

Design and Technology

Advanced GCE

Unit **F524/02**: Product Design: Component 1

Mark Scheme for June 2013

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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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 good communication of 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 Maximum	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.

Specification Points F524/02 June 2013

1. Build Environment and Construction
 2. The porch must allow natural light to reach the front door of the house so that the front door and hall do not need artificial light during daylight hours.
 3. The porch must allow water to drain away from the front elevation of the house to prevent damp penetration of the brickwork.
 4. The design of the porch must be compatible with standard building materials/components and techniques so that it can be installed by general tradesmen.
 5. The porch must offer shelter from rain for one or two people whilst locking or unlocking the front door. This is its principal day to day function.
 6. The porch must allow bulky items such as furniture to be manoeuvred through the front door of the house to allow delivery of typical household items.
2. Engineering
 1. The bench must be strong and rigid when in the working position because workbenches are expected to support heavy items and may be also be subjected to full force from the user.
 2. The bench should include a system of clamping/ holding items as this will allow the user to work with two hands safely.
 3. There should be a lip on the edge of the bench to prevent small items and spills of liquid falling on the floor.
 4. There should be storage for common DIY consumables such as oils/grease/nuts/bolts and screws to keep area tidy and to allow the user to work efficiently.
 5. There should be clips and/or conduits to manage power cables of DIY tools to keep the work surface as clear as possible to improve the safety and efficiency of the user.
3. Food
 1. The recipe must be able to be modified to provide suitable alternatives for people with special dietary requirements to cater for the whole community.
 2. To allow the whole community to be served the food must be able to be prepared in advance and either be kept warm or re-heated without losing quality.
 3. The food must be easy to eat using conventional cutlery otherwise people become embarrassed when they are unsure of how to eat in public.
 4. The dish must avoid very strong or unusual flavours to be confident of pleasing as many people as possible.
 5. If it possible that the food will be served 'buffet style' all ingredients in the dish should be small / bite sized so that the food can be eaten without the need to cut with a knife so that people can eat using one hand while standing and holding their plate.

4. Graphic Products

1. The pack should display the name/brand of the hotel (and any event sponsor) so that the customer gives the venue free advertising when the pack is in use.
2. There should be internal divisions to keep food items separate and to prevent damage from hard/heavy items crushing soft/delicate items.
3. The pack should prevent egress of grease and small spills from the food contained within so that other items are not spoilt.
4. It should be possible to add the customer's name and/or list of ingredients so that reception can be sure that the right pack is given to the guest.
5. It must be possible to use the pack as a tray from which to eat the food because it is likely to be used 'on the move' without access to conventional dining facilities.

6. Manufacturing

7. The surface of the table must allow more than one game/activity to be played so that children can be kept amused for longer periods and not get bored with the same thing.
8. It must provide storage for loose playing pieces in a way that encourages children to tidy things away ready for future use and to avoid loss of components that will render the table unusable.
9. All surfaces and components must be easy to clean with a damp cloth and spray cleaner to maintain hygiene because very young children are likely to dribble and put things in their mouth.
10. The shape of the table should encourage collaborative play to help the children to develop social skills.
11. The table should have a raised edge to help to contain loose parts and components so that supervisors are not picking items from the floor too often.

12. Resistant Materials

13. The product should not require musical ability for a school pupil to be able to make a musical note so that anyone in the school can get pleasure from the garden.
14. The sound produced should be musical/harmonious so that the garden is a pleasant experience for anyone within earshot.
15. The product should encourage group/team work by making it possible for two or more people to collaborate to produce different tones or sounds.
16. It should be possible for the product to function in all weather conditions and temperature because it is to be located permanently in the garden.
17. The product must be accessible by all pupils so any human interface must be at a convenient height for 11+ children and adults whether ambulant or seated in a wheelchair.

7. Systems and Control

1. The device must show the time remaining in hr/min/sec format for periods between 5 hours and 30 seconds to cover wide range of dishes and cooking methods.
2. The device should have an audible alarm so that the cook is alerted even if they are not looking at the timer.
3. The device should be easy to carry and not require mains power so that the cook does not have to stay in the kitchen throughout the cooking process.
4. The device should allow multiple timings (simultaneously) so that different items of food can be cooked at the same time.
5. There should be a way of alerting the cook when there is a short period of time to go before completion (5 or 10 min) so that they can prepare dishes, bowls etc ready to receive the cooked food.

6. Textiles

7. The bag should have several different carrying styles (handles, straps etc) to suit different family members (adults and children) who may also have to carry other items to the picnic site.
8. The food contained in the bag should be sheltered from external elements such as rain, dust and sand so that it doesn't become spoilt and inedible.
9. The bag should have compartments for different types of food so that it is contained and physically protected from damage whilst being carried.
10. There should be pockets in the bag to hold standard 'ice packs' purchased from any supermarket so that fresh contents can be kept cool.
11. The bag should fold or collapse in some way when empty so that it can be stored easily in a small kitchen cupboard so that it is always ready to be used by the family.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

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