higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CIVIL AND STRUCTURAL STEELWORK DETAILING

(Second paper)

NQF LEVEL 3

(120506630)

08 November 2022 (Y-paper)
13:00–15:00

REQUIREMENTS: A3 drawing paper
Hot-rolled structural steel tables (BOE 8/2)

Drawing instruments and calculators may be used

This question paper consists of 5 pages and 1 addendum.

143Q2N2208

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TIME: 2 HOURS
MARKS: 75

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. Start each section on a new page.
5. Use only a blue or black pen.
6. Write neatly and legibly.

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QUESTION 1:

1.1 Draw an elevation view of the following concrete slab:

A concrete slab measuring 8 m × 4 m is simply supported on two sides by 230 mm brick walls. The slab is 200 mm thick and reinforced at the bottom as follows:

Long span (main steel) – Y16 (shape code 35) at 150 mm centres
Short span (distribution steel) – Y12 (shape code 20) at 250 mm centres
Concrete cover 50 mm
Concrete strength 40 Mpa

Consider the longest side as a front view
Ls = Lb + 2n – 2c
n = 150

Shape code = 35

Scale 1:50 (20)

Use the information given in **FIGURE 1** below and make TWO neat cross-sectional drawings of the concrete beam at AA and BB to show the hidden bars and detail in **FIGURE 1**. The drawings must show the placing of the beams. All details and labels must be included.

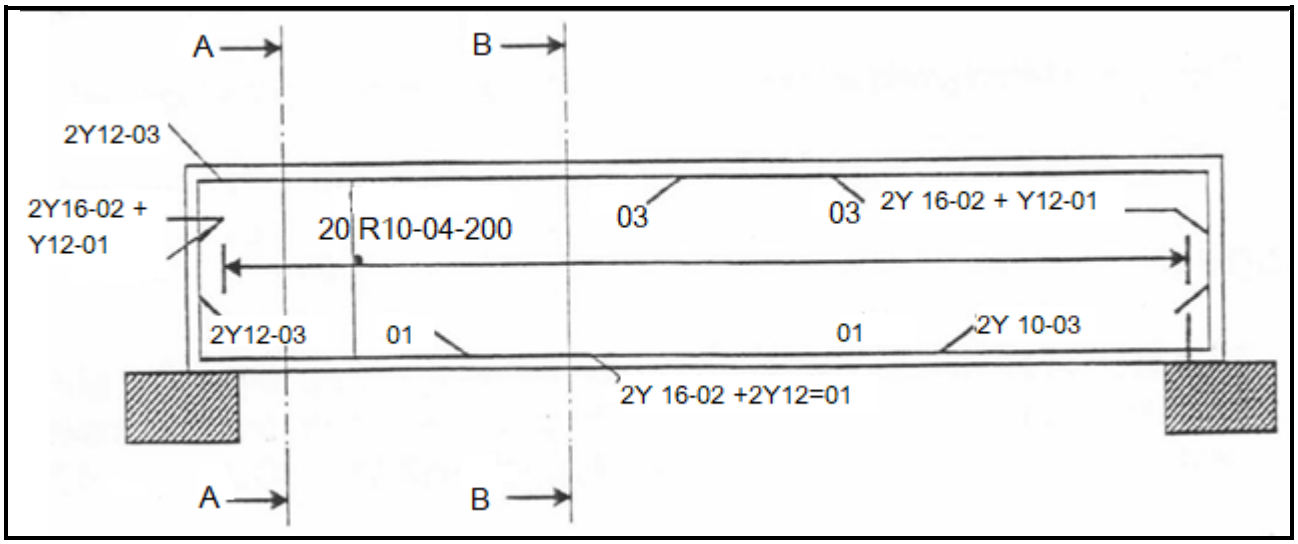


FIGURE 1 **[30]**

QUESTION 2: STRUCTURAL STEELWORKDETAILING AND SPECIFICATIONS

2.1 **FIGURE 2** below shows an isometric view of a secondary steel beam of 254 × 146 × 31,3 kg/m intersecting with a primary beam of 406 × 178 × 53,8 kg/m. The secondary beam is level and in line at the top.

Draw to a scale of 1:5 the following views: A cross-sectional front and side view through the secondary steel beam.

The completed drawings must include all labels and hatchings. Provide a title and scale for each of the drawings. (20)

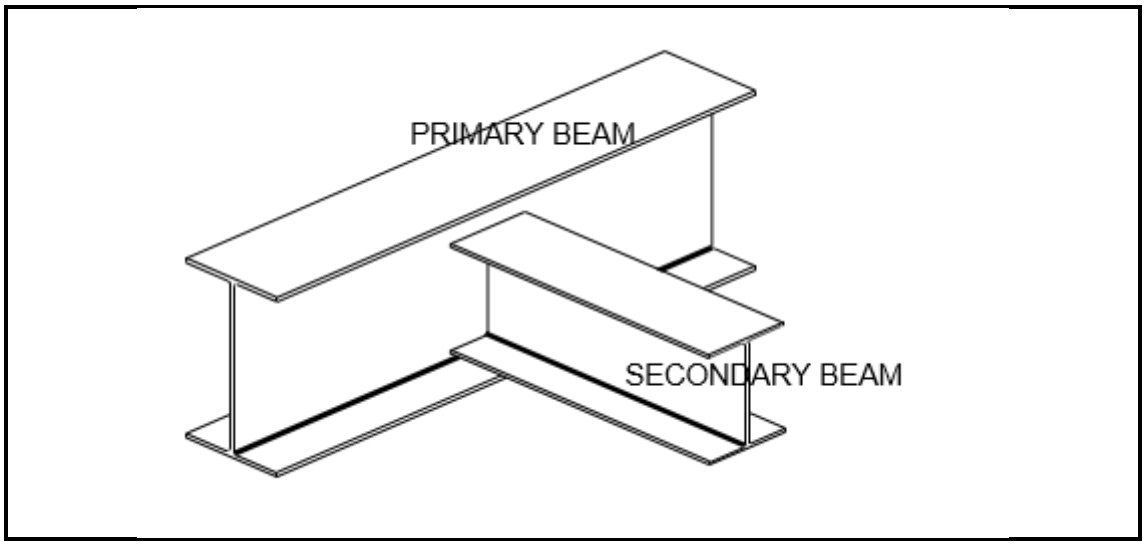


FIGURE 2

2.2 Draw to a scale of 1:1 a fully labelled section of a rolled-steel steel profile (equal legs) of 90 × 90 × 13 × 8mm. (10)

All bolt holes are drilled on the centre lines of the angles and all bolts are M20. Neatly print the size and scale of the profile centrally beneath the drawing.

[30]

QUESTION 3: STRUCTURAL STEELWORK DETAILING

3.1 **FIGURE 3** below shows a line diagram of a typical WELDED latticed girder. Draw to a scale of 1:5 typical details of the following:

3.1.1 Detail A (10)

3.1.2 Detail C (5)

SPECIFICATIONS:

- Top and bottom booms: rolled-steel angle profiles, 120 × 120 × 10
- All internal members: rolled-steel angle profiles, 100 × 100 × 8
- All gusset plates are 10 mm thick.
- Do not insert any dimensions.

The gusset plate sizes, as well as information not given, are left to your discretion.

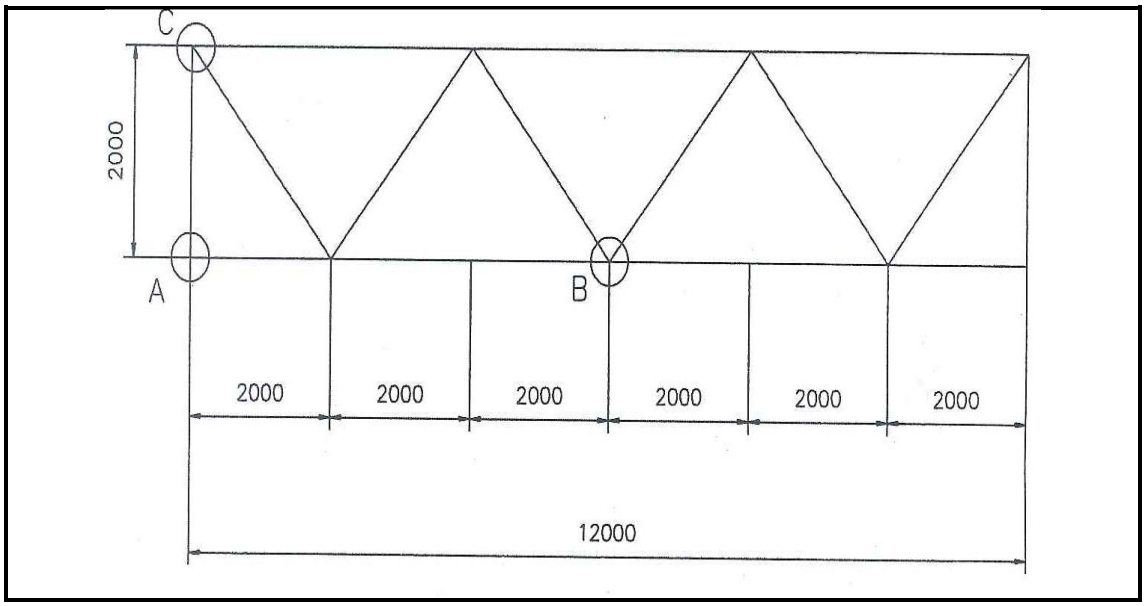
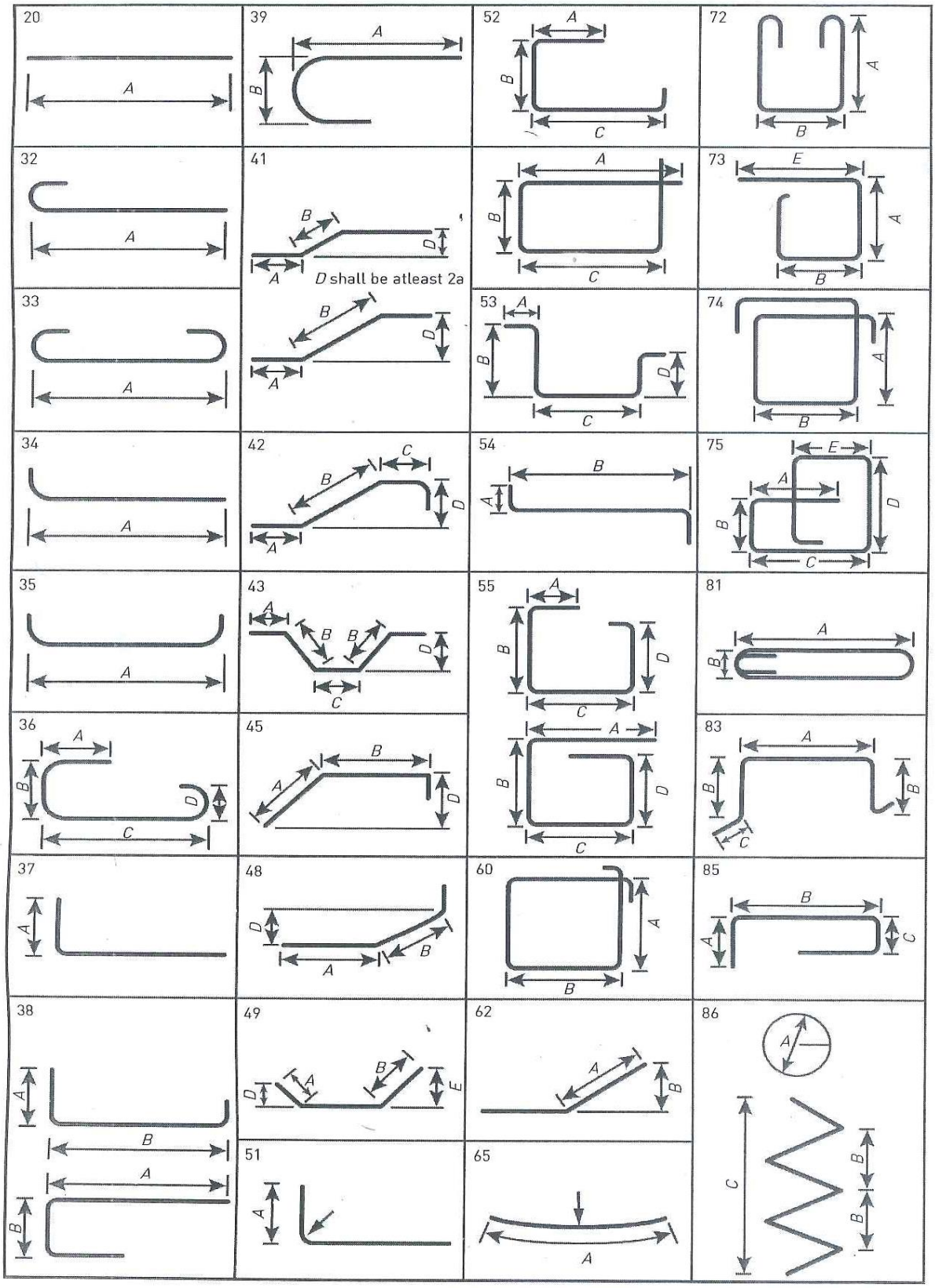


FIGURE 3

TOTAL: 75

ANNEXURE A

Shape code sheet



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