higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1130**(E)**(A2)T
APRIL 2012

NATIONAL CERTIFICATE

MECHANICAL DRAUGHTING N4

(8090204)

2 April (X-Paper)
09:00 – 13:00

REQUIREMENTS: **One sheet A2 drawing paper**

Calculators may be used.

Candidates will require drawing instruments, pencils and a ruler.

This question paper consists of 4 pages and 3 diagrams sheets.

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NATIONAL CERTIFICATE
MECHANICAL DRAUGHTING N4
TIME: 4 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers correctly according to the numbering system used in this question paper.
4. ALL drawing work, including candidate information, must be done in PENCIL.
5. ALL drawing work must conform to the latest SABS 0111 Code of Practice for Engineering Drawing.
6. Use BOTH sides of the DRAWING SHEET.
7. A 15 mm wide border must be drawn on BOTH sides of the DRAWING SHEET.
8. A radius curve stencil may be used to draw smaller arcs.
9. Unspecified radii must be 3 mm.
10. A balanced layout is very important.
11. Estimate ALL dimensions not shown in reasonable proportion.
12. Write neatly and legibly.

QUESTION 1: HELICAL SPRING

Draw, according to conventional representation and a scale of 1:1, an outside front view of a left-hand helical compression spring.

The detail is as follows:

Outside diameter	60 mm
Free length	100 mm
Lead	15 mm
Wire diameter	8 mm

[10]

QUESTION 2: DISC CAM

A cam profile is required which will impart motion to a knife-edge follower. Draw, according to scale 1:1, a full profile of the disc cam using the following information:

CAM DATA:

Minimum diameter	35 mm
Stroke height (lift/fall)	30 mm
Performance	Rises 30 mm in 150° of cam rotation according to constant velocity. Dwells for the next 30° of cam rotation. Falls 30 mm in the next 180° of cam rotation according to simple harmonic motion. Cam rotation is anticlockwise.

Show a displacement diagram and ALL construction lines. The displacement diagram must be drawn on the left-hand side of the cam profile. The knife-edge follower need NOT be drawn.

[15]

QUESTION 3: SECTIONAL DRAWING

FIGURE 1, DIAGRAM SHEET 1 (attached), shows TWO views of a machined casting.

Draw, according to scale 1:1 and in first-angle orthographic projection, the following views of the machined casting:

3.1 A full sectional front view (8)

3.2 A left view showing ALL hidden detail (10)

Insert only the following symbols and dimensions on the drawing:

At A: Show a diameter of 25 mm with an upper deviation of 15 micrometres and a lower deviation of 10 micrometres. (2)

[20]

QUESTION 4: DETAIL DRAWING

FIGURE 2, DIAGRAM SHEET 2 (attached), shows TWO views of a stepped pulley and bracket which consists of the following components:

Item 1	Mounting bracket
Item 2	Stepped pulley
Item 3	M15 hexagon bolt
Item 4	Bus
Item 5	M15 nut
Item 6	Washer

Draw, according to scale 1:2 and in third-angle orthographic projection, detail drawings of the following components:

4.1 The mounting bracket (item 1) showing the following:

4.1.1 A full sectioned front view (6)

4.1.2 A top view (6)

4.2 The stepped pulley (item 2) showing the following:

4.2.1 A full sectioned front view (5)

4.2.2 A right view (3)

NO hidden detail is required. **[20]**

QUESTION 5: ASSEMBLY DRAWING

FIGURE 3, DIAGRAM SHEET 3 (attached), shows the components of a cottered joint. The complete parts list is as follows:

Item	Part	Amount	Material
Item 1	Strap connecting	1 off	Cast steel
Item 2	Rod end	1 off	Cast steel
Item 3	Bearing half	2 off	Bronze
Item 4	Cotter	1 off	Mild steel
Item 5	Gib	2 off	Mild steel

Make an assembly drawing according to scale 1:2, showing a full sectional front view of the cottered joint.

Item numbers must be indicated on the assembly drawing.
A complete parts list must be shown below the assembly drawing. (30)

Layout, neatness and general impression of the ANSWER SHEET. (5)
[35]

TOTAL: 100

DIAGRAM SHEET 1

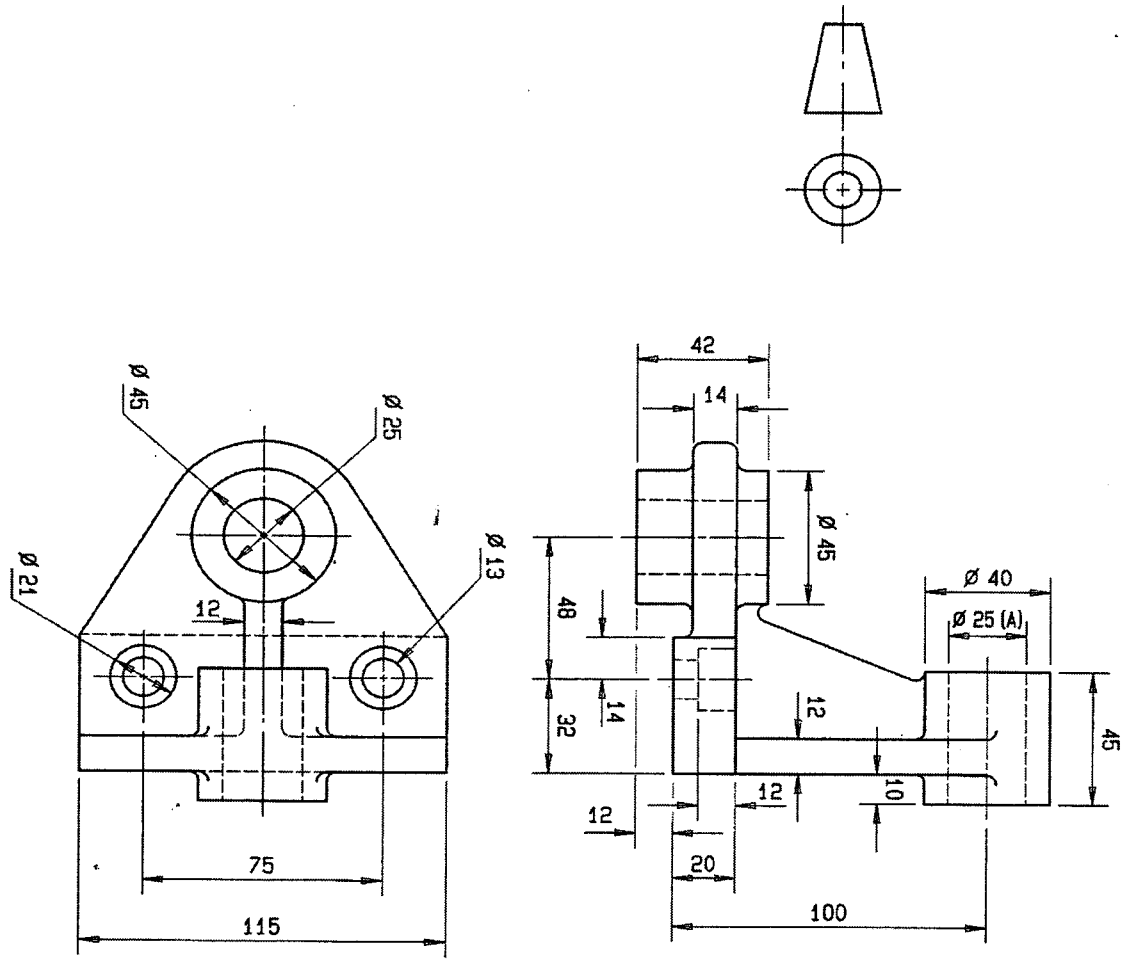

FIGURE 1

DIAGRAM SHEET 2

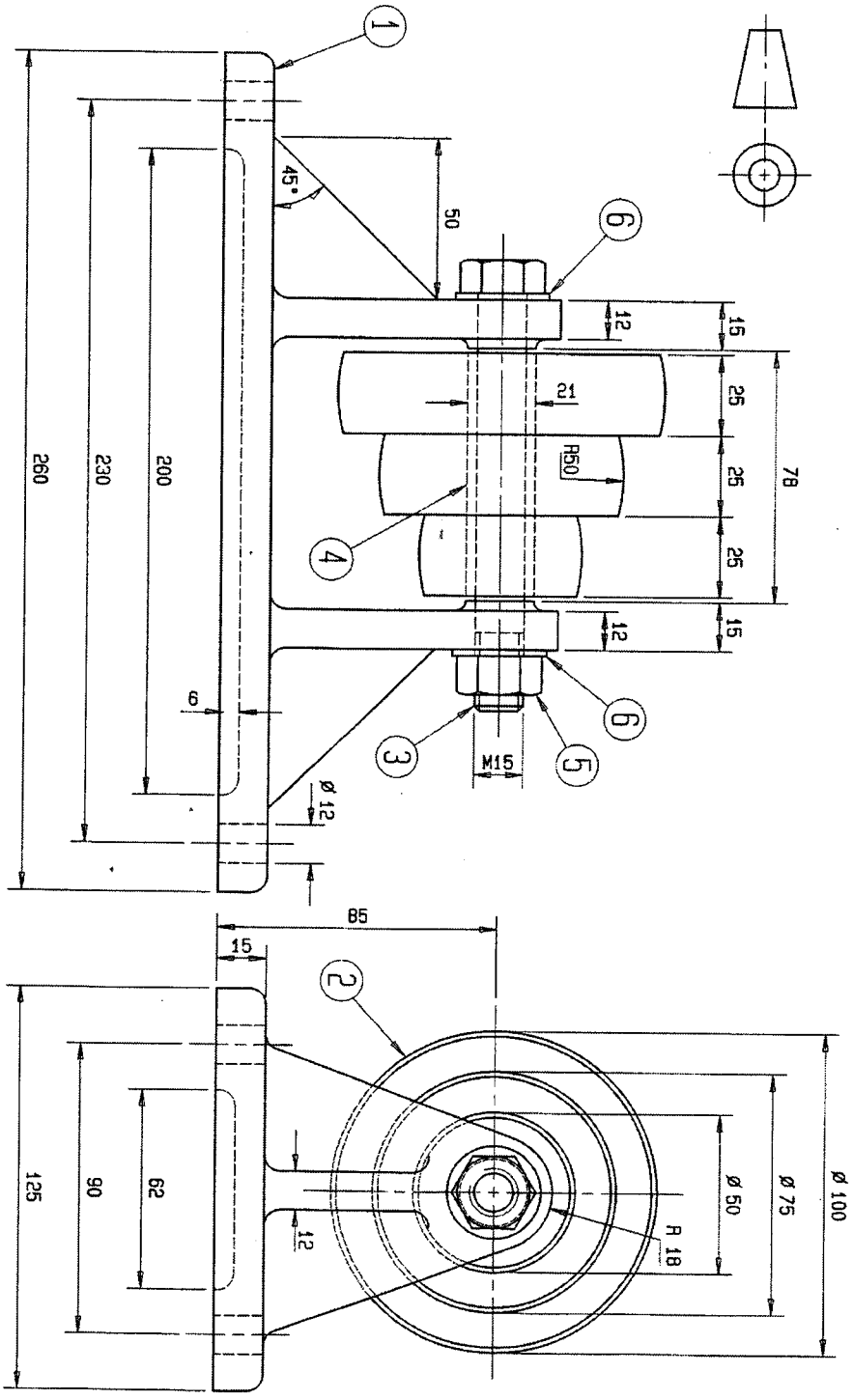

FIGURE 2

DIAGRAM SHEET 3

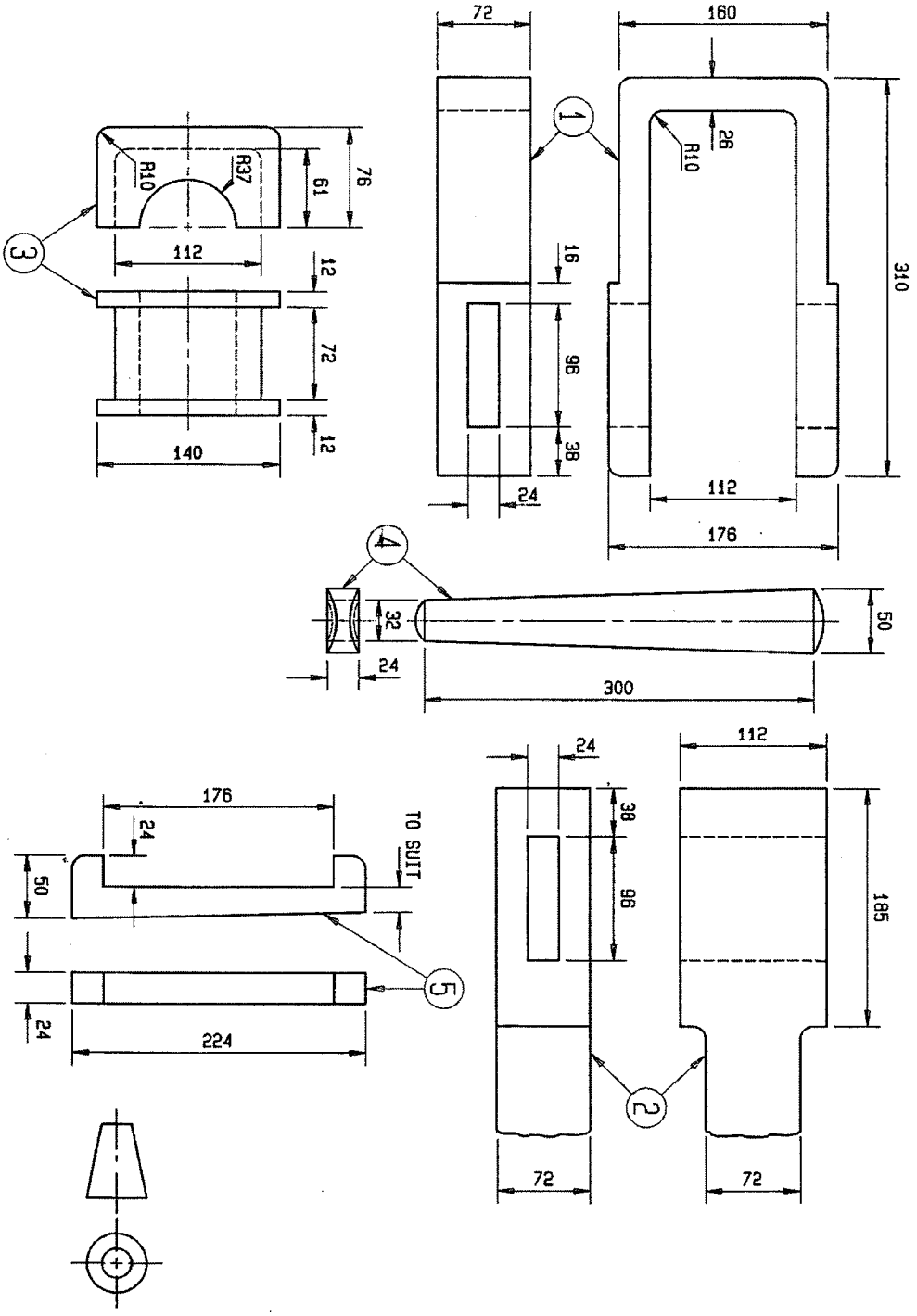

FIGURE 3