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Duration — 1 hour and 30 minutes
Total marks — 60

Attempt ALL questions.
All dimensions are in mm.
All technical sketches and drawings use third angle projection.
You may use rulers, compasses or trammels for measuring.
Use blue or black ink.
Before leaving the examination room you must give this booklet to the Invigilator.
If you do not, you may lose all the marks for this paper.
1. Cheetah Dynamics, a sports equipment company, is marketing a new range of sports shoes. The mini-ad they have produced will be used in sports magazines. The colours in the layout were chosen carefully. The red company name stands out well.

(a) State why using the colour red helps the company name to stand out against the blue and white background.

The designer wanted to create unity by making connections between different items in the layout.

(b) State the DTP feature that allows the body text to follow the shape of the sprinter.

When line is used in a layout it can have several functions.

(c) Explain the function of the lines in this layout.
1. (continued)

(d) State the name of the DTP feature that produced the **waves in the slogan** above the sports shoes.

(e) State the name of the other DTP feature used on the **wavy text**.

(f) Explain how shaping the wavy text in this way improves the layout.

The blue background **colour fill** was created by the designer.

(g) State the name of the fill effect used in the blue background.

Total marks 7
2. A furniture designer has created some preliminary sketches for a new chair. These sketches were given to a CAD technician who will make a 3D CAD model.

The CAD technician used the revolve command to model the arms of the chair.

(a) Describe, using the correct dimensions and 3D CAD modelling terms, how you would use 3D CAD software to model one arm of the chair. Do not model the slots in the arm. You may use sketches to support your answer.
2. (continued)

The chair requires two arms – one for the left and one for the right. The CAD technician modelled the left-hand arm first.

(b) Describe how the CAD technician can make an identical right-hand arm without starting a new model.

The chair has four parts, made from three components:
- the left-hand arm
- the right-hand arm
- the seat/back component (used twice).

(continued overleaf)
2. (continued)

(c) Describe the CAD constraints used to make a CAD assembly of the four parts. Use sketches to illustrate your answer.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Total marks 9
3. CAD production drawings for the manufacture of a plastic fixing clip are shown below.

The drawings were to be produced in accordance with British Standards conventions but they are not correct.

To enable the manufacture of the clip, the production drawings require one more dimension, dimension ‘X’.

(a) Identify this missing dimension and add it to an orthographic view. There is no need to add the size, just show the leader and dimension lines and put an ‘X’ in place of the size. Apply the correct drawing standards.
3. (continued)

(b) Identify eight British Standards drawing **errors** or **omissions** on the orthographic production drawings on *Page seven*. Circle and number each error on the drawing and describe each error in the table below. An example has been given.

<table>
<thead>
<tr>
<th>Your numbered error or omission</th>
<th>Description of error or omission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>This should be a centre line, not a solid line.</td>
</tr>
</tbody>
</table>

The clip drawings were produced using 3D CAD modelling software. The plastic clip will be used inside a flatscreen TV which is being designed and assembled in Scotland.

All of the components are made in a factory in China before being shipped over to Scotland.

(c) Describe two ways in which **CAD models** and **drawing standards** can make this *international work* easier.

**CAD Models:**

________________________________________________________________________

________________________________________________________________________

**Drawing Standards:**

________________________________________________________________________

________________________________________________________________________
3. (continued)

The company is always trying to improve component design. To help their designers they are transferring all of their drawings and design work from manual drawing boards to 3D CAD models.

(d) Explain two ways in which this change will benefit the designer.

The plastic clip is assembled with two other components. The drawings below show the orthographic exploded views of all three components.
3. (continued)

The exploded pictorial drawings below represent the clip assembly. Five of them are incorrect and one is correct.

(e) Identify the exploded pictorial view that matches the clip assembly on the previous page.

Exploded pictorial view _____ matches the clip assembly on the previous page. 1

Total marks 15
4. A hospital has employed a graphic designer to improve the layout of signs and notices for patients. The original sign and the improved sign are shown below.

![Original sign](image1.png) ![Improved sign](image2.png)

**Original sign**  **Improved sign**

Colour was an important consideration when designing the improved sign.

(a) Explain how the new colours improved the sign.

(b) Suggest a reason why the new typeface was preferred.

(c) Identify two layout features, excluding typeface, that make the improved sign quicker to understand.

Total marks 5
5. A range of production drawings for a domestic wall hook are shown. The hook comprises two components, the hook and the wall bracket, plus a standard component fixing screw.

Study the drawings and answer the questions.

(a) State which of the two isometric exploded views is **incorrectly** exploded.

Isometric exploded view ____ is incorrectly exploded. 1

(b) Explain why this view is **incorrectly** exploded.

________________________________________

________________________________________

________________________________________

The fixing screw is missing from the exploded views.

(c) Indicate the position and direction of the fixing screw on the correctly exploded isometric view.

<table>
<thead>
<tr>
<th>VIEW A</th>
<th>VIEW B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isometric exploded views</td>
<td>1</td>
</tr>
</tbody>
</table>
5. (continued)

Wall hook assembly drawings

(d) Identify the sectional view below that matches section A–A above.

Section A–A is view _____.

View O  View P  View Q
View R  View S  View T

(e) Identify the sectional plan view below that matches section B–B above.

Section B–B is view _____.

View U  View V  View W  View X  View Y  View Z
Exploded views and sectional views are commonly used in production drawings.

(f) Describe one benefit that exploded views provide.  

(g) Describe one benefit that sectional views provide. Do not repeat an answer from (f).  

In sectional drawings there are features that should not be sectioned or cross-hatched.

(h) Name one common feature or component that should not be sectioned.  

Production drawings can be shown in two main types: assembly drawings and component drawings.

(i) Describe the difference between assembly drawings and component drawings.  

Component drawings are dimensioned to support manufacture.

(j) State why dimensions are added to component drawings and not to assembly drawings.  

Total marks 10
6. The four main types of information graphs and charts are shown below.

Two different sets of statistics are shown below.
Each of the statistics can be made more visual by creating an information graph or chart to display the figures.

<table>
<thead>
<tr>
<th>Statistics A</th>
<th>Statistics B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual ice cream sales</strong></td>
<td><strong>Road bike technical data</strong></td>
</tr>
<tr>
<td>January 950 ltr</td>
<td>Model</td>
</tr>
<tr>
<td>February 800 ltr</td>
<td>Roadster</td>
</tr>
<tr>
<td>March 1250 ltr</td>
<td>Wheel size 590cm</td>
</tr>
<tr>
<td>April 3100 ltr</td>
<td>Frame size 147cm</td>
</tr>
<tr>
<td>May 2750 ltr</td>
<td>Gears 9 Weight 13kg</td>
</tr>
<tr>
<td>June 4500 ltr</td>
<td>Flyer</td>
</tr>
<tr>
<td>July 5600 ltr</td>
<td>Wheel size 602cm</td>
</tr>
<tr>
<td>August 6200 ltr</td>
<td>Frame size 152cm</td>
</tr>
<tr>
<td>September 4210 ltr</td>
<td>Gears 12 Weight 12kg</td>
</tr>
<tr>
<td>October 1220 ltr</td>
<td>Kingfisher</td>
</tr>
<tr>
<td>November 1000 ltr</td>
<td>Wheel size 600cm</td>
</tr>
<tr>
<td>December 1400 ltr</td>
<td>Frame size 155cm</td>
</tr>
</tbody>
</table>

(a) State the best type of information graphic to show the trends over the year in **Statistics A**. 1

(b) Explain why this is the best type of graph or chart to display **Statistics A**. 1

(c) State the best type of information graphic to display the data in **Statistics B**. 1

(d) Explain why this is the best type of graph or chart to display **Statistics B**. 1

Total marks 4
7. An architecture company makes use of preliminary, production and promotional graphics.

To enable the builder to start constructing the house, more information needs to be added to the floor plan.

(a) State three key items of information missing from the floor plan.  

(b) Add the symbol for a radiator to any one of the rooms.  

Total marks 4
A poster designed by a graphic artist to encourage young people to consider university courses is shown.

(a) Describe how the graphic artist created unity in the layout.

(b) Describe how the graphic artist created depth in the layout.

The graphic artist worked hard to design an organised layout. This was achieved by using alignment.

(c) Describe where alignment occurs in the layout.

The designer used colour to create contrast in the layout.

(d) Describe one other way in which contrast has been created in this layout.

The layout is to be used on the side of double-decker buses in towns around the country.

(e) Explain why contrast is important in a promotional layout like this one.
8. (continued)

(f) Choose the most dominant item in the layout and explain how the designer made it the most dominant item.

The most dominant item is ____________________________

The designer created dominance by ________________________

Total marks 6

[END OF MODEL PAPER]
NATIONAL 5
GRAPHIC COMMUNICATION
MODEL PAPER 1

1. (a) Background colours are receding or contrasting and help the red advancing colour to stand out.
   (b) Text wrap; wrap text
   (c) To separate items; to help create structure; to emphasise the company name
   (d) Flow text; flow text along a path
   (e) Reverse; reverse text ("Font style" will not be accepted as an answer.)
   (f) Creates contrast with the straight lines in the layout; creates a close connection between the product and the slogan; reflects the sentiment of the text; soft and smooth, suggests comfort or cushioning, suggests movement.
   (g) Graded, gradient or gradation fill

2. (a) Draw a circle of DI80mm (1 mark), 500mm away from a centre line. (1 mark)
    Revolve the circular profile 180° round the centre line. (1 mark)

(b) Select the flat face of a slot; draw a mirror line; select a plane. (1 mark for either of these) Use the mirror command to mirror the component.

(c) Assemble the chair seat and back requiring three mates. (1 mark) Mate the chair to leg/arm base. (1 mark) Mate the chair to leg/arm back. (1 mark) Constrain opposite arm using same technique. (1 mark)

(e) Exploded pictorial view iii

Table of British Standards errors and omissions in the fixing clip production drawing

<table>
<thead>
<tr>
<th>Your numbered error or omission</th>
<th>Description of error or omission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>This should be a centre line, not a solid line.</td>
</tr>
<tr>
<td>2</td>
<td>The number is underneath the dimension line; it should be on top</td>
</tr>
<tr>
<td>3</td>
<td>This dimension should be a diameter, not a radius.</td>
</tr>
<tr>
<td>4</td>
<td>Cross-hatching is in the wrong direction; one component = one direction</td>
</tr>
<tr>
<td>5</td>
<td>Units should not be shown; they appear already in the title block.</td>
</tr>
<tr>
<td>6</td>
<td>Centre line is missing.</td>
</tr>
<tr>
<td>7</td>
<td>The web is section and should not be.</td>
</tr>
<tr>
<td>8</td>
<td>Open arrows on the dimension line; these should be closed.</td>
</tr>
<tr>
<td>9</td>
<td>The plan is upside-down.</td>
</tr>
</tbody>
</table>

(c) CAD models are electronic and can be quickly and easily sent to China via email attachments.

Drawing standards are common around the world and can be understood by all users. Drawing standards help overcome language barriers.

(d) CAD models are easily modified to take account of changes to the design; CAD models can be tested before being manufactured; the CAD model can be used to produce a CNC prototype; CAD models can be rendered to produce a realistic image; CAD models can be tested in computer simulations; production drawings can be easily generated from CAD models.

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4. (a) The pale blue colours used in the improved sign are suitable because they are associated with cleanliness and are calming in nature; the two tones used help the user follow the information across the sign. (Or any other suitable answer)

(b) The sans-serif font used has no formatting (italic, bold, underline) and is clear and easy to read. OR The new font is simpler and more modern. It is less formal, less old-fashioned, etc. It is not italicised. (There is no need to specifically mention serif or sans-serif typefaces.)

(c) The line separating ‘Department’ and ‘Floor’ is removed; the department titles are accurately aligned; the floor numbers are ‘reduced’ on the improved sign; the department titles are grouped; ‘You are here’ is clear on the improved sign; the coloured banding makes connecting the department and floor easer. (Any two points, for one mark each)

5. (a) Isometric exploded view A

(b) When the physical hook assembles, the hook will need to be placed on top of the wall bracket from the top.

(c) Section A-A is view S.

(d) Section B-B is view Y.

(e) Exploded views show how the components in a product fit together; exploded views can help to show the assembler or consumer the best way to assemble a product.

(f) Sectional views give an understanding of how parts fit together; sectional views can show the features inside components and assemblies that cannot normally be seen.

(g) Webs; shafts; spindles; axles; nuts and bolts. (Any one)

(h) An assembly drawing is a drawing of a product that has more than one part and the parts are put together as they will be in the real product. Component drawings are drawings of individual parts.

(i) Component drawings are dimensioned prior to manufacture because each part is normally manufactured separately and assembled later. Dimensioning assembly drawings would be confusing because it may not be clear which component the dimensions apply to.

6. (a) Line graph

OR Bar graph

(b) The line graph has a time base and is the best choice to show a flow or trend over a period of time. OR The bar graph will give a comparison between sales in different months.

(c) A table

(d) The data is too complex to present using any of the other types of Information graphic.

7. (a) North arrow; scale of drawing; room names; dimensions; ceiling lights; electrical sockets; wall switches. (Any three)

(b) Symbol added in a suitable position to any room.

8. (a) Matching the colour of green in two items; the red flashbar is layered behind the title and the young people and the student ID card which physically connects them all; the phone number is in very close proximity to the image of young people. (Any one)

(b) By layering items on top of other items; ID card over flashbar; young people over the flashbar; etc. (Any one)

(c) Alignment occurs between the title and the ID card; the right edge of the title and the right edge of the phone number are aligned; the flow text is carefully aligned to the ID card. (Any one)

(d) Depth by layering (near and far); size (big and small text, people, etc.); vertical and horizontal; straight and curved (wavy). (Any one)

(e) Contrast can make the layout eye-catch. This is important to attract attention or when the poster is moving along a roadside and has a brief viewing time.

(f) The most dominant item is: group of young people OR the title OR the ID card. The designer created dominance by: the image of young people is on the top layer, at the front, they are in close up (large) OR title is on a red (advancing) background and so stands out well OR ID card is layered on top of the title and the curved shape gives it dominance. (Any one pair)