

Candidate Name	Centre Number	Candidate Number
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GCSE

4141/01

DESIGN & TECHNOLOGY

UNIT 1

FOCUS AREA: Product Design

P.M. WEDNESDAY, 25 May 2011

2 hours

	Leave Blank
Question 1	
Question 2	
Question 3	
Question 4	
Question 5	
Question 6	
Question 7	
Question 8	
TOTAL MARK	

ADDITIONAL MATERIALS

You will need basic drawing equipment, coloured pencils and a calculator for this examination.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. Where the space is not sufficient for your answer, continue the answer at the back of the book, taking care to number the continuation correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

Section A

Marked out of 60 60 minutes

Examiner
only

- 1. This question is about Product Analysis. It is worth a total of 15 marks.

The photograph below is of a travel hairdryer.
Study in detail the information shown below.

Travel Hairdryer



Product Information:

- 2000 W efficient heater;
- compact size and folding handle;
- 2 heat and 2 speed settings;
- dual voltage;
- 3-year guarantee;
- weight 370g;
- retail price £6.99.

- (a) A design specification was produced before designing the travel hairdryer. Write a detailed specification point for each of the following headings.

- (i) The size or weight for the travel hairdryer. [2]

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- (ii) The quality issues for the travel hairdryer. [2]

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- (iii) The environmental impact of the travel hairdryer. [2]

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- (b) The travel hairdryer has to appeal to potential customers.

- (i) State the target market for the travel hairdryer. [1]

- (ii) Describe the appeal of the travel hairdryer to that particular target market. [2]

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- (c) The safety of the user is important in the design of a travel hairdryer. State **one** safety feature and explain why it is important. [3]

Safety Feature:

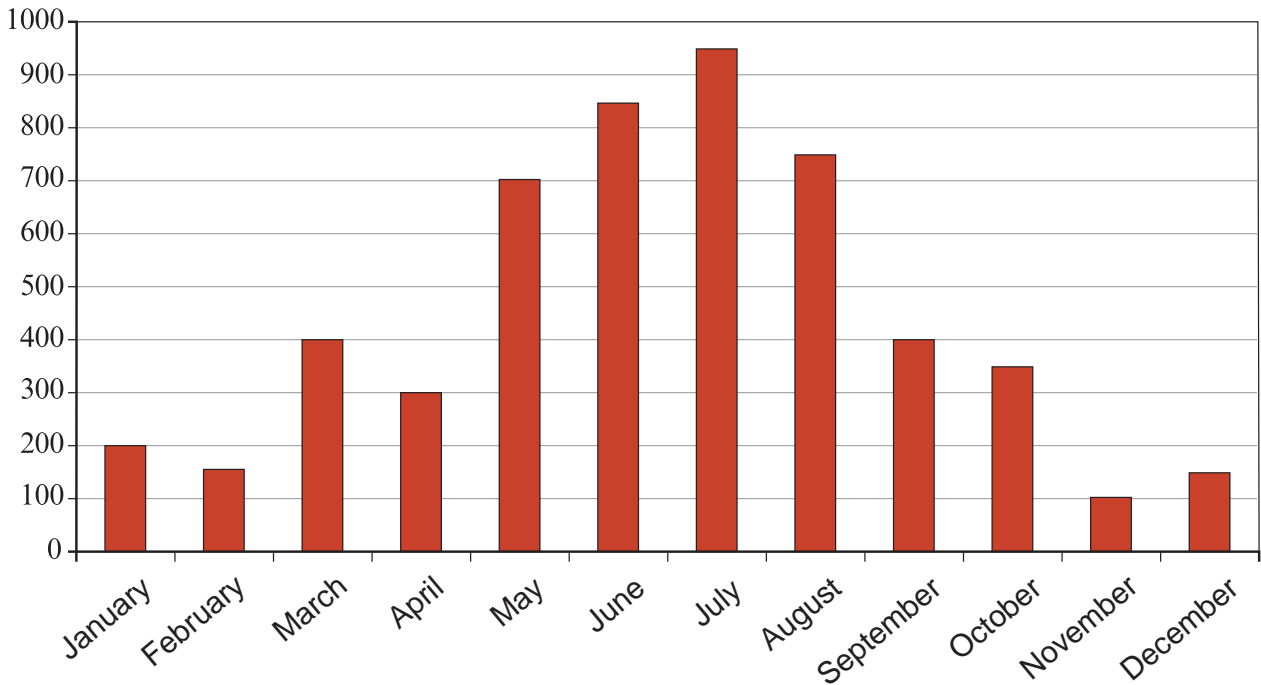
Explanation:

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- (d) The graph below shows the monthly sales of the travel hairdryer.

Sales of Travel Hairdryer



- (i) State which month had the greatest number of sales. [1]

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- (ii) The travel hairdryer is sold for £6.99 by the retailer.
Calculate how much money the retailer will receive from sales during the month of March. [2]
Show all your workings.

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2. This question is about the general issues of Design and Technology. It is worth a total of 10 marks.

(a) Designers of new products think about the 6 Rs.

Place a **tick (✓)** in the correct box to indicate the R which best represents each of the following statements. [3]

<i>Statement</i>	<i>Reuse</i>	<i>Refuse</i>	<i>Rethink</i>
Parts of the product can be used again.			
The product is not really needed.			
The product could do the job better.			

(b) The pencil case below is made from a recycled car tyre. Explain how this is helpful to the environment. [3]



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(c) The solar powered LED torch key-ring shown below has been designed with sustainability in mind.



Give **one** advantage and **one** disadvantage of this new torch key-ring.

Advantage:

..... [2]

Disadvantage:

..... [2]

3. This question is about the Designers that you have studied. It is worth a total of 10 marks.
During your course you have studied the work of Jonathan Ive and Verner Panton.

(a) The pictures below show examples of work from **one** of the designers that you have studied.



(i) Circle the designer who created the above products. [1]

Jonathan Ive **Verner Panton**

(ii) Name which of these designers work for Apple. [1]

Designer:

(b) Select **one** of these designers and write a short essay describing the innovations and/or new ideas that they have introduced over time. [8]

Marks will be awarded for the content of the answer and the quality of written communication.

Designer:

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4. This question is about the Design Process and how it is used. It is worth a total of 25 marks.

(a) (i) **Underline** the stage that is done straight after the initial design brief. [1]

ANALYSIS GENERATE IDEAS DESIGN DEVELOPMENT

(ii) **Underline** the stage that is done before design development. [1]

GENERATE IDEAS PLAN FOR MAKING DESIGN BRIEF

(iii) Explain the importance of on-going evaluation during the design development. [2]

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(iv) Planning for making is an important stage of the design process. State and fully explain **one** important feature of a good plan for making.

Important feature: [1]

Explanation:

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[2]

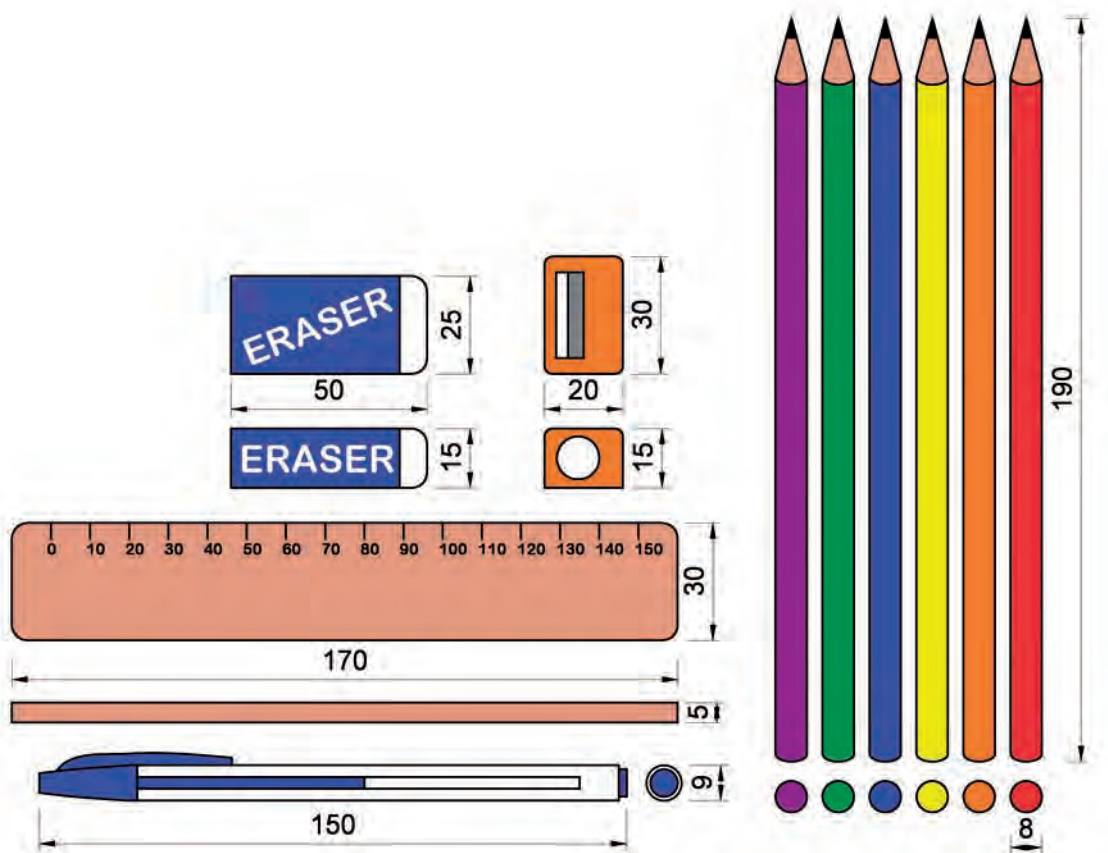
- (b) A stationery manufacturer produces a range of environmentally friendly products. A desk tidy is required for this range.

Draw **one** idea for the desk tidy. Use notes to explain your ideas.

Specification

The design must:

- be suitable for a teenage market;
- be sustainable/environmentally friendly;
- be made from suitable named materials;
- allow the items to be picked up easily;
- be able to store/hold the items shown below.

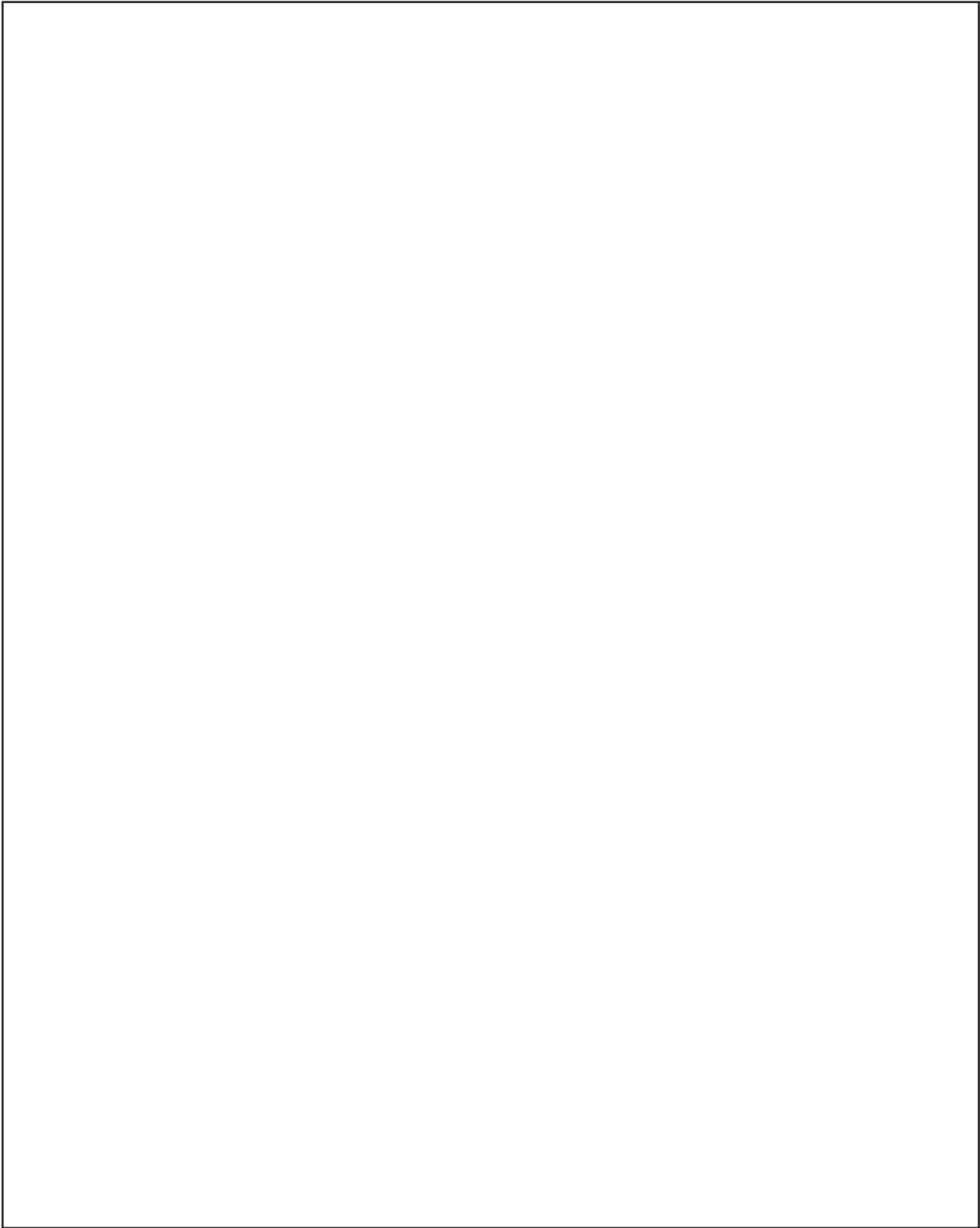


Marks will be awarded for:

- generating **one** imaginative idea to satisfy the specification;
- showing **three** overall sizes for the desk tidy;
- specifying suitable materials and manufacturing processes;
- a design that appeals to the teenage market;
- quality of communication.

[6]
[3]
[3]
[2]
[4]

Draw your design in the box below.



Section B

Marked out of 60 60 minutes




5. This question is about Commercial Manufacturing Processes. It is worth a total of 10 marks.

(a) Complete the table by selecting the correct method of production from the list below. [3]

Mass Production

Batch Production

One-off Production

<i>A Daily Newspaper</i>	<i>Prototype Phone</i>	<i>Blank CD</i>
		
..... Production Production Production

(b) The batteries shown below have been mass produced.



Describe, in detail, **one** advantage of mass producing these batteries. [2]

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(c) (i) Explain, in detail, the main features of a production line system. [3]

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(ii) Explain **one** disadvantage to workers operating on a production line system. [2]

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6. This question is about Materials and Components. It is worth a total of 15 marks.

(a) Complete the table shown below by underlining the correct words from each list. [4]
An example has been done for you.

<i>Product</i>	<i>Material</i>	<i>Classification</i>
 Kitchen Worktop	Pine <u>Oak</u> Chipboard	<u>Hardwood</u> Softwood Manufactured Board
 Mobile Phone Case	Polypropylene Acrylic ABS	Thermoplastic Thermosetting Plastic
 Plumbing Fittings	Copper Aluminium Tin	Ferrous Metal Non Ferrous Metal

(b) (i) A composite material is made by combining two or more materials. From the list below choose the most suitable material that is combined with polyester resin in the manufacture of a surfboard. [1]

Paper

Glass Fibre

Cardboard

(ii) Explain the benefits of using a composite material in the manufacture of a surfboard. [2]

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- (c) Materials are sold in stock forms. Draw a line to match up the correct stock forms to the material. [3]

An example has been done for you.

<i>Stock Forms</i>	<i>Material</i>
Rough sawn, sheet size, PSE, dowel.	Wood
ISO, A4, g/m ² , cartridge.	Plastic
Sheet, angle, flat, tube.	Paper
Powder, granules, foam, rods.	Metal

- (d) Many products have an applied surface finish.

- (i) Explain the purpose of an applied surface finish. [2]

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- (ii) The aluminium product below has been anodised.



Explain the process of anodising. [3]

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7. This question is about Tools, Equipment and Making. It is worth a total of 20 marks.

(a) (i) Complete the table by inserting the correct name for **each** tool and describe its use. [6]

<i>Tool</i>	<i>Name</i>	<i>Use</i>
	<p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p>
	<p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p>
	<p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p>

(ii) State the full name of the piece of equipment below. [2]



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(b) State **three** safety considerations you should observe when using a pillar drill. [3]

Consideraton 1:

Consideraton 2:

Consideraton 3:

(c) (i) Using notes and sketches, describe how you would accurately produce a 90 degree bend in a piece of acrylic sheet. [6]

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(ii) The process of line bending is classified as a deforming process. Explain what is meant by the term **deforming process**. [3]

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8. This question is about ICT, CAD, CAM, Systems and Processes. It is worth a total of 15 marks.

(a) (i) Name the type of software that is used for creating graphs and charts. [1]

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(ii) Name a device that can be used to upload an image to a computer. [1]

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(iii) Name a software package that can be used to draw an image from scratch. [1]

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(b) The picture below shows a pet identity tag that has been designed using CAD and cut out using CAM.



(i) State **one** advantage of using CAD. [2]

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(ii) The CAM machine has been set up to cut the pet identity tag from 3 mm Acrylic.



Machining parameters					
Order	Colour	Tool no.	Final Depth	Clear-ance	Start Offset
1	Blue	1	0.30mm	2.00mm	0.00mm
2	Red	1	3.00mm	4.00mm	0.00mm

Explain why **two** differently coloured lines are needed for the CAM machine. [3]

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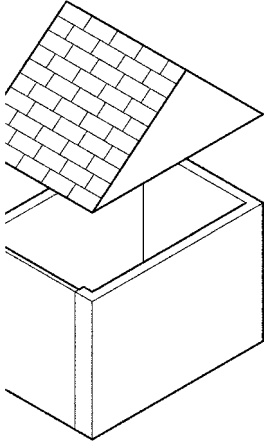
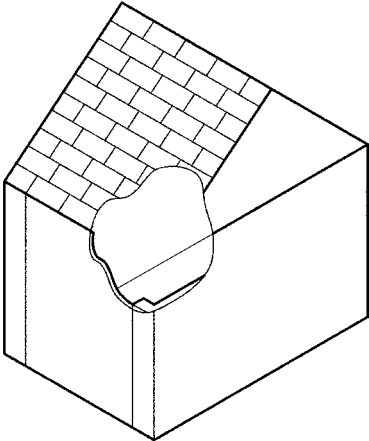
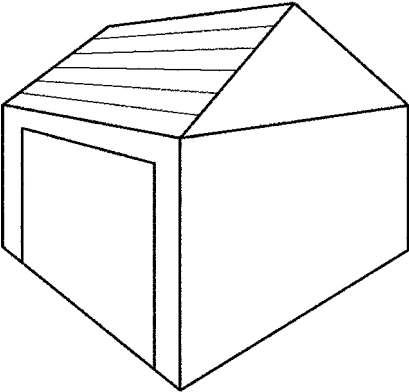
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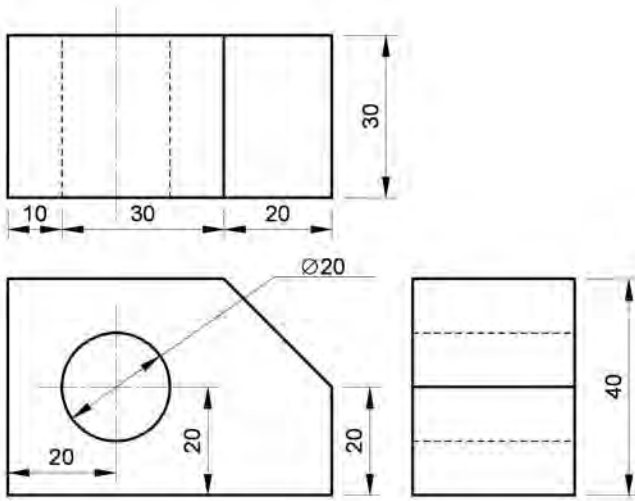
(c) There are a variety of graphic techniques used to communicate ideas clearly.

Use a line to match the name of the techniques below to the correct image.

[3]

2 Point Perspective	Exploded Drawing	Cut Away
		

(d) A dimensioned orthographic drawing is shown below.



Use the information to complete an accurate isometric drawing on the grid below.

[4]

Assume any dimension not given.

