

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
A2 GCE
F524/01

DESIGN AND TECHNOLOGY
Product Design: Component 1

FRIDAY 8 JUNE 2018: Morning
DURATION: 1 hour
plus your additional time allowance

MODIFIED ENLARGED

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

A calculator may be used

A CALCULATOR MAY BE USED FOR THIS PAPER
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READ INSTRUCTIONS OVERLEAF



INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the boxes on the front page. Please write clearly and in capital letters.

Use black ink. HB pencil may be used for graphs and diagrams only.

This paper is to be taken with F524/02 in the same examination session of 2 HOURS 30 MINUTES. The times given on the front of each paper are advisory.

Components 1 and 2 should be available to candidates for the full session.

Answer ONE question only from component 1 and ONE question only from component 2.

Component 1 and Component 2 choices can be from different material areas although it is envisaged that most candidates will select the same material area.

Read each question carefully. Make sure you know what you have to do before starting your answer.

The discuss question will be used to assess your Quality of Written Communication.

Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 36.

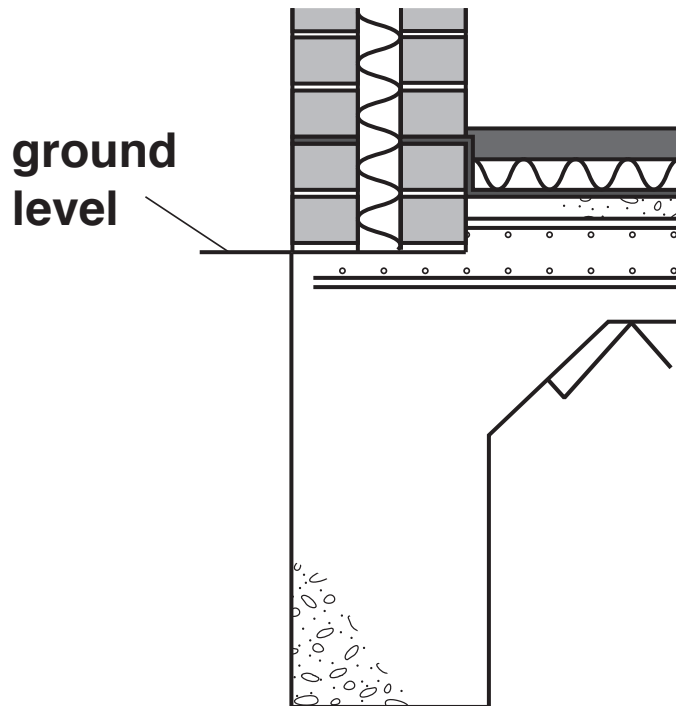
All dimensions are in mm.

Where appropriate calculations should be shown.

1 Built Environment and Construction

Fig. 1 shows a raft foundation.

FIG. 1



(a) Give FOUR justified design requirements for a raft foundation of the type shown in Fig. 1.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

[4]

- (e) (i) State a **SUITABLE SPECIFIC MATERIAL** for the raft foundation shown in Fig. 1.

Give TWO properties or characteristics that make the material suitable for this use.

[3]

- (ii) Describe in detail the site preparation procedure used to aid the design and construction of a building.**

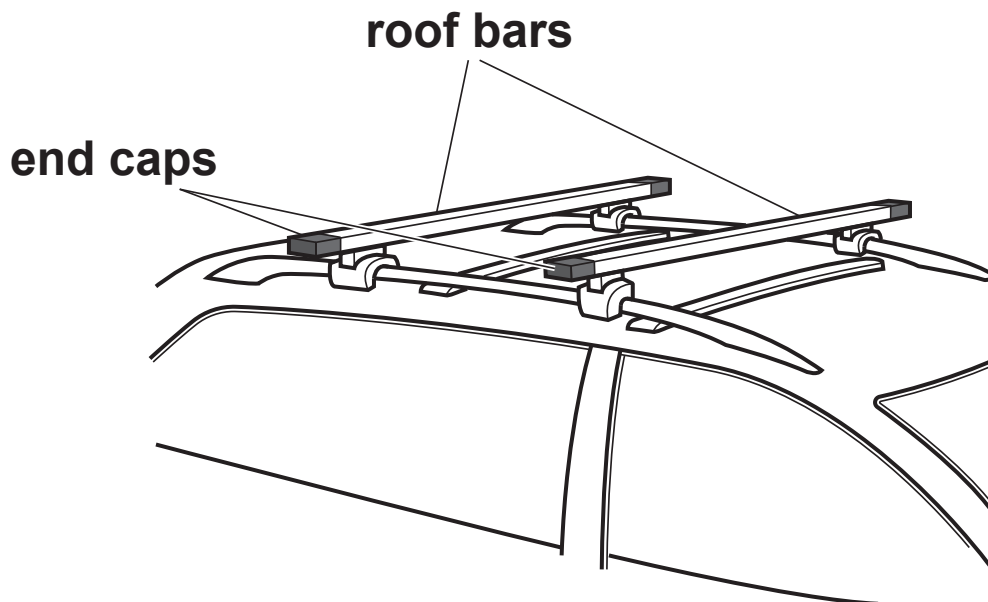
Use a flow chart and/or annotated diagrams to support your answer. [9]

(f) Discuss the issues involved in the protection of the intellectual property of designers. [8]

2 Engineering

Fig. 2 shows a pair of roof bars attached to a car roof.

FIG. 2



(a) Give **FOUR** justified design requirements for a pair of roof bars of the type shown in Fig. 2.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

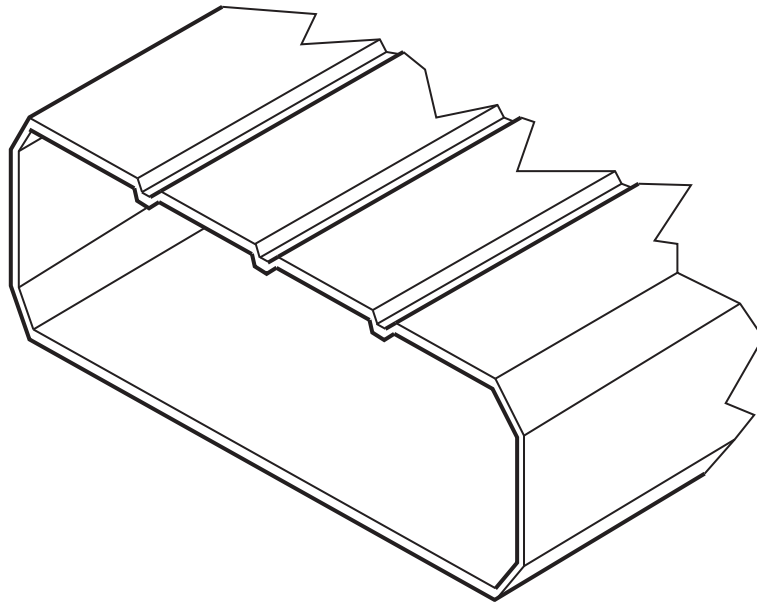
[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

[4]

- (e) Fig. 3 shows details of a roof bar with end caps removed.

FIG. 3



- (i) State a **SUITABLE SPECIFIC MATERIAL** for the roof bar shown in Fig. 3.

Give TWO properties or characteristics that make the material suitable for this use.

[3]

- (ii) Describe in detail how the roof bar would be manufactured as a batch of 5 000.**

Do NOT include end caps.

Include details of any jigs and/or formers used.

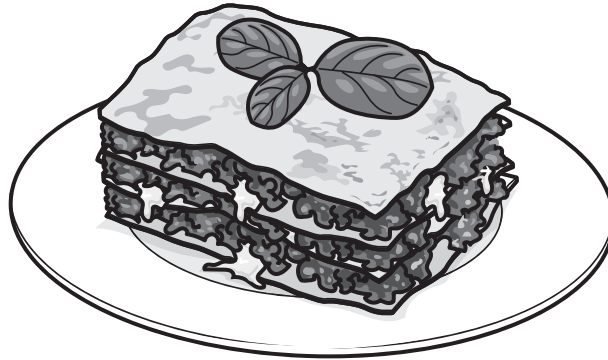
Use a flow chart and/or annotated diagrams to support your answer. [9]

(f) Discuss the issues involved in the protection of the intellectual property of designers. [8]

3 Food

Fig. 4 shows a cooked chilled beef lasagne.

FIG. 4



(a) Give **FOUR** justified design requirements for the lasagne shown in Fig. 4.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

[4]

(e) (i) Explain why a MODIFIED STARCH would be used in the production of the white sauce for the lasagne.

[3]

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- (ii) Describe in detail how the beef lasagne would be manufactured in a batch of 100.**

Include details of ingredients, scientific principles underlying the process, with particular focus on the white sauce and packaging used.

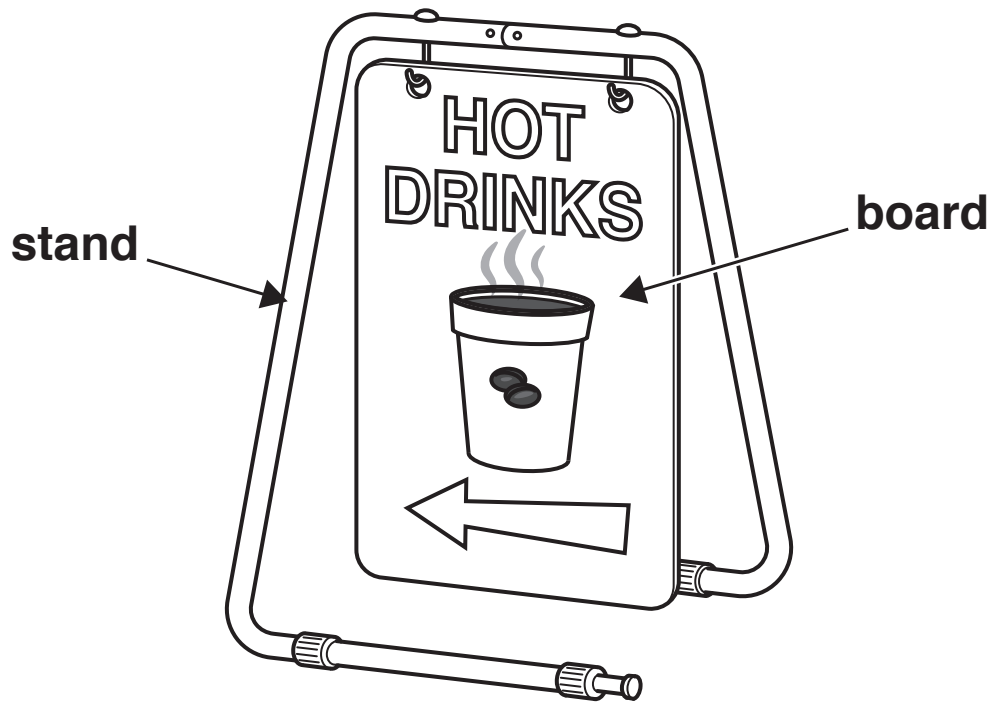
Use a flow chart and/or annotated diagrams to support your answer. [9]

[illegible]

4 Graphic products

Fig. 5 shows an outdoor display sign.

FIG. 5



(a) Give FOUR justified design requirements for an outdoor display sign of the type shown in Fig. 5.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

[4]

- (e) Fig. 6 shows details of the board of a outdoor display sign. The graphics and text are vinyl cut.

FIG. 6



- (i) State a **SUITABLE SPECIFIC MATERIAL** for the board of an outdoor display sign of the type shown in Fig. 6.

Give TWO properties or characteristics that make the material suitable for this use.

[3]

- (ii) Describe in detail how the board would be manufactured as a batch of 50.**

Include details of any jigs and/or formers used and how the text and graphics would be generated and applied.

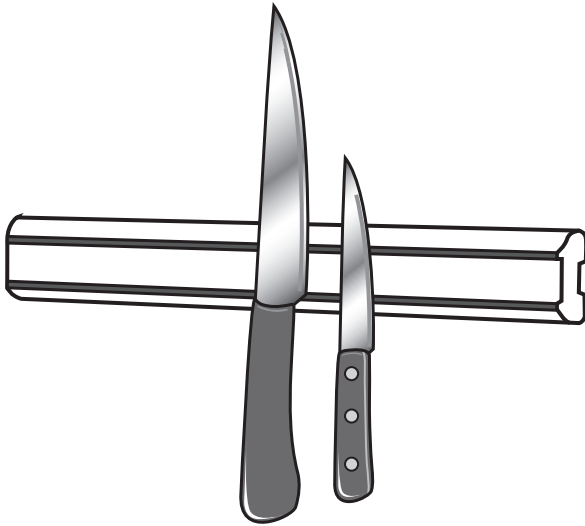
Use a flow chart and/or annotated diagrams to support your answer. [9]

[illegible]

5 Manufacturing

Fig. 7 shows a kitchen knife rack.

FIG. 7



(a) Give **FOUR** justified design requirements for a kitchen knife rack of the type shown in Fig. 7.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

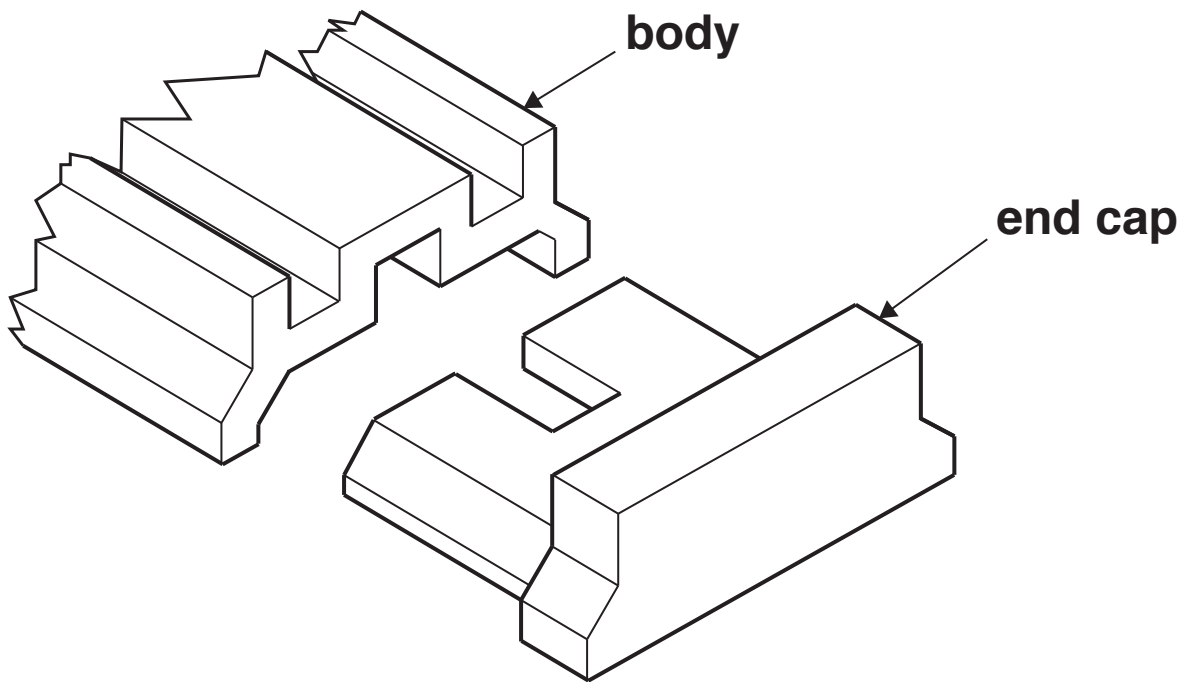
[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

[4]

- (e) Fig. 8 shows details of the body and end cap of the kitchen knife rack.

FIG. 8



Choose ONE of the parts shown in Fig. 8.

Chosen part _____

- (i) **State a SUITABLE SPECIFIC MATERIAL for the part that you have chosen.**

Give TWO properties or characteristics that make the material suitable for this use.

[3]

- (ii) Describe in detail how the part you have chosen would be manufactured as a batch of 5 000.**

Include details of any jigs and/or formers used.

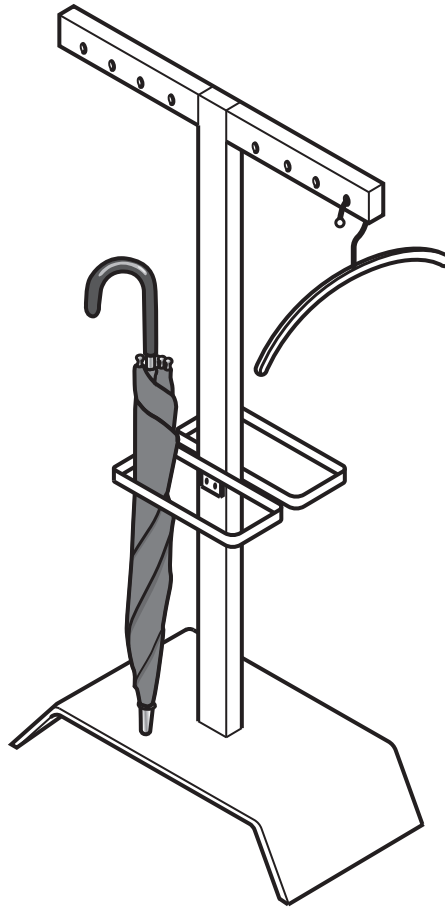
Use a flow chart and/or annotated diagrams to support your answer. [9]

[illegible]

6 Resistant Materials

Fig. 9 shows a coat and umbrella rack.

FIG. 9



(a) Give FOUR justified design requirements for a coat and umbrella rack of the type shown in Fig. 9.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

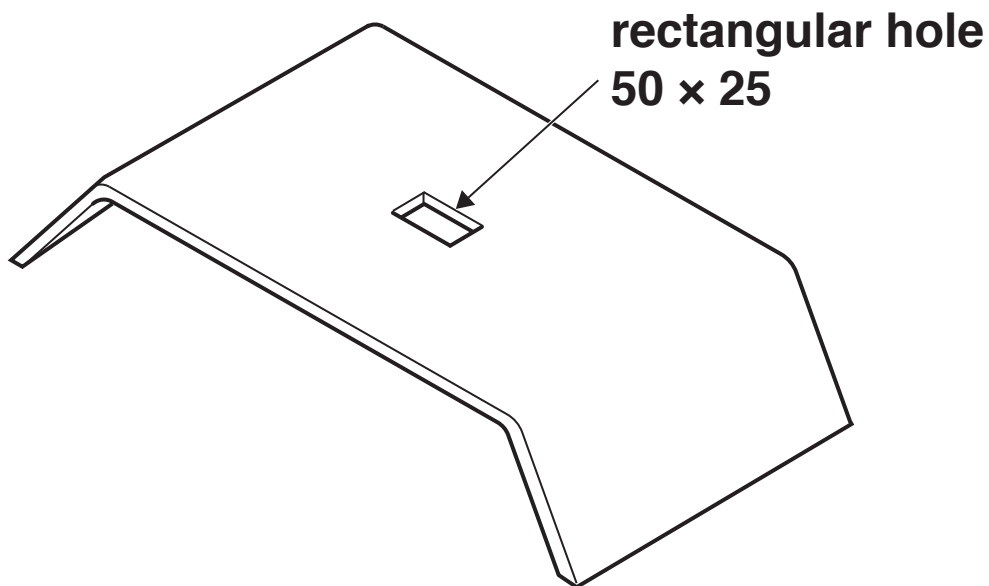
[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

_____ **[4]**

- (e) Fig. 10 shows details of the base part of the coat and umbrella rack.

FIG. 10



- (i) State a **SUITABLE SPECIFIC MATERIAL** for the base part of the type shown in Fig. 10.

Give **TWO** properties or characteristics that make the material suitable for this use.

[3]

- (ii) Describe in detail how the base part would be manufactured as a batch of 100.**

Include details of any jigs and/or formers used.

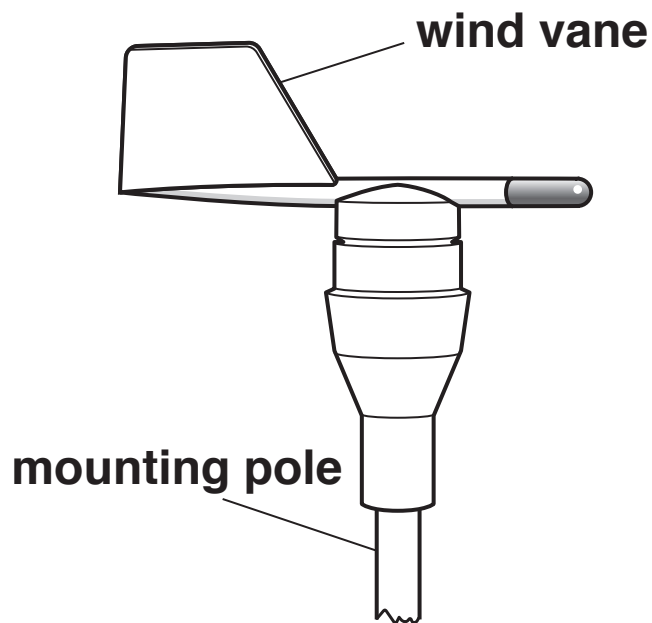
Use a flow chart and/or annotated diagrams to support your answer. [9]

[illegible]

7 Systems and Control

Fig. 11 shows a wind direction sensor for a school weather station.

FIG. 11



(a) Give **FOUR** justified design requirements for a wind direction sensor of the type shown in Fig. 11.

- 1 _____

- 2 _____

- 3 _____

- 4 _____

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

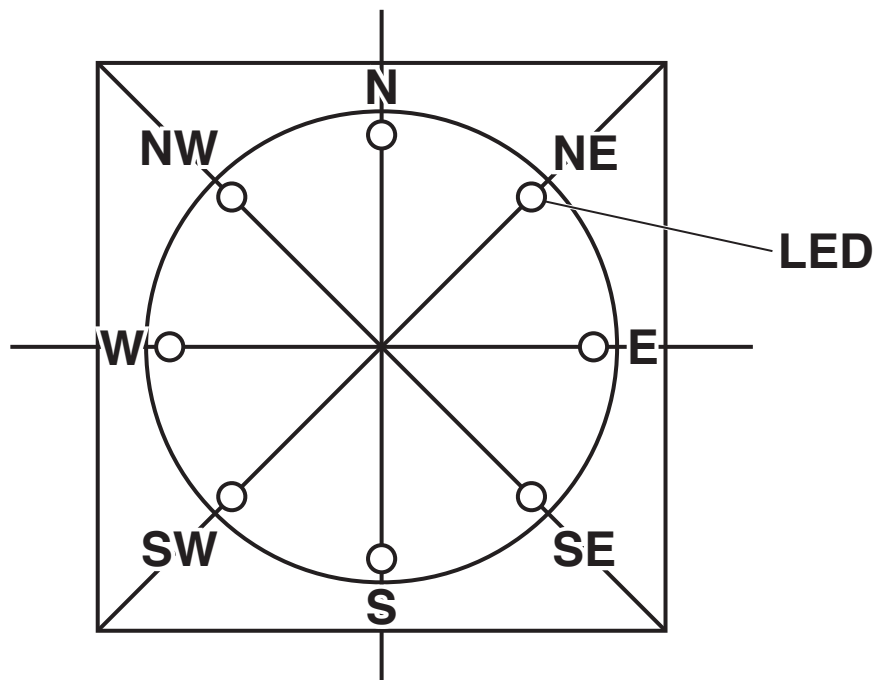
[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

[4]

- (e) Fig. 12 shows eight LEDs arranged to display the wind direction on a school weather station.

FIG. 12



- (i) State an alternative display component which would be suitable for displaying the wind direction.

Give TWO reasons why the component would be suitable.

[3]

- (ii) The wind direction sensor in Fig. 12 produces a 3-bit binary-coded output which represents the wind direction. The binary signal is sent to the display unit through a cable.

Use diagrams, sketches and notes to explain how the wind direction sensor can produce a 3-bit binary output to represent the wind direction. [9]

[illegible]

8 Textiles

Fig. 13 shows a child's 'onesie' made to look like a tiger.

FIG. 13



(a) Give FOUR justified design requirements for a child's 'onesie' as shown in Fig. 13.

1 _____

2 _____

3 _____

4 _____

[4]

(b) Describe TWO duties of the employer as required by the Health and Safety at Work Act 1974.

1 _____

2 _____

[4]

(c) Describe TWO disadvantages of the use of computerised stock control.

1 _____

2 _____

[4]

(d) Explain TWO features of a mobile phone that have been influenced by ergonomics.

[4]

(e) (i) Give THREE advantages of using a fully automated computer controlled system for cutting the fabric used to make the 'onesie'.

1 _____

2 _____

3 _____

[3]

- (ii) Describe in detail how the two colour tiger stripe design would be screen printed onto the fabric used to make the child's 'onesie'.**

Use a flow chart and/or annotated diagrams to support your answer. [9]

[illegible]

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

[illegible]

[illegible]

