

NCFE Level 1/2 Technical Award in Engineering (603/7006/3)

Examined assessment

Paper number: **Past paper**
Assessment date: **Friday 7 June 2024**

Time allowed: **1 hour 30 minutes**
Time: **9.00am – 10.30am**

Learner instructions

- Use black ink.
- Answer **all** questions.
- Read each question carefully.
- You **must** write your responses in the spaces provided.
- You may do rough work in this answer book. Cross through any work you do not wish to be marked.
- If you use a supplementary answer booklet, you must add your learner name, learner number and centre number to the front cover of the booklet. Insert your supplementary answer booklet inside this question paper at the end of your test.
- All of the work you submit **must** be your own.

Learner information

- The marks available for each question are shown in brackets.
- The maximum mark for this paper is **80**.
- You may use a calculator.

Do not turn over until the invigilator tells you to do so.

Please complete / check your details below

Learner name:

Centre name:

Learner number:

Centre number:

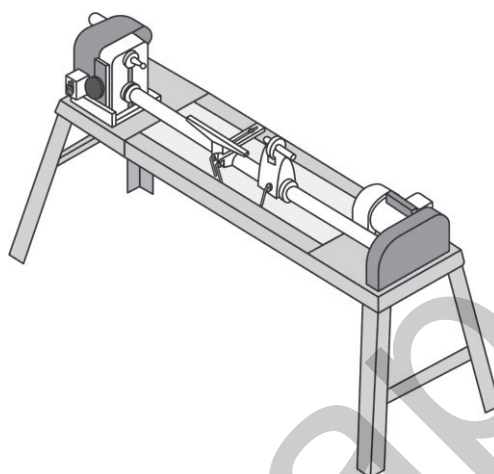
Section A

This section has a possible **32** marks.

Answer **all** questions in the spaces provided.

- 1** **Figure 1** shows a piece of machinery used in a materials workshop.

Figure 1



Name the piece of machinery shown in **Figure 1**.

[1 mark]

- 2** Give **two** items of PPE that should be worn when using the machine in **Figure 1**.

[2 marks]

1

2

3 Which **one** of the following ceramics can be formed naturally?

[1 mark]

- A Brick
- B Cement
- C Diamond
- D Pottery

Answer _____

4 Which **one** of the following metals is a non-ferrous alloy?

[1 mark]

- A Aluminium
- B Bronze
- C Cast iron
- D Stainless steel

Answer _____

5 Which **one** of the following materials turns a blue-green colour when it oxidises?

[1 mark]

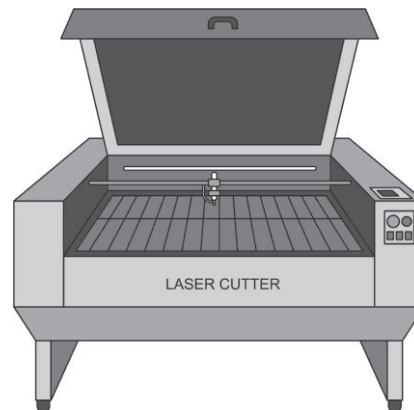
- A Acrylic
- B Copper
- C Lead
- D Solder

Answer _____

6

Figure 2 shows a laser cutter.

Figure 2



Give **two** advantages and **two** disadvantages of using a laser cutter to manufacture products.

[4 marks]

Advantage 1 _____

Advantage 2 _____

Disadvantage 1 _____

Disadvantage 2 _____

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- 7 Analyse why it is beneficial for a manufacturer to recycle waste materials.

[2 marks]

- 8 **Figure 3** shows an aircraft.

Figure 3



Aluminium is often used in the construction of aircraft.

State **two** properties of aluminium **and describe** why each property is useful in the production of aircraft.

[4 marks]

Property 1

Description 1

Property 2

Description 2

- 9 State which type of engineering includes the manufacture of aircraft.

[1 mark]

- 10 State **two** products, **other than** transportation, that are commonly made from aluminium.

[2 marks]

1

2

- 11 Most power plants generate electricity in AC form, which is then converted to DC.

Which **one** of the following is DC an abbreviation of?

[1 mark]

- A Daily current
- B Direct current
- C Distant current
- D Diverse current

Answer

- 12** Which **one** of the following devices or machines uses pulleys to gain a mechanical advantage?

[1 mark]

- A** Car suspension
- B** Mechanical scales
- C** Tower crane
- D** Wheelbarrow

Answer _____

- 13** Which **one** of the following is a hardwood?

[1 mark]

- A** Cedar
- B** Pine
- C** Spruce
- D** Sycamore

Answer _____

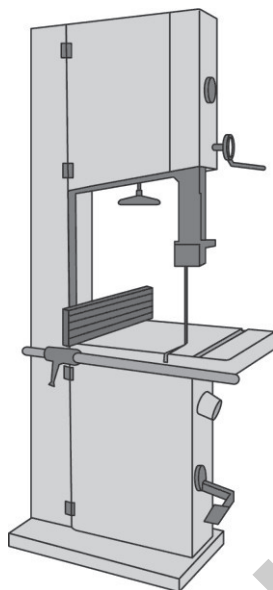
- 14** Describe **two** reasons why AC (alternating current) is used more often than DC.

[2 marks]

- 1 _____
- 2 _____

- 15 **Figure 4** shows a bandsaw, which is used by staff in a workshop.

Figure 4



Identify **three** safety features found on a bandsaw.

[3 marks]

- 1 _____
- 2 _____
- 3 _____

16 **COSHH** is an acronym for Control of Substances Hazardous to Health.

Figure 5 is a warning sign that is used within COSHH regulations.

Figure 5



Describe **two** hazards where this sign would be used.

[2 marks]

1 _____

2 _____

17 Identify **three** methods used to securely fix pieces of wood together.

[3 marks]

1 _____

2 _____

3 _____

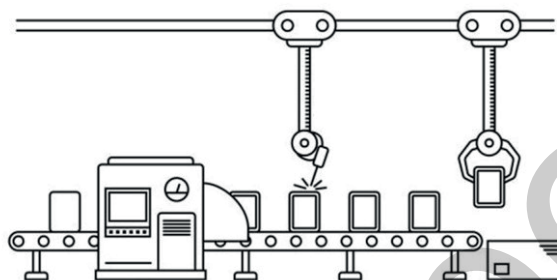
Section B

This section has a possible **14** marks.

Answer **all** questions in the spaces provided.

- 18** **Figure 6** shows an automated production line.

Figure 6



Quality control measures are used in manufacturing.

Give **one** reason why quality control is important during the manufacture of a product.

[1 mark]

- 19** An engineering manufacturer uses a Gantt chart before and during production.

Identify what a Gantt chart is **and** describe how it is used.

[3 marks]

Identification _____

Description _____

- 20** Which **one** of the following shows the number of seconds in an hour?

[1 mark]

- A** 360
- B** 600
- C** 3600
- D** 6000

Answer _____

21 Which **one** of the following SI units relates to temperature?

[1 mark]

- A Candela
- B Inch
- C Kelvin
- D Metre

Answer _____

22 A casing is being made for the hydraulic mechanism of a swing bridge.
The cylindrical casing has a length of 200 cm and has a radius of 5 cm.
Calculate the internal volume of the casing using the formula below.

Volume = π x radius² x height of cylinder

Show all of your workings out.

[3 marks]

23 A delivery truck weighs 2400 kg partly loaded.

A truck gains speed at a rate of 5.2 m/s^2 .

Calculate the force required for the truck to move at the rate of 5.2 m/s^2 using the formula below.

force (F) = mass (m) x acceleration (a)

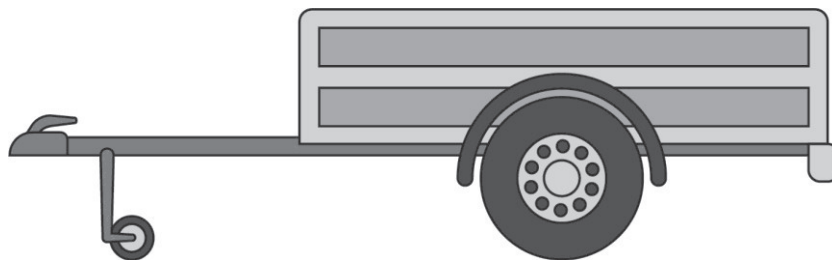
State the units of force with your answer.

[2 marks]

Please turn over for the next question.

- 24 **Figure 7** shows a lightweight trailer.

Figure 7



An engineering company is manufacturing a trailer using aluminium sheet and a tubular steel subframe.

Identify **one** method that could be used to securely attach the aluminium sheet to the steel subframe of the trailer.

[1 mark]

- 25 Suggest **one** reason why the mild steel subframe of the trailer in **Figure 7** needs a surface finish.

[1 mark]

- 26 State what the abbreviation PPE means.

[1 mark]

Section C

This section has a possible **16** marks.

Answer **all** questions in the spaces provided.

- 27** **Figure 8** shows a notation that would be found on some engineering drawings.

Figure 8

± 0.2

State what the numbers shown above indicate on an engineering drawing.

[1 mark]

- 28** An engineer uses a scale of 1:5 to draw a product.

The largest dimension of the product is 3 metres.

State what size the dimension would be on the drawing.

[1 mark]

- 29** A design company has been asked to produce some orthographic drawings of a new electric bicycle prototype.

The prototype will include a pre-existing electric motor and battery pack.

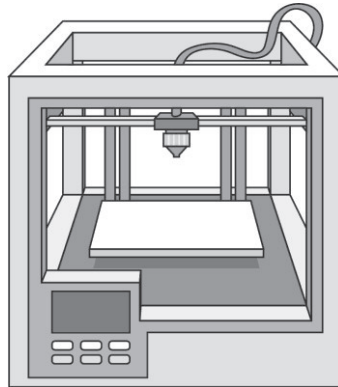
Explain **and** analyse why accurate measurements should be included on the drawings.

[4 marks]

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- 30 **Figure 9** shows a 3D printer.

Figure 9



A 3D printer uses reels of plastics that form a shape from the base upwards. Give the term that can be used to describe this kind of manufacture.

[1 mark]

- 31 3D printers are often used in both commercial and domestic settings.

Users can create a wide range of products using these machines.

Describe **three** ways in which cheap 3D printers and CAD software have helped engineers and society.

[3 marks]

1

2

3

32 Give **two** reasons why rendering a product sketch is useful.

[2 marks]

1 _____

2 _____

33 Drawings and freehand sketches are an essential part of the design process to develop ideas.

Analyse why it is important to include additional information with drawings.

Give **two** examples in your analysis **and** justify **each** example you give.

[4 marks]

Example 1 _____

Justification 1 _____

Example 2 _____

Justification 2 _____

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Section D

This section has a possible **18** marks.

Answer **all** questions in the spaces provided.

- 34** The transport of resources, materials and goods is an important part of the economy and supports trade and industry.

Analyse the use of different vehicles for this purpose **and** give examples of the effects of **each** mode of transport used.

[9 marks]

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[9 marks]

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This is the end of the examined assessment.

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To be completed by the examiner			
Question	Mark	Question	Mark
1		19	
2		20	
3		21	
4		22	
5		23	
6		24	
7		25	
8		26	
9		27	
10		28	
11		29	
12		30	
13		31	
14		32	
15		33	
16		34	
17		35	
18		TOTAL MARK	