higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 2

(12030152)

2 December 2020 (X-paper)
09:00–12:00

This question paper consists of 5 pages.

231Q1N2002

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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. Write neatly and legibly.

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QUESTION 1: BASIC CONCEPTS AND ROAD-BUILDING TERMINOLOGY

Define each of the following terms:

1.1 Soil classification

1.2 Road furniture

1.3 Plate compactor

1.4 Water sprinkler

1.5 Grader

(5 × 2) **[10]**

QUESTION 2: ROAD SURVEY

2.1 Briefly explain FIVE road-surveying concepts used when surveying a road during road construction. (5)

2.2 Name the method used to set out a right-angled triangle. (1)

2.3 Give FOUR types of instruments used when levelling on a slope. (4)

2.4 Name THREE levelling instruments used to level the ground and explain the purpose of each. (3 × 2) (6)

2.5 Write each of the following abbreviations in full:

2.5.1 PI

2.5.2 BC

2.5.3 CL

2.5.4 EC

(4 × 1) (4)
[20]

QUESTION 3: SOIL, GRAVELS AND ROAD-BUILDING MATERIALS

3.1 Name THREE types of soil commonly used to make the layers of the road. (3)

3.2 Give the particle size of each of the following types of soil:

3.2.1 Salt

3.2.2 Sand

3.2.3 Gravel

3.2.4 Clay

(4 × 1) (4)

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3.3 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (3.3.1–3.3.4) in the ANSWER BOOK.

3.3.1 Strength-bearing capacity is the maximum allowable load that soil can take before it becomes unstable.

3.3.2 Grading refers to the grouping of bitumen according to its properties.

3.3.3 Permeability is the ability of a stone to allow water to flow through it.

3.3.4 Swell is the term used for the expansion of certain soils due to an increase in water content.

(4 × 1) (4)

3.4 Give FOUR disadvantages if soil is not well compacted. (4)

3.5 List FIVE pieces of equipment needed to determine the liquid limit of soils using the flow-curve method. (5)

[20]

QUESTION 4: INTRODUCTION TO ROAD DRAINAGE

4.1 List FIVE structures used to remove water from the road surface. (5)

4.2 Give ONE function of each of the following drainage systems:

4.2.1 Culvert pipe

4.2.2 Culvert box

4.2.3 V-drain

4.2.4 Subsoil pipe

4.2.5 Channel

(5 × 1) (5)

4.3 Tabulate the differences between *surface drainage* and *subsurface drainage*.

(5 + 5) (10)

[20]

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QUESTION 5: EARTHWORKS

5.1 List FIVE types of road-construction hazards. (5)

5.2 Define each of the following concepts:

5.2.1 Runner

5.2.2 Sheeting

5.2.3 Puncheon

5.2.4 Strut

5.2.5 Poling board

(5 × 1) (5)

5.3 List FIVE responsibilities of the worker to ensure safety on the site. (5)

5.4 Give FIVE ways to reduce hazards in the workplace. (5)

5.5 Name the equipment used to do each of the following earthwork jobs:

5.5.1 Hauling

5.5.2 Excavation

5.5.3 Spreading

5.5.4 Compaction

5.5.5 Loading

(5 × 1) (5)
[25]

QUESTION 6: LAYER WORKS

List FIVE ways to prepare the subgrade of a new road. **[5]**

TOTAL: 100

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