higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

**NATIONAL CERTIFICATE**

# ENGINEERING DRAWING N3

(8090283)

**1 December 2023 (X-paper)**
**09:00–13:00**

**REQUIREMENTS: A2 drawing sheet**

**Drawing instruments may be used.**

**This question paper consists of 8 pages.**

195Q1G2301

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# DEPARTMENT OF HIGHER EDUCATION AND TRAINING
# REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
ENGINEERING DRAWING N3
TIME: 4 HOURS
MARKS: 100

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**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. Use both sides of the DRAWING SHEET.
5. Draw a 15 mm border on both sides of the DRAWING SHEET.
6. Only the candidate information on the DRAWING SHEET must be done in ink. All other drawing work must be done in pencil.
7. You may use a radius curve stencil to draw smaller arcs.
8. Unspecified radii must be R3.
9. All drawing work must conform to the latest SANS 10111 Code of Practice for Engineering Drawing.
10. A balanced layout is very important and candidates will be penalised for poor planning.
11. Work neatly.

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## MARK ALLOCATION

| | | | |
|---|---|---|---|
| **QUESTION 1: FREEHAND DRAWING** | | | **[10]** |
| Correctness | | | 4 |
| Line work | | | 3 |
| Accuracy and proportion | | | 3 |
| | | | |
| **QUESTION 2: SECTIONAL DRAWING** | | | **[25]** |
| 2.1 | Correctness – Full-sectional front view | | 6 |
| 2.2 | Correctness – Full-sectional right view | | 5 |
| 2.3 | Correctness – Full-sectional top view | | 6 |
| Line work | | | 3 |
| Accuracy | | | 3 |
| Layout and neatness | | | 2 |
| | | | |
| **QUESTION 3: ASSEMBLY DRAWING** | | | **[30]** |
| Correctness | | | 18 |
| Line work | | | 5 |
| Accuracy | | | 5 |
| Layout and neatness | | | 2 |
| | | | |
| **QUESTION 4: DETAIL DRAWING** | | | **[20]** |
| 4.1 | | Correctness – Full-sectional front view (Item 1) | 3 |
| 4.2 | 4.2.1 | Correctness – Full-sectional front view (Item 2) | 5 |
| | 4.2.2 | Correctness – Full-sectional top view (Item 2) | 4 |
| Line work | | | 3 |
| Accuracy | | | 3 |
| Layout and neatness | | | 2 |
| | | | |
| **QUESTION 5: ISOMETRIC PROJECTION** | | | **[15]** |
| Correctness | | | 8 |
| Line work | | | 2 |
| Accuracy | | | 2 |
| Scale | | | 2 |
| Point P | | | 1 |
| | | | |
| | | **TOTAL:** | **100** |

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## QUESTION 1: FREEHAND DRAWING

FIGURE 1 shows a pulley assembly.

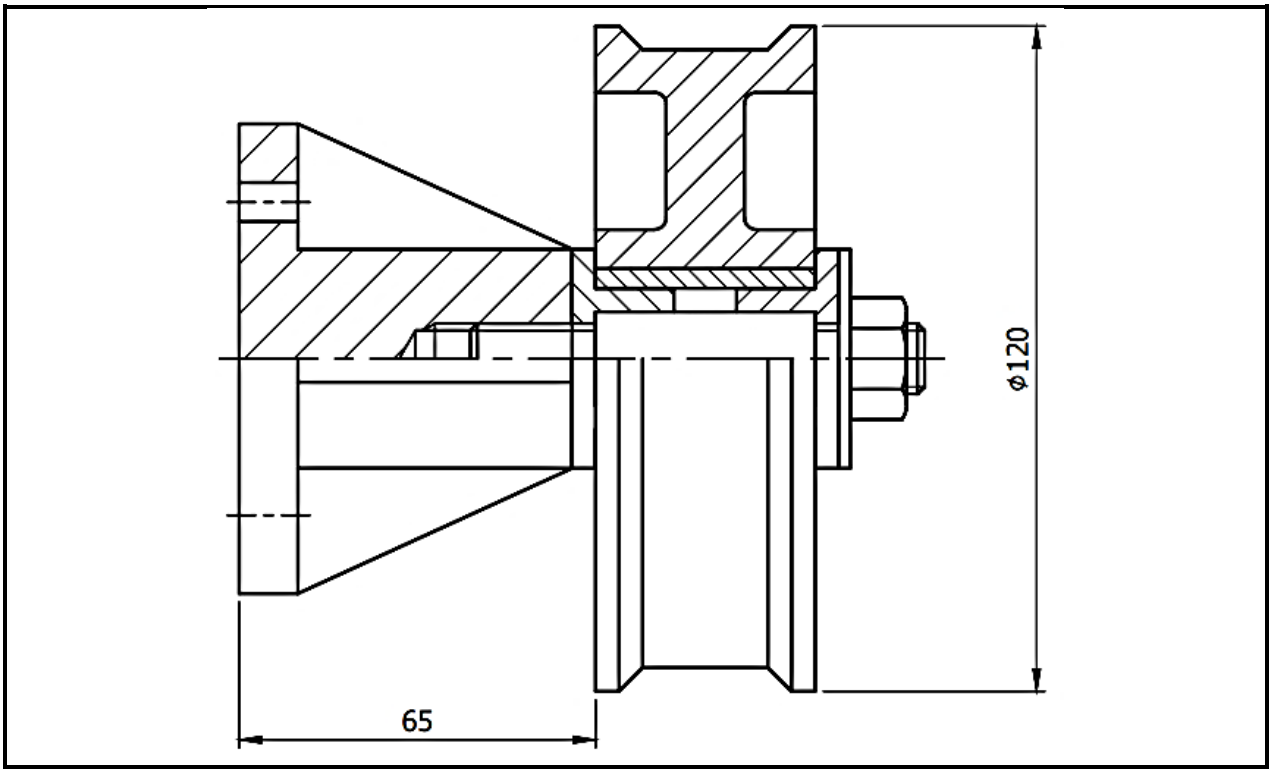



**FIGURE 1**

Make an approximately full-sized freehand drawing of the given view. **[10]**

## QUESTION 2: SECTIONAL DRAWING

FIGURE 2 shows two primary views of a component.

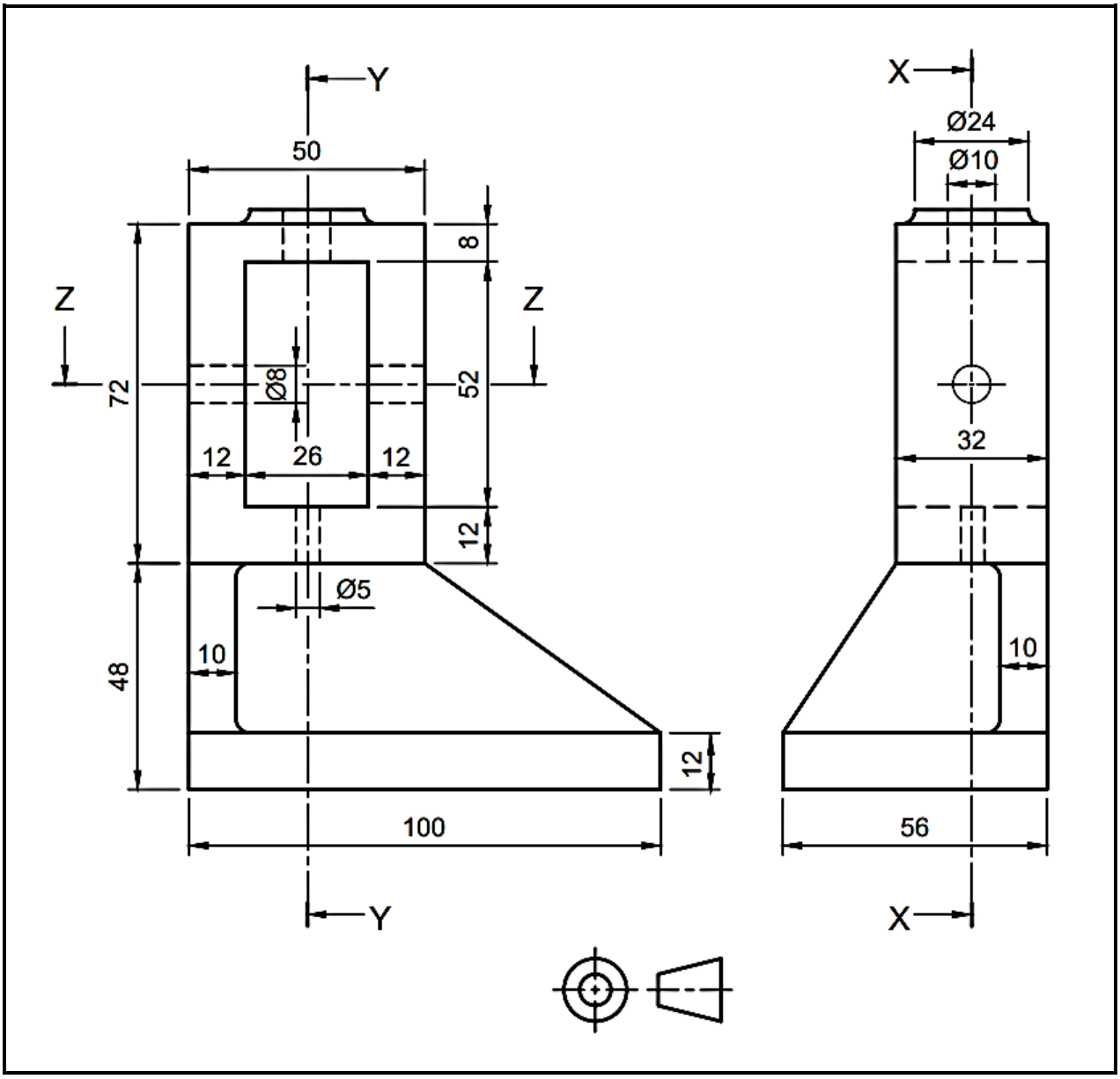



**FIGURE 2**

Draw, to scale 1:1, each of the following views of the component in third-angle orthographic projection without showing hidden detail:

2.1 A full-sectional front view on cutting plane X–X (6)

2.2 A full-sectional right view on cutting plane Y–Y (5)

2.3 A full-sectional top view on cutting plane Z–Z (6)

Line work, accuracy, layout and neatness (8)

**[25]**

## QUESTION 3: ASSEMBLY DRAWING

FIGURE 3 shows primary views of the components of a latch sub-assembly.

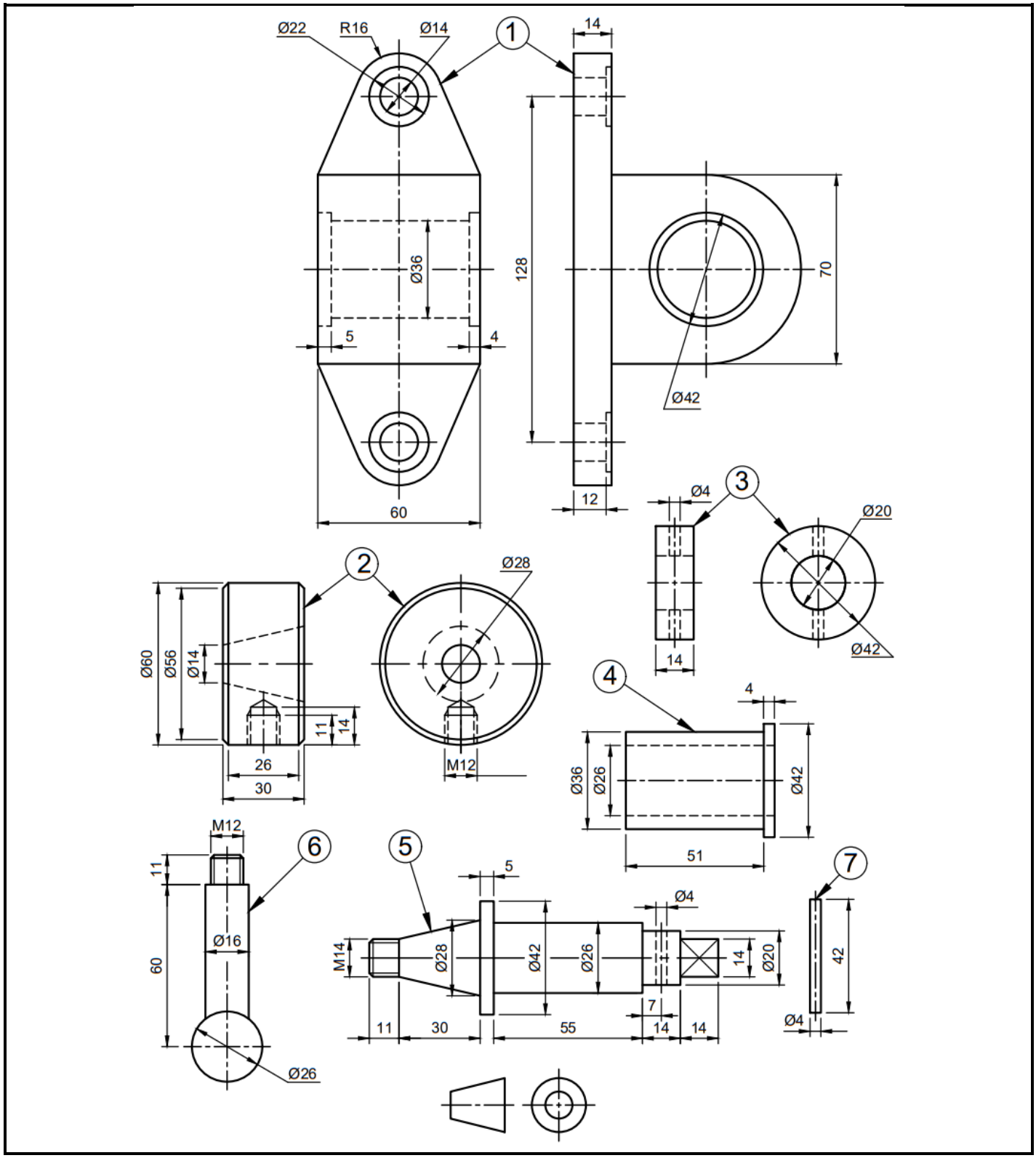



**FIGURE 3**

The complete list of parts is as follows:

| ITEM | DESCRIPTION | QUANTITY |
|---|---|---|
| 1 | Housing | 1 |
| 2 | Lever collar | 1 |
| 3 | Collar | 1 |
| 4 | Bush | 1 |
| 5 | Shaft | 1 |
| 6 | Lever | 1 |
| 7 | Pin | 1 |
| 8 | M14 hexagonal nut (not shown) | 1 |

Draw, to scale 1:1, a full-sectional front view of the latch sub-assembly. No hidden detail is necessary. **[30]**

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## QUESTION 4: DETAILED DRAWING

FIGURE 4 shows two primary views of a tension pulley assembly.

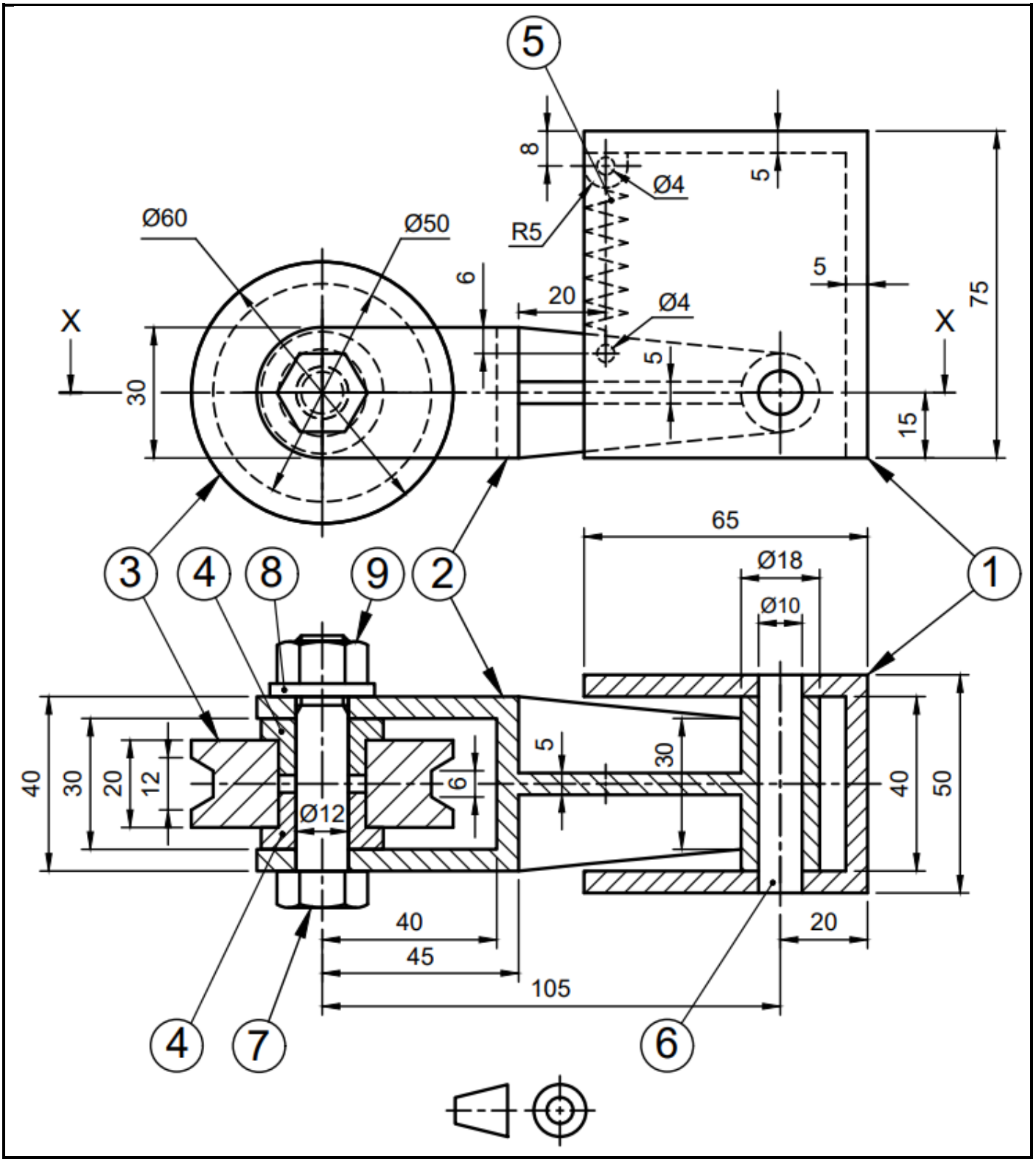



**FIGURE 4**

Draw, to scale 1:1, detailed drawings of each of the following items in first-angle orthographic projection without showing hidden detail:

4.1 The housing (Item 1) showing a full-sectional front view (3)

4.2 The fork (Item 2) showing the following views:

4.2.1 A full-sectional front view (5)

4.2.2 A full sectional top view on cutting plane X–X (4)

Line work, accuracy, layout and neatness (8)

**[20]**

## QUESTION 5: ISOMETRIC PROJECTION

FIGURE 5 shows two primary views of a geometric model.

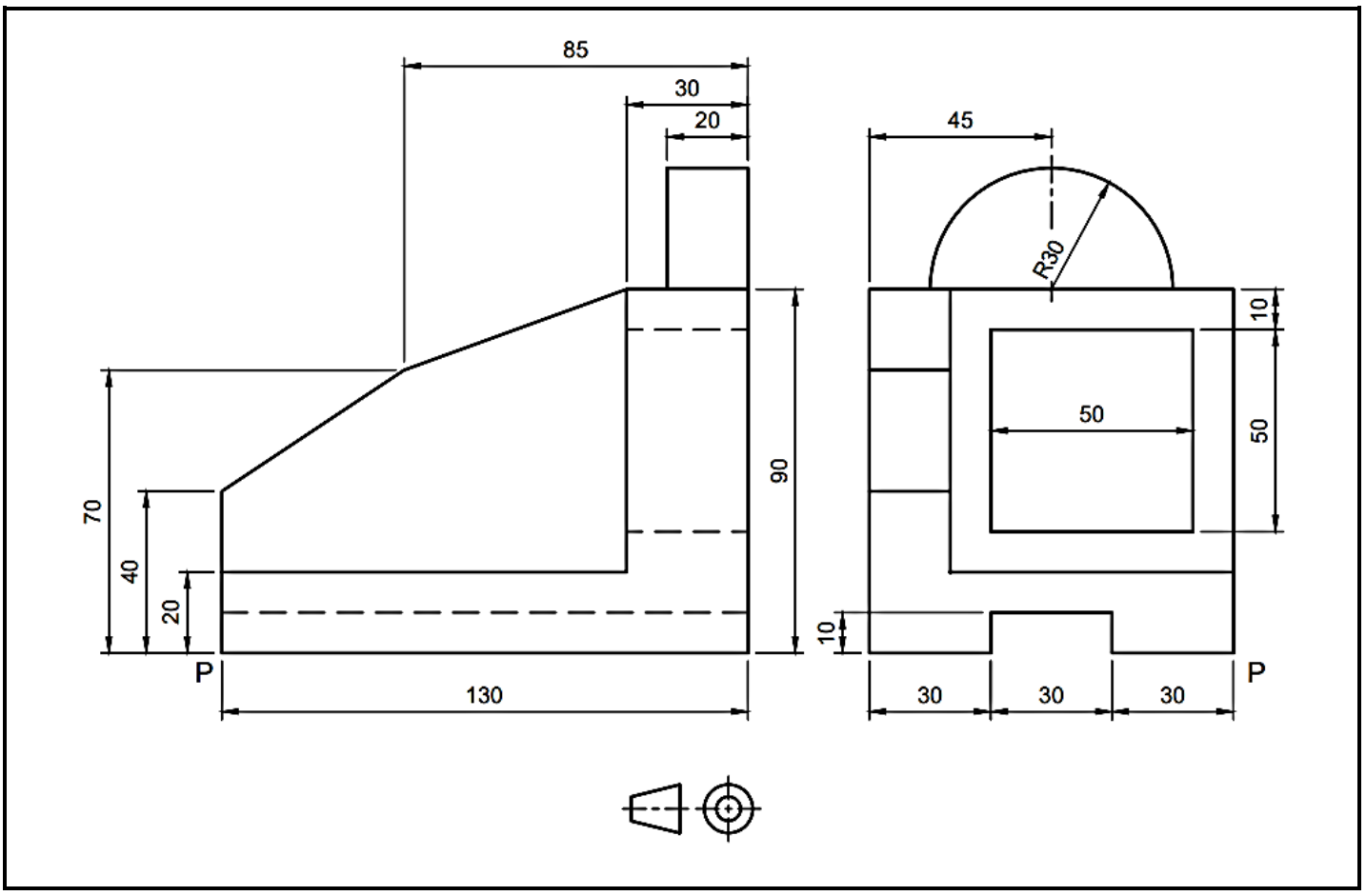



**FIGURE 5**

Construct an isometric scale and draw an isometric projection of the model. Point P must be the lowest point in the drawing. No hidden detail is necessary. **[15]**

**TOTAL: 100**

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