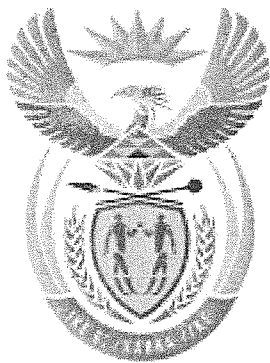


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# higher education & training

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

**T70(E)(M26)T  
APRIL EXAMINATION**

**NATIONAL CERTIFICATE**

**BUILDING AND CIVIL TECHNOLOGY N3**

**(11010273)**

**26 March 2014 (YPaper)  
13:00–16:00**

**Nonprogrammable calculators are not 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 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 One of the duties of the site supervisor is to make regular visits to the site and work closely with the site staff.
- 1.2 The joiner checks that timber is of the quality specified.
- 1.3 The primary function of planning in the building industry is to make the most efficient and economical use of labour, machines, materials, and methods.
- 1.4 The contract manager checks that the timber is of the quality specified.
- 1.5 The local authority has to ensure that the work is carried out in accordance with the plan and wishes of the architect.
- 1.6 The conditions of employment of a company can stipulate when to report for duty and when to go off duty.
- 1.7 The contractor is employed by the building owner on the architect's advice to carry out the construction work.
- 1.8 The general duties of the employers are to maintain and provide an environment that is unsafe and dangerous to the well-being of the employees.
- 1.9 Dismissal means that an employer refused to allow an employee to resume work after she took maternity leave in terms of any law, collective agreement or her contract of employment.
- 1.10 The clerk of works checks the quality of the workmanship as the job progresses.

(10 × 1) [10]

**QUESTION 2**

- 2.1 Explain the term *foundation*. (3)
- 2.2 State FIVE tasks that have to be performed before any underpinning may be carried out. (5 × 1) (5)
- 2.3 The pad or isolated foundation is used to support the load from piers and columns.

Name the SEVEN parts that are found on this type of foundation. (7)  
[15]

**QUESTION 3**

- 3.1 What must the concrete coverage for steel reinforcement be for the following:
- 3.1.1 Reinforced concrete beam
  - 3.1.2 Reinforced concrete slabs
  - 3.1.3 Reinforced concrete foundation
  - 3.1.4 Reinforced concrete columns
- (4 × 1) (4)
- 3.2 Name FIVE types of cement. (5)
- 3.3 Explain what is meant by efflorescence in brickwork. (3)
- 3.4 Calculate how much water you would need (litres) in the following situation:  
250 kg of cement with a water cement ratio of 0,4 (3)
- [15]**

**QUESTION 4**

- 4.1 Write the following abbreviations in full:
- 4.1.1 SC
  - 4.1.2 SP
  - 4.1.3 SW
  - 4.1.4 CE
  - 4.1.5 AO
  - 4.1.6 FH
- (6 × 1) (6)
- 4.2 State FOUR advantages of the pressure-valve geyser. (4)
- [10]**

**QUESTION 5**

5.1 Where would the following floor coverings be used?

5.1.1 Granolithic floors (1)

5.1.2 PVC tiles (2)

5.1.3 Thermoplastic tiles (1)

5.2 Explain the following painting terms briefly:

5.2.1 Prime coat

5.2.2 The undercoat

5.2.3 The finishing coat

(3 × 2) (6)  
[10]

**QUESTION 6**

6.1 A one-brick wall 35 m long and 4 m high has to be built. The wall has an opening of 3,5 m wide and 3 m high. Labour costs R300/m<sup>2</sup>.

**NOTE:** Half-brick walling (50 bricks/m<sup>2</sup>)  
1 m<sup>3</sup> of sand = 1 000 kg (tonne)

Calculate the following:

6.1.1 The area of the wall (6)

6.1.2 The amount of bricks required (2)

6.1.3 The amount of sand required (2)

6.1.4 The labour costs (2)

6.2 A variety of jointing can be applied to brickwork to give it a certain surface finish.

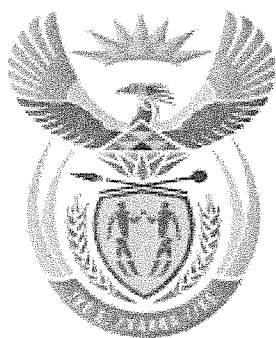
Name FIVE different types of jointing. (5)  
[17]

**QUESTION 7**

- 7.1 Calculate the volume of concrete that you would require in  $\text{m}^3$  to cast a foundation 13 m long by 0,610 m wide and 0,305 m thick. (2)
- 7.2 Explain the following parts of the road's structure:
- 7.2.1 Soil survey
  - 7.2.2 Sub-grade
  - 7.2.3 Formation
  - 7.2.4 Base course
- (4 × 2) (8)  
[10]

**QUESTION 8**

- 8.1 Health and safety committees are essential.  
What are the THREE functions of such a committee? (3)
- 8.2 According to the Occupational Health and Safety Act, there are general duties of employers to their employees.  
State FIVE of those duties. (5 × 2) (10)  
[13]
- TOTAL: 100**



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## **MARKING GUIDELINE**

### **NATIONAL CERTIFICATE APRIL EXAMINATION BUILDING AND CIVIL TECHNOLOGY N3**

**26 MARCH 2014**

**This marking guideline consists of 5 pages.**

**QUESTION 1**

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

(10 × 1) [10]

**QUESTION 2**

- 2.1 The foundation is that part of the building ✓ which is built into the ground ✓ and which supports the structure as a whole. ✓ (3)
- 2.2
- Remove any imposing loads and apply shoring, where required. ✓
  - Carry out soil tests to determine the cause of settlement. ✓
  - Carry out a detailed inspection of the building and record any defects, cracks, etc. take photographs as evidence of what you find. ✓
  - Notify the owners of adjoining buildings and give them all the relevant information. ✓
  - Check the levels at certain points and record them. Continue to check these levels during construction to see if there is any further movement. ✓
- (5 × 1) (5)
- 2.3
- Main bars✓
  - Starter bars✓
  - Weak concrete blinding ✓
  - Reinforced concrete foundation✓
  - Pad or isolated foundation✓
  - Ground floor position✓
  - 75 mm kicker✓
- (7 × 1) (7)  
[15]



**QUESTION 3**

- 3.1      3.1.1      25 mm✓
- 3.1.2      12 mm✓
- 3.1.3      75 mm✓
- 3.1.4      40 mm✓
- (4 × 1)      (4)
- 3.2      • Portland cement✓  
             • Rapid-hardening cement✓  
             • Portland blast furnace cement✓  
             • Sulphate-resisting Portland cement✓  
             • Special Portland cement✓
- (5)
- 3.3      Efflorescence occurs in bricks made from clay containing a large proportion of soluble salts, ✓ which are liable to become discoloured by the formation of whitish deposits on their surface✓. It is common in old and new bricks. ✓
- (3)
- 3.4      Mass of water = Ratio × Cement  
                         = 0,4 × 250✓  
                         = 100 kg✓  
                         = 100 litres✓
- (3)  
[15]

**QUESTION 4**

- 4.1      4.1.1      Storm water Channel✓
- 4.1.2      Soil pipe✓
- 4.1.3      Shower✓
- 4.1.4      Cleaning eye✓
- 4.1.5      Access opening✓
- 4.1.6      Fire hydrant✓
- (6 × 1)      (6)
- 4.2      • It requires very little space✓  
             • It is easy to repair the valve because it is so accessible. ✓  
             • There is increased pressure at the drawing-off point. ✓  
             • It is a cheaper geyser because it requires less labour and fewer materials to install it. ✓
- (4)  
[10]

### QUESTION 5

- |     |       |  |     |
|-----|-------|--|-----|
| 5.1 | 5.1.1 | Granolithic floors are used for large factory floors where heavy loads are left for storage. ✓   | (1) |
|     | 5.1.2 | PVC tiles are very popular in school buildings, hospitals, ✓ public buildings and offices. ✓   | (2) |
|     | 5.1.3 | Thermoplastic tiles are used in areas where there is no grease and oil such as in offices and schools. ✓                                       | (1) |
| 5.2 | 5.2.1 | The prime coat serves as a protection against rust in steel ✓ and protection against decay in timber. ✓  |     |
|     | 5.2.2 | The undercoat protects the prime coat ✓ and serves as a grip for the final coat. ✓   |     |
|     | 5.2.3 | The finishing coat gives the required decorative finish ✓ to the work and also hardens to protect the materials like wood or other surfaces. ✓ |     |
|     |       | (3 × 2)  | (6) |
- [10]**

### QUESTION 6

- 6.1      6.1.1      Area of wall =  $35 \text{ m} \times 4 \text{ m}$   
                               =  $140 \text{ m}^2$   
                               The opening =  $3,5 \text{ m} \times 3 \text{ m}$   
   =  $10,5 \text{ m}^2$   
                               Total Area =  $140 - 10,5$   
   =  $129,5 \text{ m}^2$  (6)

6.1.2      Amount of bricks required =  $129,5 \times 100$   
   = 12 950 bricks (2)

6.1.3      Amount of sand required =  $12\,950 \div 1000$   
   = 12,95 tonnes (2)

6.1.4      Labour cost =  $129,5 \times R300$   
   = R38 850 (2)

6.2      • Struck flush  
         • Curved recessed  
         • Weathered  
         • Over hung struck  
         • Square recessed (5)

