6(e)	Stage 1 Calculate the new cost of PPE £18,375.00 + (£18,375.00 x 12/100) £20,580.00 **(1)** Stage 2 Calculate the new total health and safety expenditure. £27,000+£8,260+£15,500+£20,580+£42,000 = £113,340.00 **(1)** Stage 3 Calculate the percentage of safety spending on PPE (£20,580.00/£113,340.00) x (100/1) = 18.1(577554) Accept 18%, 18.1%, 18.16%, 18.2% or answers that round **down** to 18% **(1)**	Accept alternative methods of correct working out. Error carried forward should be applied. Award full marks for correct answer only.	**(3)**

Question number	Answer	Mark
7	An isometric drawing of the chocolate box.  **Level / Mark / Descriptor** 0 – No rewardable materials Level 1 / 1 – 2 / • Drawing is produced with limited attention to detail and lacks accuracy and precision. • Inappropriate use of isometric grid resulting in inappropriate drawing orientation • Inappropriate attention to scale, size and dimensions • Line style is inconsistent and inappropriate throughout. Level 2 / 3 – 4 / • Drawing is produced with some precision and accuracy. • Mostly appropriate use of isometric grid with mostly accurate orientation • Some attention to scale, size and dimensions • Line style is mostly appropriate and consistent throughout. Level 3 / 5 - 6 / • Drawing is produced with precision and accuracy with upper corner points correctly plotted and positioned. • Fully appropriate use of isometric grid with correct orientation • Accurately drawn to scale • Line style is appropriate and consistent throughout enhancing the 3D effect. Note – acceptable to correctly show the top flaps in an open position.	**(6)**

Question number	Answer	Mark
8	This question is about how the designer of the building interior was influenced by Art Deco philosophies. Creditworthy responses will make connections, which show understanding of factors that need to be considered, going beyond general observation of the image provided. Candidates should consider the design of the building interior, showing understanding of the influence of Art Deco philosophy. Candidates might refer to the following in their responses: 1. Art Deco emerged from France in the 1920s 2. Period of 1925 to 1939 3. Reference to Eileen Gray 4. Adopted widely in North American cities during the first wave of sky scraper construction 5. Eclectic yet elegant style that drew on tradition yet simultaneously celebrated the mechanised modern world 6. Opulent style a reaction to the forced austerity of the First World War 7. Responded to the human need for pleasure and escape. 8. Often referred to as 'Hollywood' style 9. Ocean liner aesthetics 10. Use of zodiac symbolism 11. Use of zig-zag lines 12. Use of geometric forms and patterns 13. Vertical lines, symmetry and repetition 14. Expensive materials eg polished stone 15. Use of bright and pastel colours for features, window and door frames 16. Use of geometric fan motifs / sunburst motifs 17. Simplified sculptural forms of African, Egyptian and Aztec art and architecture 18. Influences from Tutankhamun's tomb 19. Explicit use of man-made materials 20. Architecture that celebrated man's technological achievements in building skyscrapers and ocean liners Note the response should relate to architecture and influences on the given building interior and not general consumer products.	**(9)**

Level	Mark	Descriptor
	0	No rewardable materials
Level 1	1 – 3	• Superficial discussion that considers a narrow range of factors, demonstrating limited understanding. • Partial application of understanding to the context of the question.
Level 2	4 – 6	• Coherent discussion that makes some relevant links between a sufficient range of factors, demonstrating competent understanding. • Generally sound application of understanding to the context of the question.
Level 3	7 - 9	• Comprehensive discussion that makes effective links between a wide range of factors, demonstrating thorough understanding. • Considered and effective application of understanding to the context of the question.

Question number	Answer	Mark
9	Candidates might refer to the following in their responses: • Introduction of new products, ideas or processes using creativity • Two strands imitation and invention • Use of many different approaches to design • Iterative design and prototyping • Innovation 'push' or 'pull' driven • "Pull' driven more likely to lead to new technologies being developed • Products develop faster leading to new business generation • Enhanced employee engagement • Cooperation between management, designers and production engineers • Use of social media etc to get feedback • Use of research techniques • Managers, engineers and designers work together to bring knowledge and ideas into innovation • Encouragement of creativity • Brainstorming • Design workshops • Step back and refocus • Opportunity for input from all employees into the design • Use of teamwork • Staff rotated to experience new roles and keep them 'fresh'. • Look into different methods of working • 'Off the wall' designs taken seriously and considered • Innovation often involves making mistakes and learning from them for success in the long run • Creativity rewarded with no penalty for mistakes • Creating an innovation culture in the workplace	**(9)**

Level	Mark	Descriptor
	0	No rewardable materials
Level 1	1 – 3	• Superficial discussion that considers a narrow range of factors, demonstrating limited understanding. • Partial application of understanding to the context of the question.
Level 2	4 – 6	• Coherent discussion that makes some relevant links between a sufficient range of factors, demonstrating competent understanding. • Generally sound application of understanding to the context of the question.
Level 3	7 - 9	• Comprehensive discussion that makes effective links between a wide range of factors, demonstrating thorough understanding. • Considered and effective application of understanding to the context of the question.

Question number	Indicative Content	Mark
10	Any two explanations of a benefit and one explanation of a drawback that include identification of the benefit/drawback (1) and linked justifications of that benefit/drawback (1) + (1). Benefits: 1. Reactive glass turns opaque / clears when an electrical current is applied (1) providing immediate change between privacy / protection and clear glass (1) unlike photochromic glass which slowly tints in reaction to UV light/ is not controllable (1) 2. The application of current / opacity can be automatically controlled (1) as switching can be via control circuits (1) which can react to external stimuli via sensors (1) 3. Reactive glass can be used to provide user safety (1) by reducing light to a safe level that will not damage eyesight / distract the user (1) in applications such as auto-dimming rear view mirrors, welding visors etc (1) 4. No requirement for curtains/blinds (1) providing initial/replacement cost savings / allowing a choice of aesthetic approach (1) and ongoing savings on maintenance/cleaning (1) 5. Allows control of solar heat gain (1) reducing air conditioning costs (1) and providing a more comfortable user environment / reducing environmental impacts (1) 6. Changes instantly from clear to opaque and opaque to clear (1) making it ideal for situations where privacy is needed (1) therefore allowing more efficient working / use of the building (1) Drawbacks: 7. The default state of reactive glass is clear or opaque / transparent (1) therefore if the circuit is broken / power is lost (1) the glass will immediately change resulting in an unwanted / unexpected change (1) 8. High cost of reactive glass installations (1) has an impact on construction budgets (1) and may be unaffordable for many clients / end users (1) 9. Reactive glass has a limited service life (1) so may degrade in performance after 10/20 years (1) meaning that it will need to be replaced, unlike standard glass that should last the life of the building (1) 10. Reactive glass requires the power to be constantly on to remain 'in state' (1) this results in electricity usage / costs (1) increasing the running cost of the building / impacts on operational budgets (1) Accept any other appropriate response	**(9)**

Question number	Answer	Mark
11	This question asks candidates to evaluate the performance of a 'spinning' bike with reference to ergonomics and user requirements. Candidates should analyse the 'spinning' bike in terms of ergonomics and user requirements for all user groups / stakeholders and give reasoned justification to qualify their judgements and conclusion. Points of analysis: • User applies to participants, instructors, gym staff, cleaners etc • Use in group exercise classes • Use in leisure centres and gyms • Shape and form • Functional use • Variety of potential activity • Size relative to relevant anthropometrics • Position and shape of handlebars and display • Use of specified materials • Potential quality issues • Support and balance • Aesthetic points related to the above Points of evaluation: • Ergonomic use by the target group • Proportion and size • Range of human movement within the target group • Use of anthropometrics and potential outliers • Safety for use by the target group • Ease of movement within the facility • Adjustability • Value for money • Features of the bike • Aesthetics • Durability • Storage Appropriate conclusion	**(12)**

Level	Mark	Descriptor
	0	No rewardable materials
Level 1	1 – 3	• Applies a basic understanding to deconstruct information, making limited connections between concepts. • Incomplete evaluation with unresolved conclusion that demonstrates limited synthesis of understanding. • Judgements are tentatively supported by evidence.
Level 2	4 – 6	• Applies a generally sound understanding to deconstruct information and provide some clear connections between concepts. • Imbalanced evaluation that synthesises some relevant understanding into a generally coherent conclusion. • Judgements are occasionally supported by relevant evidence.
Level 3	7 - 9	• Applies an effective understanding to deconstruct information and provide logical connections between concepts. • Balanced evaluation that synthesises relevant understanding into a considered conclusion. • Judgements are mostly supported by relevant evidence.
Level 4	10 - 12	• Applies a comprehensive understanding to deconstruct information and provides insightful connections between concepts throughout. • Thorough and balanced evaluation that synthesises relevant understanding into a well-developed conclusion. • Judgements are supported by pertinent evidence throughout.