higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

CONCRETE STRUCTURES
NQF LEVEL 2

28 November 2023

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 1.1.1 True
1.1.2 False
1.1.3 True
1.1.4 False
1.1.5 False
1.1.6 True

(6 × 1) (6)

1.2 1.2.1 It is a set of poles and boards that are put together to make a temporary structure for construction workers to stand on.

1.2.2 It is any material or structure to be used for only a limited period of time.

(2 × 2) (4)
[10]

QUESTION 2

2.1 2.1.1 True slump
2.1.2 Shear slump
2.1.3 Collapsed slump

(3 × 1) (3)

2.2
- Permeable form face materials absorb liquid.
- Non-permeable form face materials do not easily absorb fluids. (2 × 2) (4)

2.3
- When non-permeable form face materials are used, trapped air and water cannot escape and bubbles called bug holes will appear on the set concrete surface.
- These bug holes spoil the look of finished concrete and can cause problems if concrete must be painted.
- These bug holes when left untreated will lead to the fast deterioration of the concrete. (Any 2 × 1) (2)

2.4
- Multistory buildings
- Apartment blocks
- Hotels (Any 1 × 1) (1)

[10]

QUESTION 3

3.1
- Drawings that are needed for the manufacturing process.
- Further drawings for the work on-site
- Detailed drawings for any form of construction that cannot be clearly shown in either of the previously mentioned drawings. (3 × 2) (6)

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3.2
- Crimped ties
- She-bolts
- Colt ties
- Twisted wire loop wall ties
- Snap ties (5)

3.3 3.3.1 Twisted wire loop
3.3.2 Waling
3.3.3 Stud
3.3.4 Wall

(4 × 1) (4)
[15]

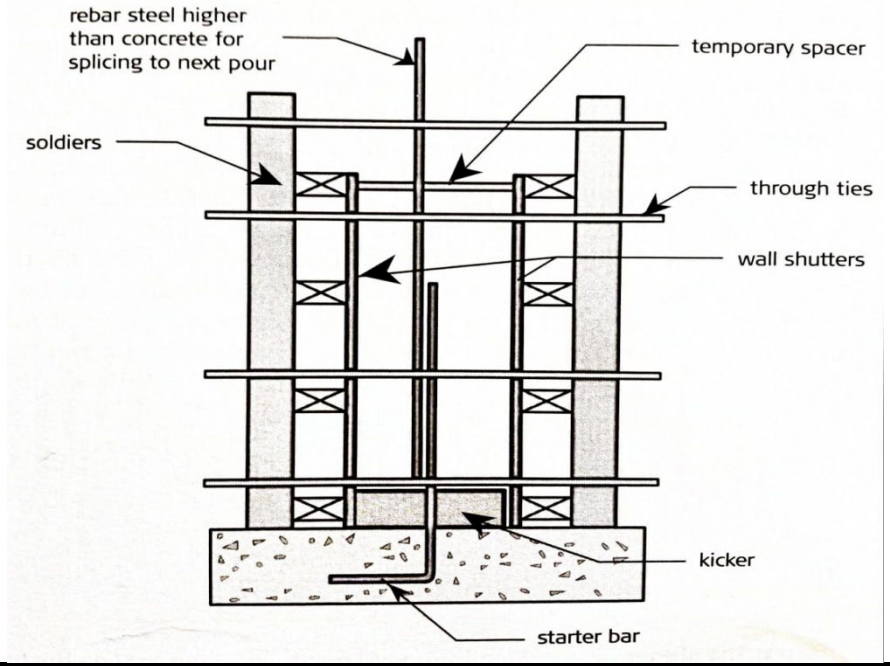
QUESTION 4

4.1 4.1.1 Short pieces of wood (1 000 mm × 1 200 mm) made with heavy pieces of timber✓ that can be used for beams or scaffolding planks.✓

4.1.2 Small blocks of wood that can be used to help keep stays and strong backs together.

(Any relevant answer) (2 × 2) (4)

4.2



Mark allocation	
Correct drawing	3
Any 6 correct labels	6
Neatness	1
TOTAL	**10**

(10)

4.3
- Make shutter board panels.
- Put all four panels in place and tie the spacers to the reinforcement.
- Nail cleats across the corners of the formwork to strap it in place.
- Nail stays to the formwork.
- Put clamps onto and wedges into the formwork.
- Tighten the clamps by hammering the wedges in as far as they will go.
- Check that the column box is square.
- Check that the column box is level.

(This is the finished formwork for a square column.) (Any 6 × 1) (6)

4.4 Trammel (1)

4.5
4.5.1 Straight walls
4.5.2 Formwork
4.5.3 Length
4.5.4 Curve

(4 × 1) (4)
[25]

QUESTION 5

5.1
- The concrete that has set but not hardened properly is called green concrete.
- The cutting into or shaving the surface of green concrete, is called green cutting. (2)

5.2
- The concrete surface must be prepared for bonding with the new concrete.
- This is done by cleaning off the exposed laitance and enough surface mortar to expose the coarse concrete.
- This is done by removing the surface laitance and mortar from the partially hardened concrete
- by means of high-pressure air and a water jet.
- Two washes or more are recommended to complete the cleaning operations. (Any 2 × 1) (2)

5.3
- The colour of cement
- The mix proportions
- The amount of mixing and compaction
- The formwork material finish and setting
- Any release agent or other coating it receives (Any 3 × 1) (3)

5.4
5.4.1 A shape with four sides, none of which is parallel.

5.4.2 A rectangular narrow cut made to cover up a construction joint
(2 × 1) (2)

5.5
- It provides a former against which the following concrete is stopped until it has hardened.
- It prepares the hardened concrete surface to get the needed continuity with a follow-on pour. (Any 1 × 1) (1)

[10]

QUESTION 6

6.1
- It prevents the absorption of water.
- Avoiding grain pattern finish.
- To overcome the problem of different types of absorption. (2 × 1) (2)

6.2 6.2.1 The release agent can cause the concrete surface to pluck,✓ which happens when patches of surface sticking to the formwork are pulled off the face when the formwork is removed.✓

6.2.2 May stain and soften the hardened concrete surface,✓ or increase the risk of getting on the steel reinforcement✓ or cause safety hazards.✓

(2 × 2) (4)

6.3
- Protect them from dust or dirt which may stick to the form surfaces.
- The release agent may be removed by the effects of the weather such as the evaporation of rainwater, strong winds and strong sunlight or drying winds. (2 × 2) (4)

[10]

QUESTION 7

7.1
- Bad concrete even if the best materials are used
- Concrete leakage
- Poor finish
- Lots of grinding, patching and rubber coating may be needed
- Serious structural failures and injuries to workers
- Poor fitting joists (Any 4 × 1) (4)

7.2
- The grout will run out and leave unfilled spaces between the stones.
- Weak concrete with ugly finish.
- Voids left in concrete due to failure of mortar to effectively fill the gaps or spaces between coarse aggregate particles. (Any 2 × 1) (2)

7.3 Honeycombing (1)

7.4 Formwork should be left as long as necessary. (1)

7.5 7.5.1 The distance from the outside face of the concrete to the nearest surface of reinforcing steel.

7.5.2 An allowance made for something to vary in size from the standard or limit, within which it is allowed to vary.

(2 × 2) (4)

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7.6 ANSWER SHEET

FORMWORK CHECKLIST

PROJECT: Name of choice			
INSPECTION	**COMMENTS**	**CHECKED BY (PRINT NAME)**	**SIGNATURE**
Joint between wall/columns and kickers correctly positioned and sealed, grout tight.✓		Name of choice	Signature of choice
Wall and columns plumb and correctly positioned.✓			
All services (electrical conduits, downpipes, service ducts and waterpipes) in place according to drawings and specifications.✓			
Conduits and service ducts have a double-draw wire visible at either end to facilitate drawing of conductors at a later stage.✓			
All apertures to services blocked off to prevent ingress of concrete, mortar and dirt.✓			
Backup poker vibrator available and a sufficient supply of fuel.✓			
Correct release agent used and properly applied to the formwork so that there is a thin film, no pools.✓			
All form joints are grout-tight and flushed.✓			
All tie bars in place and tight.✓			
Stop-ends and water stops correctly installed.✓			
False work adequately founded.✓			
Vertical props and standards plumb and not bent.✓			
No eccentricities in loaded compression members that could precipitate buckling✓			
False work adequately braced and laced.✓			
All wedges driven home securely and proper shear pins used on all telescopic props. Bundle of nails not permitted as a substitute where shear pins are missing.✓			
Placing crew has proper access to place concrete.✓			
Placing crew has a safe working platform on which to work and place equipment.✓			
Void formers firmly secured and tied down so they will not float up.✓			
A light coating of oil was applied on the back of vertical forms and fittings to prevent split concrete from sticking.✓			
An independent and suitably qualified expert inspected the formwork and consent was given to commence casting.✓			

(Any relevant answers accepted) (8 × 1) (8)

[20]

TOTAL: 100

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