higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CIVIL AND STRUCTURAL STEEL WORK DETAILING

(First paper)

NQF LEVEL 3

(12050663)

4 December 2020 (Y-paper)
13:00–15:00

REQUIREMENTS: **A4 drawing sheets**
Hot-rolled structural steel sections (BOE 8/2)

Calculators may be used.

This question paper consists of 7 pages and 1 addendum.

287Q1N2004

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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 question on a new page.
5. Write neatly and legibly.

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QUESTION 1: REINFORCED CONCRETE DETAILING

1.1

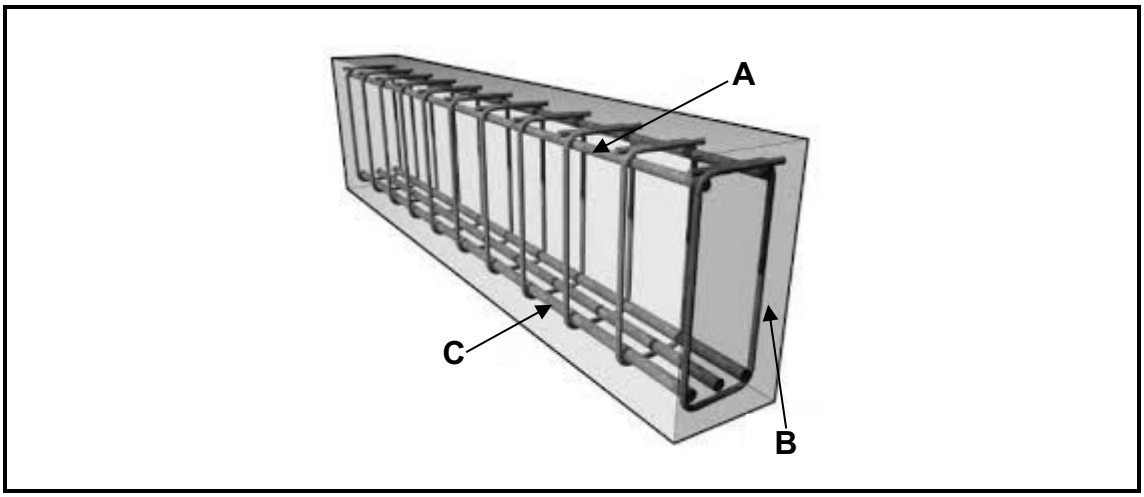


FIGURE 1

1.1.1 Name each reinforced rebar shown in FIGURE 1 by writing only the answer next to the letter (A–C) in the ANSWER BOOK. (3 × 1) (3)

1.1.2 How many main rebars are found on the compression side? (1)

1.1.3 Give a title for FIGURE 1. (1)

1.2 Explain the following description for dimensioning reinforcing bars:

8 Y10 – 02 – 100B (6)

1.3 Give the meaning of each of the following abbreviations:

1.3.1 TOG (1)

1.3.2 ALT (2)

1.3.3 STGD (1)

1.4 Name THREE types of reinforcement bars. (3)

1.5 Use the following information to complete the given bending schedule for the steel reinforcement in the beams in a construction project.

A	B	C	D	E	F	G	H				
Member								Bending dimensions			
	Bars per member	Number of members	Total bars	Type/ diameter	Bar mark	Shape code	Total length	A	B	C	D
Beam											
Main bars			16						150		
Stirrup			36						200		

1.5.1 The bars must be cut according to shape code 32. (2)

1.5.2 You need bars for FOUR beams. Each beam must have FOUR high-yield steel 16 mm bars and SIX plain mild steel 10 mm bars. (6)

1.5.3 Each of the 12 mm bars must have a straight length of 600 mm. The unbent length of these bars must be 900 mm. (2)

1.5.4 Each of the mild steel bars must have a straight length of 800 mm. The unbent lengths of these bars must be 1 200 mm. (2)

1.5.5 The high-yield bars have a bar mark of 01. The bar mark for the mild steel bars is 02. (2)

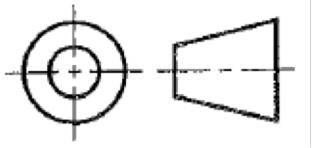
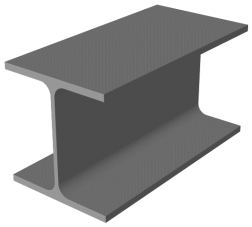
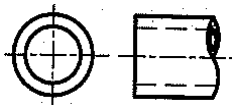
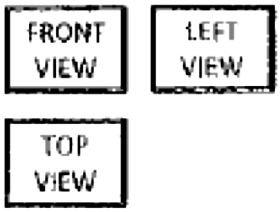
1.5.6 Calculate the total bars for each type. (2)

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QUESTION 2: STRUCTURAL STEEL WORK DETAILING

2.1 Name each of the following:

2.1.1 	2.1.6 
2.1.2 	2.1.7 
2.1.3 	2.1.8 
2.1.4 	2.1.9 
2.1.5 	2.1.10 

(10 × 1) (10)

2.2

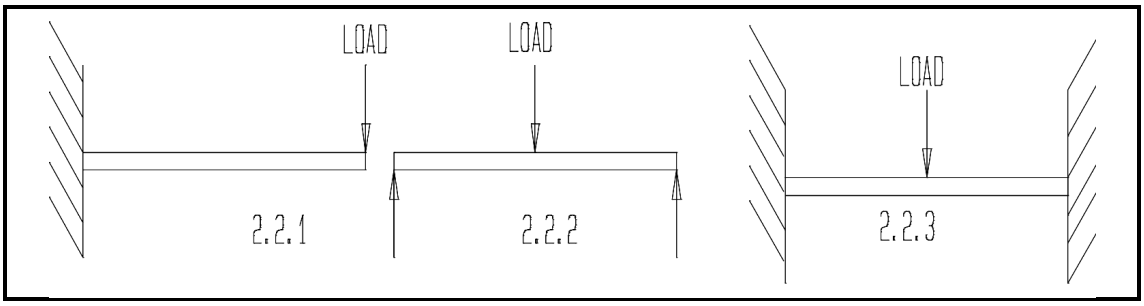


FIGURE 2

Name the THREE types of beams shown in FIGURE 2 by writing only the answer next to the question number (2.2.1–2.2.3) in the ANSWER BOOK.

(3 × 1) (3)

2.3 FIGURE 3 shows a typical threaded structural bolt.

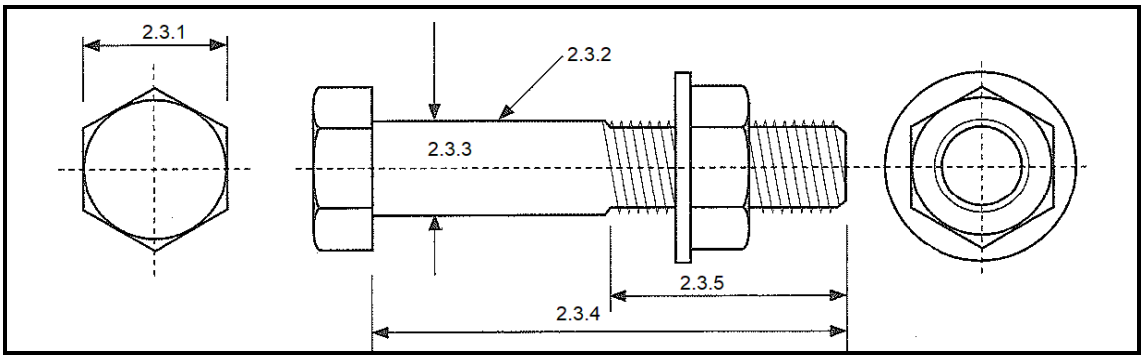


FIGURE 3

Label the typical threaded structural bolt shown in FIGURE 3 by writing only the answer next to the question number (2.3.1–2.3.5) in the ANSWER BOOK.

(5 × 1) (5)

2.4 Differentiate *hot-rolled sections* and *cold-rolled sections*. (3)

2.5 The size of a channel beam is 160 × 65 × 18,8 kg/m.

Use the steel table on the DIAGRAM SHEET (attached) to give each of the following dimensions:

2.5.1 h

2.5.2 b

2.5.3 t1 (flange thickness)

2.5.4 t2 (web thickness)

2.5.5 r1 (radius)

(5 × 1) (5)

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QUESTION 3: WELDING

3.1 Name FOUR metals that can be weld by manual metal arc welding (MMAW). (4)

3.2 FIGURE 4 shows a reference line with welding symbols.

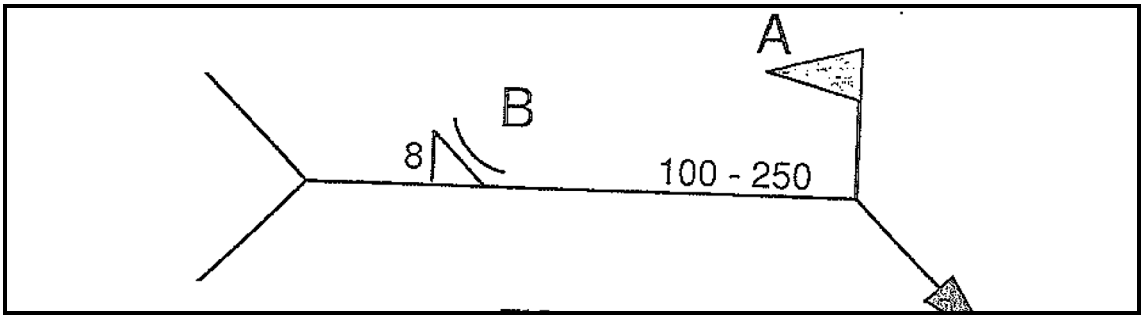


FIGURE 4

3.2.1 What does the flag at A represent? (1)

3.2.2 Explain all the symbols at B. (2)

3.2.3 Which side of the reference line is the near side? (1)

3.2.4 What do the figures 100–250 represent? (2)

3.3 What is the meaning of ESW? (2)

3.4 Name THREE hand tools used by a welder. (3)

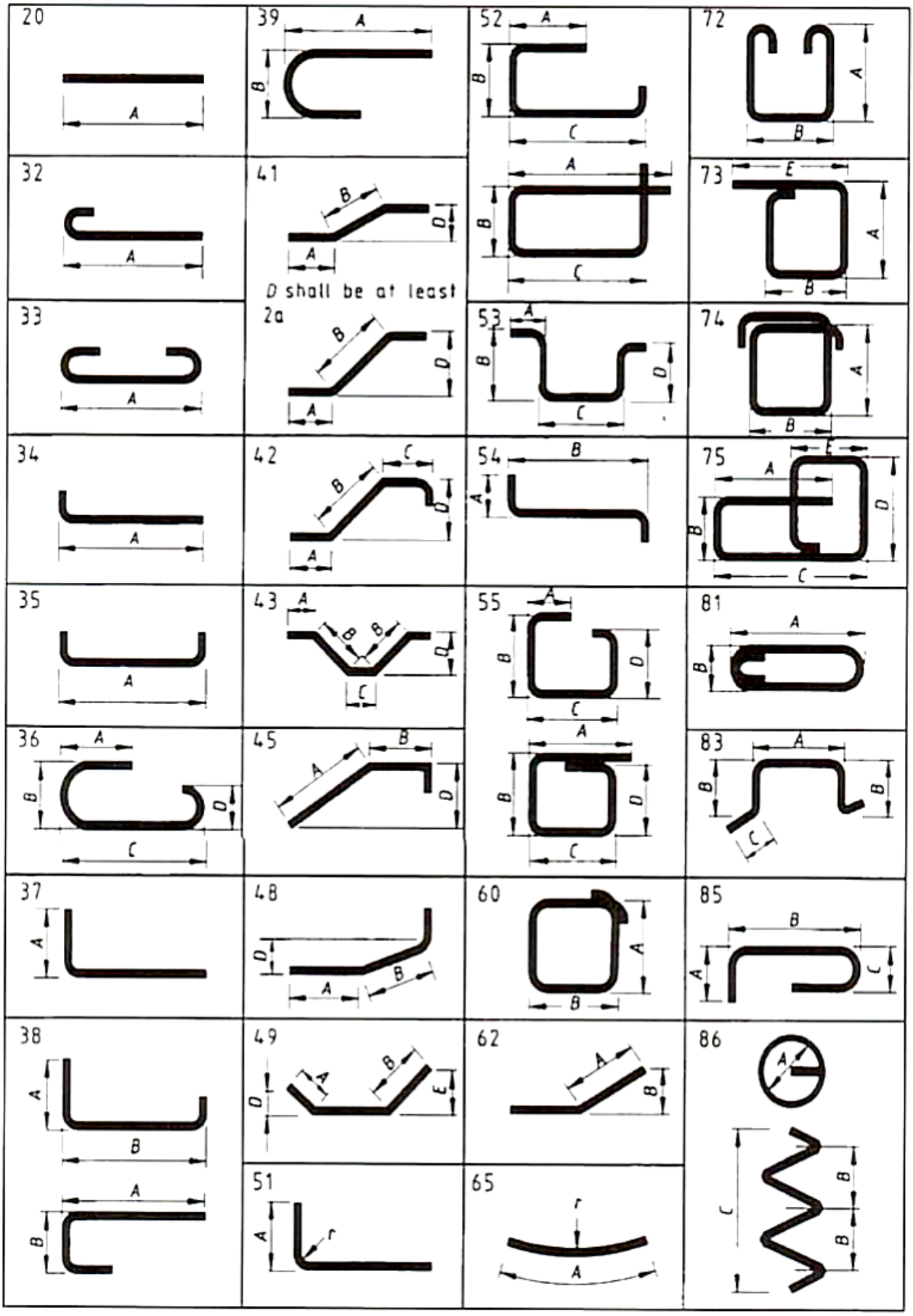
[15]

TOTAL: 75

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ADDENDUM



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