

Candidate Name	Centre Number	Candidate Number



OXFORD CAMBRIDGE AND RSA EXAMINATIONS
General Certificate of Secondary Education

DESIGN & TECHNOLOGY:
INDUSTRIAL TECHNOLOGY

1959/2

PAPER 2 Higher Tier

Thursday

26 MAY 2005

Morning

1 hour 15 minutes

Candidates answer on the question paper.
 No additional materials are required.

TIME 1 hour 15 minutes

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

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

All dimensions are in millimetres.

Assume any mechanical system to be 100% efficient.

FOR EXAMINER'S USE	
1	
2	
3	
4	
5	
TOTAL	

This question paper consists of 19 printed pages and 1 blank page.

- 1 Fig. 1 shows a student carrying a bag and a tennis racket while cycling.

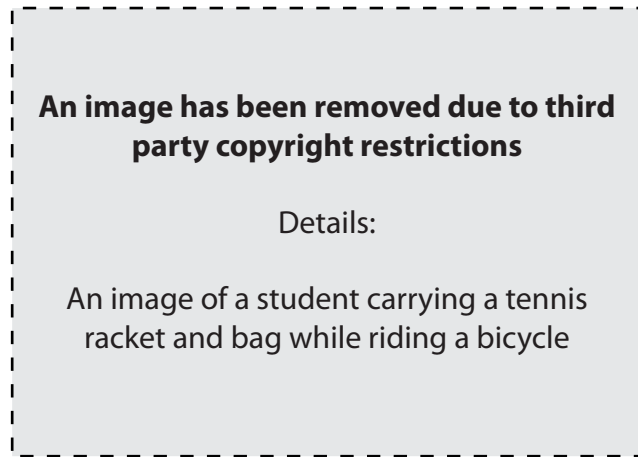


Fig. 1

- (a) Give two safety issues .

1 _____

2 _____ [2]

Fig. 2 shows a clip to hold the tennis racket to the bicycle frame.

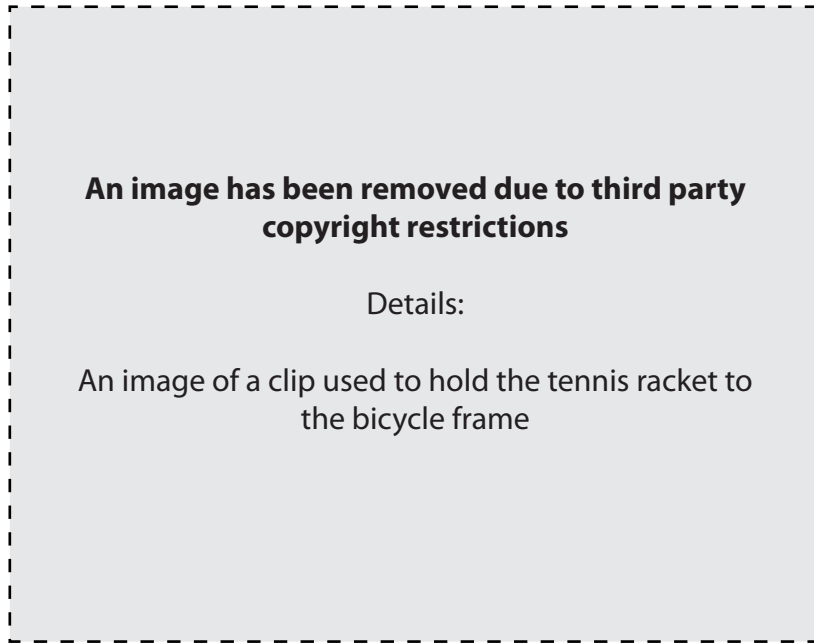


Fig. 2

(b) Complete the design specification for the tennis racket clip.

1 Fits most bicycle frames.

2 _____

3 _____

4 _____

5 _____ [4]

Fig. 3 shows a hook to carry a bag. The hook is made of plastic and designed to fit the frame of most bikes.

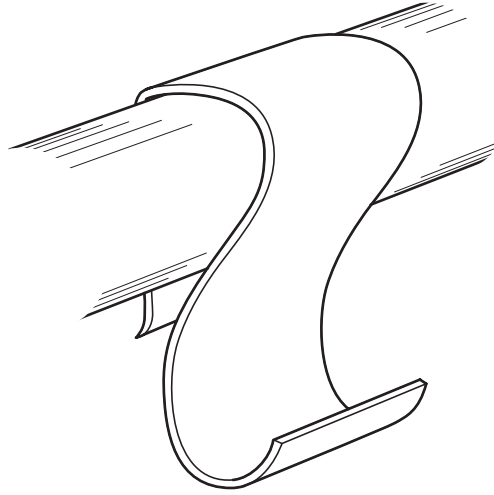


Fig. 3

The design of the clip has been tested using computer simulation.

(c) State **two** reasons for using computer simulation for testing designs.

1 _____

2 _____ [2]

In order for the hook to fit most bikes the designer has had to find out certain information.

(d) State **two** pieces of information the designer would need, to design the clip.

1 _____

2 _____ [2]

- 2 A manufacturer produces a batch of 'T' Squares. The 'T' square has two parts joined using a fitting that requires a $\text{Ø}6$ hole. Fig. 4 shows a simple jig used when drilling holes for the fittings.

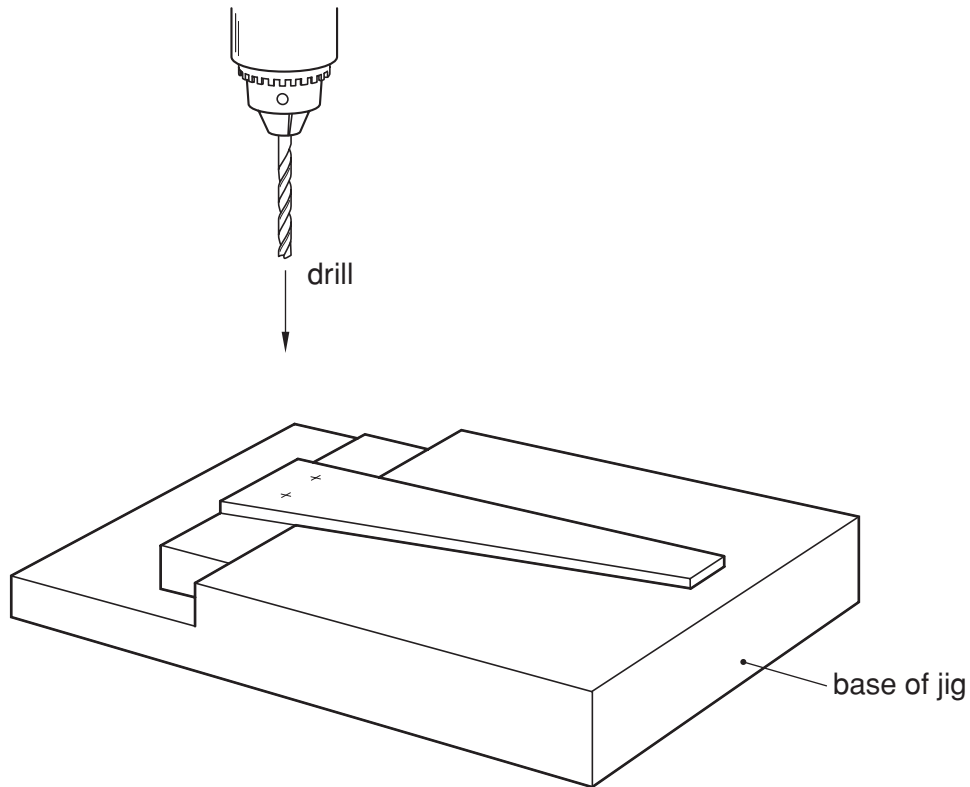


Fig. 4

- (a) Use sketches and notes to show how the jig could be improved.

The jig must:

- hold the 'T' square securely;
- have a quick release mechanism;
- be adjustable to allow for different sizes of 'T' square;
- allow accurate location on the table of the drilling machine;
- help drill holes to a certain depth.

SPACE FOR ANSWERS TO QUESTION 2(a)

[5]

The jig is used to produce a batch of 500 'T' squares.

(b) (i) Name **one** suitable metal for the base of the jig.

[1]

(ii) Give **one** reason for your choice.

[1]

Fig. 5 shows a new design for a 'T' square. It is made from **clear** acrylic.

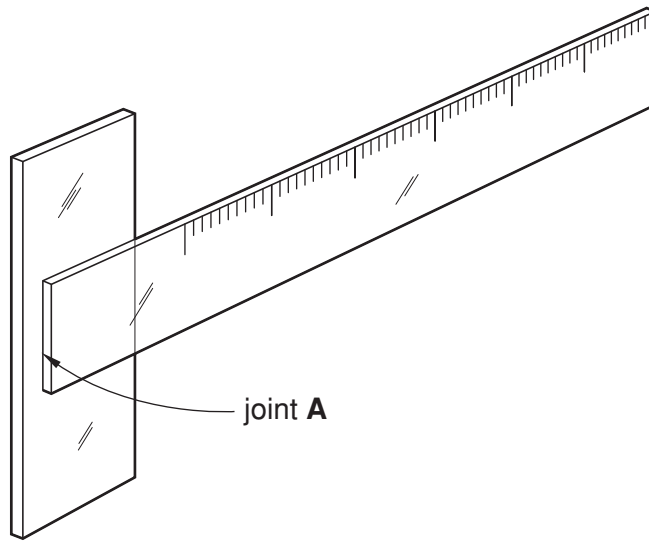


Fig. 5

(c) Give **two** features of the new design.

1 _____

2 _____ [2]

(d) Name a suitable permanent fixing for joint **A**.

_____ [1]

- 3 Fig. 6 shows an advertising stand.

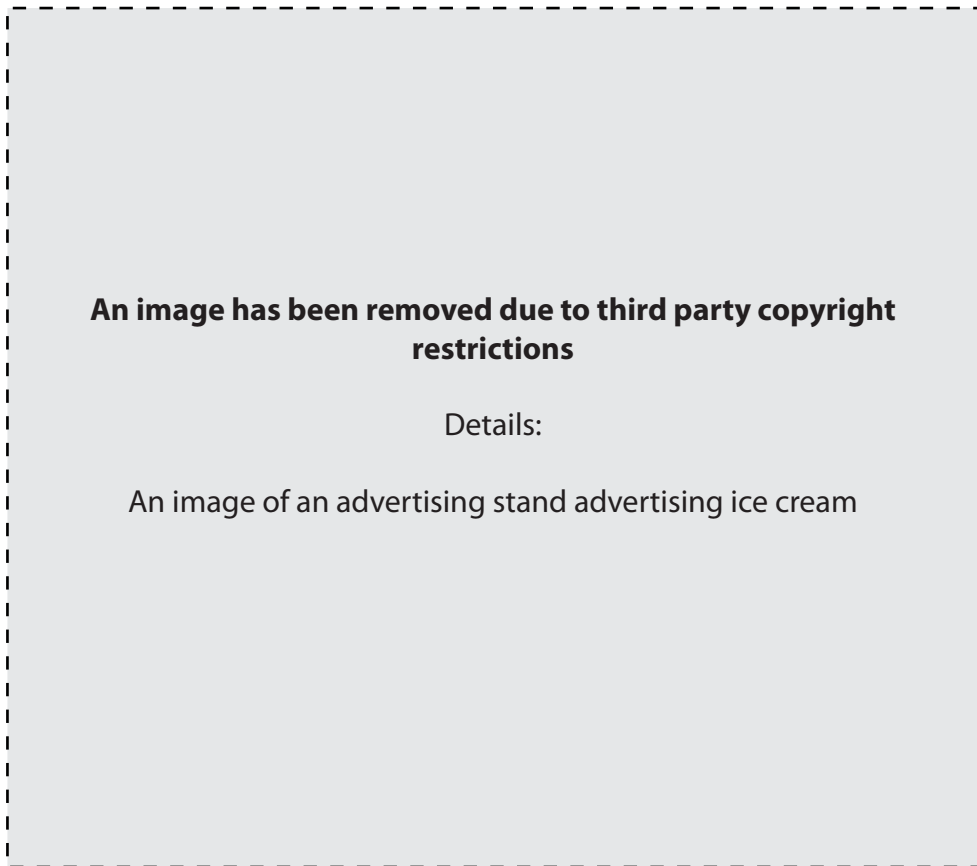


Fig. 6

The stand is made from mild steel tube. The stand is designed for self assembly and folds flat for storage. The joints at A enable the legs to be locked in the open position and folded flat for storage.

(a) Use sketches and notes to show how the steel tubes are joined at **A** so that:

- they remain connected at all times;
- the legs can be locked in the open position;
- the stand can be folded flat;
- it is easy to operate.

[4]

Fig. 7 shows the advertising plate.

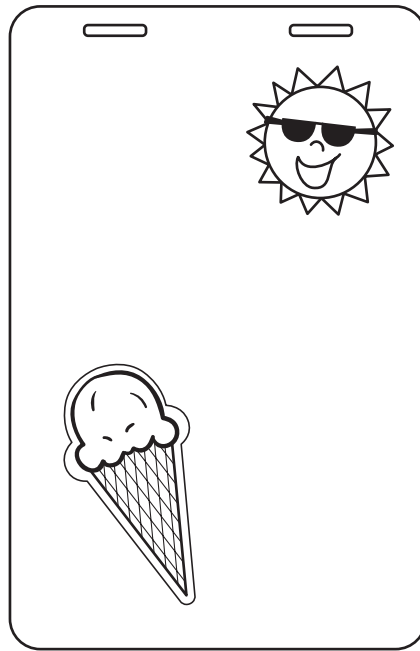


Fig. 7

(b) Using the information from Fig. 6 complete Fig. 7 by adding the following dimensions:

- the overall height of the advertising plate;
- the diameter of face.

[2]

(c) Fig. 8 shows the advertising plate, a cut out space and the cone. When the wind blows the cone will spin inside the space.

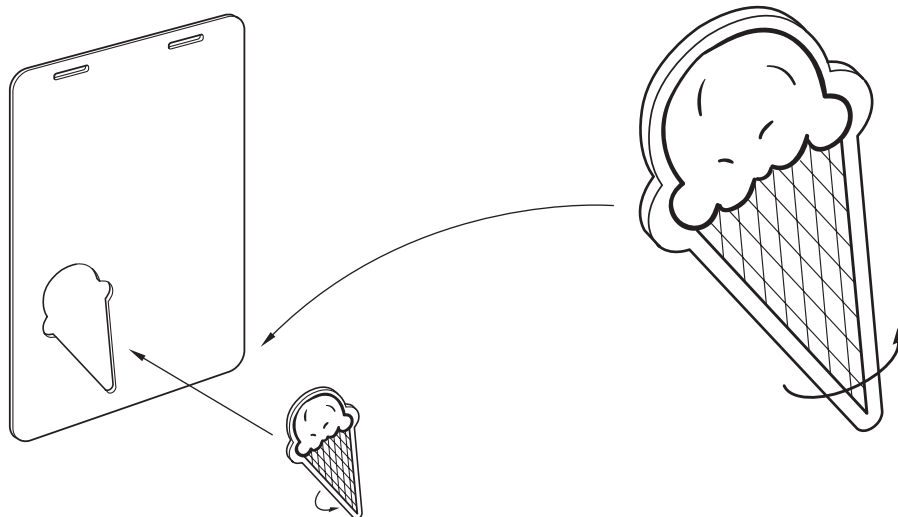


Fig. 8

Use sketches and notes to show details of how the cone could spin inside the cut out space.

[4]

- 4 Fig. 9 shows an example of a clothes rail used in a high street store.

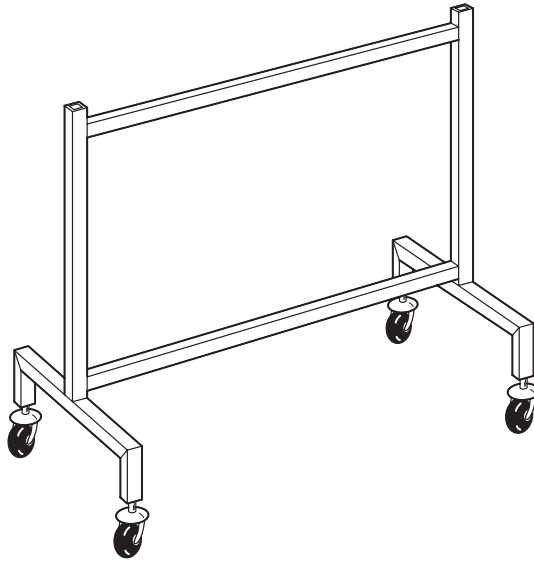


Fig. 9

The clothes rail arrives from the manufacturers as flat pack frames and rails.

- (a) Using sketches and notes show how the upper rail could be joined to one of the end frames.
The joint must allow quick assembly and disassembly.

A sawing jig is required to help manufacture the clothes rail.

(b) Use sketches and notes to show details of a sawing jig that can:

- enable cuts at angles of 45 and 90 degrees;
- be used with a hand held hacksaw;
- be adjustable to cut tubes at different lengths;
- hold the square steel tube safely;
- be secured to a work bench.

[6]

- 5 Figs 10a and 10b show the costs of manufacturing products by Batch Production and Mass Production.

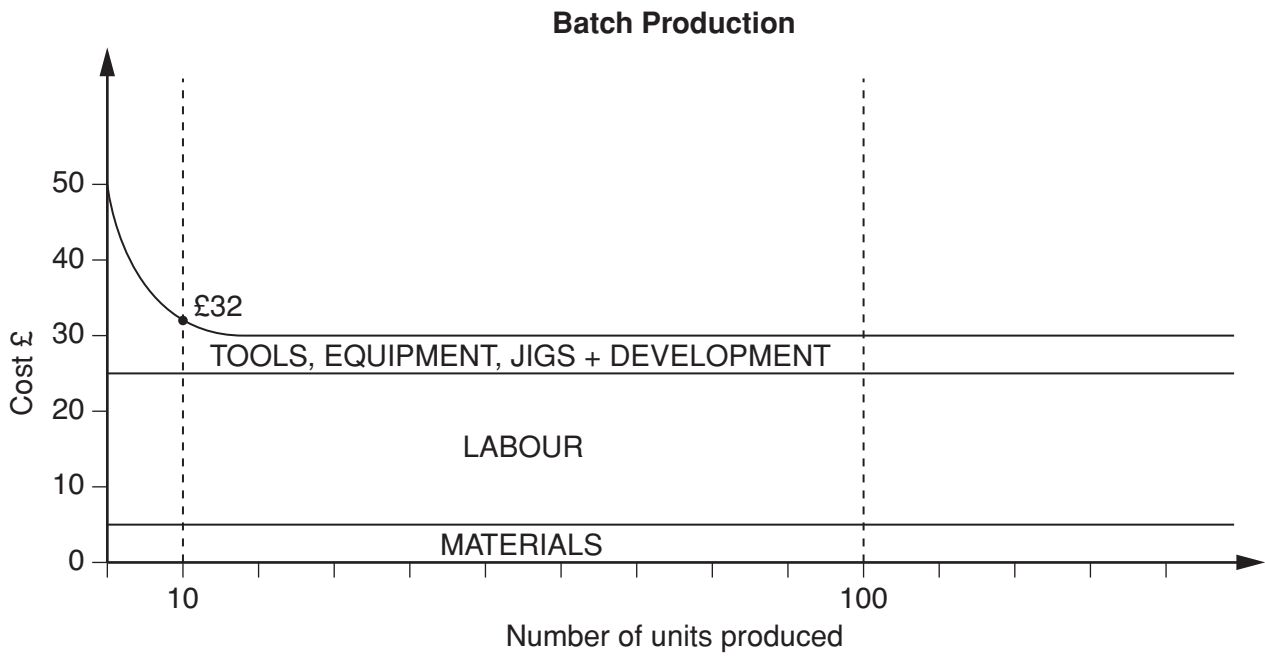


Fig. 10a

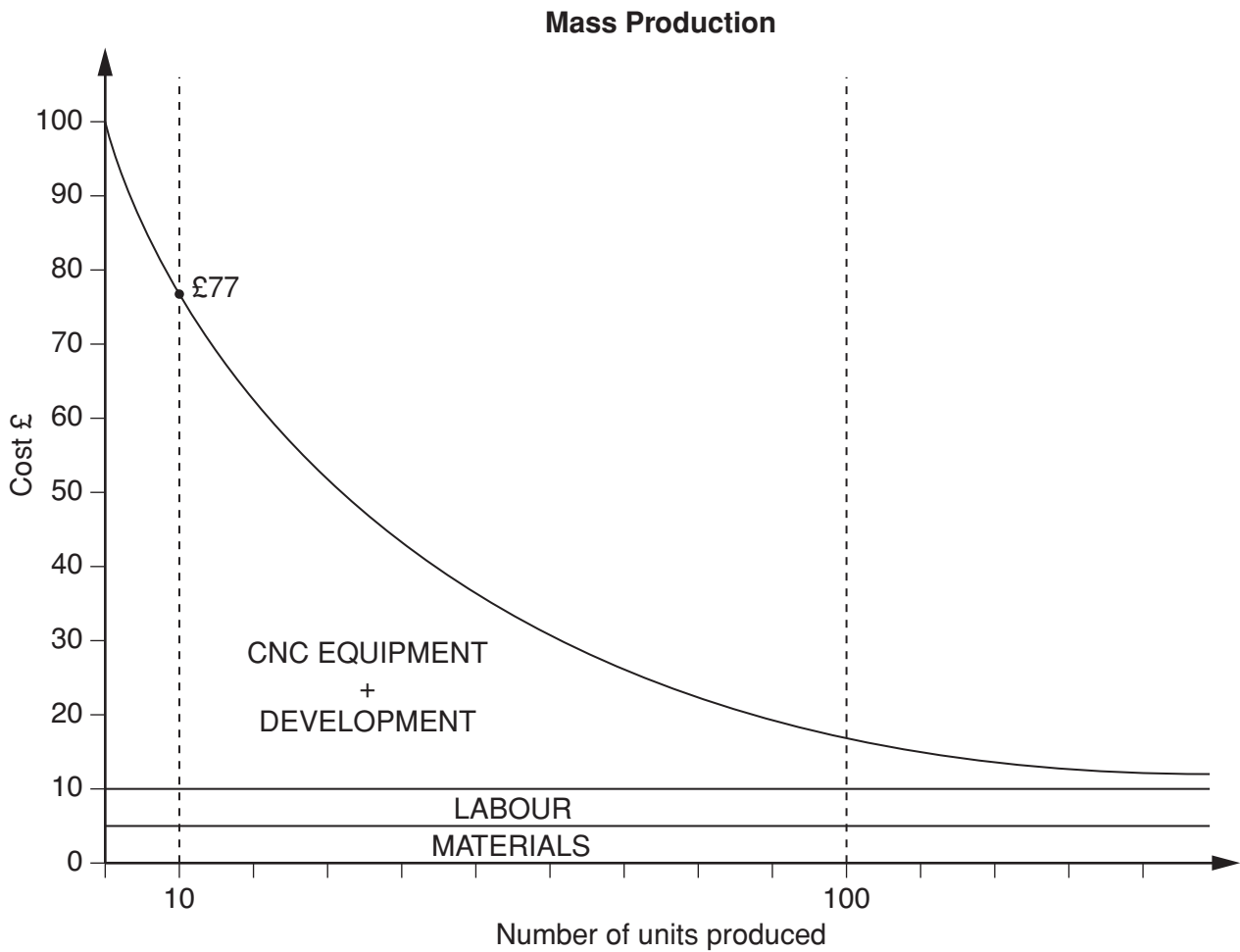


Fig. 10b

(a) State **two** fixed costs shown on the graphs in Figs 10a and 10b.

Fixed cost 1 _____

Fixed cost 2 _____ [2]

(b) Fig. 10a shows that it costs £32 to produce the first 10 units by batch production. Fig. 10b shows that it costs £77 for the first 10 units using mass production. Explain why it is more expensive to mass produce the first ten units.

_____ [2]

(c) Explain why the cost of producing 100 units by batch production has only fallen £20 per unit, whilst the cost of producing 100 units by mass production has fallen by £80 per unit.

_____ [3]

(d) Many manufacturers who mass produce also use a 'Just in Time' system.

(i) Give **two** advantages to a manufacturer of using a 'Just in Time' system.

Advantage 1 _____

Advantage 2 _____

[2]

(ii) Give **one** disadvantage to a manufacturer of using a 'Just in Time' system.

[1]

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