



# higher education & training

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

## **MARKING GUIDELINE**

**NATIONAL CERTIFICATE (VOCATIONAL)**

**NOVEMBER 2010**

**MATERIALS  
NQF LEVEL 2**

**29 NOVEMBER 2010**

**This marking guideline consists of 8 pages.**

**QUESTION 1**

1.1	1.1.1	True√	(1)
	1.1.2	True√	(1)
	1.1.3	True√	(1)
	1.1.4	False√	(1)
	1.1.5	True√	(1)
1.2	1.2.1	b√	(1)
	1.2.2	a√	(1)
	1.2.3	a√	(1)
	1.2.4	b√	(1)
	1.2.5	c√	(1)
			<b>[10]</b>

**QUESTION 2**

2.1	2.1.1	-Permeability: the ability of a substance to allow water or gas to pass through it. √√	(2)
		-The mechanical property of a material that that allows the flow of liquids or gases through a material √√	(2)
			<u>ANY ONE</u> 1X2
2.1	2.1.2	-hard and tough, but breaks if bent too much√√	(2)
		-The tendency to crack or tear easily when stretched- it collapses without ant deformation √√	(2)
			<u>ANY ONE</u> 1X2
2.1	2.1.3	the process of taking care of concrete while it hardens√√	(2)
		Is maintenance of adequate moisture and a moderate temperature in concrete while t hardens. √√	(2)
			<u>ANY ONE</u> 1X2
2.2	(a)	better in quality√	(1)
	(b)	safety proven√	(1)
	(c)	you know you have a tested product√	(1)
	(d)	you know you have a better product √	(1)
	(e)	you know the product has been made to specific standards √	(1)
	(f)	you are protected from harmful materials √	(1)
	(g)	you are protected from substandard products√	(1)
	(h)	standards allow the control of materials & procedures in terms of quality√	(1)
	(i)	when writing specifications referring to SANS documents saves time√	(1)
			<u>ANY TWO</u> 2X1
			<b>[8]</b>

**QUESTION 3**

- 3.1 - A grout residue remover can be applied to the effected area to reduce the effects of the salts.√  
 - The grout removing agent should create a fizzing reaction to indicate a chemical reaction. √

## MATERIALS

- The stains should be brushed off but the grout removing agent should not be washed off the brick. ✓ (3)
- Use a wire brush to brush the crystals of the surface. ✓  
Be careful that the brushed off crystals do not gather near the surface as they may be later dissolved by water and move back up the surface. ✓✓ (3)  
ANY THREE 3X1
- 3.2 To make easy calculation of quantities of materials. ✓  
- to avoid wastage ✓ (1)  
ANY ONE 1X1
- 3.3 To meet required standards. ✓  
- To maintain consistency ✓  
- To ensure you have a better product ✓ (1)  
ANY ONE 1X1
- 3.4  
- Moisten bricks before laying them. ✓  
- Build walls that are not too long. ✓  
- Build control joints. ✓  
- Use approved materials ✓  
- Use materials that is less absorbent ✓  
- Do not use material that show a large amount of moisture expansion ✓  
- Use expansion joints in long walls ✓
- 3.5 - Use expansion joints on the perimeter of infill panels ✓ (3)  
ANY THREE 3X1
- For environmental reasons ✓  
- For economic reasons ✓  
- It saves natural resources ✓  
- It cuts down on energy being used ✓  
- It prevents wastage of materials ✓ (2)  
- There is less pressure on existing resources ✓  
ANY TWO 2X1 [10]

**QUESTION 4**

- 4.1 - 5600 BC (one of the oldest known construction is a hut in the former Yugoslavia) mixture of red lime ✓  
- 1950 BC (a mural at Thebes in Egypt, shows concrete being manufactured and placed.) ✓  
- Romans civilisation developed concrete for use in large buildings, drainage and water systems (mix of some volcanic ash which contained fine silica and alumina which reacted chemically with the lime, creating a "pozzolanic cement" ✓  
- In 1824, Joseph Aspdin from UK patented "Portland" cement, manufactured by the burning of limestone and coal and clay. ✓ (4)

OR

## MATERIALS

Origins of concrete can be traced back to the Babylonians who used a clay mix similar to concrete. ✓

It was also used by the Romans who used a cement like material which hardened when mixed with water. ✓

Modern day concrete was not invented till 1756 when John Smeaton pioneered the use of cement in concrete. His ingredients included pebbles and powdered brick. ✓

In 1824 Joseph Aspidn invented Portland Cement by burning limestone and clay together. ✓ (4)

ANY TWO 4X1

- 4.2 To improve concrete's tensile strength. ✓✓  
 - less volume of concrete will be used to give the structure its designed strength ✓✓  
 - to improve the compressive or tensile strength of the concrete ✓✓ (2)  
ANY ONE 1X2

- 4.3 - 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 300 mm 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 ✓✓ (10)  
ANY FIVE 5X2

- 4.4 To determine the workability of concrete. ✓✓  
 - To test the consistency of concrete ✓✓  
 - gives information on the workability of concrete ✓✓  
 - It is a measure of quality control ✓✓ (2)  
ANY ONE 1X2

- 4.5 Retarders ✓  
 Accelerators ✓  
 Water reducers ✓  
 Air trapping agents ✓ (4)  
**[22]**

## QUESTION 5

- 5.1 Re-tempering happens when water is added to a re-hydrating mortar before setting. ✓

## MATERIALS

- e.g low strength of mortar and poor bonding ✓
  - the water cement ratio will tend to change which relates to the strength of the mortar ✓
- (2)
- ANY ONE EXAMPLE 1X1

- 5.2      5.2.1      5:1✓✓      (2)
- 5.2.2      6:1✓✓      (2)

- 5.3      5.3.1      Time: Mortar tube strength is tested on a cube 7 days, and again 28 after the cube has been left for curing. ✓
- Brick strength is dependent on the method of manufacturing. ✓      (2)
- 5.3.2      Strength: Both take time to achieve their optimum strength. ✓✓
- A change in mortar strength does not affect the brick strength ✓✓      (2)
- ANY ONE 1X2
- [10]**

**QUESTION 6**

- 6.1      Use appropriate type of filler material. ✓✓
- If the cracks are noticed before the plaster has completely set, the cracks can be trowelled close. ✓✓      (2)
- ANY ONE 1X2

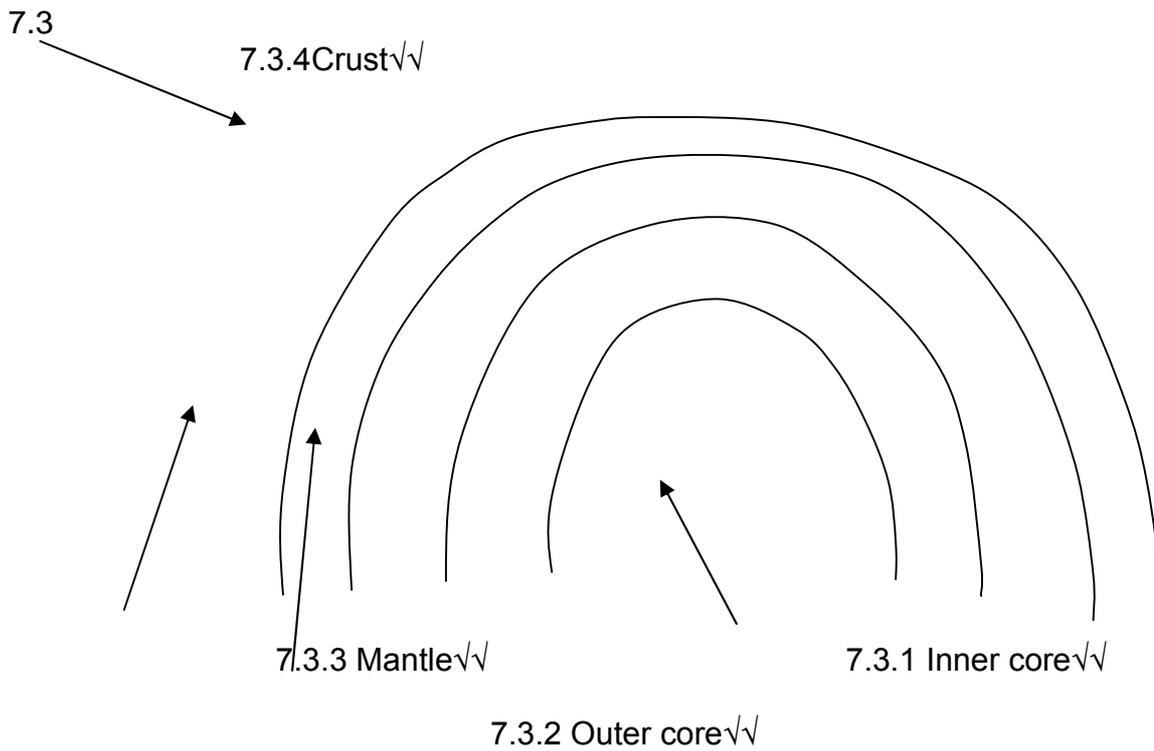
- 6.2      - Craziing✓✓
- Debonding✓✓
- Cracking✓✓
- Lack of hardness✓✓
- if it is to thin : it will weaken resistance to water penetration ✓✓
- :The outline of the brickwork/blocks will be seen ✓✓
- : It will wheather easily and fail ✓✓
- : fire resistance will be weakened✓✓
- : acoustics will be lessened ✓✓
- if it is to thick: It will not bond properly to the walls ✓✓
- : It is likely to crack ✓✓
- : It can influence the aesthetics of the wall negatively ✓✓
- : It will negatively affect the holding ability of items fixed to the walls ✓✓      (6)
- ANY THREE 3X2
- [8]**

**QUESTION 7**

- 7.1      7.1.1      Rammer/Upright tamper/plate compactor: ✓ useful for compacting smaller area or for working in confined areas. ✓      (2)
- 7.1.2      Plate tamp compactor/vibratory plate compactor: ✓ useful for compacting filling for floor slabs, under paved areas, brick or block

7.1.3 paving, or in bitumen. ✓ (2)  
Roller/Ride on vibratory roller/smooth drum roller: ✓ useful for (2)  
compacting larger areas. ✓

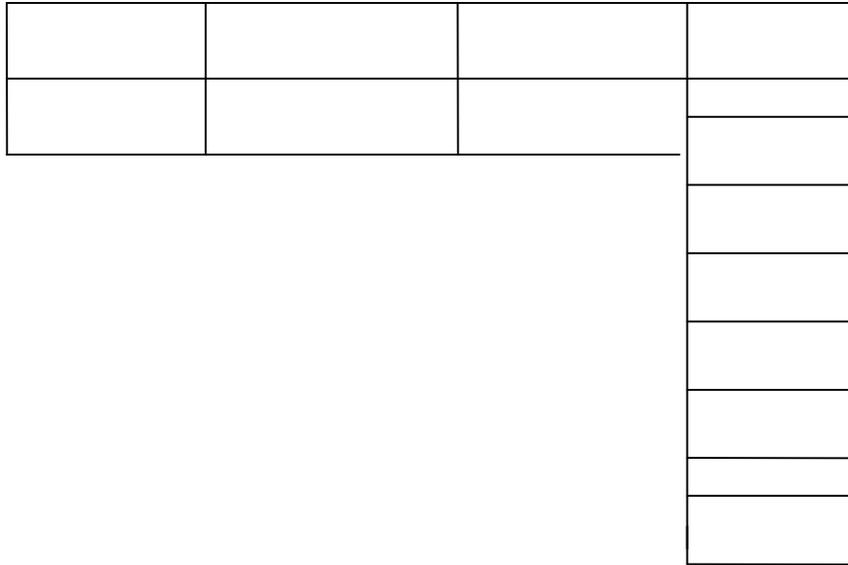
7.2 - can bear more weight ✓  
- will not compress further when built upon ✓  
- will absorb water less easily ✓  
- it becomes more dense ✓  
- it can support heavier loads ✓  
- it decreases the amount of settlement under a heavy load ✓ (3)  
ANY THREE 3X1



(8)

7.4 7.4 (i) English Bond

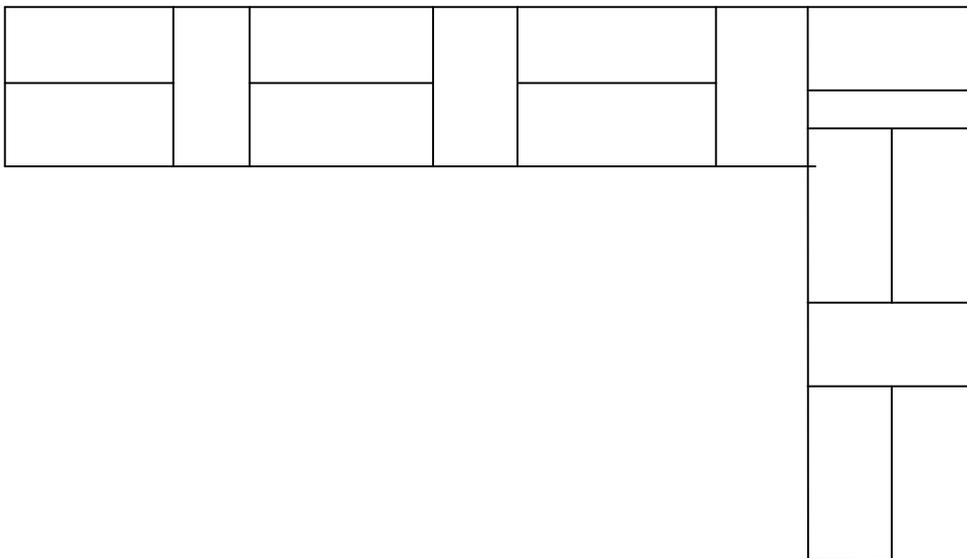
Drawing √√√



(3)

7.4 (ii) Flemish bond

Drawing √√√



(3)  
[23]

**NOTE ; FRONT VIEWS OF STRAIGHT WALLS WILL ALSO BE ACCEPTABLE**

**QUESTION 8**

- 8.1 Screed is a mixture of cement and fine sand ✓✓  
Topping is mixture of a small stones, sand and cement. ✓✓ (4)
- 8.2 - It chips away and removes deteriorating concrete without damaging the layers below. ✓✓ (4)
- 8.3 - removes the old layer of screed and roughens concrete substrate to improve the bond. ✓✓
- 40 mm✓ (1)
- [9]**
- TOTAL: 100**