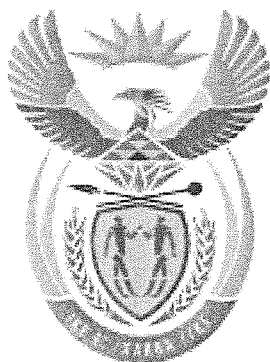


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# higher education & training

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

**T70(E)(J23)T  
AUGUST EXAMINATION**

**NATIONAL CERTIFICATE**

**BUILDING AND CIVIL TECHNOLOGY N3**

**(11010273)**

**23 July 2014 (Y-Paper)  
13:00–16:00**

**Nonprogrammable calculators are allowed.**

**This question paper consists of 6 pages.**

**DEPARTMENT OF HIGHER EDUCATION AND TRAINING  
REPUBLIC OF SOUTH AFRICA**

**NATIONAL CERTIFICATE  
BUILDING AND CIVIL TECHNOLOGY N3**

**TIME: 3 HOURS**

**MARKS: 100**

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**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. Sketches should be neatly and clearly labelled.
  5. Your understanding of the subject is what is important, NOT the reproduction of the study material.
  6. Start each question on a NEW page.
  7. Write neatly and legibly.
-

**QUESTION 1**

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1–1.10) in the ANSWER BOOK.

- 1.1 Once the owner is satisfied with the design, he/she signs a contract with the architect.
- 1.2 A health and safety committee holds a meeting once every three months.
- 1.3 The carpenter ensures that wall plates are soundly bedded.
- 1.4 The painter ensures that the specified coats of paint are applied
- 1.5 A written or verbal notice of an accident shall, as soon as possible, after such accident has happened, be given by or on behalf of the employee concerned, to the employer.
- 1.6 Communication is the process by means of which opinions are exchanged through a system of symbols.
- 1.7 One of the owner's functions is to consult with the clerk of works at the beginning of the contract and to supply him or her with all the relevant data about the proposed work, such as space, location, costs, the proposed use of the new building and time limits.
- 1.8 The contract manager is a member of the building team. His/her role is crucial to the success of any project.
- 1.9 The contractor represents a specific area or town and is involved in all building activities that fall within his/her jurisdiction.
- 1.10 The plumber ensures that ventilation pipes are properly secured or that vent valves are sealed back after testing a sewer line.

(10 × 1) [10]

**QUESTION 2**

- 2.1 A sloping rectangular site has been set out. As a site surveyor you are required to put profiles for excavation so as to level the site.

Explain how you would go about transferring your foundation levels onto the profiles based on the length of your traveller.

(6)

- 2.2 Name FOUR types of foundations.

(4)

[10]

**QUESTION 3**

- 3.1 Explain the term *cavity wall*. (2)
- 3.2 Damp-proofing is very important when building.  
Name SIX types of damp-proof courses. (6)
- 3.3 Calculate how much water you would need in the following situation: (2)  
200 kg of cement with a water: cement ratio of 0,5.
- 3.4 Discuss the terms *pointing* and *jointing*. (5)  
[15]

**QUESTION 4**

- 4.1 Different grades of timber are used and the letters are painted on one end of the timber for identification.  
Explain the meaning of the following grades:
- 4.1.1 CLG
- 4.1.2 HLG
- 4.1.3 SLG
- 4.1.4 ING
- 4.1.5 FK (5 × 1) (5)
- 4.2 Briefly describe how the following connections are used:
- 4.2.1 Bolt joints (3)
- 4.2.2 Weld joint (2)  
[10]

**QUESTION 5**

5.1 Briefly explain the following terms used in painting:

5.1.1 Sandblasting

5.1.2 Acid pickling

5.1.3 Flame cleaning

(3 x 1) (3)

5.2 Many factors should be considered when selecting a floor finishing.

Name and explain SIX factors to be considered.

(12)  
[15]

**QUESTION 6**

6.1 What causes potholes on the road?

(1)

6.2 Name THREE types of kerbing.

(3)

6.3 A foundation that is 13 m long, 0,610 m wide and 0,305 m thick must be cast.

Calculate the amount of concrete required and the cost of the concrete if the concrete cost is R450/m<sup>3</sup>.

(4)

6.4 The number of bricks used in 1 m<sup>2</sup> of one-brick walling is 100.

Calculate the square area if 9 000 bricks are used.

(2)  
[10]

**QUESTION 7**

7.1 State FOUR advantages of a combination geyser.

(4)

7.2 Give the abbreviations of the following:

7.2.1 Urinal

7.2.2 Rainwater pipe

7.2.3 Wash basin

7.2.4 Flushing valve

7.2.5 Inspection chamber

7.2.6 Sprinkler system

(6 x 1) (6)  
[10]

**QUESTION 8**

8.1 Explain the following terms used on roads:

8.1.1 Base

8.1.2 Haunch

8.1.3 Base course

8.1.4 Crown of the road

8.1.5 Formation

(2 x 5) (10)

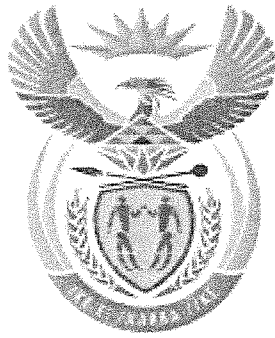
8.2 The choice of paving will depend mainly on how much the client wishes to spend, the client's personal preference, and the intended use to which the area will be put.

Describe in detail the FIVE reasons for paving.

(10)

[20]

**TOTAL: 100**



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## **MARKING GUIDELINE**

**NATIONAL CERTIFICATE  
AUGUST EXAMINATION  
BUILDING AND CIVIL TECHNOLOGY N3**

**23 JULY 2014**

**This marking guideline consists of 6 pages.**

**MARKING INSTRUCTIONS**

1. Mark neatly with a red pen
2. Do not draw lines through wrong answers.
3. Write the marks for each answer in the right margin and the TOTAL for a whole question in a circle in the left margin.
4. Use your own discretion should there be more than one possible correct answer/formula/sketch that does not appear on the memorandum. Please evaluate it and allocate marks accordingly.



**QUESTION 1**

- 1.1 True
- 1.2 False
- 1.3 True
- 1.4 True
- 1.5 True
- 1.6 False
- 1.7 False
- 1.8 True
- 1.9 False
- 1.10 False

(10 x 1) [10]

**QUESTION 2**

- 2.1 From the site boundaries measured set out the proposed building, increasing the area by  $\pm 1$  m.✓ Punch in two pegs ( $\pm 2$  m long pegs)✓ 1 m away from each corner in line with the building line in all four corners.✓ Because of the length of the pegs a traveller of 1,5 m would be appropriate.✓ The formation level plus/minus the benchmark,✓ plus the length of the traveller will give the staff reading on all eight pegs sight rails.✓

(6)

- 2.2
  - 2.2.1 Strip foundation
  - 2.2.2 Raft foundation
  - 2.2.3 Column foundation
  - 2.2.4 Cantilevered foundation

(4 x 1) (4)  
[10]**QUESTION 3**

- 3.1 Cavity walls consist of two skins of brickwork or block work with a cavity in between.✓ This type of wall gives a better resistance to moisture and it also provides thermal insulation.✓

(2)

- 3.2
- Lead
  - Bitumen
  - Slate
  - Copper
  - Asphalt
  - Polythene

(6 x 1) (6)

- 3.3                      Mass of water = Ratio × Cement  
                                  = 0,5 × 200✓  
                                  = 100 kg  
                                  = 100 litres✓ (2)
- 3.4                      *Pointing* is the finish given to the joints by raking out✓ to a depth of approximately 20 mm✓ and filling in on the face with hard setting cement.✓
- Jointing* is the finish given to the joints✓ when carried out as the work proceeds.✓ (5)  
 [15]

**QUESTION 4**

- 4.1                      4.1.1                      Clear grade timber  
                                  4.1.2                      Half-clear grade timber  
                                  4.1.3                      Selected grade timber  
                                  4.1.4                      Industrial grade timber  
                                  4.1.5                      Knot grade timber (5 x 1)                      (5)
- 4.2                      4.2.1                      Bolt joint: These are the cheapest joints available.✓ They may be either hot-forged or cold-forged, and the thread is machined onto the shank.✓ They have a low shear stress and should only be used for the end connection of secondary beams.✓ (3)
- 4.2.2                      Weld joint: This is primarily considered to be a shop connection since the cost of the welding, together with the need for inspection,✓ makes this method uneconomical for site connection.✓ (2)  
                                  [10]

**QUESTION 5**

- 5.1                      5.1.1                      Sandblasting is commonly used and is a very effective method of cleaning iron and steel work.
- 5.1.2                      Acid pickling is the treatment that is available in the form of a solution of phosphate which is applied by coating the steel with the solution.
- 5.1.3                      Flame cleaning is very effective when removing scale and rust spots from metal. (3 x 1)                      (3)

- 5.2
- Durability:✓ the material to be used must have a reasonable life span.✓
  - Resistance:✓ the floor material should withstand a heavy load placed on top of it.✓
  - Economical:✓ the initial capital investment and the maintenance of the floor area.✓
  - Cleaning operations:✓ the floor should be easy to clean.✓
  - Non-slip qualities:✓ the material used for particular traffic or storage purposes should be of a non-slip quality to ensure safety.✓
  - Appearance:✓ it is important to consider the type of material to be applied for a specific room.✓

(6 x 2) (12)  
[15]

## QUESTION 6

- 6.1 Potholes are caused by localised disintegration. (1)
- 6.2
- Barrier kerbstone with channel
  - Semi-mountable kerbs
  - Barrier kerbing
- (3 x 1) (3)
- 6.3
- Volume of concrete =  $l \times b \times d$   
 $= 13 \times 0,610 \times 0,305$ ✓  
 $= 2,418 \text{ m}^3$ ✓
- Cost of concrete =  $2,418 \times R450$ ✓  
 $= R 1088,1$ ✓ (4)
- 6.4
- Square area =  $\frac{9000}{100}$ ✓  
 $= 90 \text{ m}^2$ ✓ (2)  
 [10]

## QUESTION 7

- 7.1
- It requires no expansion pipes in the system.
  - It does not rely on a supply tank for its feed.
  - It is cheaper because it requires less labour and fewer materials for its installation and function.
  - It is compact, because it requires very little space. It can be installed in a confined space.
- (4 x 1) (4)

7.2	7.2.1	U		
	7.2.2	RWP		
	7.2.3	WB		
	7.2.4	FV		
	7.2.5	IC		
	7.2.6	SS		
			(6 x 1)	(6)
				[10]

**QUESTION 8**

8.1	8.1.1	The base is the layer that distributes the weight✓ of the traffic over the road bed or sub-base.✓		
	8.1.2	The haunch is the outmost part of the width✓ of the carriageway.✓		
	8.1.3	The base course is the bottom layer of a bituminous road,✓ which acts as a cushion to the wearing course (surfacing).✓		
	8.1.4	The crown of the road is the highest point✓ in the cross section of a cambered road.✓		
	8.1.5	The formation is the surface of the ground in its final shape✓ after the completion of the earthworks.✓		
			(5 x 2)	(10)
8.2	<ul style="list-style-type: none"> <li>• Paving enhances the appearance✓ of the property or area.✓</li> <li>• Paving is used in driveways or at entrances✓ that are subjected to heavy traffic.✓</li> <li>• Paving is used in areas where a hard-wearing surface✓ with low maintenance is required.✓</li> <li>• Paving is used to make paths for people✓ to walk in a garden.✓</li> <li>• Paving is used where the natural soil of the site✓ is unsuitable for other purposes (such as gardening).✓</li> </ul>			
			(5 x 2)	(10)
				[20]

**TOTAL: 100**