higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 2

(12030152)

12 March 2018 (X-Paper)
09:00–12:00

This question paper consists of 5 pages.

NCV

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 subsections of question together.
5. Rule off on completion of each question.
6. ALL work you do not want to be marked must be clearly crossed out.
7. Write neatly and legibly.

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QUESTION 1: BASIC CONCEPTS AND ROAD-BUILDING TERMINOLOGY

1.1 Complete the following sentences by using the words given in the list below. Write only the word(s) next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

pothole; road furniture; batter boards; plant; bitumen; median; profile; embankment; verge

1.1.1 A rough bowl-shaped hole in the road found in various sizes caused by localised disintegration

1.1.2 A black adhesive compound used to bond the aggregate on the road surface

1.1.3 The equipment that is used during the process of road construction

1.1.4 The area between the inner edges of the inside traffic lanes of a divided road, including the inner shoulder and the centre land

1.1.5 Horizontal wooden planks that are secured between two stakes

(5 × 1) (5)

1.2 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.2.1–1.2.5) in the ANSWER BOOK.

1.2.1 Temporary signs are used to warn road users of obstructions on the highway caused by roadworks.

1.2.2 A loader is a machine that digs and lifts soil from the ground using a large forklift bucket.

1.2.3 Sprinkler water is usually conveyed by a large truck used to load the soil.

1.2.4 A bulldozer is used for large excavations.

1.2.5 A pedestrian guardrail is generally found along the edge of a footway for the safety of pedestrians.

(5 × 1) (5)

[10]

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QUESTION 2: ROAD SURVEYING

2.1 Explain the following terms as used in road surveying:

2.1.1 Centre line

2.1.2 Chainage

2.1.3 Slope

(3 × 2) (6)

2.2 Briefly and step-by-step, explain the method to set out the centre line to serve as a guide for the road construction. (6)

2.3 Name the FIVE different parts of a road that need to be set out when designing a road. (5)

2.4 Calculate the density of a sample of dry soil with a mass of 102 kg and a volume of 5 m³. (3)

[20]

QUESTION 3: SOIL, GRAVEL AND ROAD-BUILDING MATERIAL

3.1 Name THREE types of seals commonly used in road construction and state how each differs from the other. (3 × 2) (6)

3.2 Name and describe THREE types of soil used in road construction. (3 × 2) (6)

3.3 Briefly describe the compaction of soil with reference to the optimum moisture content and its influence on compaction. (3)

3.4 Calculate the moisture content of the sample given below.

Given:	Mass of wet soil	=	736 g
	Mass of dry soil	=	673 g
	Mass of water	=	93 g

(5)

[20]

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QUESTION 4: ROAD DRAINAGE

4.1 Define the term *road drainage*. (3)

4.2 Briefly explain TWO types of road drainage that are used to remove water from the road surface. (2 × 2) (4)

4.3 State and explain THREE functions of road drainage. (3 × 2) (6)

4.4 Name FOUR ways in which soil erosion can be prevented along the sides of a road. (4)

4.5 What is *road camber* and why is it important? (3)
[20]

QUESTION 5: EARTHWORKS

5.1 Name and explain FIVE types of equipment used to do earthworks on site. (5)

5.2 Give FIVE reasons why soil needs to be compacted. (5)

5.3 Name FIVE acts introduced by government to ensure safe and efficient working conditions for construction workers. (5)

5.4 Briefly explain FOUR ways in which hazards can be reduced in the workplace. (4)

5.5 Define the following terms:

5.5.1 Timbering

5.5.2 Compaction

5.5.3 Haul

(3 × 2) (6)
[25]

QUESTION 6: LAYERWORKS

6.1 Name THREE types of stabilisation agents used to stabilise soil in road construction. (3)

6.2 Briefly explain TWO advantages of using foamed bitumen during soil stabilisation at roads. (2)
[5]

TOTAL: 100

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