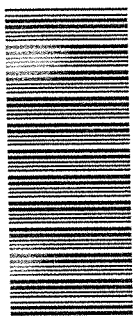


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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

**T90(E)(M30)T
APRIL EXAMINATION**

NATIONAL CERTIFICATE

BUILDING AND CIVIL TECHNOLOGY N3

(11010273)

**30 March 2015 (Y-Paper)
13:00–16:00**

This question paper consists of 5 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
BUILDING AND CIVIL TECHNOLOGY N3
TIME: 3 HOURS
MARKS: 100

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 The carpenter ensures that the wall plates are soundly bedded.
- 1.2 The joiner checks that timber is of the quality specified.
- 1.3 The painter ensures that the specified coats of paint are applied.
- 1.4 The contract manager checks that the timber is of the quality and amount specified.
- 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 The conditions of employment of a company can stipulate when to report for duty and when to go off duty.
- 1.7 The contractor represents a specific area or town and is involved in all building activities that fall within his/her jurisdiction.
- 1.8 The general duties of the employers to the employees is that every employer shall not provide or maintain, as far as reasonably practical, a work environment that is unsafe and with risk to the health of the employees.
- 1.9 The bricklayer checks that the building is rising true by sighting across.
- 1.10 The owner's responsibility is to attend meetings prior to the commencement of work and during construction.

(10 × 1) [10]

QUESTION 2

- 2.1 Damp-proofing is very important when building.
Name FIVE types of damp-proof courses. (5)
- 2.2 Explain the term *foundation*. (3)
- 2.3 The pad or isolated foundation is used to support the load from piers and columns.
Name the parts that are found on this type of foundation. (7)

[15]

QUESTION 3

- 3.1 Because there is never any certainty that soil will not collapse, it is vitally important to take precautions that will prevent it from happening.

State SEVEN causes of collapse AND the SEVEN safety checks before excavation. (7 × 2) (14)

- 3.2 Calculate the volume of concrete that you would require in m³ to cast a foundation 15 m long by 0,710 m wide and 0,400 m thick. (2)

- 3.3 Calculate how much water you would need (litres) in the following situation: 140 kg of cement with a water : cement ratio of 0,4. (3)
[19]

QUESTION 4

For centuries timber has been graded according to the appearance and workability of various types of wood. The standardisation of timber is a form of grading which indicates a certain quality.

Discuss in detail the importance of the standardisation of wood. [10]

QUESTION 5

- 5.1 Briefly explain the following terms used in painting:

5.1.1 Flame cleaning

5.1.2 Acid pickling

5.1.3 Sand blasting

(3 × 1) (3)

- 5.2 Name and explain SIX factors which should be considered and weighed up when selecting floor finishing. (6 × 2) (12)
[15]

QUESTION 6

Write brief descriptive notes on each of the following kinds of scaffolding.

6.1 Independent scaffold

6.2 Mobile scaffold

(2 × 4) [8]

QUESTION 7

7.1 Health and safety committees are essential.

What are the THREE functions of such a committee? (3)

7.2 According to the Occupational Health and Safety Act there are general duties which employers must fulfil in respect of their employees.

List FIVE of those duties. (5 × 2) (10)
[13]

QUESTION 8

8.1 A one-brick wall that is 20 m long and 3 m high has to be built, with a door opening of 2 m × 2 m and a window opening of 2 m × 1,5 m.

Calculate the following:

8.1.1 The total area (4)

8.1.2 The amount of bricks needed (2)

8.1.3 The amount of sand needed (2)

8.1.4 The labour cost to build the wall

The following details apply:

Labour – R250 per m²

50 bricks per m² for a half-brick wall

1 m³ of sand = 1 000 kg (1 tonne)

(2)
[10]

TOTAL: 100



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MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

BUILDING AND CIVIL TECHNOLOGY N3

30 MARCH 2015

This marking guideline consists of 7 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 True
- 1.3 True
- 1.4 False
- 1.5 True
- 1.6 True
- 1.7 False
- 1.8 False
- 1.9 False
- 1.10 True

(10 × 1) [10]

QUESTION 2

- 2.1
 - 2.1.1 Asphalt✓
 - 2.1.2 Slate✓
 - 2.1.3 Copper✓
 - 2.1.4 Bitumen✓
 - 2.1.5 Lead✓
 - 2.1.6 Polythene✓

(Any 5 × 1) (5)

- 2.2 Foundation is that part of the building✓ which is built into the ground✓ and which supports the structure as a whole. ✓ (3)

- 2.3
 - 2.3.1 Main bars✓
 - 2.3.2 Starter bars✓
 - 2.3.3 Weak concrete blinding ✓
 - 2.3.4 Reinforced concrete foundation✓
 - 2.3.5 Pad or isolated foundation✓
 - 2.3.6 Ground-floor position✓
 - 2.3.7 75 mm kicker✓

(7 × 1) (7)
[15]**QUESTION 3**

- 3.1 Causes of collapse:

- 3.1.1 Soil that cannot support its own weight✓
- 3.1.2 Weakening trench embankments caused by rain, and frost ✓
- 3.1.3 Vibration in the soil caused by heavy traffic✓
- 3.1.4 The placing of heavy loads of soil too near the side of an excavation✓

- 3.1.5 The type of soil (sand pockets)✓
- 3.1.6 Excavation in previously disturbed soil✓
- 3.1.7 Heavy objects may impact on the sides of the excavation✓

Safety checks:

- 3.1.8 Know the soil conditions√
- 3.1.9 Be aware of sources of vibration√
- 3.1.10 Look to see where ground has been previously disturbed√
- 3.1.11 Secure the way into and out of the trench√
- 3.1.12 Be aware of any moisture source, cables, and sewers√
- 3.1.13 Position your heavy equipment safely√
- 3.1.14 Watch closely to see what the weather is doing.√

$$(7 \times 2) \quad (14)$$

$$3.2 \quad \text{Volume of concrete} = 15 \times 0,710 \times 0,400 \text{ m}^3 \sqrt{=} 4,260 \text{ m}^3 \sqrt{=} \quad (2)$$

$$\begin{aligned}
 \text{3.3} \quad \text{Mass of water} &= \text{Ratio} \times \text{Cement} \\
 &= 0,4 \times 140\sqrt{} \\
 &= 56 \text{ kg}\sqrt{} \\
 &= 56 \text{ litres}\sqrt{}
 \end{aligned}
 \tag{3}$$

QUESTION 4

Standardisation guarantees large quantities of high-quality timber. It also ensures that parts of furniture as well as the completed pieces will be completed according to preset standards. It ensures that the consumer will get value for his/her money. Furthermore it helps manufacturers who use wood to save on costs. Lastly it leads to a better utilisation of the country's resources by allowing the use of so-called inferior timber, like pine, in the furniture industry.

[10]

QUESTION 5

- | | | | | |
|-----|-------|--|---------|--------------|
| 5.1 | 5.1.1 | Flame cleaning is very effective when removing the scale and rust spots from the metal.✓ | | |
| | 5.1.2 | Acid pickling is the treatment that is available in the form of a solution of phosphate which is applied in a coating layer to the steel.✓ | | |
| | 5.1.3 | Sand blasting is commonly used and a very effective method of cleaning iron and steel work.✓ | (3 × 1) | (3) |
| 5.2 | 5.2.1 | Durability:✓ the material to be used must have a reasonable life span.✓ | | |
| | 5.2.2 | Resistance:✓ the floor material should withstand a heavy load placed on top of it.✓ | | |
| | 5.2.3 | Economical:✓ the initial capital investment and maintenance of the floor area.✓ | | |
| | 5.2.4 | Cleaning operations:✓ the floor should be cleaned with ease.✓ | | |
| | 5.2.5 | Non-slip qualities:✓ the material used for particular traffic or storage purposes should be of non-slip qualities to ensure safety.✓ | | |
| | 5.2.6 | Appearance:✓ it is important to consider which type of material to apply for a specific room.✓ | (6 × 2) | (12)
[15] |

QUESTION 6

- | | | |
|-----|--|------------|
| 6.1 | An independent scaffold stands on its own.✓ It has two rows of standards which are connected by transoms.✓ Although it is independent,✓ it nevertheless requires the additional security of being tied to the building.✓ | (4) |
| 6.2 | A mobile scaffold requires a castor wheel, and this scaffold can be used on irregular surfaces where jacking castors are used.✓ Mobile scaffolds should not be more than three times higher than their narrowest width✓ at the base unless additional support, such as outriggers are used.✓ Castor wheels should be fixed in such a way as to prevent accidental displacement.✓ | (4)
[8] |

QUESTION 7

- | | | | | |
|-----|-------|---|---------|------|
| 7.1 | 7.1.1 | The health and safety committee may make recommendations to the employer regarding any matter affecting the health or safety of a person at the workplace.√ | | |
| | 7.1.2 | It shall keep records of each recommendation made to an employer. | | |
| | 7.1.3 | The committee or a member thereof shall not incur any civil liability by reason of the fact that it or he/she fails to do anything which it or he may or be required to do in terms of the Occupational Health and Safety Act.√ | (3 × 1) | (3) |
| 7.2 | 7.2.1 | The employer undertakes provision and maintenance of systems of work, plant and machinery that are,√ as far as is reasonably practical, safe and without risks to health.√ | | |
| | 7.2.2 | The employer must eliminate or mitigate any hazard or potential hazard√ to the safety or health of employees.√ | | |
| | 7.2.3 | Employer must establish as far as reasonably practical, what hazards to the health or safety of persons√ are attached to any work which is performed.√ | | |
| | 7.2.4 | Providing the information, instructions, training and supervision as may be necessary to ensure, as far as reasonably practical,√ the health and safety of his employees at work.√ | | |
| | 7.2.5 | Ensuring all employees are informed regarding the scope of their authority√ as contemplated in section 37 of the Act.√ | (5 × 2) | (10) |
| | | | | [13] |

QUESTION 8

8.1	8.1.1	Area of wall	$= 20 \text{ m} \times 3 \text{ m}$ $= 60 \text{ m}^2\checkmark$	
		The door opening	$= 2 \text{ m} \times 2 \text{ m}$ $= 4 \text{ m}^2\checkmark$	
		The window opening	$= 2 \times 1,5$ $= 3 \text{ m}^2\checkmark$	
		Total Area	$= 60 - 4 - 3$ $= 53 \text{ m}^2\checkmark$	(4)
	8.1.2	Amount of bricks required	$= 53 \times 100\checkmark$ $= 5\,300 \text{ bricks}\checkmark$	(2)
	8.1.3	Amount of sand required	$= 5\,300 \div 1\,000\checkmark$ $= 5,3 \text{ tonnes}\checkmark$	(2)
	8.1.4	Labour cost	$= 53 \times \text{R}250\checkmark$ $= \text{R}13\,250\checkmark$	(2)
				[10]
				TOTAL: 100