

Design and Technology

Advanced GCE

Unit **F524/02**: Product Design: Component 2

Mark Scheme for January 2011

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Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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|------------------|---|--|--|-----------------------|--|--|--------------------|--|--|------------------------|-------------|------------------------------|---------|
| Spec | A clear relevant statement – <i>functional requirement or key design constraint identified.</i> 1 mark | | | | | | | | | | | | 3x2 |
| | Clear relevant justification – <i>appropriately made; eg with reference to target users/market.</i> 1 mark | | | | | | | | | | | | |
| | No marks awarded for generic points or information repeated from the question. | | | | | | | | | | | | |
| Range | A wide range of significantly different innovative ideas, which are developed as far as possible. <i>Min 3 different concepts that could meet main needs presented. Good evidence of design thinking – eg consideration of practical details and/or user requirements. Significantly different concepts could be seen as part of the development of a single idea.</i> | | | | | | | | | | | | 11 - 15 |
| | A good range of appropriate innovative ideas with limited development of some or all ideas. <i>2 -3 different concept designs that could meet main design needs with further development. Some evidence of design thinking.</i> | | | | | | | | | | | | 6 - 10 |
| | A limited range of ideas with little evidence of innovation and little development. <i>Few ideas which lack inspiration/creativity, concepts repeated with cosmetic changes. Little evidence of design thinking.</i> | | | | | | | | | | | | 0-5 |
| Man/const detail | | | | Limited consideration | | | Some consideration | | | Detailed consideration | | | 0 - 12 |
| | appropriate techniques of construction/assembly | | | | | | | | | | | | |
| | justification of appropriate materials and components | | | | | | | | | | | | |
| | measurements Dimensions/quantities | | | | | | | | | | | | |
| | | | | | | | | | | | | 0 1 2 3 4 5 6 7 8 9 10 11 12 | |
| Evaluation | Detailed evidence of objective evaluation or reference to volume production. <i>Good understanding of the needs of user/target market/manufacturer, some explicit reference to the specification or set design brief. Evidence of perceptive design thinking.</i> | | | | | | | | | | | | 5–6 |
| | Some evidence of subjective evaluation or reference to volume production. <i>Comments should show some consideration of user/target market/manufacturers requirements and some evidence of design thinking.</i> | | | | | | | | | | | | 3–4 |
| | Limited evidence of evaluation or reference to volume production. <i>Few or no evaluative comments. Comments show little evidence of design thinking.</i> | | | | | | | | | | | | 0–2 |
| Features | Detailed identification and justification of features. <i>A final outcome presented with 3 or more suitable features clearly visible/identified. Annotation provided to justify choice of 3 or more of the features that would be carried forward to final product.</i> | | | | | | | | | | | | 7–9 |
| | Some identification and justification of features. <i>A final outcome presented with 3 or more suitable features visible/identified but not clearly justified.</i> | | | | | | | | | | | | 4–6 |
| | Limited identification and justification of features. <i>A partially defined final outcome presented with little of no justification of specific features to be carried forward to a final product.</i> | | | | | | | | | | | | 0–3 |
| Communication | High level of graphical skill and concise annotation that can be easily followed by a third party. <i>Expect to see a variety of techniques / styles (appropriate to the focus area) with annotation which is easily understood, all clearly set out to allow communication of good design thinking.</i> | | | | | | | | | | | | 5-6 |
| | Reasonable level of graphical skill and annotation appropriately used. <i>More than one technique /style used appropriately (eg 2D, 3D, detail, exploded views) with annotation. Presentation may need interpretation by experienced reader to understand design thinking.</i> | | | | | | | | | | | | 3-4 |
| | Limited level of graphical skill and annotation. <i>One technique / style used throughout. Limited or no evidence of design details presented and/or poorly set out so that it is difficult to follow the design thinking of the candidate.</i> | | | | | | | | | | | | 0–2 |
| | | | | | | | | | | | Paper Total | 54 | |

Level of design thinking judged by a number of factors, including:

- complexity of designs,
- degree of sophistication,
- awareness of user and market issues,
- consideration of manufacturing issues,
- consideration of sustainability,
- consideration of moral issues.

(S) Specification points which are qualified and justified

A clear relevant statement – (1 mark), clear relevant justification – (1 mark)

No marks awarded for generic statements or repeated information given in question.

3 x 2 [6]

(R) Range of developed ideas

- 0-5** A limited range of ideas with little evidence of innovation and little development.
- 6-10** A good range of appropriate innovative ideas with limited development of some or all ideas.
- 11-15** A wide range of significantly different innovative ideas, which are developed as far as possible. [15]

(D) Consideration of manufacturing/construction detail

- 0-4** Limited consideration of appropriate techniques, justification of appropriate materials and components and measurements.
- 5-8** Some consideration of appropriate techniques, justification of appropriate materials and components and measurements.
- 9-12** Detailed consideration of appropriate techniques, justification of appropriate materials and components and measurements. [12]

(E) Evaluation of ideas with reference to the specification and volume production

- 0-2** Limited evidence of evaluation or reference to volume production.
- 3-4** Some evidence of subjective evaluation or reference to volume production.
- 5-6** Detailed evidence of objective evaluation or reference to volume production. [6]

(F) Chosen features for FDO and justification of choices made

- 0-3** Limited identification and justification of features.
- 4-6** Some identification and justification of features.
- 7-9** Detailed identification and justification of features. [9]

(C) Communication skills and techniques

- 0-2** Limited level of graphical skill and annotation.
- 3-4** Reasonable level of graphical skill and annotation appropriately used.
- 5-6** High level of graphical skill and concise annotation that can be easily followed by a third party. [6]

Paper Total [54]

(S) Specification points which are qualified and justified

Specification points could be:

1 Built Environment and Construction

The area must allow cycles to be secured using padlocks/chains or other standard security devices because that is what most cyclists will already use.

Cycles should be protected from rain otherwise students will be discouraged from using their bikes.

It must be possible to manoeuvre any of the stored cycles out without removing others so that students can leave school anytime they need.

It must accommodate a range of different types of cycles because many different styles are in common use.

2 Engineering focus

The projector stand should be adjustable without tools for ease of use.

The stand must be firm and stable in use to ensure clear images on the screen.

The stand must not cause damage to any desk or table top it is used on.

The stand should fold down easily to make it compact for portability.

The projector must not be able to slide during use or adjustment.

The stand must not have any sharp edges to cause injury to the user or damage whilst being carried.

The stand should be a quality product to give an impression of professionalism.

3 Food focus

Product must be suitable for microwave cooking/reheating as this is a safe and simple method for elderly to use

Product must be a traditional style as elderly like less highly flavoured spicy food

The ingredients used must be economical cost to produce a product that is affordable to an elderly person

Portion size must be adequate to provide 1/3 RDA of all nutrients for an elderly person because this may be their main meal for the day.

The product should be a complete main meal not requiring additional ingredients to be cooked eg include vegetables.

The product must not require more than two cooking operations because this would deter many elderly people who want a quick and easy to prepare meal.

4 Graphic Products

The product must be easy to store/transport for suitable access on the training field.

It must be easy to open after training eg warm/cold hands

It must be easy to carry/hold so it is comfortable whilst training.

The material chosen must be able to be recycled but must also be durable enough to withstand the training environment.

The graphics should clearly display the nutritional content as well as promoting the sponsor.

The drink should be re-sealable allowing it to be kept fresh while the athletes train.

5 Manufacturing focus

The play centre must include activities suitable for the age range of the children.

The construction must be strong enough to support the weight of up to 3 small children because children must be able to use the play centre without risk of injury from the structure.

The play centre must be stable when in use so that it doesn't fall and injure the child.

The construction of the play centre should be simple to allow easy assembly.

The play centre should be resistant to damp conditions for use out-of-doors.

The play centre should be suitable for regular assembly and dismantling without damage because space in the garden may be needed for other activities.

The dismantled play centre must be compact for ease of storage.

The play centre must have no 'pinch points' to cause injury during assembly and dismantling.

6 Resistant materials focus

The product must be adjustable to provide maximum comfort for students taking examinations.

The product must be stable in use to provide solid working position.

The desk surface must be large enough to easily accommodate A3 size paper (largest exam paper opened out) so that students do not have to fold paper.

The desk surface must have facility for housing pens and pencils to stop them rolling off of the surface.

The legs of the unit must have non-slip caps or some other method of preventing easy movement.

The product must be designed to be stackable or foldable for ease of storage.

7 Systems and Control focus

The product will not be so eye-catching as to distract other drivers and possibly lead to an accident.

The product will be simple and quick to operate under pressure so that it can be used in difficult and stressful situations.

There will be clearly labelled controls and the product will have simple instruction labels attached so that it is simple to operate.

The product will have a self-contained power supply (eg batteries) or will be powered from the car's 12V system.

The batteries will have a long standby life and, in use, the batteries will last long enough to allow the car repair to take place.

The product will be sealed against rainwater and road dirt so that it can be used in all weather conditions.

8 Textile focus

The jacket must be lower at the back than the front to cover the cyclist when leaning forward.

The jacket must have a large back pocket to put a map in because these are often carried and used by cyclists whilst riding.

The jacket must incorporate high visibility reflective parts to be seen in the dark

The jacket must be easily stored in a small pack to fit into a small cycle bag

The jacket must have vents under the arms for warmer weather to allow moisture to escape and to prevent discomfort.

There must a pocket to store small personal items such as money and keys because other dedicated cycling clothing seldom has pockets for these essential items.

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