higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# NATIONAL CERTIFICATE (VOCATIONAL)

## ROADS
## NQF LEVEL 3

(12030363)

**10 March 2020 (X-paper)**
**09:00–12:00**

**This question paper consists of 5 pages.**

411Q1S2010

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**TIME: 3 HOURS**
**MARKS: 100**

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**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: FURTHER ROAD-BUILDING TERMINOLOGY

1.1 Define each of the following concepts:

1.1.1 Prime coat

1.1.2 Tack coat

1.1.3 Fog spray

1.1.4 Texture treatment

1.1.5 Asphalt

(5 × 2) (10)

1.2 Give THREE reasons for cutting a road. (3)

1.3 List FOUR types of underground services found on the road reserve. (4)

1.4 List THREE uses of gabion. (3)

**[20]**

## QUESTION 2: INTRODUCTION TO ROAD SURFACE

2.1 State FOUR aspects to monitor during the mixing of asphalt. (4)

2.2 List SIX pieces of equipment required for laying single and double seals. (6)

2.3 State FIVE properties that aggregate used as a single or double seal must have to withstand traffic load. (5)

**[15]**

## QUESTION 3: ROAD FURNITURE

3.1 Give FIVE places where pedestrian guardrails would be placed. (5)

3.2 What is a *road marking*? (1)

3.3 Give THREE uses of road markings. (3)

3.4 Give a reason why the design of direction signs is important. (1)

**[10]**

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## QUESTION 4: ROAD SURVEY

4.1 Define each of the following concepts:

4.1.1 Reverse curve

4.1.2 Spiral curve

4.1.3 Super elevation

4.1.4 Centripetal force

4.1.5 Set out

(5 × 2) (10)

4.2 Write down the abbreviation of each of the following terms related to the curve of the road:

4.2.1 Point of intersection

4.2.2 Length of curve

4.2.3 Point of vertical tangent

4.2.4 Final slope of road

4.2.5 Initial slope of road

(5 × 1) (5)

4.3 Briefly explain how to set out a simple manual theodolite. (5)

4.4 Briefly explain FIVE steps to estimate the horizontal distance when using a level. (5)

**[25]**

## QUESTION 5: EARTHWORK

5.1 Give ONE use of each of the following:

5.1.1 Vibrating roller

5.1.2 Dozer

5.1.3 Articulated truck

5.1.4 Digger

5.1.5 Front-end loader

5.1.6 Slip form

5.1.7 Rock dumper

5.1.8 Scraper

(8 × 1) (8)

5.2 What is *soil compaction*? (3)

5.3 Give FIVE reasons for compacting soil. (5)

5.4 List FOUR types of compaction. (4)

5.5 Give ONE type of soil that can be easily compacted. (1)

5.6 When is the formula d = ((a – b) ÷ (b – c)) × 100 used? (1)

5.7 State the purpose of each of the following soil tests:

5.7.1 Sand-replacement test

5.7.2 California bearing-ratio test

5.7.3 Relative-density test

5.7.4 Modified-AASHTO test

(4 × 2) (8)

**[30]**

**TOTAL: 100**

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