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)

15 March 2018 (X-Paper)
09:00–12:00

REQUIREMENTS: **A3 drawing paper**

Calculators may be used.
Candidates need drawing instruments.

This question paper consists of 5 pages and 1 addendum.

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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. Rule off across the page on completion of each question.
6. Drawings and sketches must be done neatly using drawing instruments.
7. Write neatly and legibly.

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QUESTION 1: REINFORCED CONCRETE DETAILING

1.1 Give a concise definition of each of the following terms:

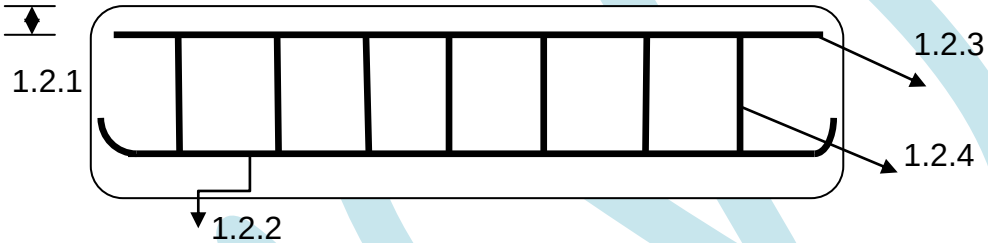
1.1.1 Concrete

1.1.2 Concrete cover

1.1.3 Stirrups

(3 × 2) (6)

1.2 Name the members of the reinforced beam in the FIGURE below. Write only the answer next to the question number (1.2.1–1.2.4) in the ANSWER BOOK.



(4)

1.3 Detailing involves schematically describing the way in which one is going to place the steel.

Briefly describe how you would orient reinforcement bars on each of the following members:

1.3.1 Column

1.3.2 Beam

1.3.3 Slab

(3 × 2) (6)

1.4 Study the bar bending schedule below and describe the meaning of each of the elements, for instance 'Number of members' means the number of members that make up the structure.

1	2	3	4	5	6	7	8	9	10	11	12
Member	Reinforcement					Bending dimensions for shape codes (SANS 282)					
Mark; size & no. off	No. in each	Total no.	Type and size	Mark	Length (mm)	Shape code	A	B	C	D	E or R

(10)

1.5 Explain the following description for dimensioning reinforcing bars:

18 R12 – 05 – 150T (4)

[30]

QUESTION 2: STRUCTURAL STEEL WORK DETAILING

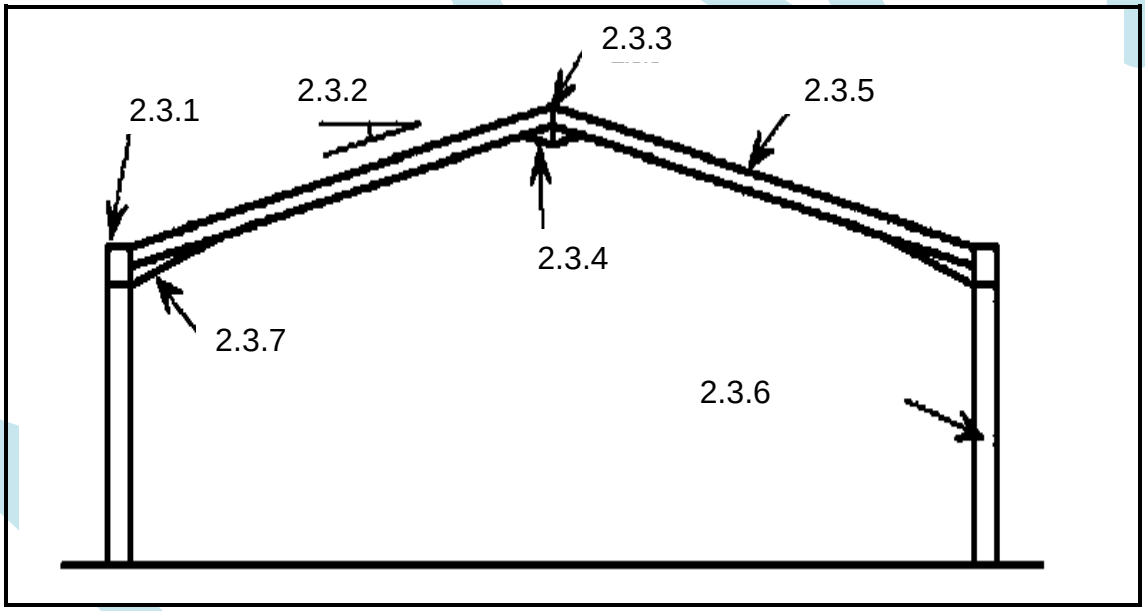
2.1 The function of a bolt is not only to attach one member to another, but also to transmit a force from the one member to the other.

Name THREE types of bolts used for connecting structural work. (3)

2.2 Differentiate between a *typical roof truss* and a *lattice girder truss*. (3)

2.3 The drawing below shows a portal frame.

Name the various components. Write only the answer next to the question number (2.3.1–2.3.7) in the ANSWER BOOK.



(7)

2.4 Holding down bolts have two purposes, namely to position the column base accurately and to transfer axial uplifting forces from the base of the column into the foundation.

Make a neat, fully labelled drawing of the holding down bolt detail to scale 1 : 5.

The footing is 1 000 mm × 1 000 mm × 400 mm
H.D. bolt 25 mm diameter (14)

2.5 Give a concise definition of the term *structural steel*. (3)

[30]

QUESTION 3: WELDING

3.1 Define each of the following terms with respect to welding:

3.1.1 Electrode

3.1.2 Weld distortion

(2 × 2) (4)

3.2 Describe FIVE hazards associated with manual arc welding. (5)

3.3 Briefly define the term *welding*. (2)

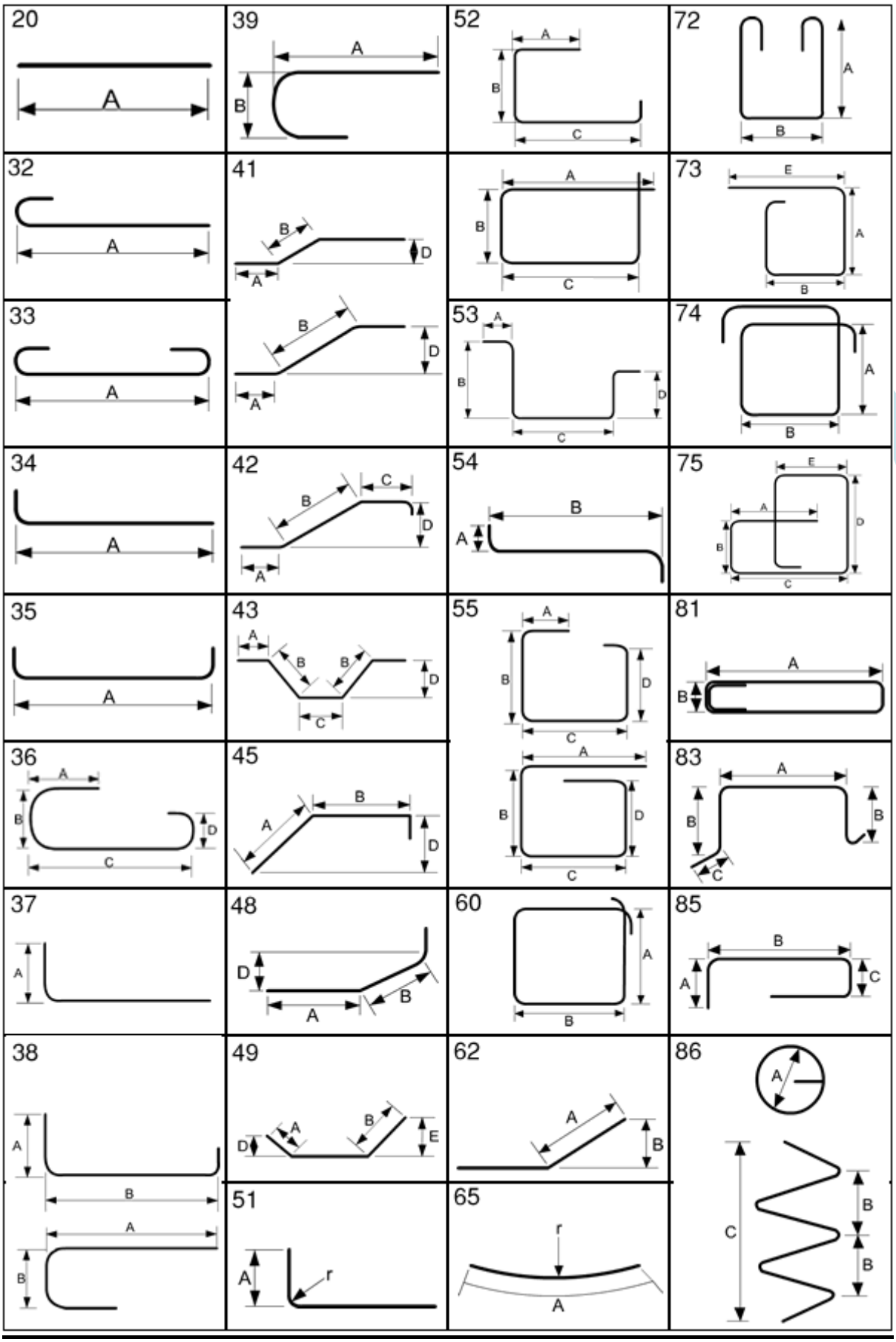
3.4 Name FOUR factors that influence the choice of edge preparation. (4)

[15]

TOTAL: 75

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ADDENDUM



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