



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

NOVEMBER EXAMINATION 2011

**MATERIALS
NQF LEVEL 2**

11 NOVEMBER 2011

This marking guideline consists of 7 pages.

QUESTION 1

- 1.1 1.1.1 Density is the mass of solid materials contained in a particular volume. (1)
- 1.1.2 This is the density of material relative to the density of water usually given as 1000 kg/m³. (1)
- 1.1.3 Volume is the amount of space the material occupies and can be measured in cube metres (m³). (1)
- 1.1.4 Mass is the amount of matter (Solid particles) in a material and can be measured in kilograms (kg). (1)
- 1.2 1.2.1 Stress is the result of force over an area. (1)
- 1.2.2 Strain is the possible change in shape from the downward stress. (1)
- 1.3 - People are protected from harmful materials.
 - Trade with other countries is boosted.
 - When writing contract specifications refer to various SANS documents.
 - Standards allow the control of materials and procedures in terms of quality.
 - Quality assurance (4)
 - Safety Approved [10]
 - Durable
- (any relevant answer)Any (2 × 2)

QUESTION 2

- 2.1 2.1.1 Eight. (1)
- 2.1.2 Star. (1)
- 2.1.3 Trilliard. Any Galaxy (1)
- 2.1.4 Gaseous. (1)
- 2.1.5 Orbiting (1)
- (Due to incorrectness of question full marks must be awarded to candidate even if he/she did not attempt question).
- 2.2 2.2.1 - The Core
 - The Mantle
 - The Crust Any (1 × 1) (1)
- 2.2.2 - The Core - the innermost part of the Earth.
 - The Mantle - the part of the Earth between the core and the crust.
 - The Crust - the outer skin of the Earth.
 Any (1 × 1) (1)

- 2.3 - Chromite.
 - Vanadium.
 - Platinum
 Gold (3)
 Diamonds or any other mineral (3 × 1) [10]

QUESTION 3

- 3.1 - Clay and silt.
 - Sand and gravel.
 - Water.
 - Gas.
 - lime (3)
 Any (3 × 1)
- 3.2 - Strip foundation.
 - Pad foundation.
 - Raft foundation.
 - Pile foundation.
 - Deep strip foundation.
 - Reinforced strip foundation.
 Any (2 × 1) (2)
- 3.3 - Hand tampers.
 - Impact tampers.
 - Plate vibrators/ compactors.
 - Double Roller.
 - Rammer/Jumping jack/Upright Tamper.
 - Three - wheeled roller. (any relevant answer)
 Any (3 × 1) (3)
- 3.4 - Plate Compactor.
 - It needs minimal handling of the materials.
 - No mortar is required.
 Is cheaper (2)
 Any (2 × 1) [10]

QUESTION 4

- 4.1 - Clay is the material used to manufacture clay bricks.
 - Material particles are fused together by applying large amount of heat.
 - (1,5 × 2) (3)
- Note - Face brick aesthetic (FBA).
 4.4 - Face brick standard (FBS).
 - Face brick extra (FBE).
 (any relevant answer) Any (2 × 1) (2)

- 4.2 - Porosity is a measure of space in material.
 - It can be measured in percentage between 0 – 100% or by fraction between 0 – 1.
 - Porosity is indirectly related to hydraulic conductivity. (3 × 1) (3)
- 4.3 - Vanadium stains can be seen as yellow – green discolouration on the brick surface.
 - It can be prevented by making sure the water cannot get into the brick.
 - Do not wash the wall with water afterwards. (4)
 Any (2 × 2)
- 4.5 - Saturate wall with water (1)
 - Apply mortar cleaning acid. (1)
 - Wash down wall thoroughly again. (1)
 (any relevant answer) [15]

QUESTION 5

(Question does not make sense) award 5 full marks for any reasonable answer

- 5.1 5.1.1 Is a composite material traditionally made by mixing cement, water, sand and stone to form a mouldable material that hardens into whatever shape it is placed into. (1)
- 5.1.2 Are steel cables, wire or rods that are street so that they transfer a compressive force to concrete. (1)
- 5.1.3 Is concrete that is kept in compression by steel tendons. (1)
- 5.1.4 Is concrete that is cast or placed where it is to be used. (1)
- 5.1.5 Is concrete that is cast or placed in one location. (1)
- 5.2 Portland cement is the basis of all common cements covered by SANS 50197 – 1 and of site blends that include a cement extender. (2)
 (question confusing: award full marks for reasonable answer)
- 5.3 - Plasticisers.
 - Superplasticisers.
 - Air entrainers.
 - Accelerators.
 - Retarders. (any relevant answer) (5)

- 5.4
- A conical container with a vertical height of 300 mm, a bottom diameter of 200mm and a top diameter of 100 mm is used.
 - The container is placed on a clean, level surface and filled with freshly mixed concrete.
 - Filling is done in four layers (± 75 mm per layer). Each layer is compacted 25 times with a 16 \times 600 mm bullet point rod.
 - As soon as the container is full, scrape off level, overturn it and carefully lift it off.
 - Allow to slump and place a level across the container and over the concrete.
 - The distance by which the concrete has slumped can now be measured. The amount of water in the container mixture will influence the slump.
- Any (5 \times 1) (5)
- 5.5
- Clay and lime are processed and combined with water to form slurry.
 - This slurry is fed into a rotary kiln, from top to the bottom. Heat is provided by a burner at the lower end with a temperature of 1 456° C at the burner to approximately 70° c at the higher end
 - This slurry is then fed into the kiln at the higher end.
 - In this process, all the water will evaporate.
 - The lime will for calcium oxide and combine with the silica from the clay to form dark grey nodules called Portland clinker.
 - The fine powder is made from clinker to form Portland cement.
 - The clinker is then ground to a fine powder to form Portland cement.
 - Limestone and Cl
- Any (5 \times 1) (5)
- 5.6
- Place cement of bags on stacks of wood to avoid contact with water.
 - Store it in a temperature controlled and a water tight room.
 - Bags should not be stacked more than 12 bags high.
 - Different types of cement should not be mixed together.
 - FIFO (first in first out).
 - Silos must be marked to indicate which type of cement they contain.
 - Bag must be stored such that the older bags are used first
 - The floor of the store must be dry.
 - Bags must be stored close together to prevent circulation of air.
 - Bags must be stacked at least 300mm from the walls.
 - Bags should be covered with tarpaulins or other waterproof covers for further protection from moisture.
 - Store in a secure and lockable room.
- Any (3 \times 1) (3)
[25]

QUESTION 6

- 6.1 It is a mixture of sand, water and cement or cement and lime that becomes hard as stone. (2)
- 6.2 - In the use of construction masonry units..
- It binds bricks and blocks together to give strength and stability to a wall.
- It is used to bond masonry together and has to be applied with a trowel.
(any relevant answer) (3 × 1) (3)
- 6.3 - Cement.
- Lime.
- Sand.
- Water. (4 × 1) (4)
- 6.4 - To improve resistance to water penetration.
- To improve the aesthetics of the wall's final appearance.
(any relevant answer) (2 × 1) (2)
- 6.5 - Cement - sand plasters. For External
- Cement - lime – sand plasters. For internal Gypson base plaster
(2 × 1) (2)
- 6.6 Plaster mixes made with masonry cement:
- Masonry cement consist of a blend of group clinker, ground limestone or hydrated, and an air – entraining additive. (1)
- Plaster mixes made with common cement:
- Plasters made with common cements are stronger and more impermeable than those made with masonry cement.
(any relevant answer) (1)
- 6.7 - A plaster mix should be used within 2 hours.
- In very hot weather, setting could occur after an hour.
(any relevant answer) (2 × 1) (2)
- 6.8 - Hydrated builders lime is made by quenching quicklime.
- The lime used in mortar and concrete is hydrated builder's lime.
- Motar becomes more workable
Motar have high water retention rate. (3)
Smooth finish (any relevant answer) **[20]**

QUESTION 7

7.1	7.1.1	True.	(1)
	7.1.2	False.	(1)
	7.1.3	True.	(1)
	7.1.4	True./or false	(1)
	7.1.5	False.	(1)
	7.1.6	False.	(1)
	7.1.7	False.	(1)
	7.1.8	False.	(1)
	7.1.9	True.	(1)
	7.1.10	false	(1)
			[10]

TOTAL: 100