260

higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1120(**E**)(A1)T
APRIL 2011

NATIONAL CERTIFICATE

MECHANICAL DRAUGHTING N4

(8090204)

1 April (X-Paper)
09:00 – 13:00

CLOSED-BOOK EXAMINATION.

REQUIREMENTS: ONE sheet A2 drawing paper

Candidates will require drawing instruments, pencils and a ruler.

Calculators may be used.

This question paper consists of 4 pages and 3 diagram 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 and candidates are advised to plan their layout accordingly.
11. Estimate ALL dimensions not shown in a reasonable proportion.
12. Write neatly and legibly.

QUESTION 1: HELICAL SPRING

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

The detail is as follows:

- Outside diameter 60 mm
- Free length 120 mm
- Lead 20 mm
- Wire diameter 8 mm **[10]**

QUESTION 2: DISC-CAM

A cam profile is required which will impart motion to a roller 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) 50 mm
- Roller diameter 24 mm
- Performance Rises 50 mm in 180° of cam rotation according to simple harmonic motion
  Falls 50 mm in the next 180° of cam rotation according to uniform acceleration and retardation
  Rotation of cam is anti-clockwise

Show a displacement diagram and ALL construction lines. The displacement diagram must be drawn on the left hand side of the cam profile. The roller follower need NOT be drawn. **[15]**

QUESTION 3: SECTIONAL DRAWINGS

FIGURE 1, DIAGRAM SHEET 1 (attached), shows two views of a machined casting. Draw, according to scale 1:2 and in third-angle orthographic projection, the following views of the machined casting:

3.1 A sectional front view on cutting plane Y-Y (8)

3.2 A sectional right view on cutting plane X-X (9)

Insert only the following symbols and dimensions on the drawing:

At A: A 90 mm diameter hole with an upper deviation of 10 micrometer and a lower deviation of 15 micrometer (2)

At B: Show that no machining is allowed (1)

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

QUESTION 4: DETAIL DRAWINGS

FIGURE 2, DIAGRAM SHEET 2 (attached), shows two views of a control unit which consists of the following components:

Item 1	.....	Body
Item 2	.....	Lever
Item 3	.....	Coupling pin
Item 4	.....	Collar
Item 5	.....	Pin

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

4.1 The body (item 1) showing the following:

4.1.1	A front view	(6)
4.1.2	A sectional left view on X-X	(8)

4.2 The lever (item 2) showing the following:

A front view	(6)

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

QUESTION 5: ASSEMBLY DRAWINGS

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

ITEM	PART	AMOUNT	MATERIAL
Item 1	Body	1 off	cast steel
Item 2	Gland	1 off	cast steel
Item 3	Shaft	1 off	mild steel
Item 4	Inner disc	1 off	mild steel
Item 5	Outer disc	1 off	mild steel
Item 6	Roller ball bearing	1 off	steel
Item 7	Saw blade	1 off	steel
Item 8	Hexagon nut	1 off	mild steel
Item 9	Hexagon head screw	4 off	mild steel
Item 10	Key	1 off	mild steel

Make an assembly drawing, according to scale 1:1, showing a full sectional front view of the circular saw.

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]**

TOTAL: 100

FIGURE 1
DIAGRAM SHEET 1

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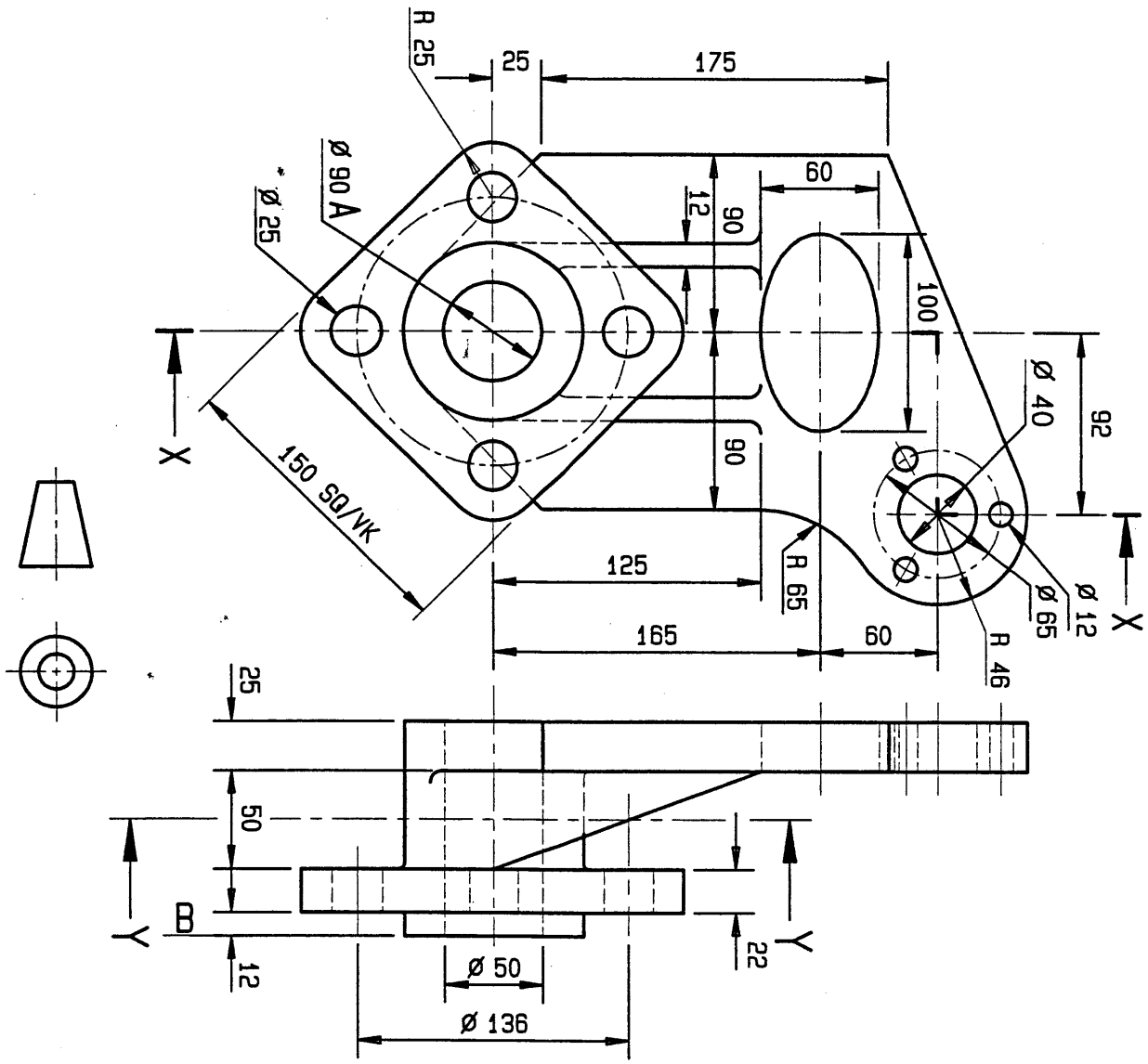

FIGURE 2
DIAGRAM SHEET 2

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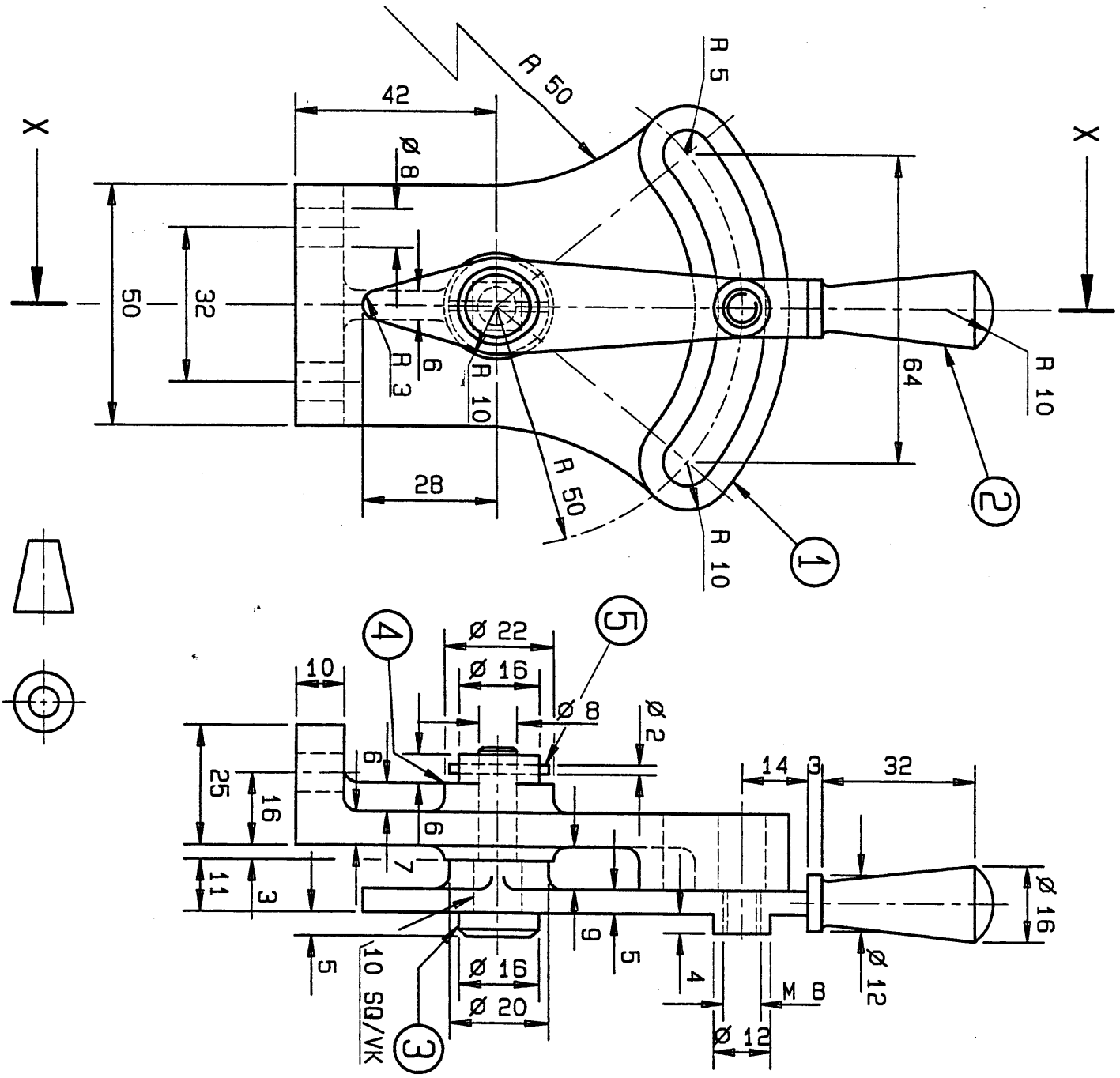

FIGURE 3
DIAGRAM SHEET 3

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