



**General Certificate of Secondary
Education**

*Design and Technology:
Short Course*

Specimen Mark Scheme

The Specimen assessment materials are provided to give centres a reasonable idea of the general shape and character of the planned question papers and mark schemes in advance of the first operational exams.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Question 1

(a)

Materials/ingredients made from trees and plants	Flour, Pine, Cotton
Materials/ingredients made from oil	Acrylic, Polythene, Polyester
Materials/ingredients taken from animals	Wool, Lard, Cheese, Silk
Made from materials dug out of the ground	Copper, Mild steel

3 x 1 mark (3 marks)

(b)

(i) Answer shows a clear understanding of the issue – reasonably defined, response may include an example 2 marks

Answer vaguely defines the issue, no real explanation or examples given 1 mark

No relevant explanation or example(s) given 0 marks (2 marks)

Possible answers:

Fair trade – Prevention of child labour, Products are manufactured abroad to lower costs, in some cases workers in these countries work long hours for poor pay in poor working conditions. Fair trade logo on products indicates that workers have been fairly paid for their labour and work in good conditions

Organic – concerns about the use of pesticides and other chemicals in food production, additives in food products and the impact on health

Animal welfare – Caused championed by chefs in recent TV programmes e.g. chicken - battery farming and broil houses seen as cruel, drive to encourage free range, where animals have a better quality of life

Sustainability – Concerns about the depletion of the world's natural resources, buying goods from sustainable resources helps with this e.g. FSC symbol on wooden products shows that the wood has come from managed forests

Product miles – A lot of unnecessary travel for products e.g. food products which are capable of being grown in the UK but are imported from elsewhere in the world, environmental impact of this – encourage to buy local

Special diets - e.g. vegetarianism, halal, kosher, allergies – restricted from eating particular ingredients, need to check food labels carefully to make sure products bought do not contain them. Some products state this clearly on the label

(b)	(ii)	See 1 (b) (i) for relevant responses and mark range		(2 marks)
			Total	7 marks

Question 2

(a)		Mark scheme to be exemplified with examples for each mark range		
		Good evidence of the scamper approach. Feasible and effective idea, well drawn and clearly annotated with a variety of information which is more than descriptive e.g. explains/justifies/evaluates	6 marks	
		Clear changes to the idea using the scamper approach – e.g. change of function, additional features some of the labelling is more than descriptive e.g. explains/justifies/evaluates	4-5 marks	
		Small changes to the idea – mainly superficial e.g. surface shape/decoration, labelling is superficial e.g. this is the handle, it will be blue, it is a birthday cake, it has 100s and 1000s on, etc.	2-3 marks	
		Idea redrawn but some simple labelling evident or idea redrawn with one small change, no labelling	1 mark	
		Redrawn idea from the question with no changes, no labelling – award no marks	0 marks	(6 marks)
(b)	(i)	clear drawings to communicate design details		
		Clear written/graphical communication skills demonstrated. Construction/assemble detail clearly shown using a cross section/ exploded view/ detailed annotation	3 marks	
		Reasonable graphical / written communication skills demonstrated to show a construction/assembly detail, but some areas lack clarity. i.e. good drawing but weak notes, good notes but weak drawing	2 marks	
		An attempt at a drawing / labelling, may not adequately explain construction / assembly details Award no marks if part a is simply redrawn with no additional detail	1 mark	
		Inappropriate idea redrawn with incorrect or no labelling evident.	0 marks	(3 marks)

- (b) (ii) Notes which would allow for 3rd party manufacture

You should be looking for the following sorts of information,

Bag – Cross section view most appropriate

- Fabric named (any specific woven fabric e.g. polycotton, denim, polyester, nylon)
- Sizes
- How handles / another fastening is attached
- Construction details, e.g. draw string channel, hemming, etc.
- Details / names of any surface decoration processes to be used

CD rack – Exploded view most appropriate

- Materials named (any specific and appropriate materials e.g. pine , acrylic , mild steel)
Do not accept specific materials which are unsuitable e.g. PP, Hips, etc.
- Rods could be dowel, acrylic rod, PVC rod, Mild steel rod
- Sensible dimensions given
- Joining method for ends and rod given
- Tools or methods for cutting/shaping the ends stated e.g. a specific type of saw, laser cutter / CNC router, etc.

Cake – Most likely to be a cross section view

- Ingredients and weights
- Fillings / toppings / decorations named
- How the cake is layered
- Names / descriptions of processes for cake making (creaming method / all in one Method /melting method/ whisking method)
- Explanation about how decoration is to be applied

Design labelled in a lot of detail, demonstrating a high level of feasibility, very little information missing (6+ pieces of information included in the response), possible to make the product from the info provided.

7-9 marks

Design labelled in a lot of detail (5-6 pieces of information), however there may be one or two errors e.g. specific material named inappropriate, sizing, but overall the response shows that the candidate has a clear idea about how the product would be made. With some minor adjustments this is feasible.

5-6 marks

Technical / construction details suggest that the idea is feasible. Sufficient labelling to explain at least one technical / constructional part of the design (3-4 pieces of information can be gleaned from the response)

3-4 marks

Some simplistic labelling included on the design but insufficient detail to ascertain whether the idea could be made. Generic material names given (e.g. plastic), some components identified for parts of the product, no description of processes.

1-2 marks (9 marks)

No relevant response

0 marks

Total 18 marks

Question 3

(a) Any 3 responses from

- Protect from damage / tampering
- Ease of transport / carriage / storage
- Inform / identifies / advertises / displays
- Contain
- Preserve

3 x 1 mark (3 marks)

(b) (i) Some points to look for when materials are analysed:

Base expanded polystyrene - good heat insulator, clean, white, hygienic, supports the pizza, very light, not heatproof.

LDPE sealed wrap - hygienic, clear and relatively soft so keeps the contents of the pizza in place, easy to remove.

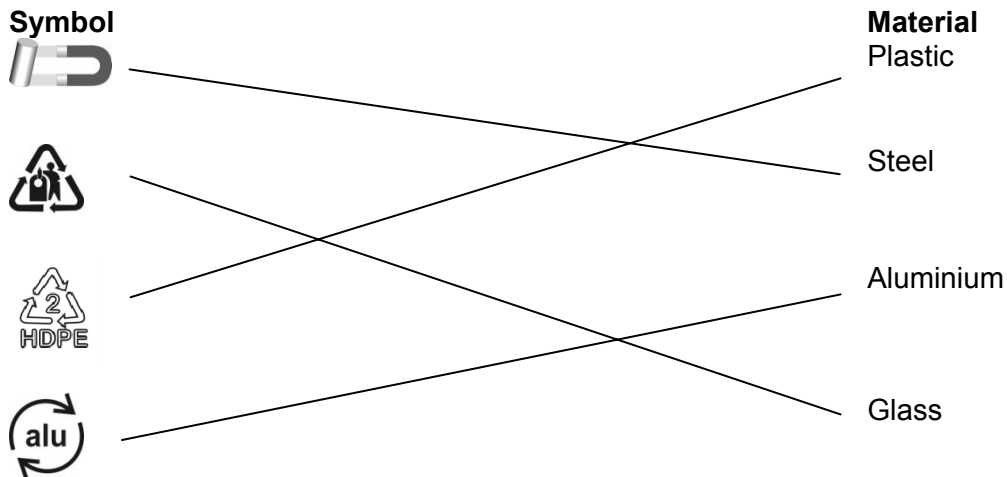
Cardboard package - strong, protects the pizza as it is transported, reasonably robust, flat packed when made, easily folded at point of sale, some insulation properties, light in weight, can be printed fairly easily, relatively cheap when produced in very large quantities.

Through evaluation with 3-4 qualified points made, can be positive or negative but relate to packaging function. Comments show a good level of understanding e.g. function explained specifically for pizza, and linked to materials/ design features. The packaging needs to protect the pizza from being squashed in transit or whilst being stored. The expanded polystyrene base is rigid so performs this job well. Response is well organized and structured in a clear and concise manner with good use of appropriate terminology and shows a good grasp of spelling, punctuation and grammar.

4-6 marks

	Two or 3 comments made but the reasoning provided may be weak. Comments may relate to good/ bad points about the packaging – e.g. good size for pizza, the rectangular shape makes it easy to store as it will stack well in the freezer. Comments may relate to why the function is important for pizzas e.g. information like product name is needed so consumers can identify the product/ know how to cook it/store it. Responses are unlikely to relate the two. Response is fairly well organized and structured with some good use of the appropriate terminology and with a small number of errors in spelling, punctuation and grammar.	2-3 marks	
	An attempt at a response with at least one comment which is evaluative e.g. good/ bad features of the design. List of the sort of responses needed – starting point would be what we already have about materials but other responses which relate to other design aspects of the packaging e.g. size, shape, graphics etc are equally as valid. Response is organized and structured poorly with little or no use of the appropriate terminology and shows numerous errors in spelling, punctuation and grammar.	1 mark	
	No relevant response	0 marks	(6 marks)
(b)	(ii) Appropriate improvements suggested, well justified, responses may make reference to how the improvements would be made.		
	e.g. Add a window in the card so the product can be seen. Would need a cellophane cover to protect the pizza, Reduce the amount of packaging to reduce cost – the expanded polystyrene disk is not needed as long as the cardboard chosen is stiff and the pizza is wrapped in LDPE	3 marks	
	Appropriate improvements suggested with some explanation		
	e.g. More information needed on the packaging – add cooking instructions	2 marks	
	A sensible improvement suggested – Make the box more attractive	1 mark	
	Vague or inappropriate responses		
	e.g. make the pizza bigger	0 marks	(3 marks)

(c)



1 mark for each symbol correctly matched to the material

4 x 1 mark (4 marks)

(d)

Clear understanding that materials need to be identified so they can be sorted to enable the materials to be recycled

2 marks

Simplistic answer – e.g. for recycling

Do not accept: so you know what material it is – this is implicit in part (c).

1 mark

No relevant response

0 marks (2 marks)

(e)

Each relevant point made

3 x 1 mark

Additional marks for explanation / expansion on points made

3 x 1 mark

1 point + 5 expansions / 2 points + 4 expansions / 3 points + 3 expansions all equally valid methods of achieving 6 marks

Possible responses:

Identifying materials from renewable / non renewable resources

Identifying materials which can be reused or recycled

Suggest ways in which the amount of packaging can be reduced

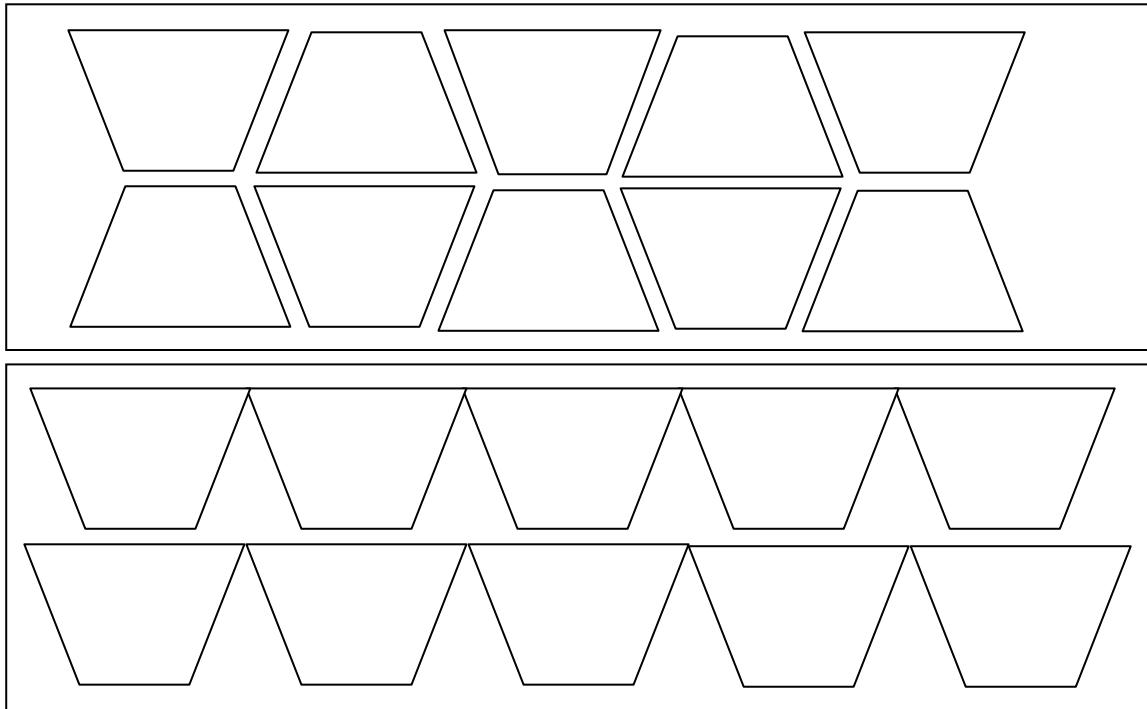
Less packaging = less energy needed to produce it

Explanation of which materials are likely to cause a problem if it goes to landfill and which materials are bio-degradable

Total (6 marks)
24 marks

Question 4

- (a) Shape rotated to nest – 10 consistently drawn shapes fitted with space to spare, e.g. 3 marks



10 consistently drawn shapes fitted into the space e.g. 2 marks

Drawing shows that the candidate has an idea about placing shapes closely together / nesting, but shapes are inconsistently drawn 1 marks

Size of shape altered to make 10 fit easily or shape maintained but haven't managed to fit in 10 shapes 0 marks (3 marks)

- (b) Reason qualified e.g. linked to cost of material / waste 2 marks

Simple reason e.g. to use up less space 1 mark

No reason given 0 marks (2 marks)

- (c) **1 mark** for any specific material which is available in sheet form, e.g.
- Woods – plywood, pine, MDF
 Plastics – Acrylic, Polypropylene, PVC, Vinyl, HIPS
 Metals – mild steel, brass, copper
 Fabrics – cotton, polycotton, denim, corduroy
 Food – pastry, biscuit dough, bread dough
 Accept cardboard 1 mark
- Answers such as wood, metal, plastic, fabric 0 marks (1 mark)
- (d) Answers should be appropriate for multiple production and better answers should consequently include the use of a cutter / punch / CAM to ensure accuracy in cutting. The processes described should be possible in a school setting.
- An accurate description of each stage of the process, selected process practically guarantees that the shapes will be identical, i.e. CAM
- Food answers – In addition to cutter, rolling out to a consistent thickness (measured)
- Textile answers – In addition to a pattern pinned to the fabric and cut around, answers should refer to consistent grain direction or cutting several layers of fabric at the same time for a consistent result 5 marks
- Correct sequence but some details missing, appropriate process e.g. use of a cutter or template 3-4 marks
- Appropriate process superficially described 2 marks
- A process for cutting stated, or inappropriate process (for repeatability) accurately described. E.g. drawing out and cutting each shape in turn by hand. 1 mark
- No relevant process given 0 marks (5 marks)

Possible responses:

Laser cutting – Appropriate for Plastics / Fabrics / Woods (if less than 6mm)/Card

Draw shape (Corel Draw / 2D design), change outline colour (usually red to cut), place material in the laser and select correct settings. Cut a single shape to check it is correct. If OK paste 10 onto a page economically by nesting. Send to print.

Milling / routing – Appropriate for Metals / Plastics & Woods

Draw shape (e.g. corel draw/ 2D design), change colours for different sized cutters, place material in the machine and adjust offsets. Send single design to plot to check it is correct. If OK paste 10 onto a page economically by nesting. Send to plot.

Plotter cutting – Appropriate for Vinyl, Iron on vinyl, thin card

Select machine to set correct size/layout for drawing. Draw shape (Corel draw/ 2D design), Change outline colour to cut (usually red) and remove any fill colour. Feed the vinyl into the cutter, adjust settings for speed and pen force appropriate to the material. Send a single shape to plot to see if it is correct. If OK paste 10 onto a page economically by nesting. Send to plot.

Die cutting – Appropriate for card and fabric

Make cutter by fastening dieflex blade around MDF/Plywood shape using either double sided tape or screws. Use this to stamp out shapes. If a response refers to die cutting but does not explain how the die is made, additional detail about cutting e.g. alignment, fabric grain etc for full marks

Pastry / biscuit / bread dough, etc – A cutter will need to be made. Answers may refer to this – vacuum forming over a wooden former and trimmed to make a cutter is a common method. The dough would need to be rolled out to a designated thickness. Cutter is used starting at the edge of the material so as many shapes as possible can be cut in one rolling. Excess material is rolled out again to the same thickness and the process is repeated.

Total 11 marks

Question paper total 60 marks