higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1070**(E)**(A9)T

APRIL EXAMINATION

NATIONAL CERTIFICATE: MULTI-DISCIPLANARY DRAWING OFFICE PRACTICE

MECHANICAL DRAUGHTING

(8090244)

9 April 2013 (X-Paper)
09:00–13:00

CLOSED-BOOK EXAMINATION

REQUIREMENTS: A2, A3 and A4 DRAWING PAPER

Calculators may be used

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

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE: MULTI-DISCIPLANARY DRAWING OFFICE PRACTICE
MECHANICAL DRAUGHTING
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. EACH drawing question must be answered on a SEPARATE A3 or A4 drawing sheet when using the computer.
5. Before any drawing work is commenced, a border must be retrieved from the symbols directory and displayed on the screen.
6. Plot the answers on ONE side of the drawing paper.
7. All the candidate's information must be plotted in the title block.
8. Candidates will be responsible, under suitable supervision, for the plotting of their own answers.
9. All the standard symbols (mechanical) may be obtained from the symbols directory.
10. Use your discretion for dimensions not given.
11. THREE diagram sheets are attached to this question paper.
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 right view of a single spur gear. The details are as follows:

SPUR GEAR DATA:

- Pitch-circle diameter 80 mm
- Addendum 6 mm
- Dedendum 7 mm
- Shaft diameter 36 mm
- Thickness of gear 32 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 to scale 1 : 1, a full profile of the disc cam using the following information:

CAM DATA:

- Minimum diameter 32 mm
- Stroke height (lift/fall) 38 mm
- Performance Dwells for the first 30° of cam rotation.
  Rises 38 mm for the following 90° of cam rotation according to constant velocity.
  Dwells for the next 60° of cam rotation.
  Falls 38 mm in the next 180° of cam rotation according to simple harmonic motion.
  Rotation of cam is 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 DRAWINGS

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

3.1 A sectional front view on cutting plane X-X (9)

3.2 A sectional left view on cutting plane Y-Y (7)

Insert only the following symbols and dimensions on the drawing:

At A: a 25 mm diameter hole has an upper deviation of 15 micrometre and a lower deviation of 25 micrometres. (2)

At B: a surface texture with a roughness value of 6,3 micrometres that must be produced without machining.

No hidden detail is required. (2)
[20]

QUESTION 4: DETAILED DRAWINGS

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

Item 1 ... Body
Item 2 ... Lever
Item 3 ... Coupling pin
Item 4 ... Ring
Item 5 ... Pin
Item 6 ... M8 hexagon bolt

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

4.1 The body (item 1) showing the following:

4.1.1 A front view (4)

4.1.2 A sectional left view on X-X (6)

4.2 The lever (item 2) showing the following:

4.2.1 A front view (5)

4.2.2 A sectional left view on X-X (5)

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

QUESTION 5: ASSEMBLY DRAWING

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

Item	Part	Amount	Material
Item 1	Forked end	2 off	cast steel
Item 2	Cross piece	1 off	mild steel
Item 3	Drive shaft	2 off	mild steel
Item 4	Driving pin	4 off	mild steel
Item 5	Key	6 off	mild steel

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

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

DIAGRAM SHEET 1

FIGURE 1

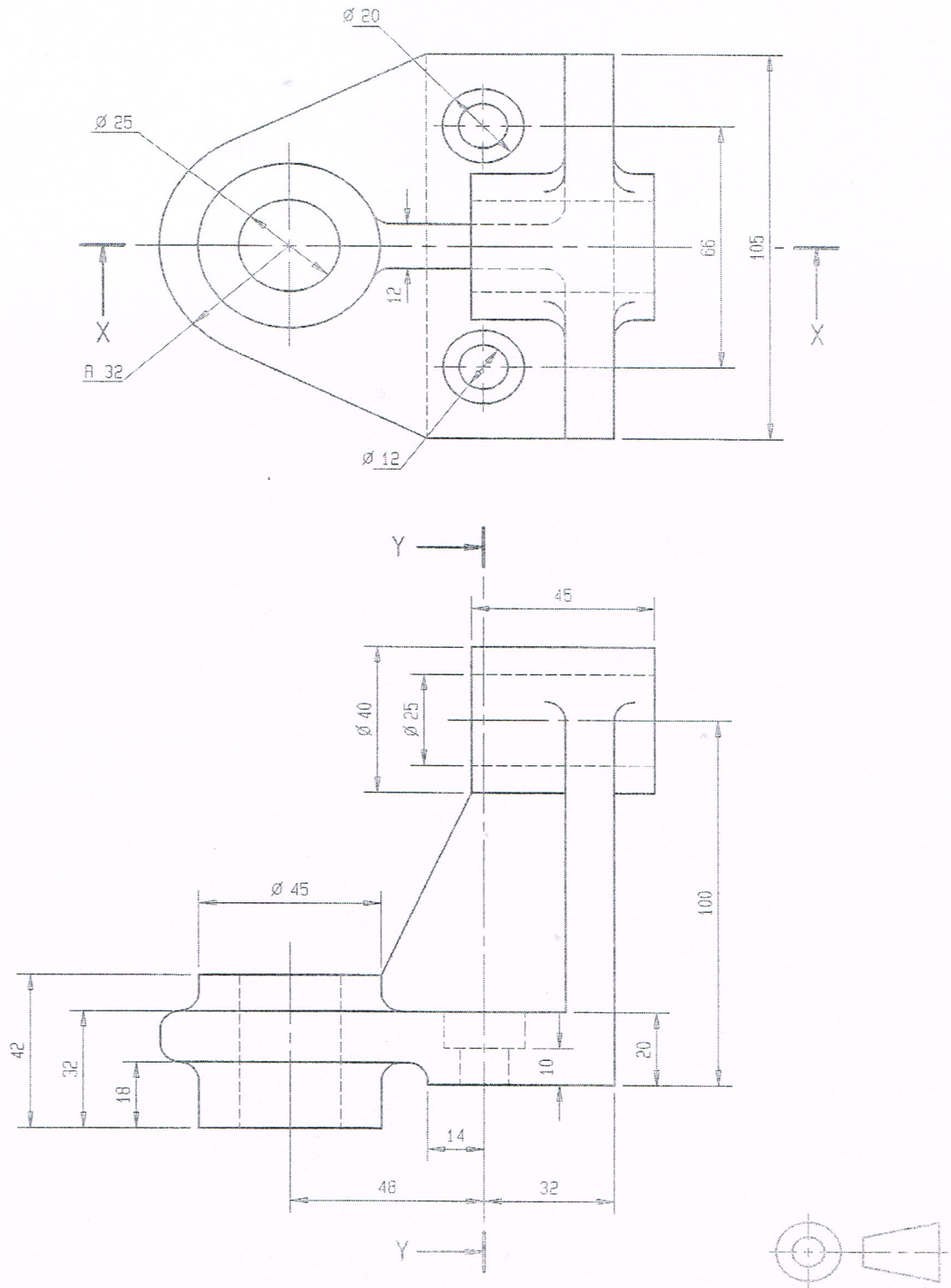

DIAGRAM SHEET 2

FIGURE 2

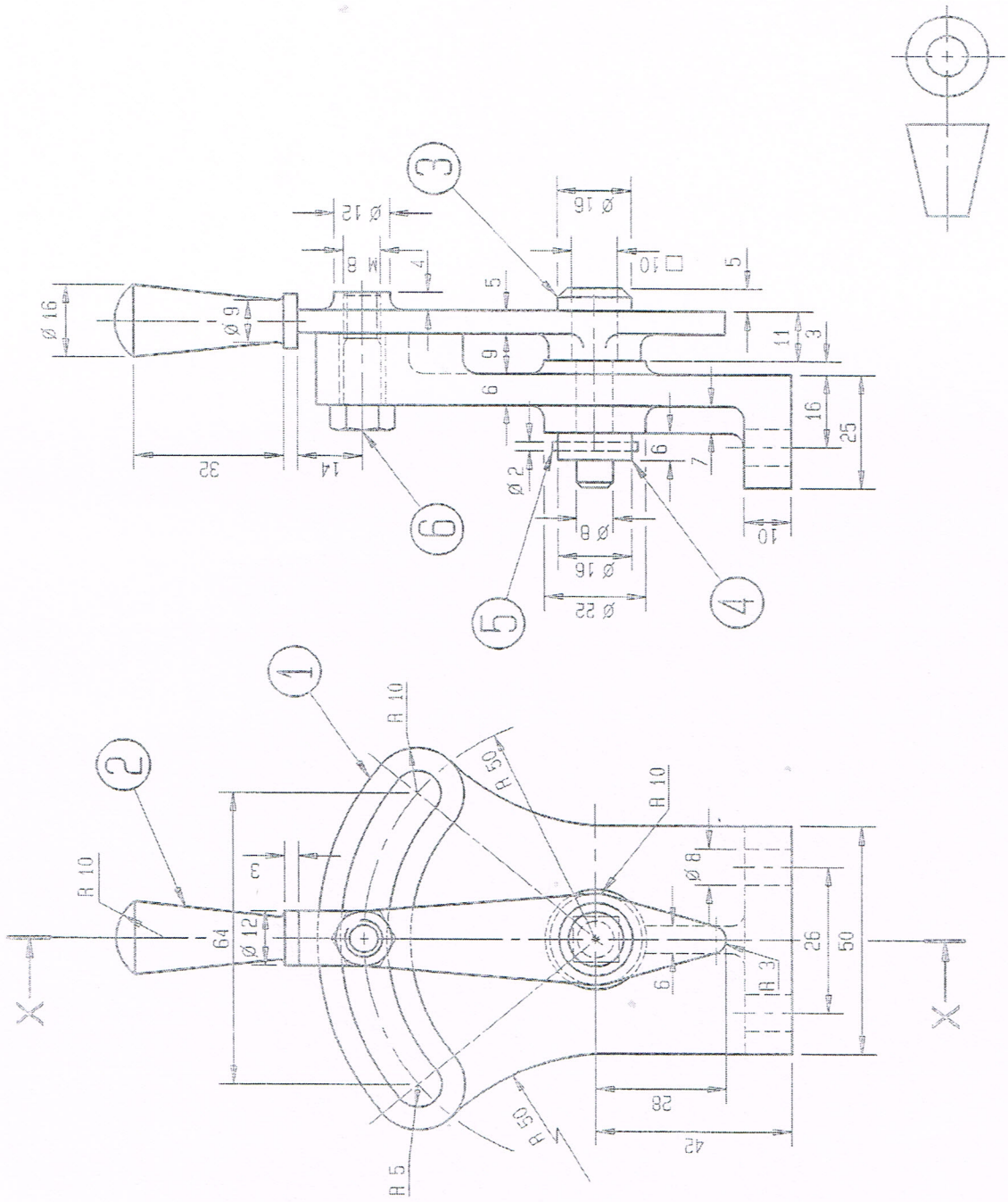

DIAGRAM SHEET 3

FIGURE 3