higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

CONCRETE STRUCTURES
NQF LEVEL 2

(12020132)

2 December 2020 (X-paper)
09:00–12:00

Calculators may be used.

This question paper consists of 5 pages.

181Q1N2002

Copyright reserved

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. Keep sub-sections of questions together.
5. Rule off across the page after each completed question.
6. Start each question on a new page.
7. Sketches should be neat, clear and done with a pencil.
8. Write neatly and legibly.

Copyright reserved

QUESTION 1: INTRODUCTION TO FORMWORK AND FALSEWORK

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 Admixtures are chemicals in flake, powder or liquid form added to concrete at the mixing stage to modify properties of the mix.

1.2 Accelerators slow the chemical reaction of the cement and water leading to longer setting and slower initial strength gain.

1.3 We can use seawater if the concrete includes reinforcing steel or metal brackets, fixings, etc.

1.4 The Romans used pozzolana cement to build many other famous structures such as Table Mountain in Cape Town and Robben Island.

1.5 In 1824 Joseph Aspin, an English mason, produced new cement, which he called Portland cement because it looks the same as a natural stone quarried from the earth.

(5 × 2) **[10]**

QUESTION 2: FORM FACE MATERIALS AND SPECIAL TYPES OF FORMS

Define the following concrete terms:

2.1 Formwork

2.2 Shutters

2.3 Mould

2.4 Falsework

2.5 Formface

(5 × 2) **[10]**

QUESTION 3: PRESSURES RESISTED BY FORMWORK AND FALSEWORK

3.1 Calculate the pressure at the bottom of liquid concrete in a container with a height of 2 m. The density of the concrete is 2 000 kg/m^3 and the gravity force is 9,81 m/s^2. Give the answer in kPa. (5)

3.2 Give FOUR reasons why we sometimes use concrete form ties in formwork. (4)

3.3 Give FOUR reasons why a prop can buckle and collapse. (4)

3.4 Define the term *reshores.* (2)

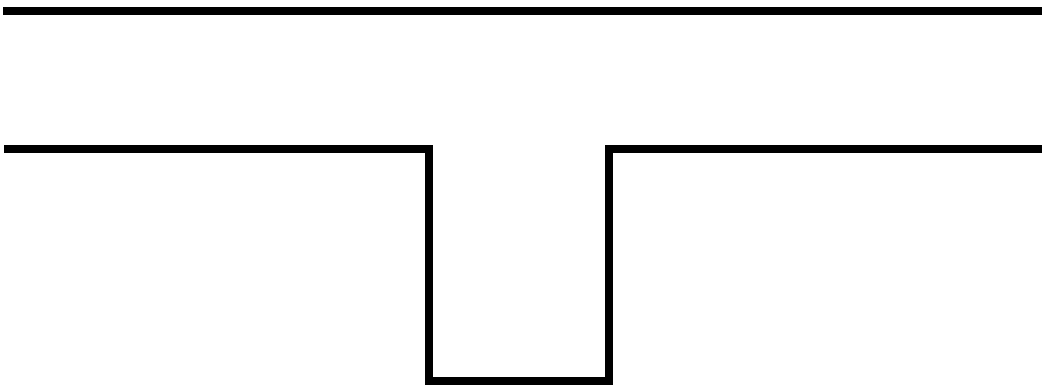
[15]

Copyright reserved

QUESTION 4: ERECTING FORMWORK AND FALSEWORK

4.1 Make a neat, simple top-view drawing to illustrate the support work and formwork for an L-shaped wall. Your drawing must indicate the following sections and parts of the structure: waler, soldier, ferrule tie, kicker block, stay, cross brace, strongback and strap. Label your drawing clearly. (10)

4.2 The FIGURE below shows part of a concrete beam and slab. Copy this figure in the answer book and complete it by showing what the wooden formwork would look like, including a prop, uprights, cleats and a deck board. Label the drawing.



(10)

4.3 Explain by means of a neat, labelled drawing the use of a trammel. (5)
[25]

QUESTION 5: VERTICAL STOP ENDS, WATER AND JOINTS

5.1 Explain under what circumstances you would use the following types of joints:

5.1.1 Joggle joints

5.1.2 Construction joints with starter bars

5.1.3 Expansion (isolation) joints

5.1.4 Contraction (control) joints

(4 × 2) (8)

5.2 Name TWO types of materials that water stops are manufactured of. (2)
[10]

QUESTION 6: USING RELEASE AGENTS

6.1 Define a *releasing agent.* (2)

6.2 Name FIVE characteristics of a release agent. (5)

6.3 Name THREE instances when a release agent must be applied to the formwork faces. (3)
[10]

QUESTION 7: WORKMANSHIP AND DETAILING IN CONCRETE STRUCTURES

7.1 Make a neat, labelled, freehand sketch to show the effect of a rebate on concrete cover. (8)

7.2 List 10 points that should be included on a formwork checklist. (10)

7.3 State TWO factors that could negatively affect the sufficiency of concrete cover. (2)
[20]

TOTAL: 100

Copyright reserved