

higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T990(E)(A4)T
AUGUST EXAMINATION

NATIONAL CERTIFICATE

MECHANICAL DRAUGHTING N4

(8090204)

4 August 2014 (Y-Paper)
13:00–17:00

REQUIREMENTS: One sheet A2 drawing paper.

Calculators may be used.

Candidates will require drawing instrument.

This question paper consists of 5 pages and 3 diagram sheets.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
ENGINEERING SCIENCE N4
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 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: SPUR GEAR

Draw, according to third angle orthographic projection and a scale of 1 : 1, the conventional representation of a sectional front view and a left view of a single spur gear. The detail is as follows:

SPUR GEAR DATA:

- Pitch circle diameter 76 mm
- Addendum 7 mm
- Dedendum 8 mm
- Shaft diameter 36 mm
- Thickness of gear 30 mm
- Keyway width D/4
- Keyway height D/12

[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 28 mm
- Stroke height (lift/fall) 36 mm
- Performance Dwells for the first 30° of cam rotation.
Rises 36 mm in 150° of cam rotation according to constant velocity.
Falls 36 mm in the next 180° of cam rotation according to simple harmonic motion
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 knife edge follower need not be drawn.

[15]

QUESTION 3: SECTIONAL DRAWING

FIGURE 1, DIAGRAM SHEET1, (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 full sectional front view (11)
- 3.2 A sectional top view on cutting plane A-A (9)
- [20]**
- NO DASHED LINES ARE REQUIRED.

QUESTION 4: DETAIL DRAWING

FIGURE 2, DIAGRAM SHEET 2, (attached) shows a view of a spindle which consists of the following:

- Item 1 Pulley: keyway is 3 mm deep
- Item 2 Base
- Item 3 Shaft
- Item 4 Bush
- Item 5 Half - moon key x 3 mm wide
- Item 6 Washer
- Item 7 Hexagon nut

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

- 4.1 The pulley (item 1) showing the following:
- 4.1.1 A sectional front view (5)
- 4.1.2 A right view (5)
- 4.2 The base (item 2) must show a sectional front view. (5)
- 4.3 The shaft (item 3) must show a front view. (5)
- [20]**

Show all hidden detail on views not in section.

QUESTION 5: ASSEMBLY DRAWING

FIGURE 3, DIAGRAM SHEET 3, (attached) shows the components of a control valve drawn in first-angle orthographic projection.

The complete parts list is as follows:

Item	Part	Amount	Material
Item 1	Body	1 off	cast steel
Item 2	Flange	1 off	mild steel
Item 3	Handle	1 off	cast steel
Item 4	Spindle	1 off	mild steel
Item 5	M12 stud	1 off	mild steel
Item 6	M12 hexagon nut	1 off	mild steel

Make an assembly drawing, according to scale 1 : 1, showing a sectional front view on cutting plane X-X, shown on item 1, of the control valve in the closed position.

Item numbers must be indicated on the assembly drawing.

A complete parts list must be shown on the assembly drawing.

[30]

Layout, neatness and general impression of the answer sheet.

[5]

TOTAL: 100

DIAGRAM SHEET 1

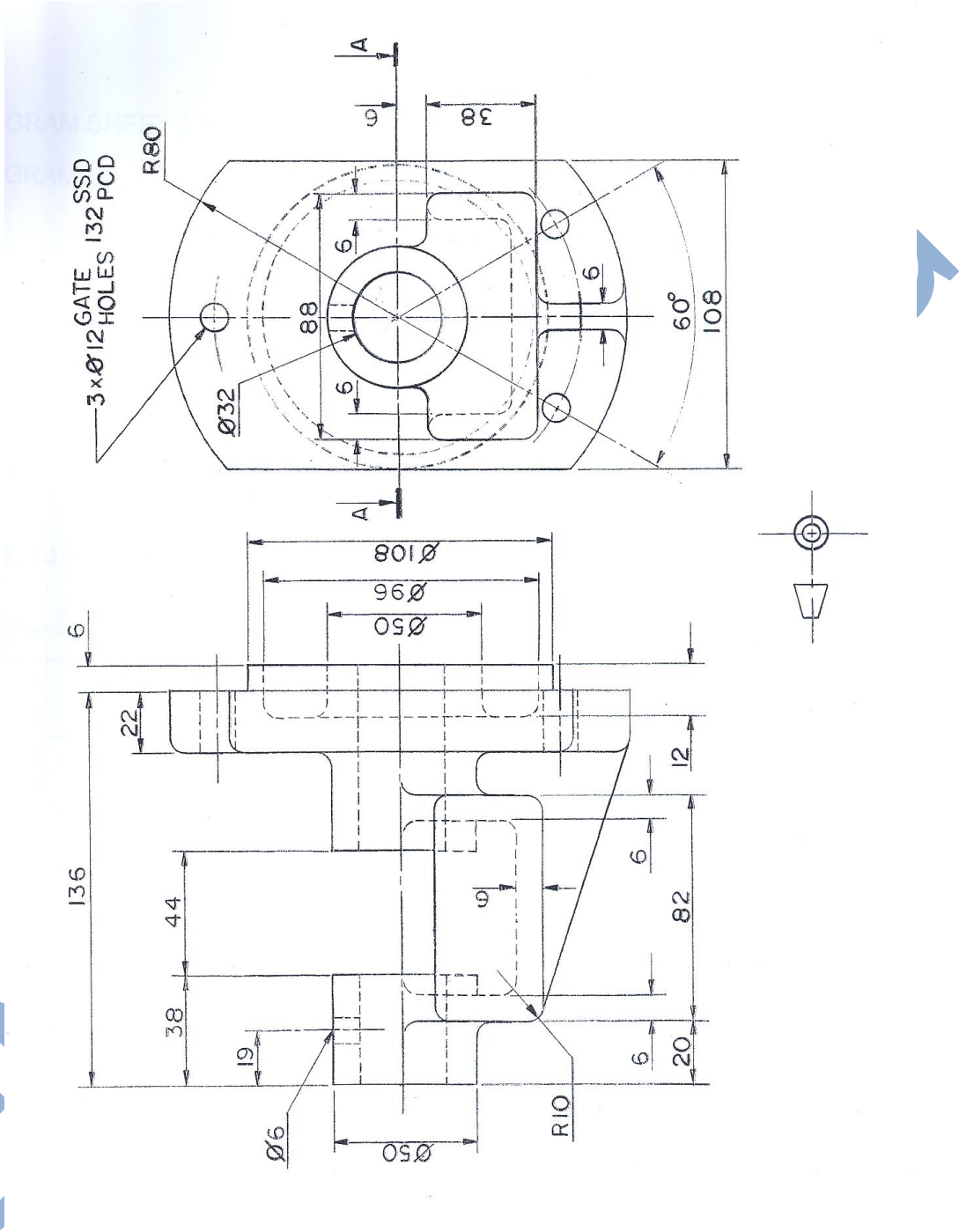


FIGURE 1

DIAGRAM SHEET 2

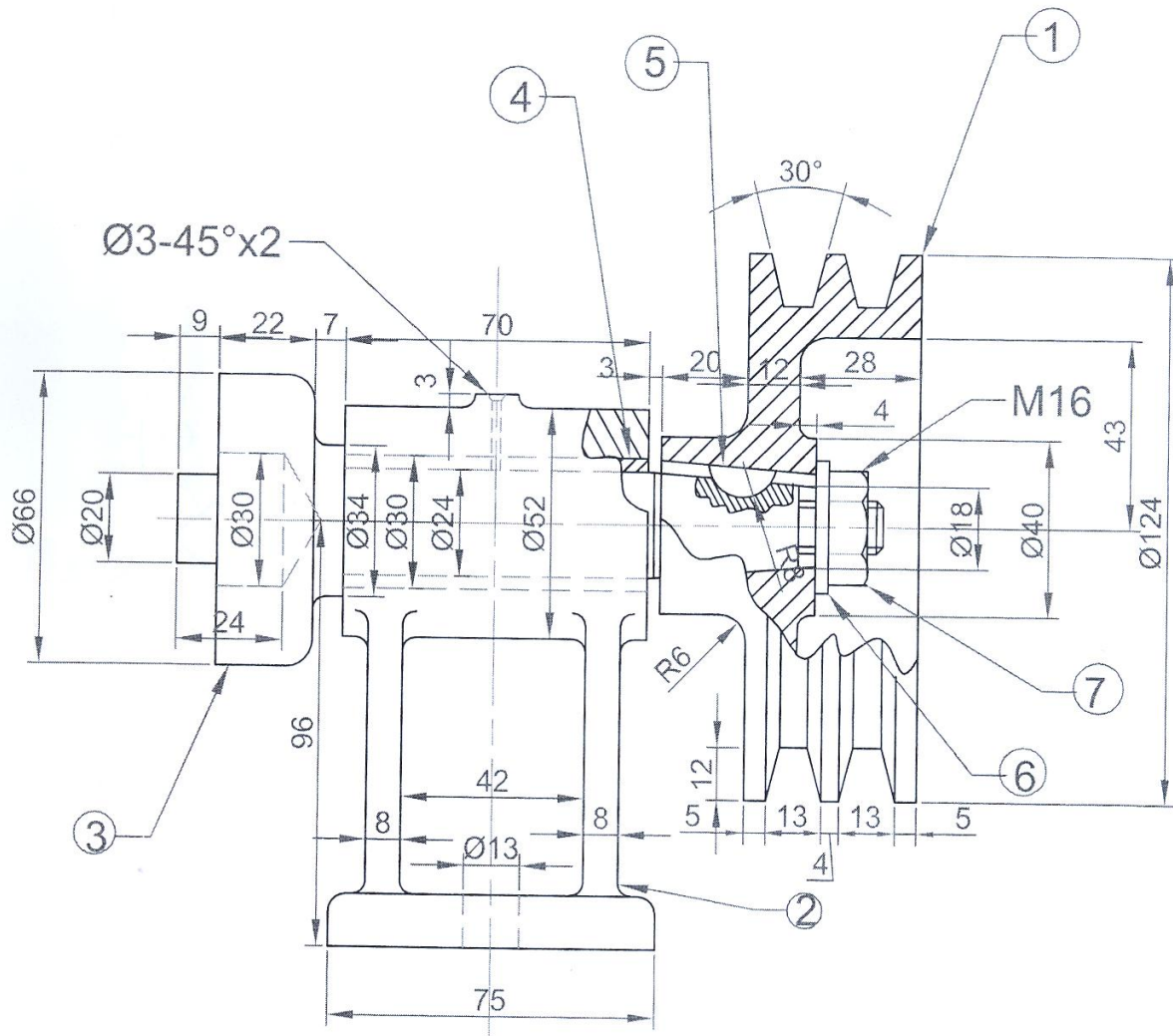


FIGURE 2

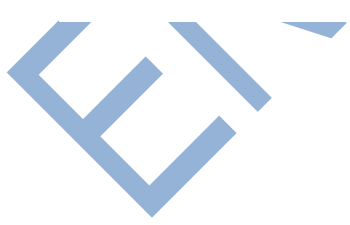


DIAGRAM SHEET 3

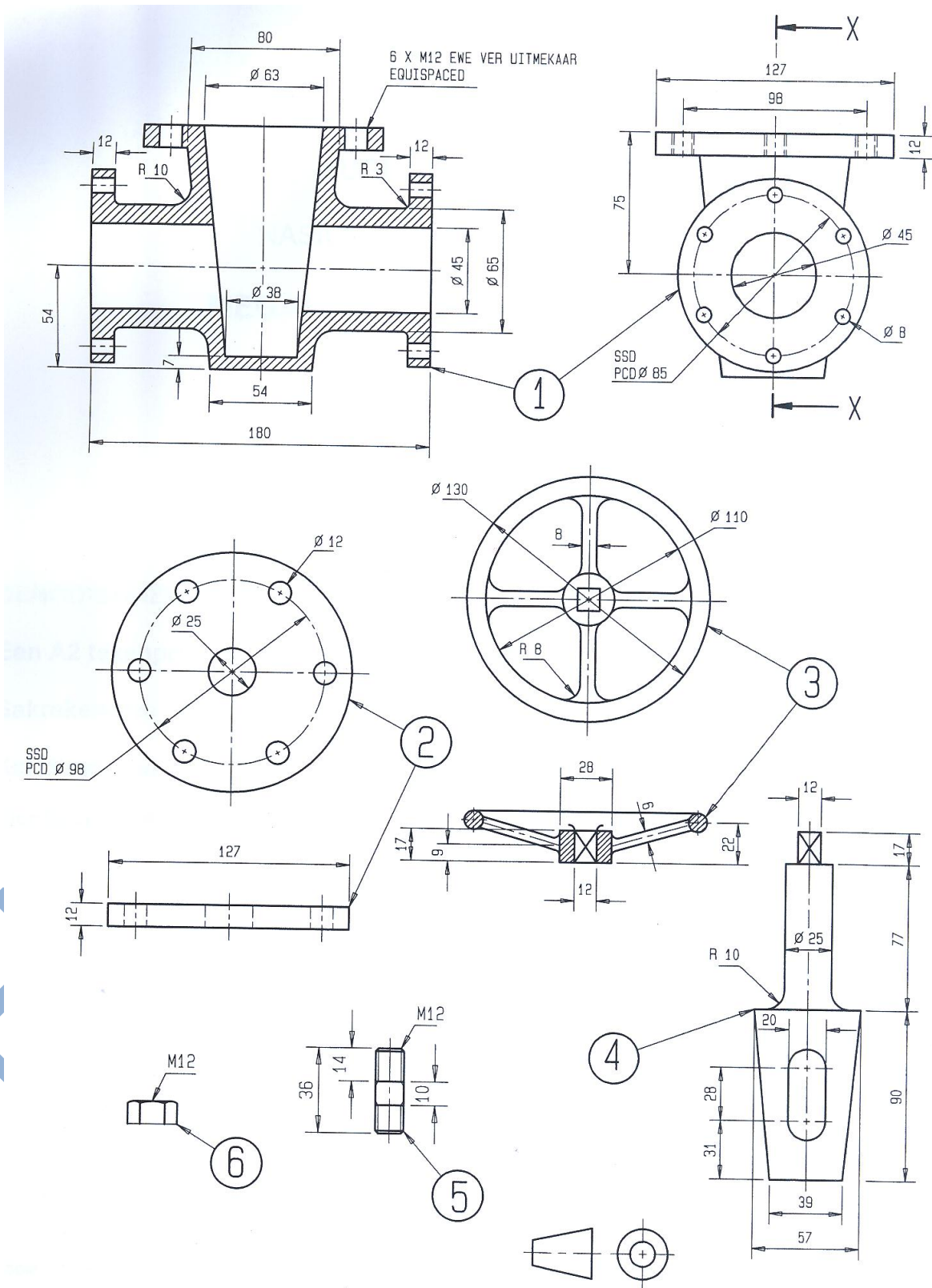


FIGURE 3