higher education & training

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

T170**(E)**(N11)T
**NOVEMBER 2010**

NATIONAL CERTIFICATE

# BUILDING AND CIVIL TECHNOLOGY N3

(11010273)

**11 November (X-Paper)**
**09:00 – 12:00**

**Non-programmable calculators may be used.**

**This question paper consists of 6 pages and a 1-page diagram sheet.**

# 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 correctly according to the numbering system used in this question paper.
4. ALL the sketches must be clear, of good proportion and properly labelled.
5. Rule off across the page on completion of each question.
6. ALL work you do not want to be marked, must be clearly crossed out.
7. Write neatly and legibly.

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**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 – 1.16) in the ANSWER BOOK.

1.1 The general duty of employers to their employees is that every employer shall not provide or maintain, as far as is reasonably practical, a working environment that is unsafe and with risk to the health of the employees.

1.2 The engineer consults with the local authority as it assesses the stability of the project.

1.3 The architect takes full responsibility for the duration of the contract.

1.4 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.

1.5 One of the duties of the site supervisor is to make regular visits to the site and work closely with the site staff.

1.6 The local authority has to ensure that the work is carried out in accordance with the plan and wishes of the architect.

1.7 Positive motivation offers something valuable to the person in return for acceptable performance (increased salary, promotion, bonus, praise).

1.8 The joiner checks that timber is of quality specified.

1.9 The contractor is employed by the building owner on the architect's advice to carry out the construction work.

1.10 The clerk of works checks the quality of the workmanship as the job progresses.

1.11 The primary function of planning in the building industry is to make the most efficient and economical use of labour, machines, materials and methods.

1.12 The contractor is to clean and level the site.

1.13 The contract manager checks that the timber is of the quality specified.

1.14 The conditions of employment of a company can stipulate when to report for duty and when to go off duty.

1.15 It is the responsibility of the owner to take over the payment of insurance policies from the contractor, which are necessary for the safety and upkeep of the completed building.

1.16 The engineer informs the architect of the progress made with payment. **[16]**

**QUESTION 2**

2.1 Make a large, neat sketch of a vertical section through a cavity wall built on a reinforced strip foundation.

Include the following detail:

(i) Cavity wall
(ii) Strip foundation
(iii) Cavity filled at least 150 mm from DPC
(iv) Damp-proof course
(v) Width of foundation
(vi) Reinforcement in foundation (8)

2.2 Write brief, descriptive notes on the following types of scaffolding:

2.2.1 Mobile scaffolding (2)
2.2.2 Independent scaffolding (2)

2.3 Because there is never any certainty that soil will not collapse, it is vitally important to take precautions that will prevent collapse. State FOUR causes of collapse. (4)
**[16]**

**QUESTION 3**

3.1 Damp-proofing is very important when building. Name SIX types of damp-proof courses. (6)

3.2 Illustrate by means of a large, neat sketch in the ANSWER BOOK, the slump test and include ALL labels. (6)

3.3 Calculate how much water you would need (litres) in the following situation: 200 kg of cement with a water:cement ratio of 0,5. (2)

3.4 Explain the term *cavity walls*. (2)
**[16]**

**QUESTION 4**

4.1 State FOUR advantages of the pressure valve geyser. (4)

4.2 Make a large, neat sketch in the ANSWER BOOK of TWO channels welded to a base plate to ensure that the vertical load of the column does not penetrate or cut through the concrete surface. (5)

4.3 What do the following abbreviations mean?

4.3.1 SC
4.3.2 SP
4.3.3 SW
4.3.4 CE
4.3.5 AO (5)

4.4 The following grades are indicated by the following letters painted on one end of the wood for identification. What colour is the following letters painted on the end of the wood?

4.4.1 The letters 'FK', which indicate knot grade timber. (1)

4.4.2 The letters 'FC', which indicate clear grade timber. (1)
**[16]**

**QUESTION 5**

5.1 Show with the aid of a neat sketch in the ANSWER BOOK, the following electrical symbols:

5.1.1 Light wall switch
5.1.2 Switch socket outlet
5.1.3 Electricity meter
5.1.4 One-way switch (three poles)
5.1.5 Two-way switch
5.1.6 Socket outlet (6)

5.2 Make a neat sketch in the ANSWER BOOK of a one-way switch with one lamp. (2)

5.3 Complete the following sentences by filling in the missing word(s). Write only the word(s) next to the question number (5.3.1 – 5.3.4) in the ANSWER BOOK.

5.3.1 16 amp circuit breaker serves up to ... rooms.
5.3.2 20 amp circuit breaker serves up to ... rooms.
5.3.3 25 amp circuit breaker serves up to ... rooms.
5.3.4 30 amp circuit breaker serves up to ... rooms. (4)

5.4 Give FOUR reasons why walls are plastered. (4)
**[16]**

**QUESTION 6**

6.1 DIAGRAM SHEET 1 (attached), shows a section through the side of the road displaying the different parts. Identify the different parts numbered from 1 to 4, in the ANSWER BOOK. (4)

6.2 Name THREE types of kerbing. (3)

6.3 What causes potholes on the road? (1)

6.4 Calculate the following:

6.4.1 The square area if given 9 000 bricks (bricks in 1 $m^2$ of one brickwalling = 100) (2)

6.4.2 The labour cost if the cost of labour is R250/$m^2$ (2)

6.5 A brick wall has an area of 150 $m^2$.

Calculate the following:

6.5.1 The amount of bricks required (2)

6.5.2 The amount of sand required (2)

NOTE: Bricks in 1 $m^2$ of one-brick walling = 100
1 000 kg = 1 tonne

6.6 A foundation 8 m long by 600 mm wide and 250 mm thick must be cast.

Calculate the amount of concrete required and the cost of the concrete if the concrete cost is R450/$m^3$. (4)
**[20]**

**TOTAL: 100**

**DIAGRAM SHEET 1**

**QUESTION 6.1**