

Product Design Bridging Units

Task 1 (Technical Principles)

There are many materials that can be selected by designers to manufacture products. All materials have their own unique characteristics that make them more or less suitable for specific products. As a Product Designer or Engineer it is important that you have a wide understanding of different types of materials, what properties those materials have and how you might manufacture a product differently depending on material selection and what the product is.

Answer the following questions. It is expected that you will use **notes** as well as sketched **diagrams** that have annotations to explain them. You should use fine-line pen to make your sketches stand out and colour, where appropriate, to communicate key aspects of your diagrams.

*Tip: Look at the marks awarded for each question and try to ensure you make enough points in your answer to gain that many marks. An **annotated diagram** can be worth up to half of the total marks awarded.*

1. The photographs below show a Childs chair. The chair can be used inside or outside. It is designed for children aged 2 – 6 years old.



1 (a) The chair has been made from High Density Polyethylene (HDPE).

Explain in detail why this polymer is suitable.

[6 marks]

1 (b) The manufacturer will have taken steps to ensure the polymer does not degrade if the chair is used outside

Explain what steps the manufacturer would take to prevent polymer degradation.

[4 marks]

1(c) The chair has been rotationally moulded.

Use notes and diagrams to describe this process.

[9 marks]

2. The image below shows an armchair.

The chair arms shown in the image could be produced either from solid hardwood or from laminated veneers.

Compare the suitability of both materials for the chair arms shown.

[4 marks]



3. **Figure 1** shows a plywood balance bike (left) and **Figure 2** shows a tubular aluminium balance bike (right).



Analyse and evaluate the two balance bikes in terms of their:

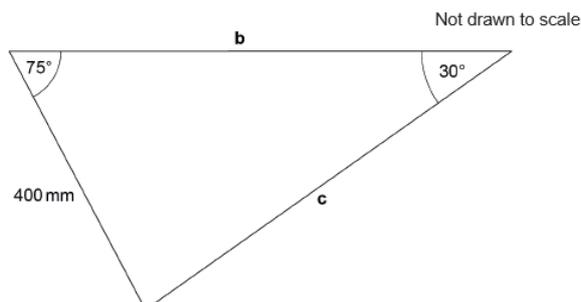
- suitability for mass production
- suitability of materials.

[12 marks]

4. The diagram below shows three tubes that make the front section of a bike frame. Work out the total length of tube required to make the front section.

Give your answer to the nearest mm. Show your working out.

[3 marks]



5 (a) Define the meaning of the term 'smart material'.

[2 Marks]

5 (b) Name a specific 'smart material' and an energy saving product that it is used in.

[2 marks]

5 (c) Describe how the properties of the smart material you have chosen enable energy to be saved.

[2 marks]

(Total 44 marks)

Task 2 (Designing and Making Principles)

Design Theory

As a Product designer or Design engineer it is crucial that you have knowledge and understanding of key design styles and movements and their principles of design. As well as, an understanding the work of influential designers and how their work represents the principles of different design movements.

I would like you to research **one** of the following Design Movements **or** Designers that inspires you and create a PowerPoint (max 3 slides) *or* Word doc (max 2 sides of A4) of information along with images. Nb. This must be your own work, do not copy from the internet as this is plagiarism and you will be asked to resubmit any work that is found to be copied.

Choose one of the following:

Design Movements

- Arts and craft movement
- Art Deco
- Modernism, eg Bauhaus
- Post modernism, eg Memphis

Tip: Talk about when the design movement came about, what made it famous and why? Materials and processes linked to the movement, show images of key pieces of work in that time, designers linked that movement. Add your own thoughts and opinions.

Designer/s

- Phillipe Starck
- James Dyson
- Margaret Calvert
- Dieter Rams
- Charles and Ray Eames
- Marianne Brandt

Tip: Talk about when they started their career, who they may have been inspired by, show key pieces of work, what makes them so iconic? Design principles they stick to, have they inspired others? How has industry changed because of their work? Do you like their work, your opinions.

Useful link:

designmuseum.org/

Task 3 (NEA) Option A

Using the iconic Durelex 'Picardie' glass, design & develop a new use for the glass as a product. You could imagine something simple that could be 3D printed from 1 material or it could be something more complex where the glass forms an integral part of the design (But not as a drinking vessel!). Some examples are shown below. Perhaps a good way to start this is to think about the glass not as a glass but as a clear, hollow form that could contain something.

You can present the work on A3 design sheets, scanned images onto a PowerPoint slide, Photoshop sketches, CAD renderings, or any other suitable communication method. How many you do is up to you!



Task 3 (NEA) option B

Using a newly developed USB LED 'light' board, design & develop a Task light that utilises a range of materials (think timber, metal, acrylic, 3D printed parts, water dipped, concrete cast, leather or fabric etc.). The USB LED board is shown below as an example of one that allows the angle to be changed, done in a design style (De Stijl) and uses a number of materials and processes. The USB cable to power the LED can be any colour and could be a 'braided' material. This could also be made into a feature!

You can present the work on A3 design sheet(s), scanned images onto a PowerPoint slide, Photoshop sketches, CAD renderings, or any other suitable communication method. How many you do is up to you but be creative and communicate well!



Looking forward to seeing you all in September, if you have any issues or questions don't hesitate to contact me via email or Firefly.

Mrs V Bell