higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T580**(E)**(M22)T

NATIONAL CERTIFICATE

ENGINEERING DRAWING N2

(8090272)

22 March 2018 (X-Paper)
09:00–13:00

REQUIREMENTS: ONE A2 drawing sheet

Calculators and drawing instruments may be used.

This question paper consists of 9 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
ENGINEERING DRAWING N2
TIME: 4 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. ALL drawings must be drawn neatly using drawing instruments, unless otherwise specified.
5. ALL drawings must conform to the latest SANS Codes of Practice.
6. A 15 mm border must be drawn on both sides of the paper.
7. Unspecified radii must be R3.
8. Candidates may use only their own drawing instruments.
9. Write neatly and legibly.
10. ALL drawing and written work, including candidate information, must be done in pencil.
11. Use BOTH sides of the drawing sheet.
12. A balanced layout is very important and candidates will be penalised for poor planning.

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QUESTION 1: THREADS, ABBREVIATIONS, WELDING

TAKE NOTE: This question is to be answered directly onto the **DRAWING SHEET** and **NOT** a separate answer book.

1.1 Give the proportions for each of the following bolt heads and nuts:

1.1.1 Hexagon-head or square-head bolt or nut

1.1.2 Height of bolt head

1.1.3 Height of nut

1.1.4 Thread

1.1.5 Thread before nut

1.1.6 Thread after nut

(6 × 1) (6)

1.2 Give the abbreviations for each of the following:

1.2.1 Pitch-circle diameter

1.2.2 Centre line

1.2.3 Internal diameter

(3 × 1) (3)

1.3 Explain the term *weld all round.* (3)

1.4 Name FIVE typical welding joints used for sheet metal and light loads. (5)

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QUESTION 2: SCREW THREADS

FIGURE 1 shows a machined shaft with a round shoulder on one end.

Draw, to scale 1 : 1, the given view. Part A is to be provided with a right-hand square external screw thread having a pitch of 16 mm.

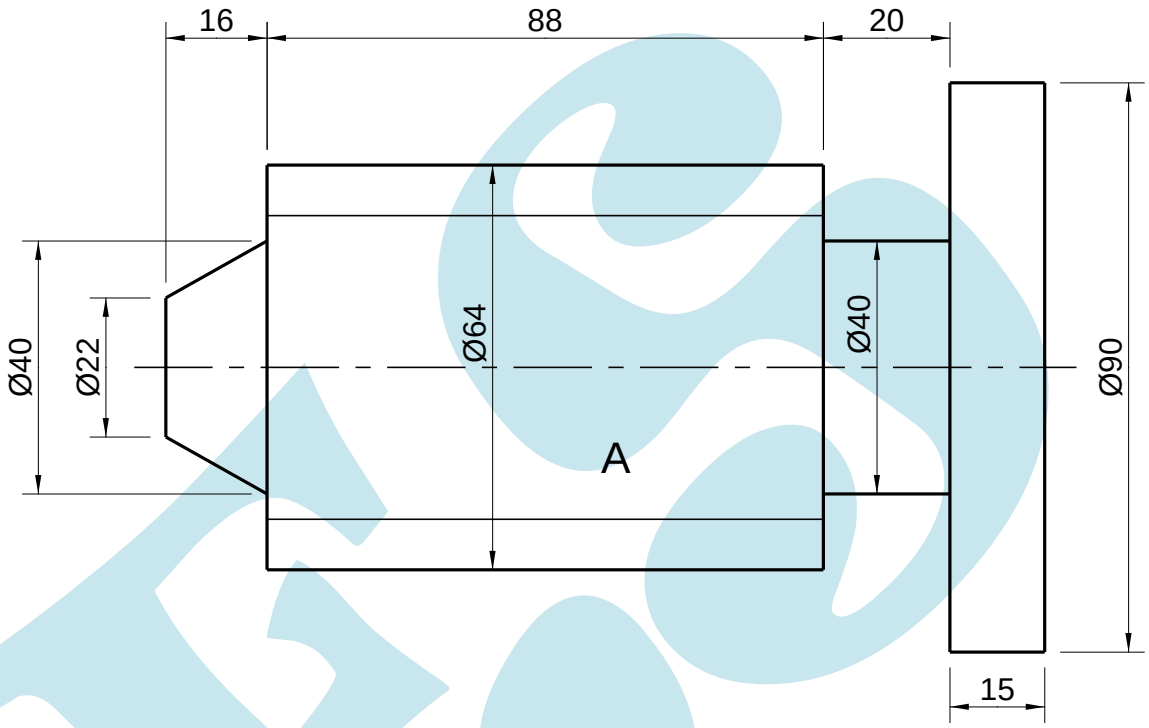

FIGURE 1 **[12]**

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QUESTION 3: FIRST-ANGLE ORTHOGRAPHIC PROJECTION

FIGURE 2 shows a front and left view of an axle chuck in first-angle orthographic projection. The axle is fastened to the chuck by an M20 nut and washer. The axle is in place, however, the securing nut and washer has been omitted.

Draw, to scale 1 : 1, the following views:

3.1 A full-sectional front view with the securing nut and washer in place. (13)

3.2 An outside left view with the securing nut and washer in place. (8)

3.3 Print the following title and scale centrally beneath the layout:

AXLE CHUCK
SCALE 1 : 1 (2)

3.4 Insert the first-angle orthographic projection symbol below the title and scale. (1)

3.5 Layout and Neatness (1)

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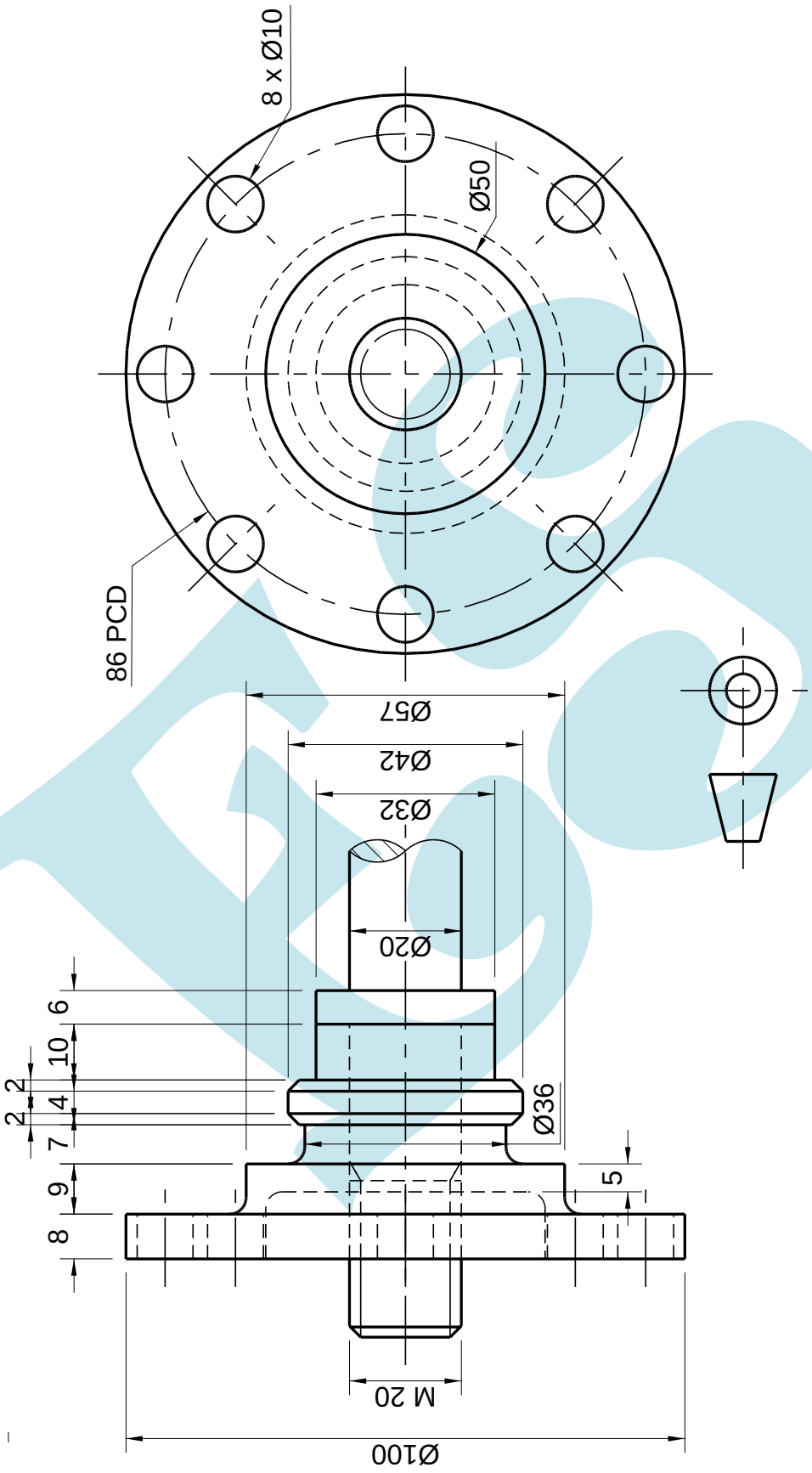

FIGURE 2

[25]

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QUESTION 4: ISOMETRIC

FIGURE 3 shows TWO views of a casting drawn in first-angle orthographic projection.

DO NOT draw the given views, but draw, to scale 1 : 1, an isometric view of the bracket.

Point P must be the lowest point.

NO hidden detail required.

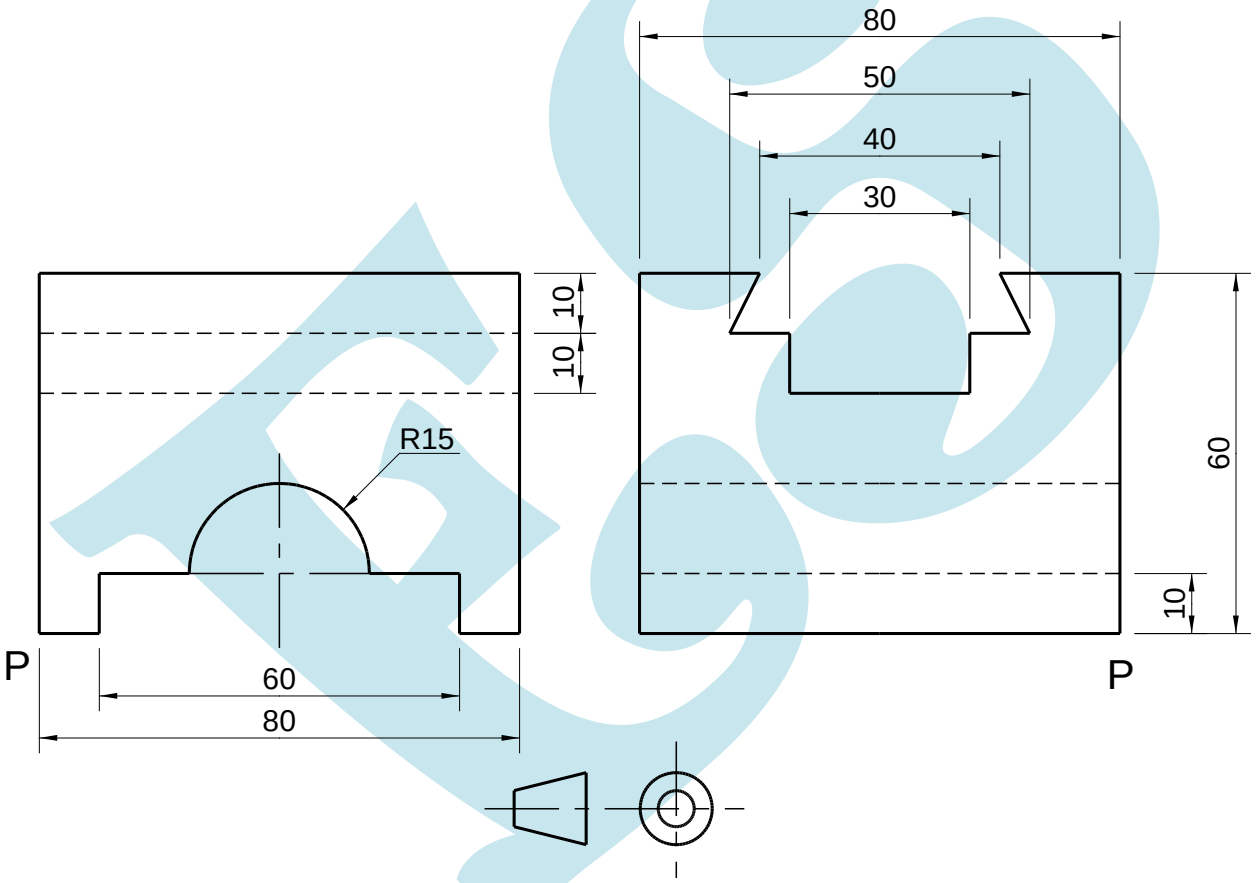

FIGURE 3 **[14]**

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QUESTION 5: INTERPENETRATION

FIGURE 4 shows the front and top views of a cylinder and a square pipe that intersect at right angles.

Redraw, to scale 1 : 1, the TWO given views in first-angle orthographic projection and show the following:

5.1 The interpenetration curve on the front view

5.2 ALL construction lines needed to project the curve of interpenetration

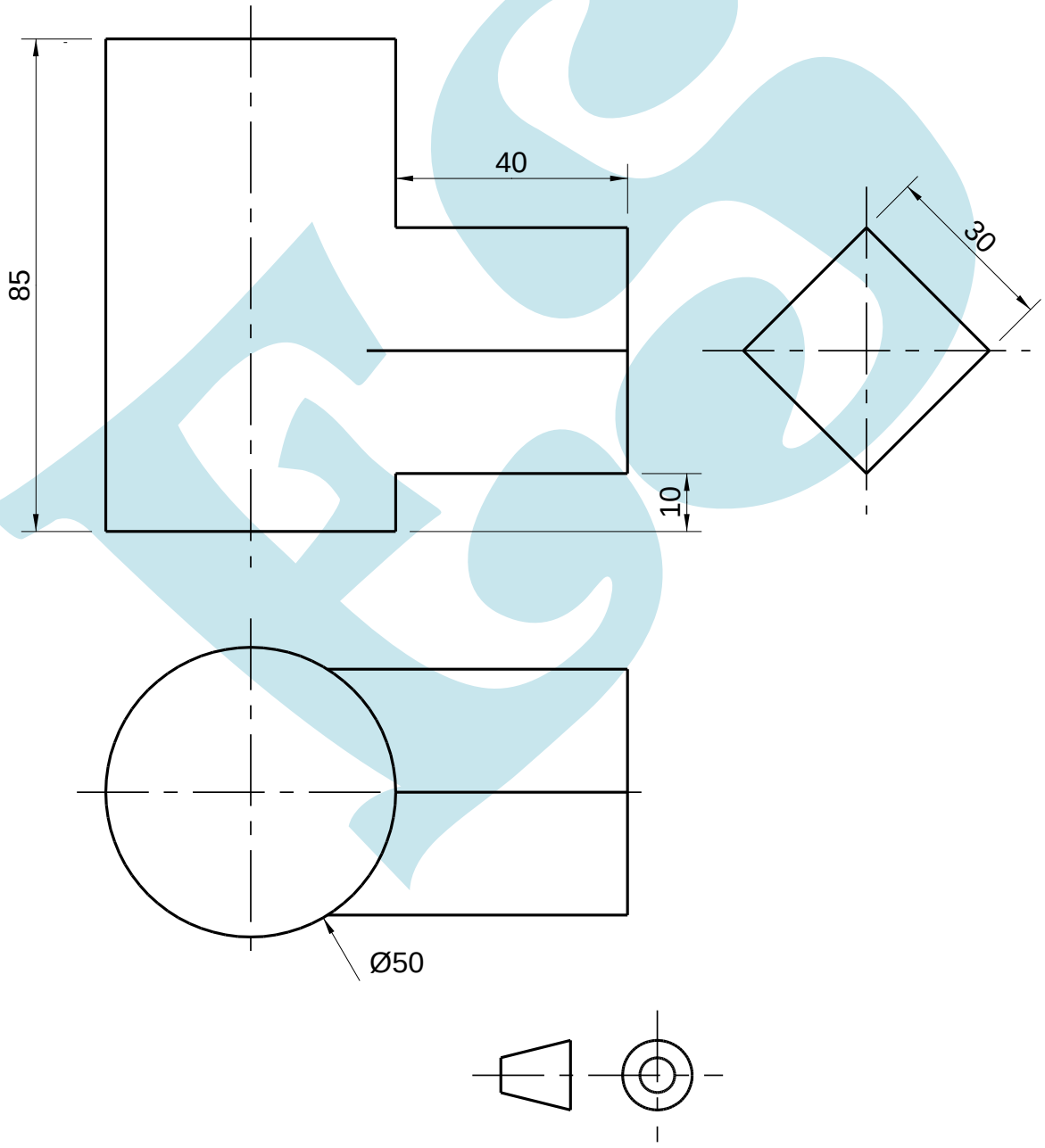

FIGURE 4 **[12]**

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QUESTION 6: THIRD-ANGLE ORTHOGRAPHIC PROJECTION AND MACHINE SYMBOLS

FIGURE 5 shows TWO views of a clamp link.

Draw, to scale 1 : 1, the following views of the CLAMP LINK in third-angle orthographic projection:

6.1 A full-sectional front view on cutting plane B-B (8)

6.2 A full-sectional top view on cutting plane A-A (8)

6.3 Add the title and scale centrally beneath the layout. (2)

6.4 Draw the third-angle orthographic symbol in the space below the title and scale. (1)

6.5 Layout and Neatness (1)

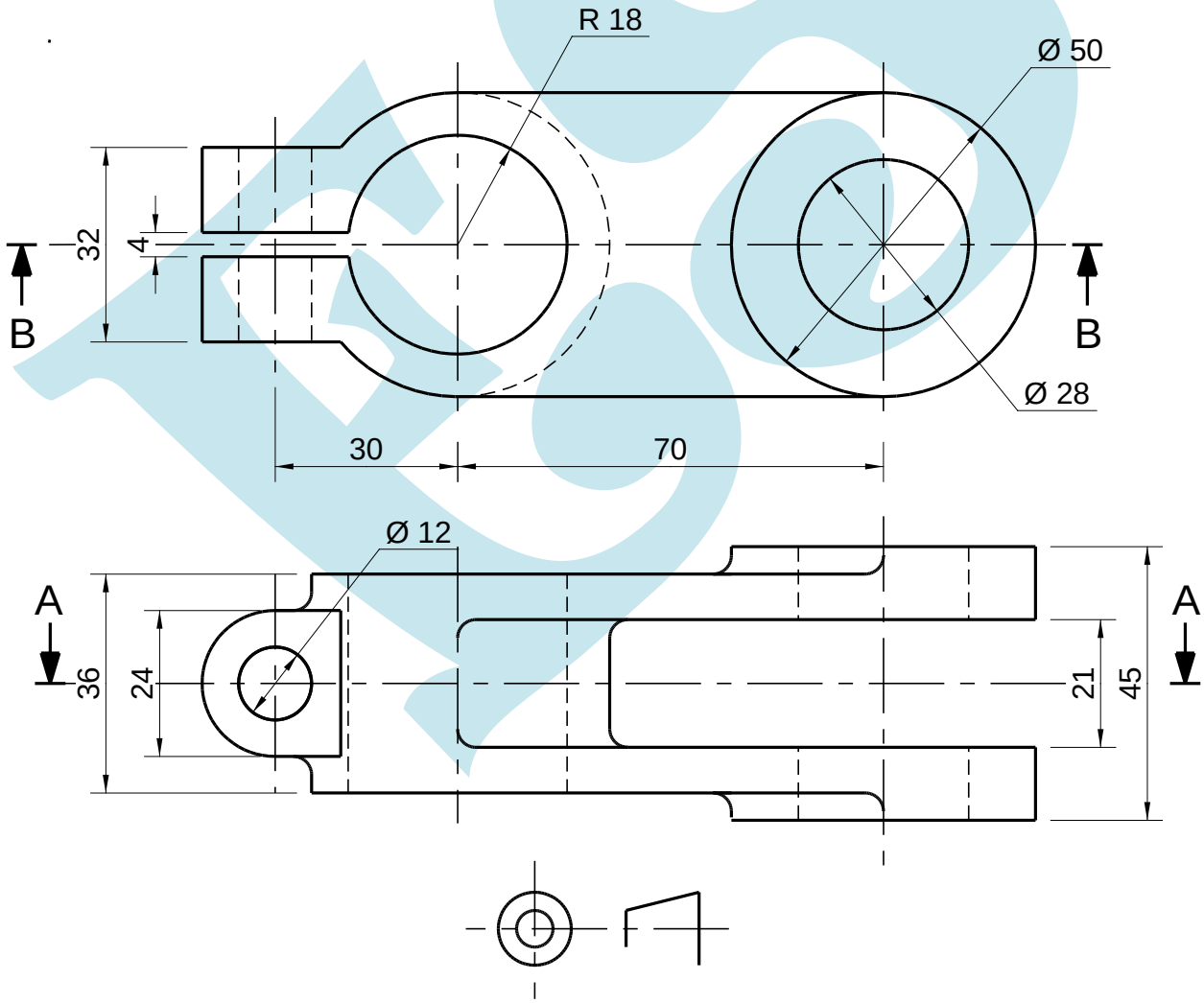

FIGURE 5 **[20]**

TOTAL: 100

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