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| Centre Number | Candidate Number | Name |
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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

DESIGN AND TECHNOLOGY

0445/01

Paper 1 Common Core

May/June 2006

1 hour 45 minutes

Additional Materials: A3 Drawing paper
Standard drawing equipment

To be taken together with the optional paper for which you have been entered in one session of 2 hours 45 minutes.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paperclips, highlighters, glue or correction fluid.
You may use a calculator.

Part A

Answer **all** questions.
Write your answers in the spaces provided on the Question Paper.

Part B

Answer **one** question.
Write or draw your answers on the A3 drawing paper provided.







At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [] at the end of each question or part question.

| For Examiner's Use | |
|--------------------|--|
| Part A | |
| Part B | |
| Total | |

Part A

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

1

| | | |
|----------|---|--------|
| Friday |    | 30 000 |
| Saturday |   | 20 000 |
| Sunday |  | 10 000 |

The above table shows the number of cars that crossed a bridge during different days of the week.

Complete the part of the table below to show that 25 000 cars crossed the bridge on Thursday. Each symbol on the chart represents 10 000 cars.



[4]

- 2 Fig. 1 shows a child playing on a garden swing.

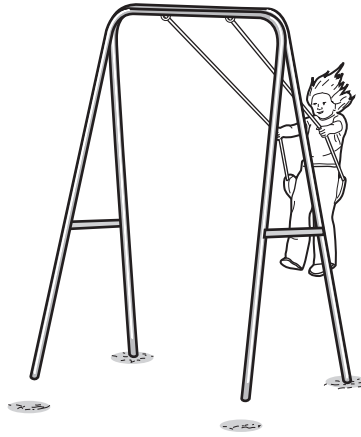


Fig. 1

Use notes and sketches to show how the swing could be modified to stop the frame lifting off the ground when in use.

- 3 Complete the table below which shows tools, materials on which they are used and processes involved.

| Tool | Material | Process |
|------------|----------|-------------------------------|
| Hacksaw | | Cutting to length |
| | Wood | Cutting across the grain |
| Try square | Wood | |
| | Acrylic | Cutting curves |
| | Metal | Marking line parallel to edge |

[5]

- 4 The preparation of material to the correct size involves several important stages.

Arrange the following stages in the correct order.

Mark width

Choose material

Select datum edge (face edge)

Plane or file to width

Plane or file datum edge (face edge)

1

2

3

4

5 [4]

- 5 Materials can be joined in many ways, some of which are permanent and others temporary.

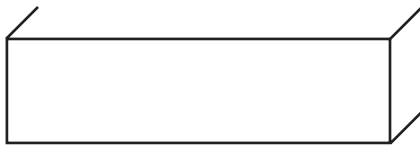
Complete the following table which includes materials, joining methods and whether they are permanent or temporary.

| Material | Joining method | Permanent/Temporary |
|----------|------------------|---------------------|
| Acrylic | Solvent adhesive | |
| Wood | | Temporary |
| | Riveting | |
| Card | | Permanent |

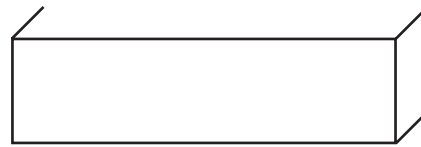
[5]

- 6 Wood is available in many different forms, some of which are natural and others manufactured.

Complete Fig. 2 to show the **edge** of a piece of plywood and the **end grain** of a length of solid wood.



Plywood



Solid wood

Fig. 2

[4]

- 7 Fig. 3 shows an eccentric cam and the linear plot of the follower for one complete revolution.

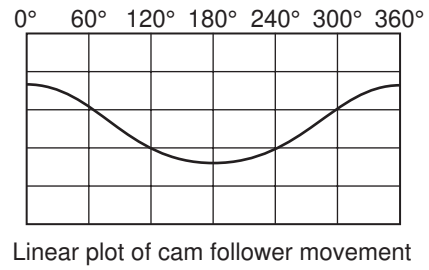
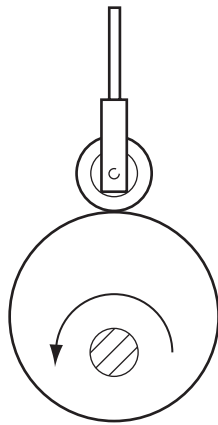


Fig. 3

Complete Fig.4 to show the linear plot of the snail cam follower for one complete revolution.

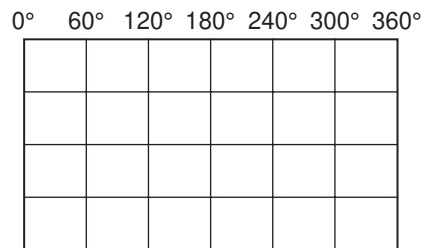
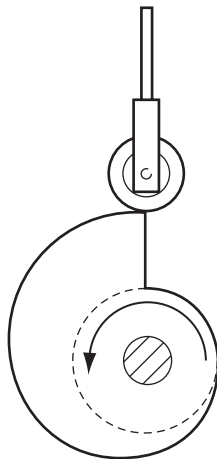


Fig. 4

[4]

- 8 Fig. 5 shows a simple beam supported at **A** and **B** with a load of 120 N at the point indicated.

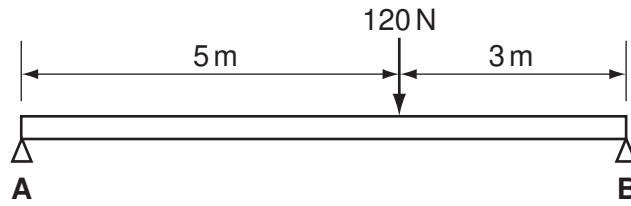


Fig. 5

Calculate the reactions at **A** and **B**.

.....

.....

.....

.....

..... [3]

- 9 Fig. 6 shows an electric motor and the driving axle and one wheel on a model car.

Draw on Fig. 6 to show how the drive shaft on the electric motor could be connected to the axle so that the car moves in the direction shown.

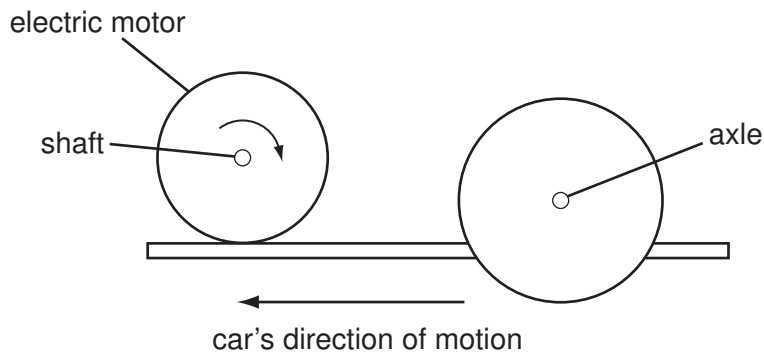


Fig. 6

[3]

10 Explain **two** reasons why people might choose one product in preference to another.

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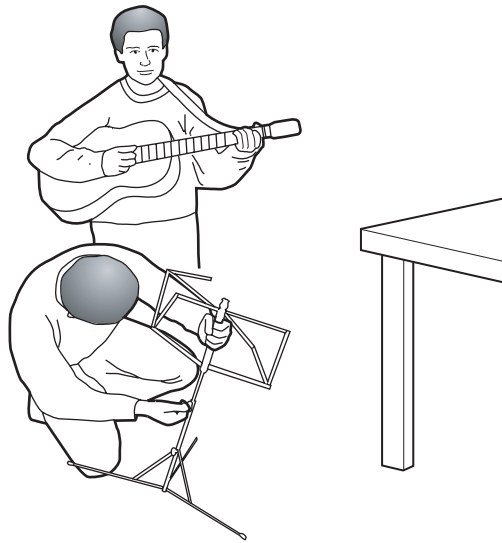
.....

..... [4]

Part B

Answer **one** question using the A3 paper provided.

11

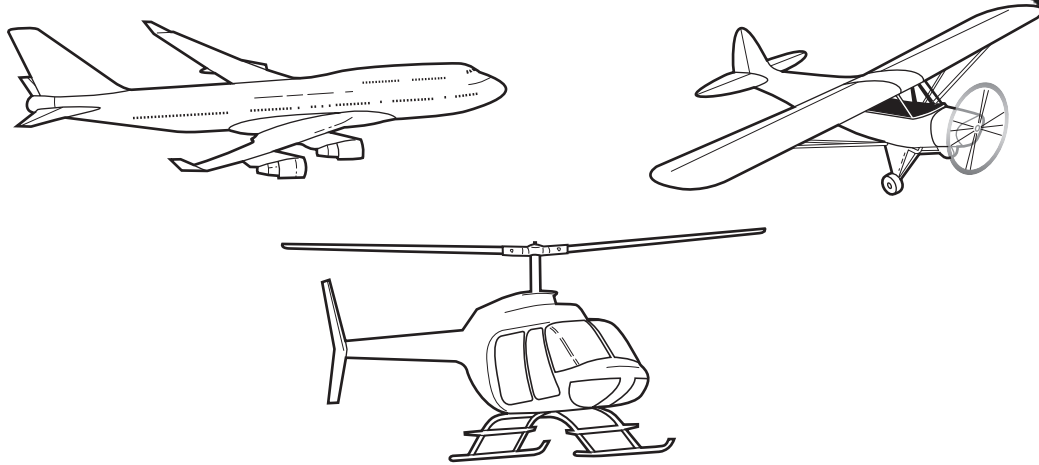


Many folding music stands are very difficult to erect and not very stable in use.

A music stand is required that could be placed on a table when in use. It must be possible to fold the stand and carry it from place to place in a school bag.

- (a) List **four** points about the function of such a music stand that you consider to be important. [4]
- (b) Describe, with notes and sketches, **two** types of flexible joint that could be used to join materials together. [4]
- (c) Develop and sketch ideas for the music stand. [15]
- (d) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (e) Draw, using a method of your own choice, a full solution to your problem. [18]
- (f) Suggest suitable materials for your solution and give reasons for your choice. [4]
- (g) Outline a method used to manufacture **one** part of your solution in the school workshop. [7]

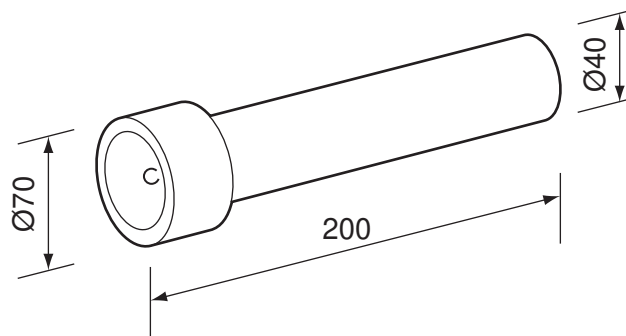
12



Your local airline 'LO-FLY' has asked you to design a new colour scheme for its aircraft. The paint scheme will be shown first on model aircraft, made from fold-flat lightweight materials, to be given to children to mark the event.

- (a) List **four** aspects of the new colour scheme that you consider to be important. [4]
- (b) List **four** ways by which lightweight materials could be joined together to allow for easy assembly of the model aircraft. [4]
- (c) Develop and sketch ideas for the model aircraft including details of the colour scheme. [15]
- (d) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (e) Draw, using a method of your own choice, a full solution to your problem. [18]
- (f) Give **two** methods that could be used to apply colour to the model. Name the material on which the colour will be applied in each case. [4]
- (g) Use sketches and notes to describe a promotional gift that could be given away to adults to help market the new colour scheme. [7]

13



It is often difficult to carry out tasks in the dark while trying to hold or support a torch at the same time.

A device that would hold a standard torch would be very useful.

- (a) List **four** points about the function of such a device that you consider to be important. [4]
- (b) Describe, with notes or sketches, **two** ways of tightening adjustable devices. [4]
- (c) Develop and sketch ideas for the device. [15]
- (d) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (e) Draw, using a method of your own choice, a full solution to your problem. [18]
- (f) Suggest suitable materials for your solution and give reasons for your choice. [4]
- (g) Outline a method used to manufacture **one** part of your solution in the school workshop. [7]

14



Home owners encourage birds to their gardens by putting out food and water for them to feed on.

A feeding area that could not be reached by cats and other small animals would help to protect the birds and their food.

- (a) List **four** points about the function of such a feeding area that you consider to be important. [4]
- (b) Describe **two** methods that could prevent access to the feeding area for cats and small animals. [4]
- (c) Develop and sketch ideas for the feeding area. [15]
- (d) Evaluate your ideas and justify why you have chosen one idea to develop more fully. [8]
- (e) Draw, using a method of your own choice, a full solution to your problem. [18]
- (f) Suggest suitable materials for your solution and give reasons for your choice. [4]
- (g) Outline a method used to manufacture **one** part of your solution in the school workshop. [7]