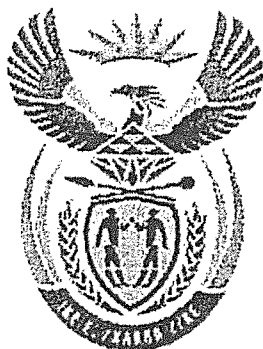


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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T120(E)(A2)T
APRIL EXAMINATION

NATIONAL CERTIFICATE

BUILDING AND CIVIL TECHNOLOGY N3

(11010273)

2 April 2013 (X-Paper)
09:00–12:00

Non-programmable calculators may be used.

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

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. Rule off across the page on completion of each answer.
 5. ALL sketches must be clear, of good proportion and properly labelled.
 6. ALL work you do NOT want to be marked must be clearly crossed out.
 7. Write neatly and legibly.
-

QUESTION 1

- 1.1 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.
- 1.1.1 The purpose of communication is to facilitate effective control.
- 1.1.2 The objective of planning is to be able to measure the degree of progress at any time during construction.
- 1.1.3 Every employee shall take reasonable care for the health and safety of him-/herself and other persons who may be affected by his/her acts of omissions.
- 1.1.4 A function of the health and safety committee is that it shall permit the employer to pay the fine in such instalments as he/she may determine.
- 1.1.5 The architect must prepare drawings and calculate costs which are in line with what the owner is prepared to pay.
- 1.1.6 The site supervisor is to ensure that a slow rate of progress is maintained to ensure quality.
- 1.1.7 The contract manager is a member of the builder's team. His/Her role is crucial to the success of any project.
- 1.1.8 'Dismissal' means an employer has terminated a contract of employment with or without notice.
- 1.1.9 Compensation in terms of the Occupational Injuries and Diseases Act stipulates that no periodical payments shall be made in respect of temporary total disablement or temporary partial disablement which last for three months or more.
- 1.1.10 Every employee has the right to participate in forming a trade union or federation of trade unions. (10 × 1) (10)
- 1.2 Name THREE factors that positively influence motivation on site. (3)
- 1.3 Explain THREE site functions performed by the clerk of works. (3)
- [16]**

QUESTION 2

- 2.1 The pad foundation is used to support and transmit the loads from piers and columns. Make a large, neat sketch in the ANSWER BOOK of this type of foundation and indicate the following details clearly:
- 2.1.1 Weak concrete blinding
 - 2.1.2 Pad foundation
 - 2.1.3 Main bars
 - 2.1.4 Ground floor position
 - 2.1.5 Reinforced concrete column
 - 2.1.6 Starter bars
- 2.2 Name four types of scaffolding. (8)
- 2.3 Make a large, neat labelled sketch in the ANSWER BOOK to show how one can transfer a level mark from one peg to another by means of a spirit level. (4)
- [16]**

QUESTION 3

- 3.1 Name FOUR types of damp-proof courses. (4)
- 3.2 State FOUR advantages of a cavity wall. (4)
- 3.3 Make a large, neat sketch in the ANSWER BOOK, illustrating the slump test and include all labels. (6)
- 3.4 Calculate how much water (litres) will be needed in the following situation:
800 kg of cement with a water : cement ratio of 0,6. (2)
- [16]**

QUESTION 4

- 4.1 Make a large, neat detailed sketch of a vertical section through the bottom end of a structural steel column which is fixed to a concrete base by means of holding down bolts. Include all labelling. (8)
- 4.2 Write out the following abbreviations:
- | | |
|-------|-----|
| 4.2.1 | SP |
| 4.2.2 | SW |
| 4.2.3 | SC |
| 4.2.4 | RE |
| 4.2.5 | RWP |
- (5 x 1) (5)
- 4.3 Name THREE advantages of the combination geyser. (3)
[16]

QUESTION 5

- 5.1 Make a large, neat sketch of a two-way switch with one light. (4)
- 5.2 Make a large, neat sketch of a vertical section through the bottom section of a timber wall panelling and show the following clearly:
- | | |
|-------|----------------|
| 5.2.1 | Skirting |
| 5.2.2 | Spacer |
| 5.2.3 | Flooring |
| 5.2.4 | Quadrant |
| 5.2.5 | Airbrick |
| 5.2.6 | One-brick wall |
| 5.2.7 | Ground |
| 5.2.8 | Bottom rail |
- (8)
- 5.3 Explain briefly the following defects in plastered walls:
- | | | |
|-------|--------------------|-----|
| 5.3.1 | Efflorescence | (2) |
| 5.3.2 | Crazing of surface | (2) |
- [16]

QUESTION 6

- 6.1 Give SIX reasons for paving. (6)
- 6.2 Edging is important when paving is done. Briefly explain the term *edging*. (1)
- 6.3 Give ONE reason why potholes form in a road. (1)
- 6.4 A foundation 15 m long by 0,6 m wide by 0,25 m deep must be cast. Calculate the amount of concrete in m^3 needed to cast the foundation. (2)
- 6.5 A wall 15 m long by 2,8 m high and 0,25 m thick must be built on the foundation mentioned in QUESTION 6.4.

Calculate:

- 6.5.1 The amount of bricks needed (4)
- 6.5.2 The amount of sand needed (2)
- 6.5.3 The amount of cement needed (2)
- 6.5.4 The labour to build the wall (2)

(Labour R250 per m^2)
(50 bricks per m^2 for a half brick wall)
(Five bags of cement for every 1 000 bricks)
(0,8 m^3 of sand for every 1 000 bricks)

[20]

TOTAL: 100



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MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

BUILDING AND CIVIL TECHNOLOGY N3

2 APRIL 2013

This marking guideline consists of 9 pages.

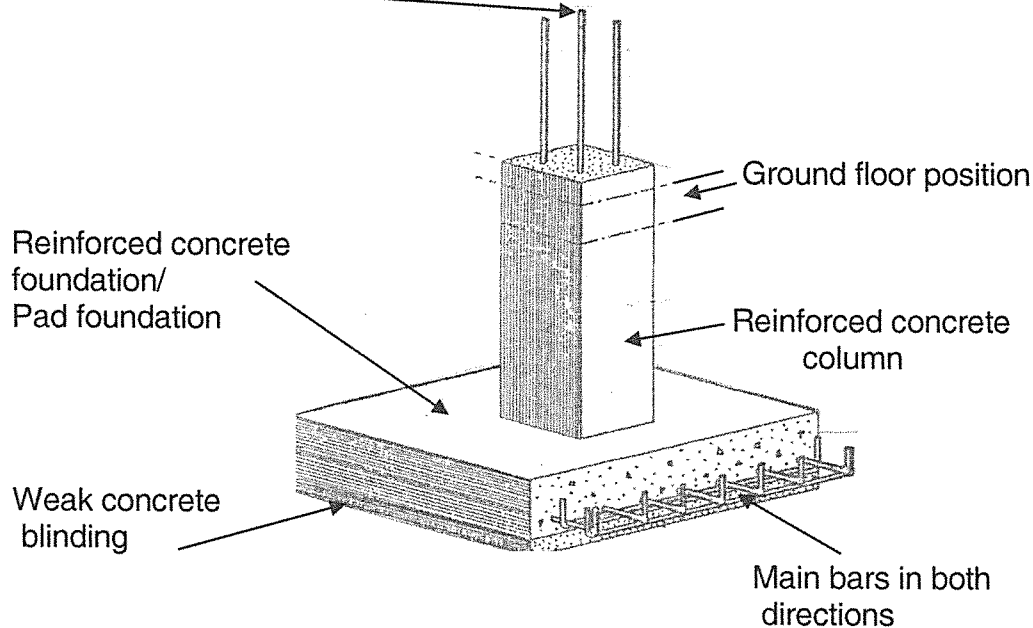
QUESTION 1

- | | | | | |
|-----|--|-------|-------------|------|
| 1.1 | 1.1.1 | True | | |
| | 1.1.2 | True | | |
| | 1.1.3 | True | | |
| | 1.1.4 | False | | |
| | 1.1.5 | False | | |
| | 1.1.6 | False | | |
| | 1.1.7 | True | | |
| | 1.1.8 | True | | |
| | 1.1.9 | True | | |
| | 1.1.10 | True | (10 × 1) | (10) |
| 1.2 | <ul style="list-style-type: none"> • Maintain good working conditions • Treat all workers as individuals • Encourage teamwork • Develop harmony by consultation • Develop co-operation by providing job security • Develop loyalty by always being fair | | (Any 3 × 1) | (3) |
| 1.3 | <ul style="list-style-type: none"> • To understand all contract documents • Examine all materials once it has been delivered to the site • Check the quality of workmanship as the job progresses • Ensure that poor quality work is rectified • keep records of all deviations that occur • submit weekly reports to the architect • include all sub-contractors work • keep a daily diary and instruction book • record all on site day to day happenings | | (Any 3 × 1) | (3) |

[16]

QUESTION 2

2.1 Starter bar for columns

**MARK ALLOCATION**

Labels	$6 \times \frac{1}{2} = 3$
Sketch correct	$= 3$
Neatness	$= 2$
	<u>8</u>

TWO CROSS-SECTIONAL SKETCHES ARE ALSO ACCEPTABLE.

(8)

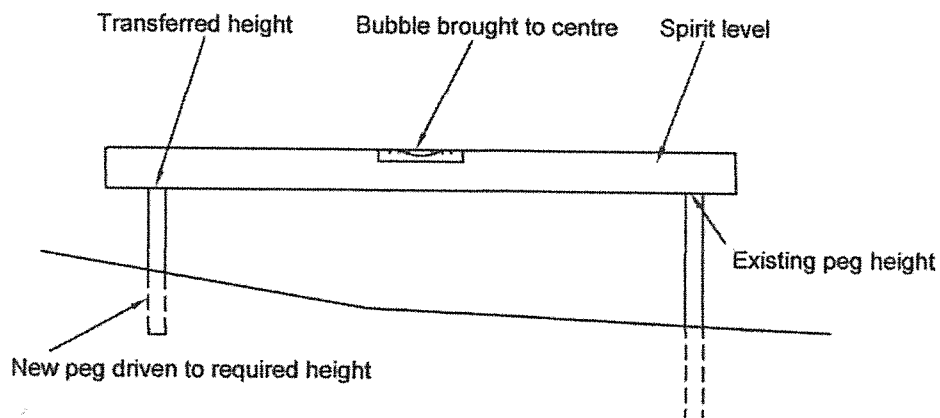
2.2

- Mobile scaffolding
- Independent scaffolding
- Steel trestles
- Suspended scaffolding
- Framed scaffolding
- Bricklayer scaffolding
- Cantilever scaffolding
- Cuplock scaffolding
- Ringlock scaffolding
- Kwikstage scaffolding
- Birdcage scaffolding

(Any 4 × 1)

(4)

2.3



Any suitable drawing accepted.

Mark Allocation:

Labels $5 \times \frac{1}{2} = 2.5$

Sketch = 1.5

4

(4)

[16]

QUESTION 3

- 3.1
- Lead
 - Copper
 - Bitumen
 - Mastic asphalt
 - Polythene
 - Slates
 - Dense brick
 - Material covered in asphalt

(Any 4 × 1)

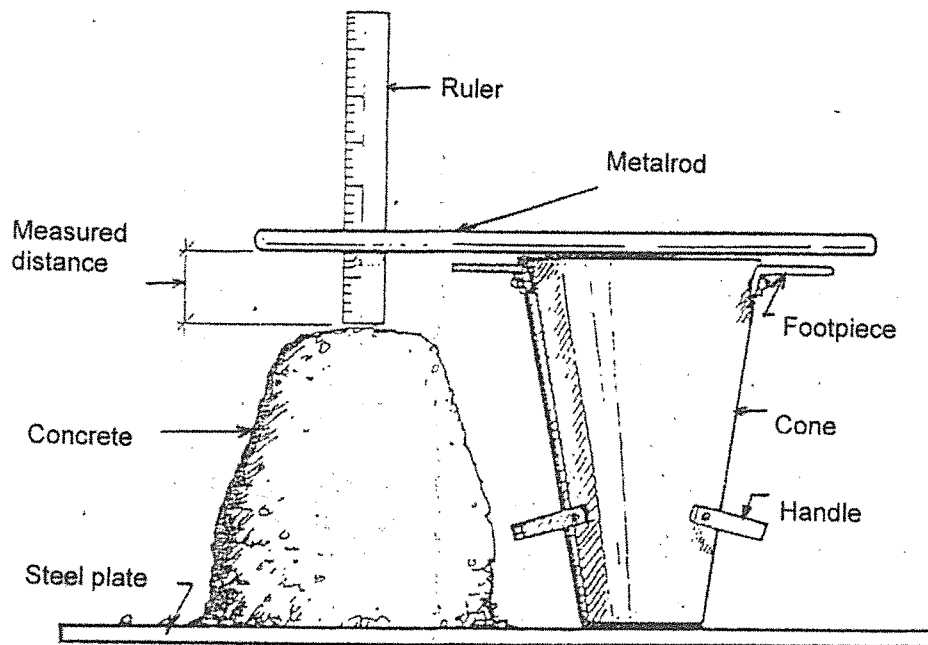
(4)

- 3.2
- No need for internal rendering
 - enable the use of cheaper and alternative materials for the inner construction
 - gives good thermal insulation, keeping the building warm in winter and cool in summer.
 - able to withstand the driving rain in all situations penetrating to the inner wall surface

(Any 4 × 1)

(4)

3.3



MARK ALLOCATION

Correct sketch = 1

Neatness = 1

8 labels = $8 \times \frac{1}{2} = 4$
6

(6)

3.4 Mass of water = Ratio \times cement
 = $0,6 \times 800$ ✓
 = 480 kg
 = 480 litres ✓

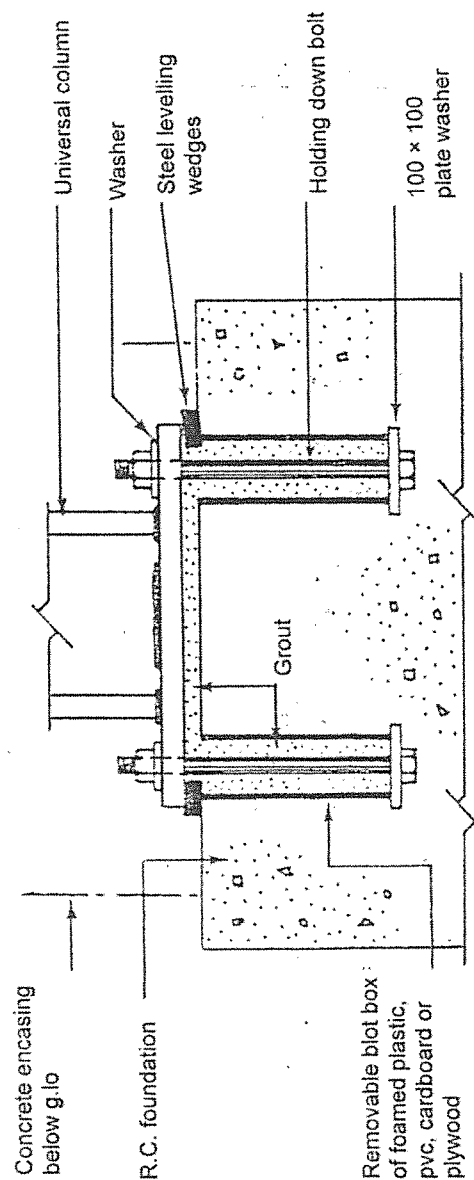
(1)

(1)

[16]

QUESTION 4

4.1



ANY OTHER BASE WITH SUITABLE HOLDING DOWN BOLTS ARE
ACCEPTED

MARK ALLOCATION

Sketch correct	= 4
Any relevant 6 labels = $6 \times \frac{1}{2}$	= 3
Neatness	= 1
	<u>8</u>

(8)

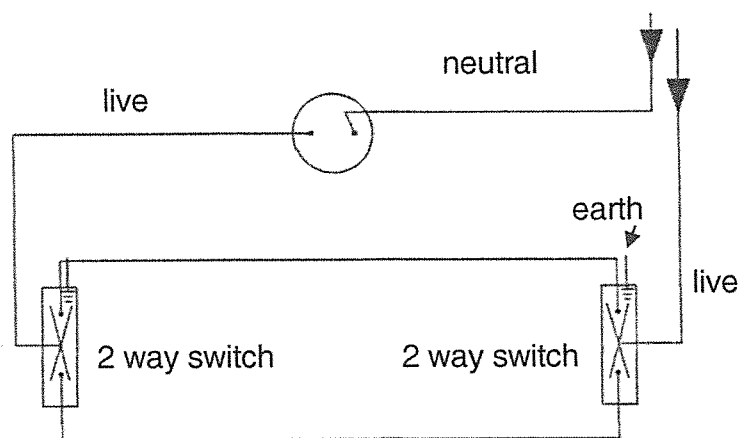
4.2	4.2.1	Soil pipe	(1)
	4.2.2	Shower	(1)
	4.2.3	Stormwater channel	(1)
	4.2.4	Rodding eye	(1)
	4.2.5	Rainwater pipe	(1)

- 4.3
- 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.

(Any 3 × 1) (3)
[16]

QUESTION 5

5.1



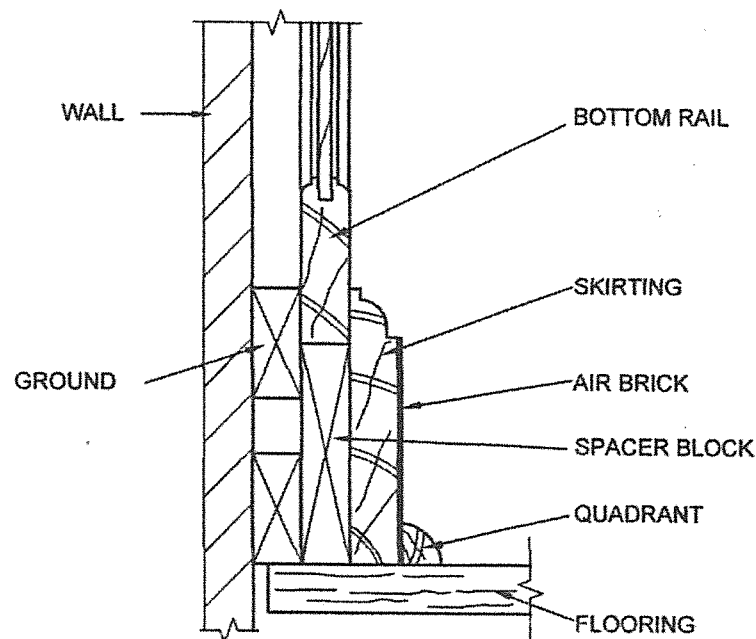
MARK ALLOCATION

Labels $6 \times \frac{1}{2} = 3$

Sketch $= \frac{1}{4}$

(4)

5.2



MARK ALLOCATION

Labels 8 x ½ = 4

Sketch correct = 3

Neatness = $\frac{1}{8}$

(8)

5.3 5.3.1 Defects due to efflorescence may range from the appearance of a white powder on the surface of the brickwall, which may lead to a complete failure of the plaster application.

(2)

5.3.2 This defect is often caused by poor ungraded sand, over-trowelling, especially with a steel trowel, or too rapid drying out by direct sunlight.

(2)

[16]

QUESTION 6

- 6.1
- Paving enhances the appearance of the property or area.
 - Paving is used in driveways or at entrances that are subject to heavy traffic.
 - Paving is used in areas where a hard-wearing surface with low maintenance is required.
 - Paving is used to make paths for people to walk in a garden.
 - Paving of roads.
 - Paving is used where the natural soil of the site is unsuitable for other purposes (such as gardening).

(6)

6.2 Edging – This is to prevent the paving from moving and disintegrating.

(1)

6.3	<ul style="list-style-type: none"> • Localised disintegration • Limitations of road construction • Natural causes eg. rain, heat • Stress due to traffic • Damage from weather related conditions • surface not well compacted • tar on road surface of poor quality • very heavy traffic, e.g. trucks, using the road meant for light vehicles 	(Any 1 × 1)	(1)
6.4	Volume = $L \times b \times d$ = $15 \times 0,6 \times 0,25$ = $2,25 \text{ m}^3$		(1) (1)
6.5	6.5.1 Area	= $15 \times 2,8$ = 42 m^2	(1) (1)
	Amount of bricks	= $(42 \times 50) \times 2$ = 4 200 bricks	(1) (1)
	6.5.2 Amount of sand	= $(4\,200 \div 1\,000) \times 0,8 \text{ m}^3$ = $3,36 \text{ m}^3$ (4 m^3)	(1) (1)
	6.5.3 Amount of cement	= $4,2 \times 5$ = 21 bags of cement	(1) (1)
	6.5.4 Cost of labour	= 42×250 = R10 500	(1) (1)
			[20]

TOTAL: 100