higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CONCRETE STRUCTURES
NQF LEVEL 2

(12020132)

28 November 2023 (Y-paper)
13:00–16:00

This question paper consists of 6 pages and 1 answer sheet.

421Q1N2328

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
CONCRETE STRUCTURES
NQF LEVEL 2
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. Answer QUESTION 7.6 on the ANSWER SHEET (attached).
5. Use only a blue or black pen.
6. The drawing must be clear, neat and labelled and a pencil may be used.
7. Write neatly and legibly.

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QUESTION 1

1.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1.1–1.1.6) in the ANSWER BOOK.

1.1.1 Concrete is the most frequently used material in the building industry and can be found in roads, houses and bridges.

1.1.2 It is widely believed that the first truly cement-like binding material was found in Pozzolana.

1.1.3 The domed Pantheon in Rome was originally built as a temple to all the gods.

1.1.4 The oculus in an aqueduct has been open to the weather, allowing rain to enter and fall to the floor.

1.1.5 A vault is an architectural term for an arched form with attached supports used to provide a space.

1.1.6 The Hoover Dam is seen as an architectural and engineering wonder.

(6 × 1) (6)

1.2 Explain the following terms:

1.2.1 Honeycomb

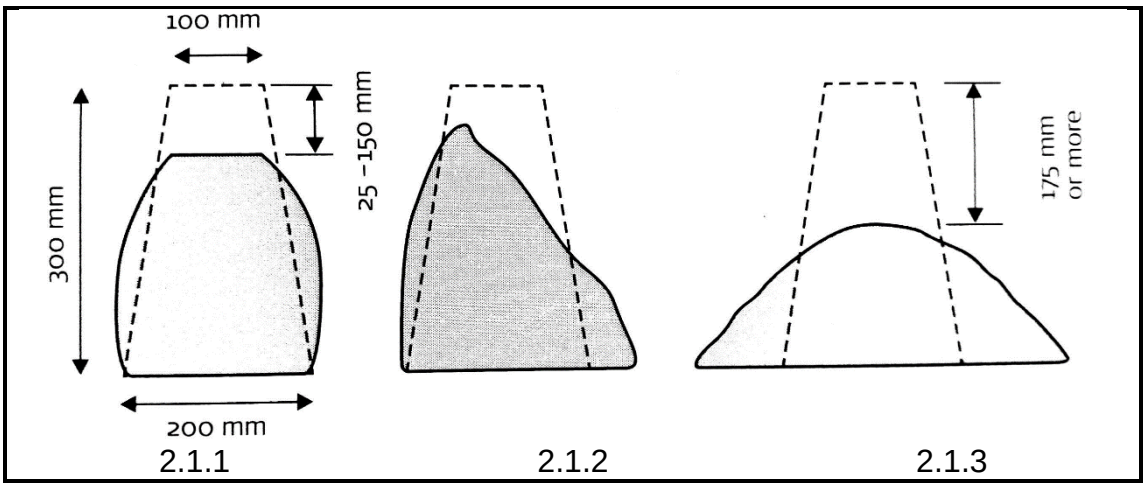
1.2.2 Temporary

(2 × 2) (4)

[10]

QUESTION 2

2.1 Name the following results obtained when concrete is tested:



(3)

2.2 Compare *permeable form face materials* with *non-permeable form face materials*. (2 × 2) (4)

2.3 Explain the results of using non-permeable form face materials. (2)

2.4 Name ONE type of structure that benefits from flying forms or table forms. (1)

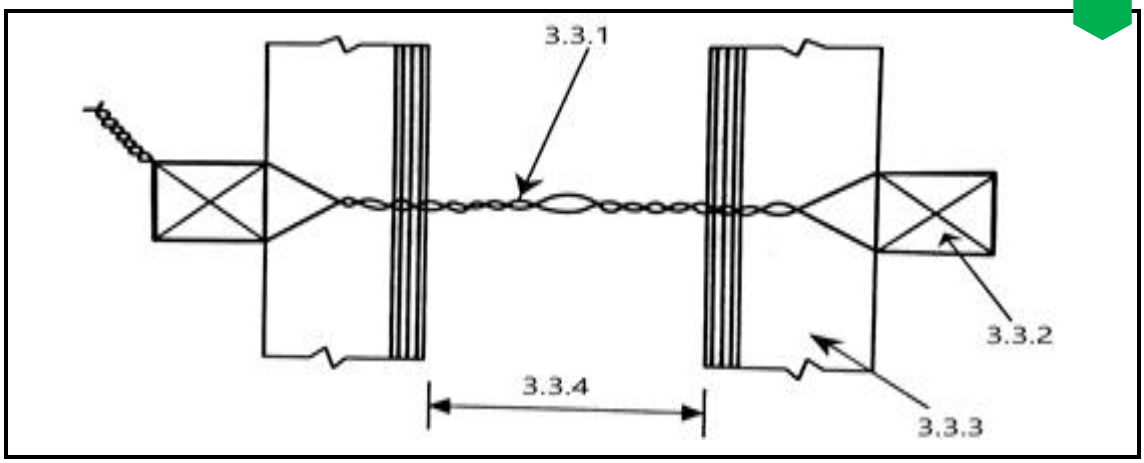
[10]

QUESTION 3

3.1 State THREE main groups of drawings in formwork construction. (3 × 2) (6)

3.2 Name FIVE types of concrete form ties. (5)

3.3 Study the diagram below and name the parts indicated by writing only the answer next to the question number (3.3.1–3.3.4) in the ANSWER BOOK.



(4 × 1) (4)

[15]

QUESTION 4

4.1 Explain the difference between the following:

4.1.1 Strong backs

4.1.2 Blocking pieces

(2 × 2) (4)

4.2 A kicker is used in wall forms where walls are clamped tight to the kicker.

Make a neat, labelled diagram of a kicker used in walls.

Show the following:

- Rebar steel higher than concrete for splicing to the pour
- Through ties
- Temporary spacers
- Wall shutters

(10)

4.3 State SIX steps in the erecting of a square timber formwork for a square column with the starter cast already in place. (6 × 1) (6)

4.4 Name ONE tool that may be used to mark shutters for a curved wall. (1)

4.5 Complete the sentences about the factors affecting the planning, setting out and preparing of shutters for curved walls by choosing the words from the list below. Write the answer next to the question number (4.5.1-4.5.4) in the ANSWER BOOK.

length; formwork; straight wall; curve; aluminium

When setting out the shutters that would be used for curved walls, follow the basic procedure used for (4.5.1) … . However, with curved walls, the outer side of the (4.5.2) … is longer than the inner side, so you need to take the difference in (4.5.3) … into account for the slightly different (4.5.4) … that the formwork will have.

(4 × 1) (4)
[25]

QUESTION 5

5.1 Explain the terms *green concrete* and *green cutting.* (2)

5.2 Describe the use of the green-cutting technique to prepare a concrete surface. (2)

5.3 State THREE factors that will show that the concrete was affected during the pours. (3)

5.4 Explain the difference in shape between the following:

5.4.1 Trapezium

5.4.2 Rebate

(2 × 1) (2)

5.5 Discuss ONE stage of producing vertical construction joints. (1)
[10]

QUESTION 6

6.1 Why is it important to pre-treat form faces? (2)

6.2 Compare the following effects of the application when applying a release agent to the form:

6.2.1 Not using enough

6.2.2 Applying too much

(2 × 2) (4)

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6.3 After applying a release agent to the form face, you should protect it.

Give TWO reasons for protecting form face materials. (2 × 2) (4)

[10]

QUESTION 7

7.1 The role of good workmanship is essential in achieving durable concrete structures.

State FOUR effects of poor workmanship. (4)

7.2 State TWO effects of poor fitting joints in formwork. (2)

7.3 Give the term used for poor fitting joints. (1)

7.4 State the most preferred and best method of curing. (1)

7.5 Differentiate between the following concrete terms:

7.5.1 Cover

7.5.2 Tolerance

(2 × 2) (4)

7.6 The checklist for inspecting formwork and false work is provided on the ANSWER SHEET (attached). Write EIGHT items to be checked when inspecting formwork and false work. It is not necessary to add comments.

Write your EXAMINATION NUMBER on the ANSWER SHEET, detach it from the question paper and hand in with the ANSWER BOOK. (8)

[20]

TOTAL: 100

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ANSWER SHEET **EXAMINATION NUMBER:**

QUESTION 7.6

FORMWORK CHECKLIST			
PROJECT:			
INSPECTION	**COMMENTS**	**CHECKED BY (PRINT NAME)**	**SIGNATURE**

(8)

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