

1.

(a) State the term given to the practice of applying an upper and lower limit from a nominal dimension when designing a component for manufacture.

..... 1

(b) State **two** reasons why this practice is important in manufacturing.

(i) 1

..... 1

(ii) 1

..... 1

(3)

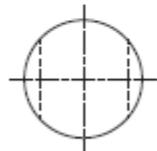
3.

(d) Sketch on the drawing below, using British Standard conventions.

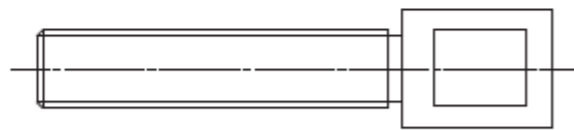
(i) The metric thread diameter 12 mm on the elevation.

(ii) The flat surface at the right hand end of the component.

(iii) The external thread detail on the end elevation.



END ELEVATION



ELEVATION

Name:

2.

(i) Describe what is meant by **dimensional tolerancing**.

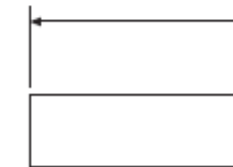
..... 1
..... 1

(ii) State **two** reasons why tolerances are an important feature in manufacturing.

Reason 1 1
..... 1

Reason 2 1
..... 1

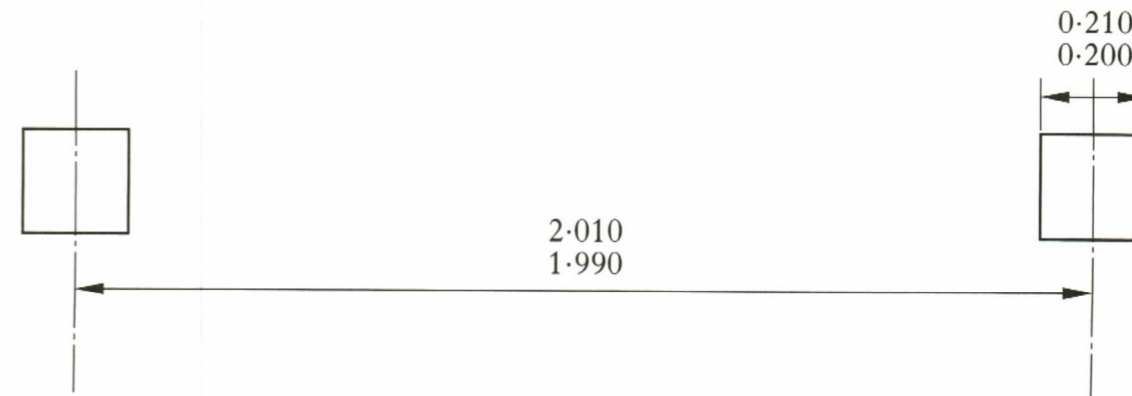
(iii) Show a horizontal linear dimension of 30 mm with a tolerance of +0.15 and -0.25 applied directly to the given graphic, using a recommended method.



1
(4)

4.

Two identical posts, each nominally \square 200mm, are set apart at 2.0m nominal centres. There are tolerances on both the **sizes** and **locations** of the posts and these are shown on the drawing. State the maximum and minimum possible clear widths between the posts. (Show any relevant calculations.)

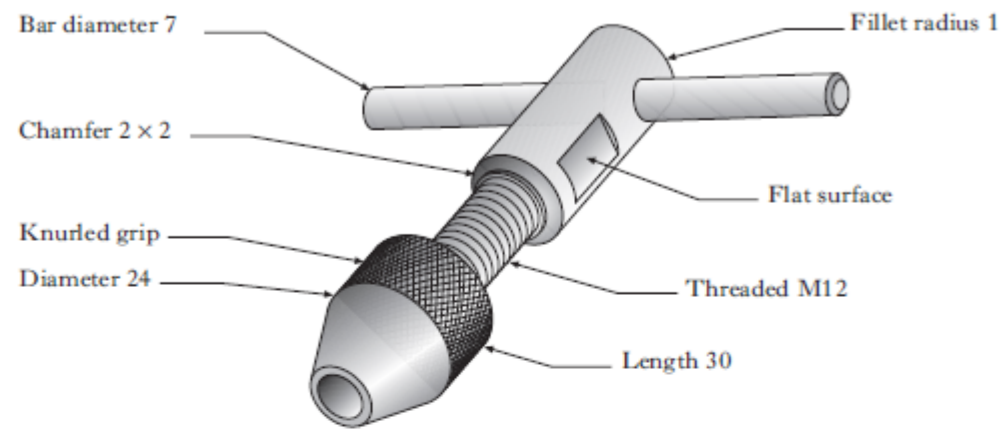


maximum width 2

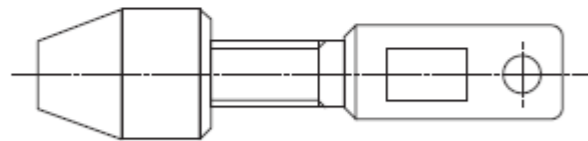
minimum width 2

(4)

5. A pictorial view of a tap wrench is shown. Six sizes are given. Marks



(a) Sketch to British Standards conventions, the six given sizes on the orthographic view below.



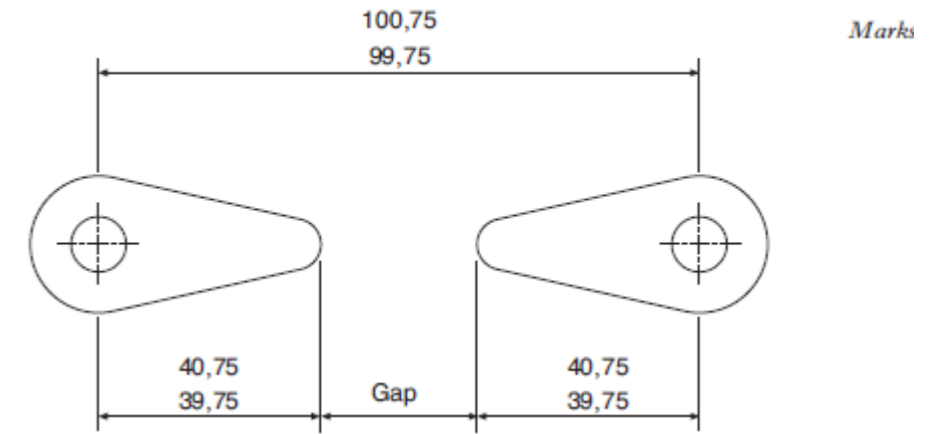
(b) Sketch, on the orthographic view above, the British Standards convention to indicate:

- (i) the flat surface on the barrel;
- (ii) the knurled pattern on the chuck.

6

2
(8)

6.



The paddles from a pinball game are shown. The paddles are set at a nominal 100 mm apart centre to centre.

The distance between the pivot centre and the end of the paddle is 40 mm with a tolerance of +0.75 and -0.25 applied.

Calculate the maximum and minimum gap between the paddles.

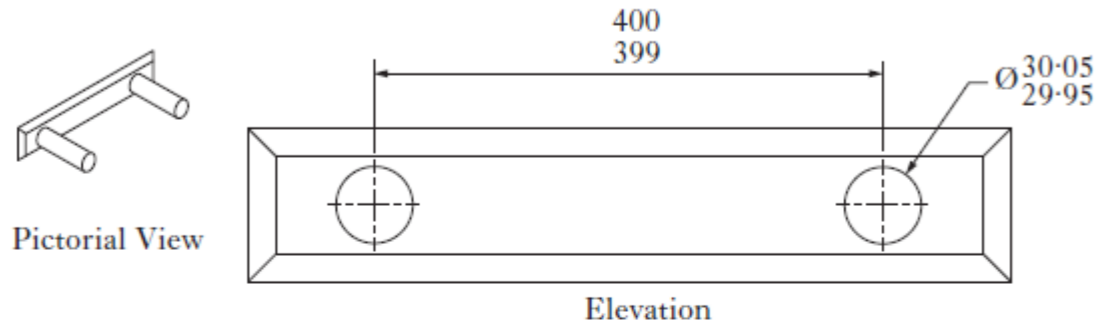
(Show all relevant calculations.)

7.

A pictorial view and elevation of a menu holder are shown below.

The location pins each $\text{Ø}30$ mm are set apart at 400 mm nominal centres.

There are tolerances on both the **sizes and location** of the pins and these are shown on the drawing below.



(a) Calculate the **maximum** and **minimum** gap between the pins.

Maximum

1

Minimum

1

(b) State **two** reasons why tolerances are an important feature in manufacturing.

Reason 1

1

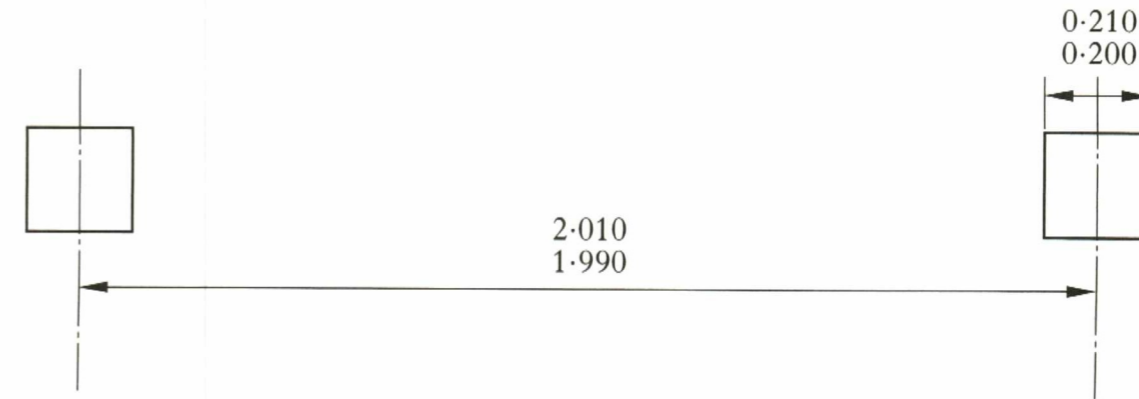
Reason 2

1

(4)

8.

Two identical posts, each nominally $\square 200$ mm, are set apart at 2.0 m nominal centres. There are tolerances on both the **sizes and locations** of the posts and these are shown on the drawing. State the maximum and minimum possible clear widths between the posts. (Show any relevant calculations.)



maximum width

2

minimum width

2

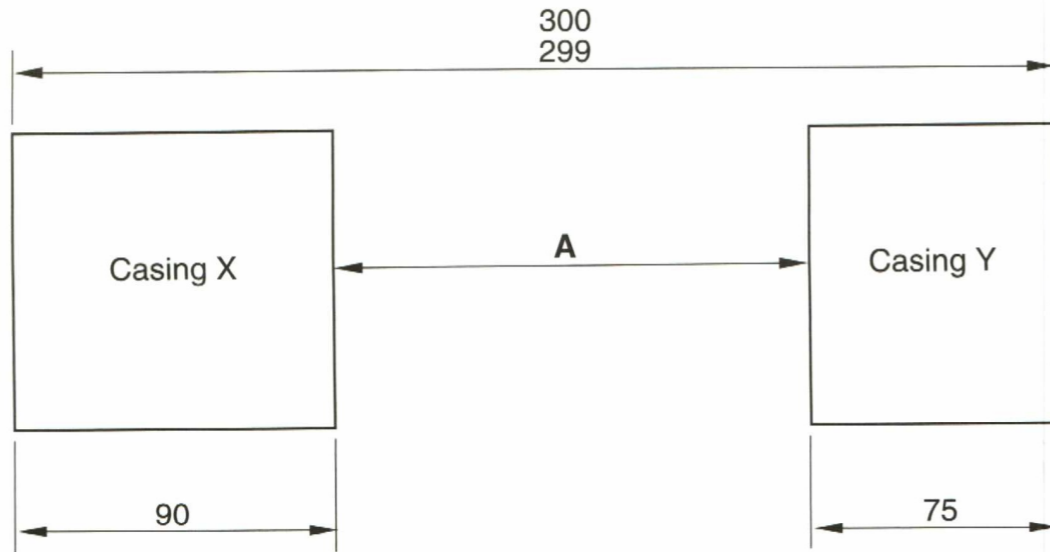
(4)

9.

Machine casings are to be positioned according to the drawing below. A tolerance of +1.5 mm, -1 mm has been applied to the widths of both casings. Their nominal sizes and the total width that they are apart are given (**not to scale**).

Marks

- (a) Calculate the **maximum** and the **minimum** distance for the dimension **A**. Show all relevant calculations.



Maximum distance 2
 Minimum distance 2

- (b) State a reason for applying manufacturing tolerances.

..... 1
 (5)

10.

SKETCH

2

- (c) Where shafts, bolts, nuts and screws are cut longitudinally, they normally remain unhatched.

State **two** other features within longitudinal sections which also are not normally hatched.

Feature 1 1

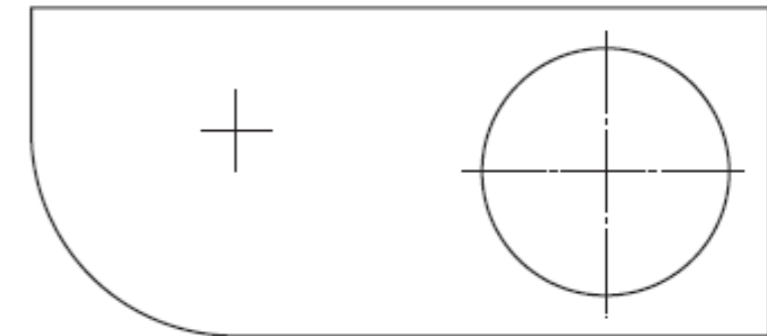
Feature 2 1

(5)

7. The component below is drawn to a scale of 1:10.

Dimension the drawing, using **British Standards**, to include:

- (i) the overall length; 1
 (ii) the overall height; 1
 (iii) the radius. 1



(3)