

SAMPLE DESIGN AND TECHNOLOGY GCSE EXAMINATION PAPER

CENTRE NUMBER

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CANDIDATE NUMBER

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SURNAME _____

FORENAME(S) _____

CANDIDATE SIGNATURE _____

2 HOURS ALLOWED

Materials required for this examination:

- normal writing and drawing instruments
- a calculator
- a protractor.

Instructions to candidates:

- Use black ink or black ball-point pen. Use pencil only for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information

- The marks for questions are displayed.
- The maximum mark for this paper is 120.
- There are 22 marks for Section A, 32 marks for Section B and 66 marks for Section C.

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CORE TECHNICAL PRINCIPLES - SECTION A

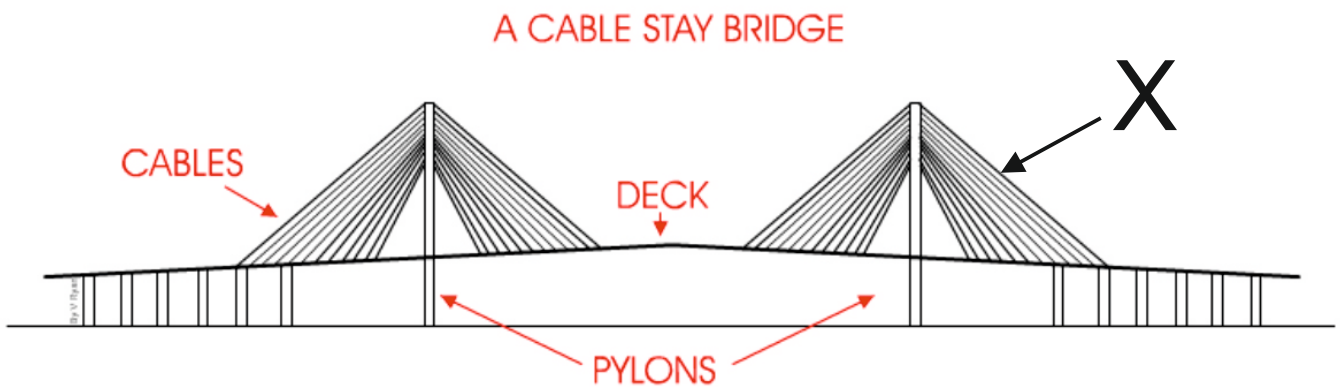
The questions to follow are multiple choice. Tick one answer for each question.

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1. A house alarm system has a number of outputs and inputs. Identify an OUTPUT from the selection below.

- A. Movement sensor
- B. Key pad
- C. Siren
- D. Magnetic door sensor

2. The drawing below shows a simple drawing of a bridge. What is the force applied to part X.



- A. Tension
- B. Compression
- C. Torsion
- D. Shear

3. Which of the following metal is a non-ferrous metal?

- A. Steel
- B. Copper
- C. Iron
- D. Stainless Steel

4. From the list of materials, identify the metal alloy.

A. Copper

B. Chromium

C. Stainless steel

D. Lead

5. Which of the following systems, means the production of ONE item?

A. Prototype manufacture.

B. Continuous Manufacture

C. Batch production

D. Mass manufacture

6. Which of the following statements is true?

A. Pine is a manufactured material

B. Zinc is used to protect metal from corrosion

C. MDF means 'Middle, Density, Foam'

D. QC mean 'Quality Counts'

7. Which of the statements below is The definition of the physical property 'Elasticity'?

A. The ability of a material to stand up to forces being applied without it bending, breaking, shattering or deforming in any way.

B. The ability of a material to change shape (deform) usually by stretching along its length.

C. The ability of a material to stretch without breaking or snapping.

D. The ability of a material to absorb force and flex in different directions, returning to its original position.

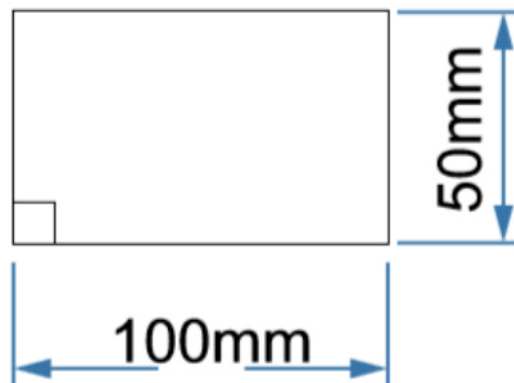
8. Designers consider 'sustainability' as one important aspect of design. What is sustainability?

- A. A product that is designed to use once.
- B. Materials that can be naturally replenished / regrown.
- C. Finite materials are the only materials used in the manufacture of a product
- D. Sustainability means involving the customer at all stages of design

9. Which of the following 'finishes' is used for woods.

- A. Anodising.
- B. Chemical Blacking.
- C. Galvanising
- D. Shellac

10. What is the area of the rectangle shown below?



- A. 500mm²
- B. 50000mm²
- C. 5000mm²
- D. 5500mm²

TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/rmflsh1/pine2.html>

11. Describe / explain two properties of natural Pine, that makes it ideal for the construction industry. 2 marks

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Property 1: _____

Property 2: _____

TO HELP YOU ANSWER
THIS QUESTION

http://www.technologystudent.com/despro_fish/charity9.html

12. Corrugated card is used extensively in the manufacture of packaging. Why is this the case - list two reasons below. 2 marks

Reason 1: _____

Reason 2: _____

TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/energy1/solar7.htm>

13. Solar power is one form of alternative energy, that is becoming popular. Give two reasons for its increase in popularity. 2 marks

Reason 1: _____

Reason 2: _____

14. Give two reasons why some people are not in favour of solar energy production. 2 marks

Reason 1: _____

Reason 2: _____

15. This question is about alternative energy. A local wind farm produces 4 terawatt hours of electricity over a year. At the same time, a solar farm produced 0.5 terawatt hours of electrical power. What is the ratio Wind farm : Solar Power ? Include an explanation of your working out. 4 marks

WIND FARM : SOLAR POWER
4 : 0.5

EXPLANATION: _____

SECTION B - Specialist Technical Principles

Natural Pine Board
300mm X 20mm X 3000mm

Steel Round
Section 50mm Dia.

Acrylic Round
Section 50mm Dia.

16. Select one of the stock forms listed above.

Identify the stock forms primary source (where it comes from) 1 mark

Name of Stock Form _____

Primary Source (where it comes from) _____

In the space below, explain how the primary source material is converted to the stock form you have selected. 4 marks

TO HELP YOU ANSWER
THIS QUESTION
(Natural Pine)

<http://www.technologystudent.com/joints/forest3a.html>
<http://www.technologystudent.com/joints/forest4a.html>
<http://www.technologystudent.com/joints/wdprocess1.html>

17. Describe two ways in which natural woods are given a 'finish' to enhance and protect their surface. 2 x 2 marks

TO HELP YOU ANSWER
THIS QUESTION

http://www.technologystudent.com/despro_fish/mats_finish1.html

Finish 1:

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Finish 2:

18. Select one of the products shown in the table below. Then, describe two of the features that mean it is suitable for manufacture on a production line. 2 x 2 marks

<p>STEEL CHAIR</p>  <p>TO HELP YOU ANSWER THIS QUESTION</p>	<p>PACKAGE</p>  <p>TO HELP YOU ANSWER THIS QUESTION</p>	<p>POLYPROP CHAIR</p>  <p>TO HELP YOU ANSWER THIS QUESTION</p>
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TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/prddes1/barcelona2.html>
<http://www.technologystudent.com/grp08/pack1.html>
<http://www.technologystudent.com/prddes1/polyprop2.html>

PRODUCT: _____

FEATURE 1: _____

FEATURE 2: _____

19. For the product you selected in question 18 - name and describe one of the industrial processes used in it's manufacture. 5 marks

TO HELP YOU ANSWER
THIS QUESTION

<http://www.technologystudent.com/prddes1/barcelona2.html>
<http://www.technologystudent.com/grp08/pack1.html>
<http://www.technologystudent.com/prddes1/polyprop2.html>

INDUSTRIAL PROCESS: _____

DESCRIPTION OF MANUFACTURING PROCESS
INCLUDE NOTES AND A SKETCH(S)

20. Circle one of the materials and its associated product. Then, explain why the material has physical properties, making it suitable for the manufacture of the product 2 x 2 marks

Plywood - Chair

Steel tube - bench

PCB (Printed Circuit Board) - Circuit found in electronic products

Metal Foam - Crumple Zone on a train carriage.

Copper - Pipes for domestic water supply

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

Plywood - Chair - <http://www.technologystudent.com/prddes1/eames6.html>
http://www.technologystudent.com/despro_fish/flexply1.html
<http://www.technologystudent.com/joints/plywood1.html>

Steel tube - bench - <http://www.technologystudent.com/joints/steelbnch1.html>

PCB (Printed Circuit Board) - Main circuit found in electronic products -
<http://www.technologystudent.com/pcb/pcb1a.htm>
<http://www.technologystudent.com/pcb/wave1.html>

Metal Foam - Crumple Zone on a train carriage -
http://www.technologystudent.com/joints_fish/metalfoam1.html
http://www.technologystudent.com/joints_fish/metalfoam2.html

Copper - Pipes for domestic water supply -
<http://www.technologystudent.com/designpro/metals1.htm>
<http://www.technologystudent.com/joints/nonferrous1.html>

Property 1:

Property 2:

21. Designers often select materials based on their environmental impact and the expectations of potential customers. For example, materials that can be recycled, are preferred to those that are non-recyclable.

How are the following materials and strategies regarded as an ethical choice? **10 marks**

MATERIALS

Sustainable timber

Polylactide

Biopol

Oxodegradable Polymers

STRATEGIES

The 6Rs

Recycling - Upcycling - Closed loop recycling

Life Cycle Analysis

Replacing the Materials Economy

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

MATERIALS

Sustainable timber

<http://www.technologystudent.com/prddes1/susenv1.html>

Polylactide

<http://www.technologystudent.com/joints/pla1.html>

Biopol

<http://www.technologystudent.com/prddes1/biopola.html>

Oxodegradable Polymers

http://www.technologystudent.com/joints_fish/oxodegrad1.html

STRATEGIES

Reduce, Reuse, Refuse

http://www.technologystudent.com/prddes1/rev_card_three_rs.html

Recycling - Upcycling - Closed loop recycling -

<http://www.technologystudent.com/prddes1/closetloop1.html>

<http://www.technologystudent.com/prddes1/upcycling1.html>

Life Cycle Analysis - <http://www.technologystudent.com/prddes1/lifecy1.html>

Replacing the Materials Economy -

http://www.technologystudent.com/prddes_2/matecon1.html



SECTION C - DESIGNING AND MAKING PRINCIPLES

A typical task light is shown below



SPECIFICATION

REQUIREMENT 1: The office / task light must be manufactured from fully recyclable materials.

REQUIREMENT 2: The task / office light will be based on an Art Movement.

REQUIREMENT 3: The task / office light must be stable, when adjusted in any possible lighting position.

TO HELP YOU ANSWER
THIS QUESTION

Follow the links below.

http://www.technologystudent.com/joints_fish/office8.html

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

http://www.technologystudent.com/joints_flash/office13.html

25. With the aid of a sketch and notes, describe two anthropometric measurements that could be applied to an improved task light design. 2 x 4 marks

NOTES

SKETCHES

MEASUREMENT 1:

MEASUREMENT 2:

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

http://www.technologystudent.com/joints_flsh/office8.html

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27. Three specification requirements for the Task Light are written below. Underneath each requirement, write an explanation. The first point has been completed for you. 2 x 4 marks

REQUIREMENT 1: The office / task light must be manufactured from fully recyclable materials.

EXPLANATION: When the office / task light comes to the end of it's working life, there will be a need to dismantle the light and recycle the materials. The materials can either down-cycled into lower quality products OR reused for spare parts OR up-cycled into higher value products. This will help to protect the environment and attract environmentally conscious customers.

REQUIREMENT 2: The task / office light will be based on an Art Movement.

REQUIREMENT 3: The task / office light must be stable, when adjustable to any possible lighting position.

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/designpro/newspec1.html>

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28. Designers spend time writing a justified specification. What is the purpose of a specification? 2 marks

TO HELP YOU ANSWER THIS QUESTION Follow the link below.

<http://www.technologystudent.com/designpro/model1.htm>

29. Why do designers make a model, before full production of the product takes place? 2 marks

TO HELP YOU ANSWER THIS QUESTION Follow the links below.

<http://www.technologystudent.com/prddes1/modmat1.html>
<http://www.technologystudent.com/prddes1/modemat2.html>

30. Name a material suitable for modelling? 1 marks

TO HELP YOU ANSWER THIS QUESTION Follow the links below.

<http://www.technologystudent.com/gprep07/phortho4.html>

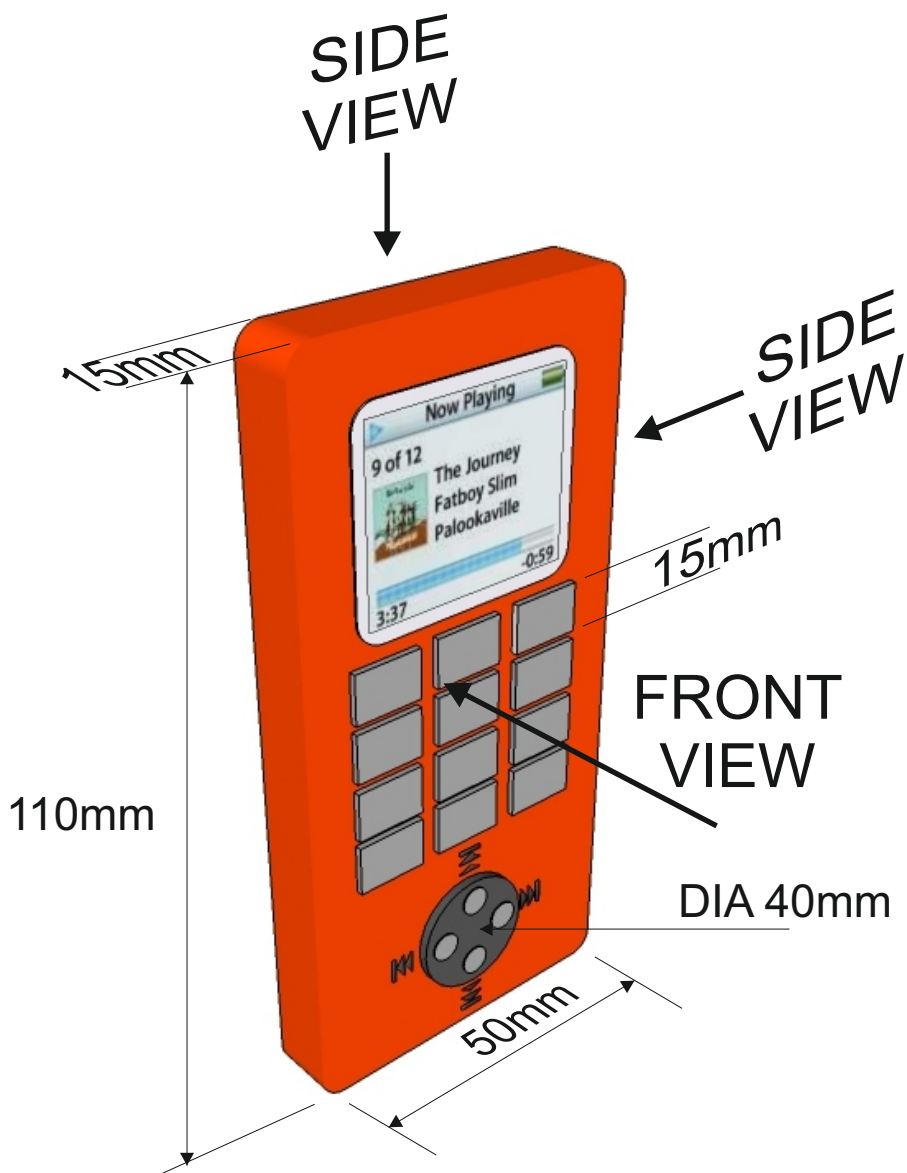
<http://www.technologystudent.com/gprep07/phortho11.html>

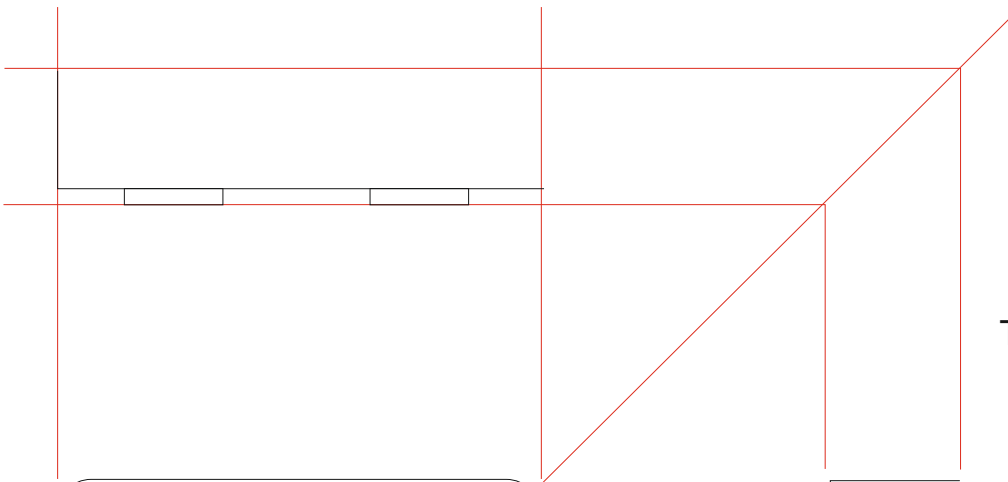
31. A typical mobile phone is shown below. This is drawn in perspective (3D).

1. Complete the orthographic drawing (on the next page) of the same mobile phone, in third angle orthographic projection. Show all your construction lines.

2. Add five dimensions

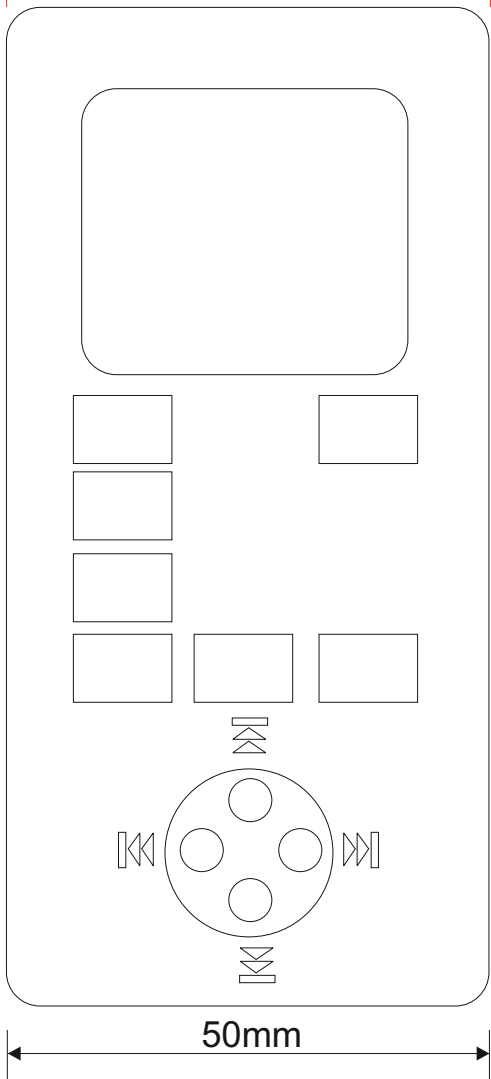
3. Add the symbol for third angle orthographic projection. 8 marks





SCALE 2:1

THIRD ANGLE PROJECTION



TO HELP YOU ANSWER THIS QUESTION Follow the link below.
http://www.technologystudent.com/despro_fish/smartphone1.html

32. Study the three views of the mobile phone seen opposite. Using the isometric grid at the bottom of the page, sketch an accurate 3D version.

Add realistic colour and detail.

8 marks

