



Mark Scheme (Standardisation)

Summer 2019

Pearson Edexcel GCE
In Product Design: Graphic Products
Unit 3: Designing For the Future
6GR03/01

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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.

Question Number	Answer	Mark
1(a)	Any two of the following sources • British Standards Institute (BSI) (1) • Department of Business Innovation and Skills (BIS) also accept former name Department for Trade and Industry (DTI) (1) • Compendium of essential design and technology standards for schools and colleges (1) • European anthropometric database (1) • European sizing survey (1) • Named UK internet sites (1) The response must be an appropriate named source and not generic. (2 x 1)	(2)
1(b)	Any four of the following: • Difficult to produce a design in a size that suits everybody (1) • People vary in size (1) • Anthropometric data covers the middle 90% of the population (1) • Designs exclude the largest and smallest 5% of the population (1) • Needs to fit the majority of consumers (1) • Maximises potential profits as manufacturing in small numbers for the extremes would be costly/reduces the number of sizes required (1) (4 x 1)	(4)

1(c)	Any four of the following: • Ergonomics takes into account people's wide range of shapes. (1) • Takes into the account the range of movement that the human body / limbs can make. (1) • Designers make products usable for the majority of people. (1) • Ergonomic design makes the product safer to use. (1) • Products are more comfortable to use. (1) • Ergonomic design can improve health by reducing back pain. (1) • Ignoring ergonomic design can affect users' health. (1) • Poor ergonomic design can affect productivity / affect efficiency. (1) • Ergonomic design can affect the sales / success of products. (1) • Fit for purpose / interacts with the customer. (1) • Product is made user friendly / easy to use. (1) • Provides a 'feel-good' factor. (1) • Provision of an appropriate example of good ergonomic design. (1) (4 x 1)	(4)
	Total for question	10

2	A discussion covering six of the following: • Function follows form. (1) • Reduces products to basic forms (1) • Stylised design for the fashion conscious. (1) • Major emphasis on aesthetics. (1) • Does not have to look like a kettle in order to boil water. (1) • Object of desire. (1) • Lifestyle product / product with personality. (1) • Bold use of colour. (1) • Uses unusual materials in different ways (1) • Humour and creativity. (1) • Better to make a creative mistake than a stagnant work in good taste. (1) • Handle and spout are combined. (1) • The filling of the kettle has not had due consideration. (1) • Offset shape balances the projecting spout / handle. (1) • Art form where functionality became irrelevant. (1) • No consideration of user safety. (1) (6 x 1)	(6)
	Total for question	6

Question Number	Answer	Mark
3(a)	An outline covering four of the following: • Use as few different materials as possible. (1) • Make components easy to separate. (1) • Label and mark polymers for correct sorting. (1) • Labeling of other materials / printed recycling information. (1) • Avoid surface treatments / laminating/adhesives which can prevent recycling. (1) • Use recycled materials as opposed to virgin materials. (1) • Make all/part of packaging recyclable. (1) • Make aspects of the packaging recoverable for future use. (1) • Use of materials (including GM materials) that are recyclable. (1) • Use of materials that are easier to recycle / use less energy to Recycle. (1) • Avoid use of non-recyclable material. (1) • Minimise the amount of printing on packaging. (1) (4 x 1)	(4)

3(b)	Any two of the following explanations: • Aesthetic and functional properties deteriorate over time (1) therefore product has limited lifespan / ends up in landfill. (1) • Cleaning is required before refilling (1) reduces the cost advantage of reusable containers. (1) • Packaging materials need to be more durable (1) increases the material content / cost of the initial packaging. (1) • Takes a long time to degrade in landfill (1) because made of more durable/thicker materials. (1) • Potential health issues relating to poor hygiene (1) when self-cleaning/refilling of food or drink containers is undertaken. (1) • Inconvenient for the consumer (1) as they have to return the packaging/may discourage them from buying the product (1) (2 x 2)	(4)
3(c)	A discussion that covers any four of the following: • Manufacturer can claim green credentials as they are “doing their bit for the environment” / improves company image. (1) • Home reuse can lead to reduced transport costs for the manufacturer. (1) • Less virgin raw material use during product manufacture (1) • Better economy for manufacturers. (refills cost less than original) (1) • Reduction in refill packaging size assists storage/transport/ materials usage. (1) • Reduced pollution/energy use/CO2 emissions from manufacturing and transporting further bottles enables manufacturer to meet emissions targets. (1) • Attracts more customers. (1) • High quality packaging less likely to be damaged in transit. (1) (6 x 1)	(6)
	Total for question	14

Question Number	Answer	Mark
4(a)	Any two of the following explanations: • Manufacturers often postpone the release of a new technologies (1) to create future demand for subsequent releases. (1) • It is often cheaper to replace a product than repair it (1) resulting in consumers discarding old products. (1) • New and improved models/products are released by companies to entice sales (1) puts pressure on consumers who want the latest version. (1) • Newer models may be cheaper than the old model (1) creating a reluctance to repair the product. (1) • Replacement parts are only provided for a limited period/while stocks last (1) products are no longer repairable and need to be replaced. (1) • Some parts are designed with a limited lifespan (1) resulting in consumers replacing the product earlier than intended/reducing consumer confidence in the company. (1) • New products and developing technologies (1) entice consumers who always want to be seen with the newest/latest/updated version of a product. (1) • Has become accepted by a large section of todays consumer society (1) who have a lack of knowledge/skill/desire to repair a product. (1) • The very design of a product may determine its lifespan (1) as consumers move towards disposable/consumable products. (1) • Changes in fashion/style may make a product aesthetically obsolete (1) creating demand for newer more trendy products. (1) • Products with a shorter lifespan can be produced more economically (1) resulting in lower prices for the consumer (1) (2 x 2)	(4)

4(b)	A discussion covering any six of the following: • Touch screens have reduced the need for additional controls/switched/buttons. (1) • Software technology has allowed multiple functions to be assigned to a single control panel. (1) • Advanced integrated circuits allow more components on a single chip. (1) • Advanced battery technology results in smaller and lighter batteries. (1) • Advanced liquid crystal displays are thinner. (1) • Advanced liquid crystal displays require less current therefore reduces battery size. (1) • Modern materials including alloys and carbon fibre can be of thinner wall construction than polymers. (1) • Modern materials reduce the need for an internal structure allowing for a more compact packaging of components. (1) • Smaller charging/USB connectors have been developed which contribute to the overall space saving. (1) • Use of solid state memory/storage. (1) • No moving parts reduces battery/space requirements. (1) • Surface mount technology results in higher component density and a smaller product (1) (6 x 1)	
	Total for question	(6) 10

Question Number	Answer	Mark
5(a)	An outline covering any four of the following points to gain marks from only one movement: <u>Art Deco</u> • Eclectic style drawing upon tradition. (1) • Embraced both hand crafted and machine manufacture. (1) • An opulent style that was a reaction to the forced austerity of the First World War. (1) • Influenced by cubist paintings of Picasso & Braque. (1) • Primitive art forms African/Aztec/Egyptian art used. (1) • Used geometric/symmetrical/simple shapes, zig zag patterns/ chevrons/sunbursts. (1) • Bright colours used. (1) • Designs strong/bold shapes/sharp edges. (1) • Used in jewellery/buildings/perfume bottles/radios. (1) • Expensive/exotic materials/enamel/ivory/polished stone /chrome/coloured glass used. (1) • Use of Bakelite also facilitated some lower cost designs. (1) • Art Deco designs to be made at low cost through mass production. (1) <u>Art Nouveau</u> • Unity and harmony across the various fine arts. (1) • Flowing/wavy/sweeping/curly/whiplash lines. (1) • Based on the style of nature/natural forms. (1) • Stylised climbing plants/insects/flowers/female form. (1) • Decorative/personalised/handcrafted style. (1) • Celtic/Arabian/Japanese/ancient Greek patterns gave inspiration. (1) • Used modern materials/glass and wrought iron. (1) • Used in architecture, glass, jewellery, fabrics & wallpaper. (1) • Some designers embraced the benefits of mass production. (1) Marking points used must relate to the design movement indicated by the candidate. (4x1)	(4)

5(b)	A discussion covering six of the following points: • Functional design (form follows function). (1) • 'Box-like' cubic structures that make efficient use of space. (1) • Less is more / minimalist. (1) • High end functional product with artistic pretensions (works well but looks good). (1) • Simple geometry / pure form with clean lines. (1) • Smooth facades with clean lines. (1) • Favours right angles but can feature rounded corners and balconies. (1) • Elimination of unnecessary clutter / decoration. (1) • It grasps architecture in terms of space versus mass. (1) • Use of modern materials such as concrete and through coloured render. (1) • Still a strong influence on contemporary design. (1) • Often have large 'picture' windows on multiple facades. (1) • Constructed using contemporary materials. (1) • Flat roof construction form. (1) • Often incorporates a green roof or a roof terrace. (1) • Colours used are white, grey, black or beige / dull colours that emphasise the lack of ornamentation. (1) • Floor plans are open and functional. (1) • Encouraged multi-disciplinary approach and collaborative working practice between the arts, technical professionals and industry (1) (6 x 1)	(6)
	Total for question	10

Question Number	Answer	Mark
*6	A balanced response should be put forward. Consideration of both advantages and disadvantages must be included for full marks. If only one is considered, award a maximum of 7 marks. Advantages: • Reduction of lignin in tree growth. (1) • Reduces the use of toxic chemicals used in the paper industry to break down the lignin. (1) • Produces trees with faster growth rate / more renewable / efficient production / increased yield. (1) • Trees grown specifically for the paper and board industry. (1) • Enzymes break down the timber fibres more effectively. (1) • Paper fibres can be more effectively bonded. (1) • Aids the resistance of trees to disease / insect attack. (1) • Better forest management / reduces deforestation / sustainable sourcing. (1) • More effective recycling. (1) • Fewer pesticides used as disease resistant. (1) • Paper treated to biodegrade more easily and quickly. (1) • Increases speed of paper production. (1) • Lighter colour reduces the requirement for bleaching. (1) • Reduced energy required to produce paper. (1) Disadvantages: • Long term side effects not yet apparent. (1) • 'Escape' of modified genes into natural ecosystems / impact upon ecosystems / must be grown away from other trees. (1) • Could have an adverse impact on the quality of timber produced for structural use. (1) • Development of tolerance to the modified trait by insects or disease organisms. (1) • Rapid growth could cause shorter more intense rotations, resulting in greater water demand and reduced opportunity for nutrient recycling. (1) • More expensive raw material because of development costs. (1) • Concerns about ethics and pressure groups / public perception. (1) • Reduced biodiversity. (1) • Impacts on animal habitats. (1) (8 x 1)	(8)
	Total for question	8

Question Number	Answer	Mark
7(a)	Any two of the following explanations: • Only provide light during daylight hours (1) so alternative sources of power are required. (1) • Power production is affected by the weather (1) reducing reliability as a daytime source of power. (1) • Considered by some to negatively impact upon the aesthetics of a property (1) affecting house values .(1) • Require regular maintenance and cleaning (1) which offsets the benefits gained. (1) • Has to be south facing (1) in order to work at maximum efficiency. (1) • Solar farms require large areas of land (1) which impacts on food production. (1) (2 x 2)	(4)

*7(b)	A balanced response should be put forward. Consideration of both advantages and disadvantages must be included for full marks. If only one is considered, award a maximum of 7 marks Advantages: • Does not use finite resources / completely renewable resource. • Does not produce carbon dioxide / does not contribute to global warming. • Does not pollute the air. • Hydroelectric plants are highly efficient. • Hydroelectric plants have longer economic lives than fuel fired plants. • High initial setup cost quickly recovered after a few years. • Reservoirs used for leisure and recreation. • Large dams protect towns downstream and control flooding. • Can provide off grid power. • Reliable source of energy/storage of potential energy. • Tidal and wave power can be harnessed. • Water can be pumped using off peak power. • No start up time/instant power. Disadvantages • High setup costs/long construction period. • Reservoirs use large land area/footprint. • Communities may be displaced. • Rivers maybe diverted / cause problems for people who rely on the river economically. • Dam failures have the potential for disasters. • Disruptive to surrounding ecosystems. • Cause changes to the downstream river environment. • Visually intrusive. • Could be affected by climate changes/droughts • High maintenance costs. • Difficult environment for maintenance. • Cannot be located in flat low level areas (8 x 1)	(8)
	Total for question	

