higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CONCRETE STRUCTURES
NQF LEVEL 4

(12020514)

28 November 2023(X-paper)
09:00–12:00

This question paper consists of 6 pages.

423Q1N2328

Copyright reserved

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
CONCRETE STRUCTURES
NQF LEVEL 4
TIME: 3 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. Use only a black or blue pen.
5. Write neatly and legibly.

Copyright reserved

QUESTION 1: DELIVERY, HANDLING AND STORAGE OF REINFORCING STEEL

1.1 Give TWO reasons for storing bars. (2)

1.2 Complete the following sentences by choosing a word or words from the list below. Write only the answer next to the question number (1.2.1–1.2.8) in the ANSWER BOOK.

substances; neutralises; acids ; cement; alkaline; passive oxide; protective; corrosion; acidic conditions

Alkali is one of a class of (1.2.1) … that (1.2.2) … and are neutralized by (1.2.3) … oxide of the lime group.

The chemical environment provided by (1.2.4) … is (1.2.5) … and this alkalinity causes a (1.2.6) … ferric oxide protective film to form on the surface of the steel, making it much more resistant to (1.2.7) … than it would be in neutral or (1.2.8) … .

(8 × 1) (8)

[10]

QUSTION 2: INSTALLATION OF REINFORCING STEEL

2.1 Give a reason why ends of wire must always be cut off when fixing steel. (3)

2.2 Give THREE items you should wear to prevent cutting yourself with pliers ,or with sharp end of the wire when cutting ,bending and joining the steel bars. (3)

2.3 Illustrate by means of sketches and explain how the following ties are tied .

2.3.1 Crown tie

2.3.2 Slash tie

2.3.3 Ring slash

2.3.4 Splice

2.3.5 Hairpin

(5 × 2) (10)

Copyright reserved

2.4 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.4.1–2.4.5) in the ANSWER BOOK.

2.4.1 Bar tie twister wire is used by most contractors because it is malleable.

2.4.2 Ring slash is used on walls to prevent vertical bars from slipping.

2.4.3 Crowns ties are strong and secure ties and are often used in the same way as ring hairpin ties.

2.4.4 Hairpin ties are the strongest ties and are usually used to tie main bars together so that they do not move.

2.4.5 The concrete cover over projecting ends of ties or clamps must not comply with the concrete requirements for reinforcement.

(5 × 1) (5)

2.5 State a reason why black annealed wire is mostly used in construction. (2)

2.6 Give the difference between the following tools used by steel fixers in the construction industry.

2.6.1 Tying wire nips

2.6.2 Bar tie twister

(2 × 2) (4)

2.7 A steel fixer needs to fix reinforcement bars together. Explain how reinforcing steel is tied. (8)
[35]

QUESTION 3: CHECKS BEFORE CONCRETING

3.1 List TWO loads that can be carried by falsework. (2)

3.2 Explain the following bar notations:

3.2.1 20Y10 (3)

3.2.2 4R8 (3)

3.3 Mention the SANS ACT that should be considered when checking that bars are free from dirt. (2)
[10]

QUESTION 4: THE MANUFACTURE, PLACING AND COMPACTING OF CONCRETE

4.1 Illustrate by means of diagrams the THREE different types of slumps that can be achieved when determining the workability of concrete. (10)

4.2 The table below indicates the minimum and maximum mixing times. Complete the table by writing only the missing word or words next to the question number (4.2.1–4.2.3) in the ANSWER BOOK.

	DRUM-TYPE MIXER	PAN-TYPE MIXER
Batch size	**4.2.1**	
Minimum mixing time	1,5 minutes	1 minute
	Increase by 20 s for each additional cubic metre or part thereof.	**4.2.2**
Maximum continuous mixing time	**4.2.3**	6 minutes

(3 × 1) (3)

4.3 Give and briefly discuss THREE methods to retard the stiffening of concrete. (12)
[25]

QUESTION 5: STRIKING OF FORMWORK, MAKING GOOD AND FINISHING

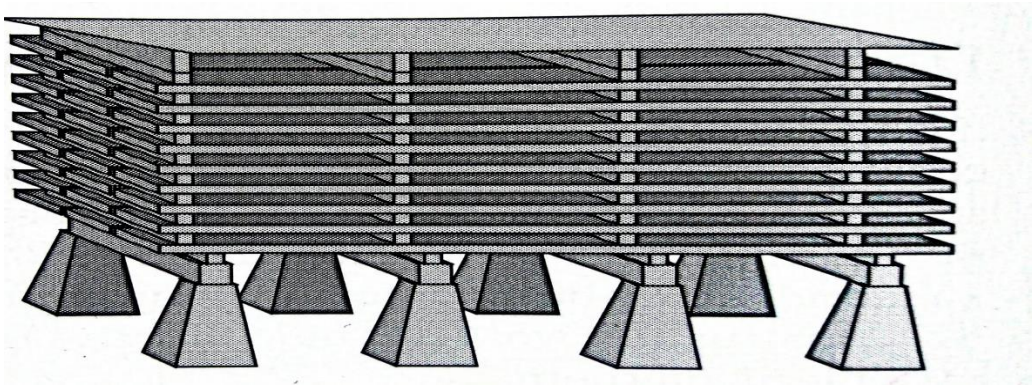
5.1 Give SIX advantages of preventing damage rather than trying to repair damaged concrete while making good. (6)

5.2 Briefly explain when surface plucking occurs. (2)

5.3 Define the term, *decking panels.* (2)
[10]

QUESTION 6: MAINTAINING AND STORING FORMWORK

6.1 Study the diagram and answer the question that follow.



6.1.1 Are the panels shown in the diagram stored correctly? Give a reason for your answer. (2)

6.1.2 Name the material used to cover the panels against reducing evaporation. (1)

6.1.3 State a reason why these panels are stored on top of a base. (2)

6.2 List FIVE facts to be considered when storing small components in a weatherproof shed or containers. (5)

[10]

TOTAL: 100

Copyright reserved