

Pearson
Edexcel GCSE

Design and Technology:
Resistant Materials Technology
Unit 2: Knowledge and Understanding of
Resistant Materials Technology

Friday 16 June 2017 – Afternoon

Time: 1 hour 30 minutes plus your additional time allowance

Write your name here

Surname							
Other names							
Centre No.							
Candidate No.							
Paper Reference							
5	R	M	0	2	/	0	1
YOU WILL REQUIRE: Diagram Booklet (enclosed)					Total Marks		

INSTRUCTIONS

- **Use BLACK ink, ball-point pen or your usual method.**
- **If pencil is used for diagrams/sketches, it must be dark (HB or B). Coloured pens, pencils and highlighter pens must NOT be used.**
- **FILL IN THE BOXES at the top of the previous page with your name, centre number and candidate number.**
- **Answer ALL questions.**
- **Answer the questions in the spaces provided – there may be more space than you need.**

INFORMATION

- **The total mark for this paper is 80.**
- **The marks for EACH question are shown in brackets**
– use this as a guide as to how much time to spend on each question.
- **Questions labelled with an ASTERISK (*) are ones where the quality of your written communication will be assessed**
– you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

ADVICE

- **Read each question carefully before you start to answer it.**
- **Try to answer every question.**
- **Check your answers if you have time at the end.**

ANSWER ALL QUESTIONS.

QUESTIONS 1–10 MUST BE ANSWERED WITH A

CROSS IN A BOX ☒ . IF YOU CHANGE YOUR MIND

ABOUT AN ANSWER, PUT A LINE THROUGH THE

BOX ☒ AND THEN MARK YOUR NEW ANSWER

WITH A CROSS ☒ .

1 To which group from the list below does mahogany belong?

☐

A Manufactured boards

☐

B Softwoods

☐

C Composites

☐

D Hardwoods

(TOTAL FOR QUESTION 1 = 1 MARK)

2 What is the name of the component shown in the diagram booklet?

☐

A Pop rivet

☐

B Countersunk head screw

☐

C Washer

☐

D Knock down fitting

(TOTAL FOR QUESTION 2 = 1 MARK)

- 3 Which ONE of the following manufactured boards is made up of several layers glued together at right angles?**

☐

A Hardboard

☐

B MDF

☐

C Chipboard

☐

D Plywood

(TOTAL FOR QUESTION 3 = 1 MARK)

4 Which ONE of the following polymers is a thermosetting plastic?

☐

A Urea formaldehyde

☐

B Acrylic

☐

C Polyvinyl Chloride

☐

D Acrylonitrile-Butadiene-Styrene (ABS)

(TOTAL FOR QUESTION 4 = 1 MARK)

5 Which ONE of the following tools is an abrading tool?

☐

A Chisel

☐

B Plane

☐

C File

☐

D Twist drill

(TOTAL FOR QUESTION 5 = 1 MARK)

6 Which ONE of the following ICT systems is used by retailers to record sales data?

☐

A OPEC

☐

B BTEC

☐

C EPOS

☐

D CAD/CAM

(TOTAL FOR QUESTION 6 = 1 MARK)

7 Carbon steel is made from carbon and which other material?

☐

A Copper

☐

B Iron

☐

C Brass

☐

D Aluminium

(TOTAL FOR QUESTION 7 = 1 MARK)

8 Which ONE of the following processes would be used to manufacture continuous lengths of plastic pipe?

☐

A Vacuum forming

☐

B Blow moulding

☐

C Injection moulding

☐

D Extrusion

(TOTAL FOR QUESTION 8 = 1 MARK)

9 Which ONE of the following materials will respond quickly to a change in Ultra Violet (UV) light?

☐

A Shape memory alloys

☐

B Carbon fibre

☐

C Reactive glass

☐

D Carbon nanotubes

(TOTAL FOR QUESTION 9 = 1 MARK)

10 A material that resists abrasive wear and indentation has which ONE of the following properties?

☐

A Elasticity

☐

B Hardness

☐

C Plasticity

☐

D Malleability

(TOTAL FOR QUESTION 10 = 1 MARK)

- 11 (a) Complete the table in the diagram booklet by giving the missing names and uses. (4)**

11 (b) The drawing in the diagram booklet shows a wind chime. It hangs from a tree in the garden and makes a gentle noise when blown in the wind.

(i) Give TWO properties of aluminium that make it suitable for the weight. (2)

1

2

(ii) Name TWO other non-ferrous metals that could be used for the weight. (2)

1

2

11 (c) Study the diagram in the diagram booklet.

A cross halving joint is used to join the two pieces of pine together for the frame.

Name THREE hand tools that would be used to mark out and make the cross halving. (3)

1

2

3

11 (d)(i) Explain TWO advantages of using pine to make the frame rather than MDF. (4)

1

2

11 (d)(ii) The pine used to make the frame is from a recycled source.

Explain TWO advantages for the environment of using pine from a recycled source. (4)

1

2

(TOTAL FOR QUESTION 11 = 19 MARKS)

- 12 You have been asked to design a display unit for small plastic figures shown in the diagram booklet.**

DESIGN SPECIFICATION

The specification for the display unit is that it must:

- **be capable of holding at least two small and two large figures**
- **be lockable**
- **allow them to be easily accessed**
- **have adjustable shelves**
- **include a light source**
- **be capable of being fixed to a wall**
- **be made from materials available in the school workshop**
- **be made using processes suitable for a one-off**

In the spaces on the following two pages, use sketches and, where appropriate, brief notes to show TWO DIFFERENT design ideas for the display unit that meet the specification points above.

Candidates are reminded that if a pencil is used for diagrams/sketches it must be dark (HB or B).

Coloured pens, pencils and highlighter pens must NOT be used.

DESIGN IDEA 1 (8)

21

DESIGN IDEA 2 (8)

(TOTAL FOR QUESTION 12 = 16 MARKS)

13 The image in the diagram booklet shows a desk lamp.

(a)(i) Give TWO properties of brass that make it suitable for the base of the desk lamp. (2)

1 _____

2 _____

(ii) Explain ONE reason why brass is a better choice of material than acrylic for the base of the desk lamp. (2)

13 (b) The electric cable is coated with a thin layer of PVC

Explain ONE reason why the electric cable is coated with a thin layer of PVC. (2)

13 (c) Explain why the desk lamp is successful in meeting the following specification points:

(i) easy to light up different areas of the desk (2)

(ii) will not fall over. (2)

13*(d) The images in the diagram booklet show two different types of desk lamp.

Evaluate desk lamp A in comparison to desk lamp B in terms of form and user requirements. (6)

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(TOTAL FOR QUESTION 13 = 16 MARKS)

14 The image in the diagram booklet shows the frame of a mass-produced chair made from mild steel.

(a) One reason mild steel was chosen was because it is easily welded.

(i) Name ONE other method of joining mild steel which involves the use of heat. (1)

14 (a)(ii) Explain TWO other reasons why mild steel is an appropriate choice of material for the frame of the chair. (4)

1

2

14 (b) Describe TWO health and safety precautions that should be taken when welding. (4)

1

2

14 (c) The metals parts are held in a jig when they are being welded.

Explain TWO reasons why a jig is used when the parts are being welded. (4)

1

2

14*(d) A new chair frame is to be designed using a CAD system.

Discuss the advantages and disadvantages of using CAD for virtual modelling and testing the designs. (6)

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(TOTAL FOR QUESTION 14 = 19 MARKS)

TOTAL FOR PAPER = 80 MARKS