higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ROADS
NQF LEVEL 3

(12030363)

9 March 2018 (X-Paper)
09:00–12:00

This question paper consists of 6 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. Write neatly and legibly.

NCV

QUESTION 1: FURTHER ROAD BUILDING TERMINOLOGY

1.1 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.1.1	Material not suitable to be used where a specified type of soil must be used to build a pavement layer	A	interchange
1.1.2	To transport, as with a truck or cart	B	tangent
1.1.3	A junction of two or more highways by a system of separate levels that permit traffic to pass from one highway to another without the crossing of traffic streams	C	tack coat
1.1.4	Place where water is gathered in large quantities like a river or dam	D	outfall
1.1.5	Raised devices, parabolic in shape, placed across the road to slow traffic	E	speed humps
1.1.6	A technique whereby concrete is cast and formwork is moved forward along the project leaving the previously cast concrete hardening behind it	F	bowser
1.1.7	A thin film of binder to improve adhesion between courses in a road formation	G	spoil
1.1.8	A tanker truck is used to spray water evenly on the road layers to ensure a correct moisture content in the soil	H	hauling
1.1.9	A line that is perfectly perpendicular to the radius of the curve	I	pavement
1.1.10	The surfaced area on which traffic drives	J	slip forms

(10 × 1) (10)

1.2 Define the following terminology commonly used in road construction works:

1.2.1 Road bed

1.2.2 Borrow pit

1.2.3 Geology

1.2.4 Flexible pavement

1.2.5 Camber

(5 × 2) (10)
[20]

QUESTION 2: INTRODUCTION TO ROAD SURFACING

2.1 Name THREE types of concrete pavements used for surfacing roads. (3)

2.2 Describe the following types of asphalt used in South Africa:

2.2.1 Gap graded asphalt

2.2.2 Continuous graded asphalt

2.2.3 Open graded asphalt

(3 × 2) (6)

2.3 Name TWO types of seals used in asphalt road construction. (2)

2.4 State FOUR variables that the selection of a type of road surfacing material for a particular application may depend on. (4)
[15]

QUESTION 3: ROAD FURNITURE

3.1 Explain the function of the following road furniture:

3.1.1 Painted lines

3.1.2 Wire rope

(2 × 2) (4)

3.2 State TWO important requirements for signage alongside a very busy road. (2)

3.3 State the place along the road where the following road furniture is installed:

3.3.1 Traffic lights

3.3.2 Cat's eyes

(2 × 2) (4)
[10]

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QUESTION 4: ROAD SURVEYING

4.1 Explain the use of the following road-surveying equipment and instruments:

4.1.1 Boning rods

4.1.2 Dumpy level

4.1.3 Water level

4.1.4 Profile boards

(4 × 2) (8)

4.2 Differentiate between a *sag curve* and a *crest curve.* (4)

4.3 Describe how to set out a horizontal curve using the method of successive chords. (9)

4.4 List FOUR components of a theodolite. (4)

[25]

QUESTION 5: EARTHWORKS

5.1 Name FOUR compaction equipment and their uses during road construction. (8)

5.2 Name THREE types of tests that can be conducted when testing the moisture content in different types of soils for road building. (3)

5.3 Calculate the density of a base course material with a mass of 2 490 kg and a volume of 0,9 kg/m^3.

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$ (3)

5.4 Name the construction machinery in FIGURE 1 below and state TWO of its uses during road construction.



FIGURE 1 (3)

5.5 Name TWO types of plant or machinery that can be used for each of the following operations:

5.5.1 Spreading

5.5.2 Compacting

5.5.3 Hauling

(3 × 2) (6)

5.6 Describe the implications of moisture content being:

5.6.1 Slightly above optimum content when compacting gravel

5.6.2 Slightly below optimum content when compacting gravel

(2 × 2) (4)

5.7 What do the following abbreviations stand for?

5.7.1 CBR

5.7.2 RD

5.7.3 TRH

(3 × 1) (3)

[30]

TOTAL: 100

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