



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2013

**CIVIL TECHNOLOGY**  
**MARKING GUIDELINES**

Time: 3 hours

200 marks

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**These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.**

**The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.**

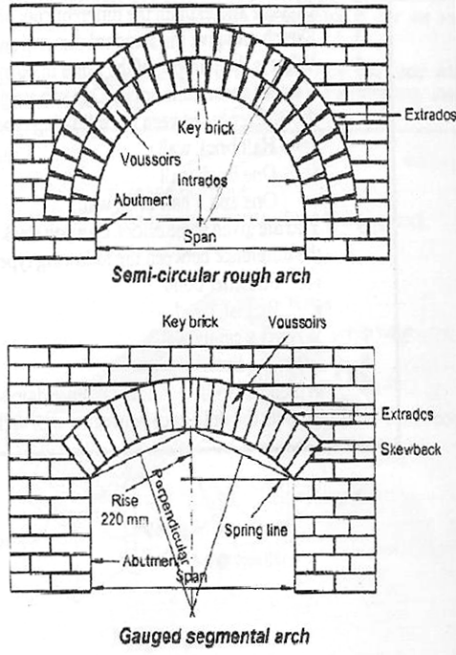
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**QUESTION 1**

- 1.1 1.1.1 Deeper than 1,5 m braced and shuttered  
 Bracing must be cross braced  
 Bracing strong enough to keep soil  
 Access and escape by ladder  
 Daily inspect **(any three)** (3)  
 (Civil Technology Grade 12, page 38)
- 1.1.2 Protruding ends covered  
 No paint or rust  
 Trained person must erect scaffold  
 Daily inspection  
 No moving of scaffold with people on **(any three)** (3)  
 (Civil Technology Grade 12, page 183)
- 1.1.3 Stacks bonded and interlocked  
 No stack more than three times higher than width of base  
 Strong flooring needed  
 Choose site with care and avoid projection  
 Should not obstruct fire fighting equipment, light or ventilation  
 No climbing or walking around on stacks **(any three)** (3)  
 (Civil Technology Grade 12, page 39)
- 1.2 1. I beam  
 2. Channel iron  
 3. H – beam (3)
- 1.3 1.3.1 Bolster – used for cutting bricks (1)  
 1.3.2 Scaffold – apparatus to achieve access to higher parts of building (1)  
 1.3.3 Profile board – Board used in setting out of building to mark trench widths  
 and wall widths (1)  
 1.3.4 Brick force – shaped wire net to strengthen walls (1)  
 1.3.5 Cladding Material on wall for decoration, e.g. wood, metal (1)  
 1.3.6 Datum – All heights on site determined from this peg/block (1)
- 1.4 Strong not deflect Grout tight  
 Easy assemble and dismantle Accurate **(any other correct answer)** (4)  
 (WorkwCiv, page 48)
- 1.5 Rolled glass – glass in windows  
 Safety glass – shower doors, sliding doors  
 Pattern glass – windows **(any two)** (4)
- 1.6 Wear safety/surgical gloves  
 Pressure on wound  
 Elevate limb  
 Create pressure point if bleeding does not stop  
 Treat for shock  
 Phone for ambulance **(surgical gloves and any other three)** (4)
- [30]**

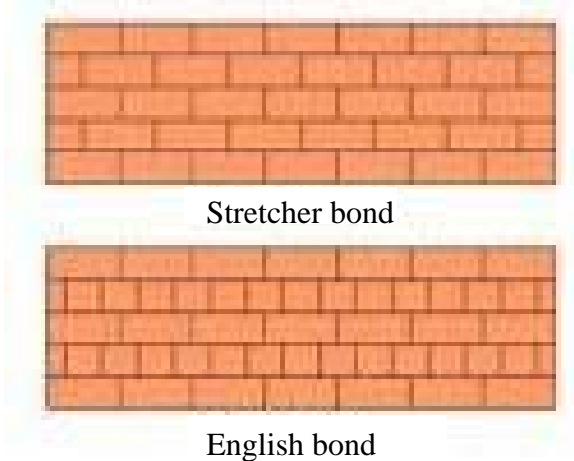


2.2.3



(4)

2.2.4 stretcher

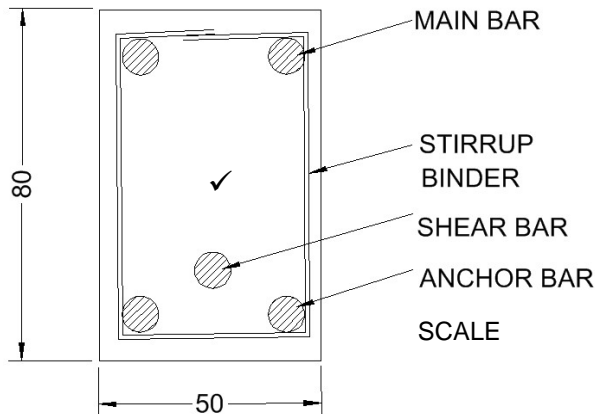


(4)

- 2.3 8 – number of bars in group
- Y – high yield steel, type of metal
- 20 – diameter metal
- 01 – bar number on schedule
- 250 – spacing between centres

(5)

2.4

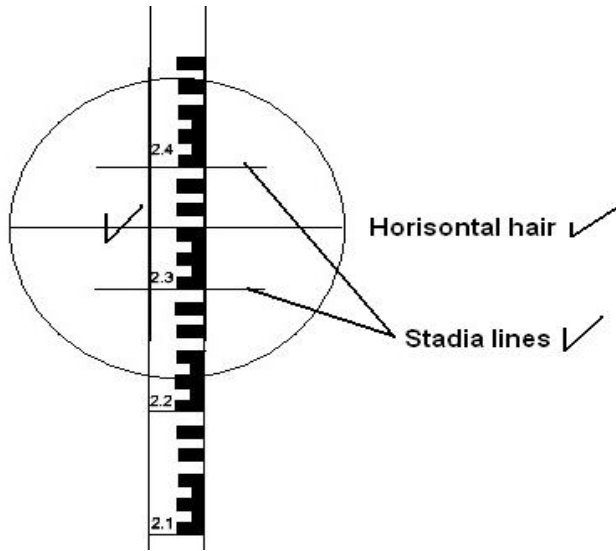


SECTION S-S  
SCALE 1:5

(6)

- 2.5 Bolt diameter Pitch  
 Seam edge Size of member  
 Angle of member (any four) (4)

2.6

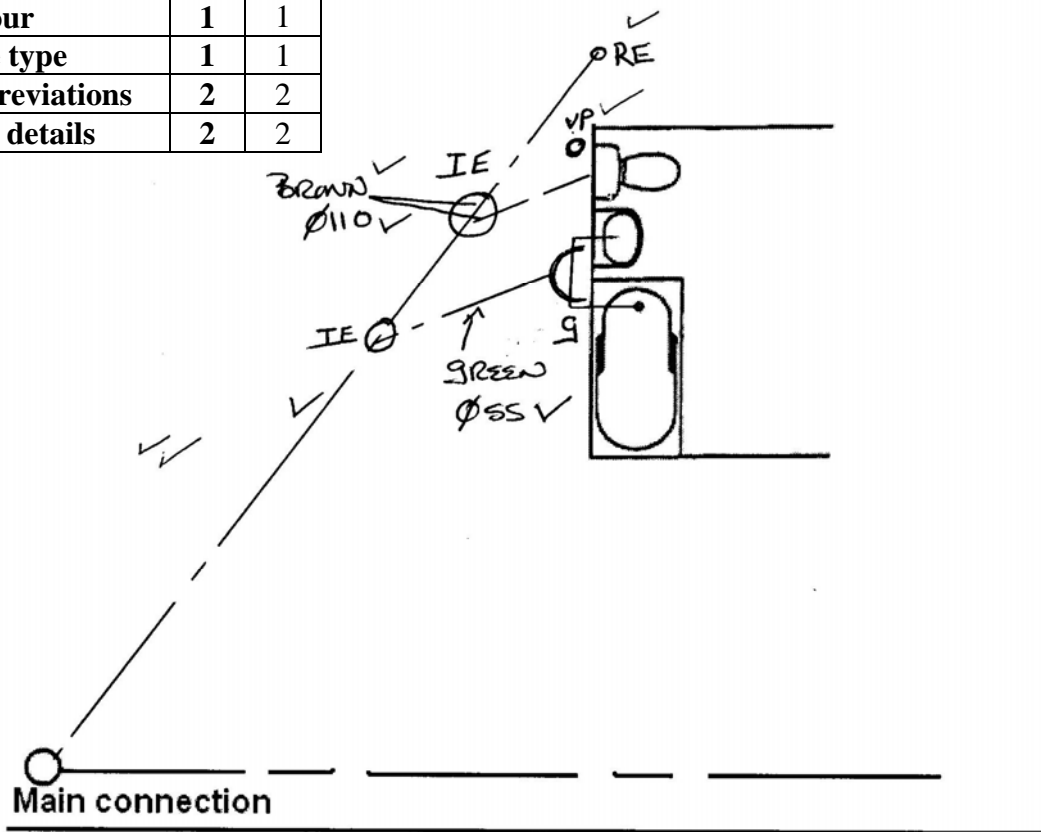


(3)  
 [40]

**QUESTION 3**

3.1

Correct	2	2
Colour	1	1
Line type	1	1
Abbreviations	2	2
Pipe details	2	2



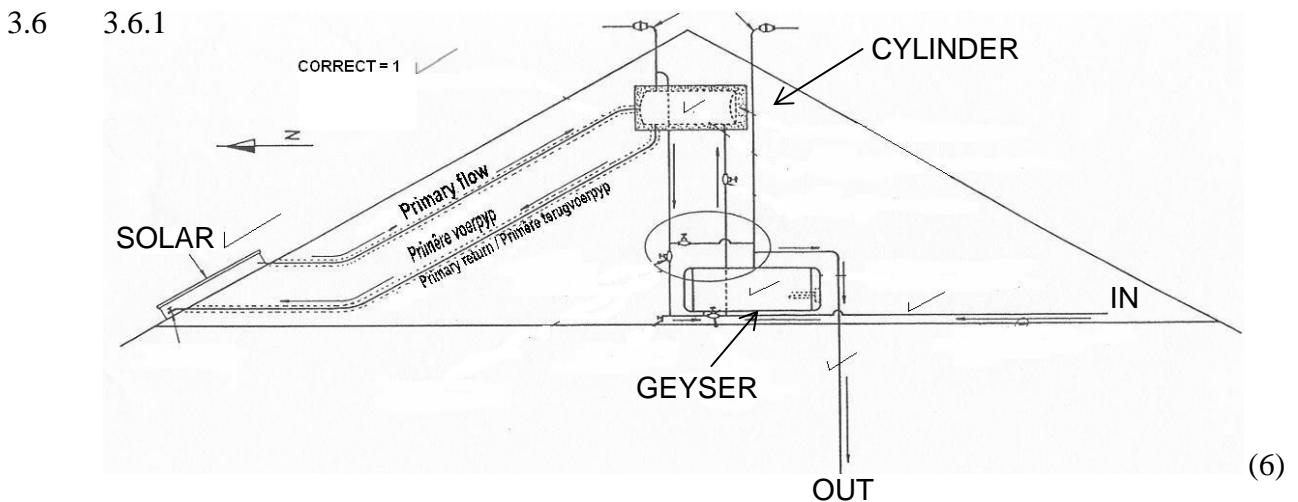
(8)

- 3.2 3.2.1 Hand wash basin = HWB (1)
- 3.2.2 Toilet = WC (1)
- 3.2.3 Sink – S – Bt (1)
- 3.2.4 Shower – Sh (1)

- 3.3
  - Drain min. depth 600 mm
  - Should be water tight
  - Inside clean and no loose objects
  - Constant gradient
  - Junctions not exceed 90 degrees
 (Work with Civil Technology, page 98) (5)

- 3.4 Watertight – pressure and water test  
 Laid straight – mirror test  
 No obstructions – ball test (3)

- 3.5 Water power  
 Nuclear power  
 Wind power (any two) (2)



- 3.6.2 Economical in long run  
 Energy efficient  
 More hot water (any two) (2)
- [30]**

**QUESTION 4**

- 4.1
1. Cornice
  2. Picture rail
  3. Architrave
  4. Dado rail
  5. Skirting
- (5)

4.2  $8 + 11 + 2.4 + 2.4 + 4.5 = 28.3 \text{ m}$   
 $28.3 \times R45 = R 1273.50$

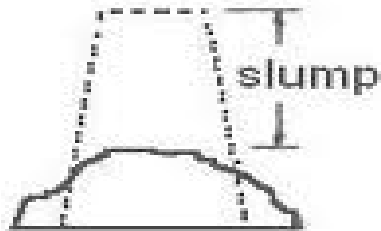
(3)

4.3  $0.675/0.033 = 20.4$  wheelbarrows total  
 $4 + 3 + 3 = 10$   
 $20.4 \div 10 = 2.04/\text{ratio}$   
 Stone  $4 \times 2.04 = 8.16$  or 9 wheelbarrows stone needed.

(3)

- 4.4
- 4.4.1 Truncated cone  
 Tamping rod  
 Steel ruler
- (3)

4.4.2 Collapse slump



**Collapse**

Shear Slump



**Shear**

**Types of slump**

(4)

4.5

Item	Measurement	Result	Description
			Centre line
			$10 \times 2 = 20 \text{ m}$
			$6 \times 2 = 12 \text{ m}$
			<b>= 32 m</b>
			Less $4 \times 0,220 = 0.880 \text{ m}$
		31.12 m	<b>Total = 31.12 m</b>
			Total bricks Superstructure
2/	$31.12 \times 2.8$	<b>= 87.14 m<sup>2</sup></b>	
	$= 87.136 \text{ m}^2$		
	$87.14 \times 52 \times 2$		
	$= 9062.56$		<b>= 9063 total bricks</b>
			Total openings
			Windows
6/	$1 \times 1.5$		
	$= 1.5 \times 6$		
	$= 9 \text{ m}^2$		
		<b>9 m<sup>2</sup></b>	
			Doors
1/	$2 \times 0.900$		
	$= 1.8 \text{ m}$		
		<b>1.8 m<sup>2</sup></b>	
		<b>Total area = 10.8 m<sup>2</sup></b>	
			Total bricks openings
2/	$10.8 \times 52 \times 2$		
	$= 1123.2$		<b>= 1124 total bricks openings</b>
			Total bricks Superstructure
	$9063 - 1124$		$= 9063 \text{ less } 1124$
			<b>= 7939</b>

(12)  
[30]



**QUESTION 5**

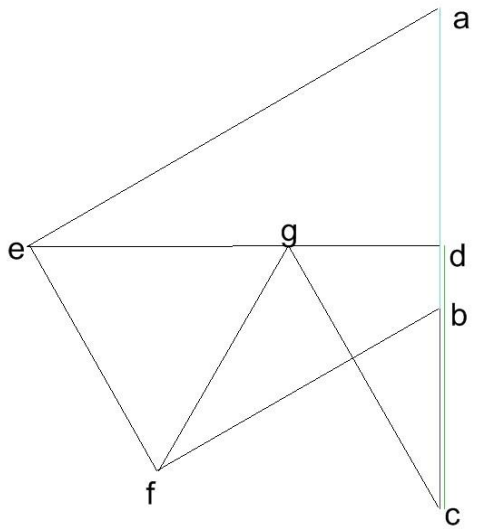
- 5.1 5.1.1 Weight – Gravitational force of earth on an object =  $kg \times 9.98ms^{-1}$  or  $10 ms^{-1}$  (1)
- 5.1.2 Dynamic load = Load that moves on an object, moving load. (1)
- 5.1.3 Resultant = One force that has same effect as two or more forces. (1)

5.2 5.2.1  $P \times 10 = 35 \times 2 + 30 \times 5 + 50 \times 8$   
 $= 70 + 150 + 400 = 620/10 = \mathbf{62\ kN}$  **Test**  
**UP = DOWN**  
 $Q \times 10 = 50 \times 2 + 30 \times 5 + 35 \times 8$   $53 + 62 = 35 + 50 + 30$   
 $= 100 + 150 + 280 = 530/10 = \mathbf{53\ kN}$   $115 = 115$  (5)

5.2.2  $BmB = 62 \times 2 = \mathbf{124\ kN}$   
 $BmC = 62 \times 5 - [15 \times 1.5 + 50 \times 3]$   
 $= 310 - [22.5 + 150] = 310 - 172.5 = \mathbf{137.5\ kN}$   
 $BmD = 53 \times 2 = \mathbf{106\ kN}$  (3)

5.2.3  $SfB- = 62 - 50 = \mathbf{12\ kN}$   
 $SfC- = 12 - 15 = \mathbf{-3\ kN}$   
 $SfD- = -18 - 35 = \mathbf{-53\ kN}$  (3)

5.3 5.3.1 Force diagram



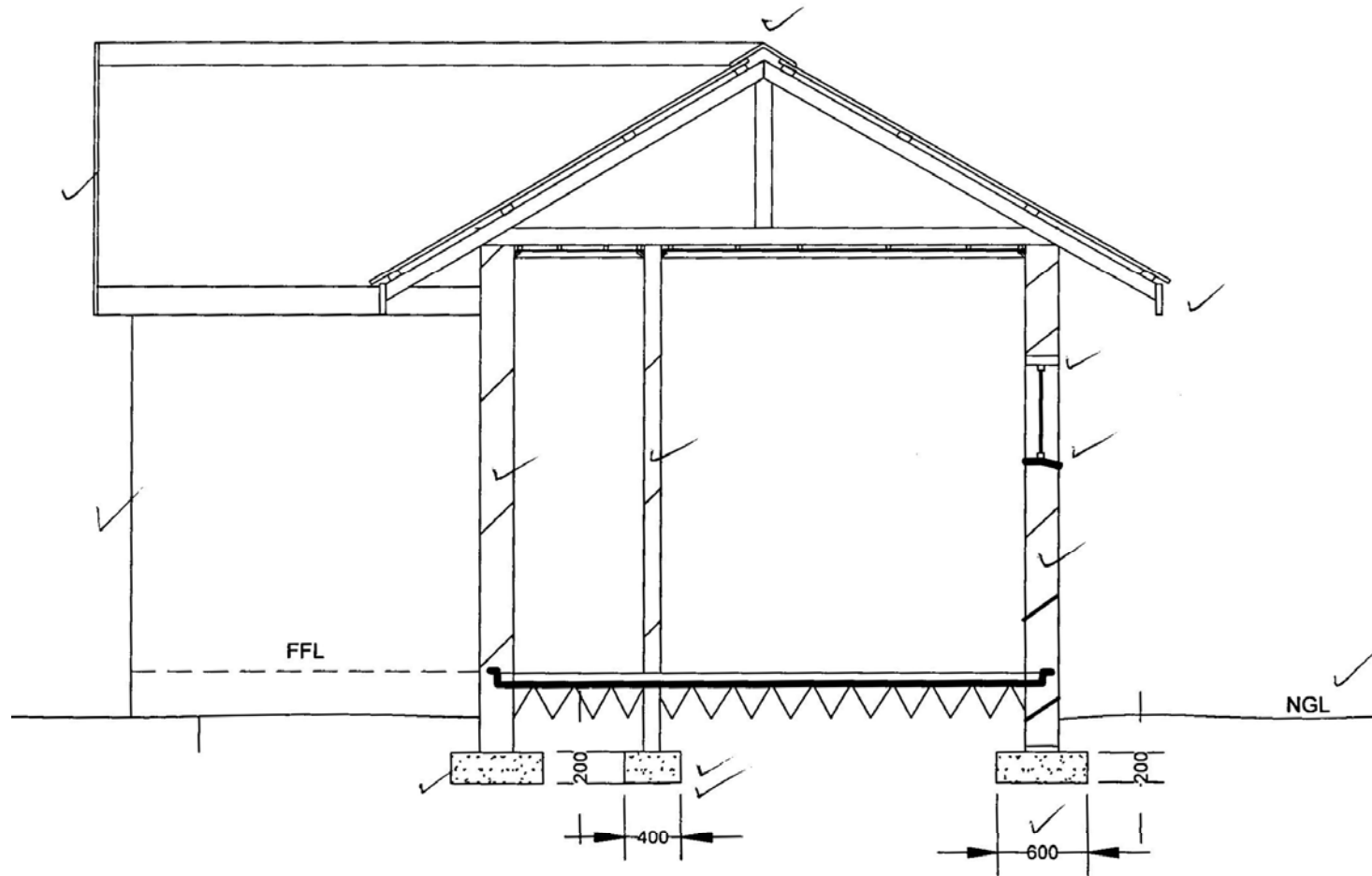
5.3.2

MEMBER	MAGNITUDE	NATURE
BF	14 N	Strut
DE	17 N	Tie
FG	10.4 N	Strut

(6)

5.4 Stress = Load/Area Area =  $l \times b$   
 $= 50000/0.0001 = 0.01 \times 0.01$   
 $= \mathbf{500\ 000\ 000\ N/m\ or\ Pa}$   $= \mathbf{0.0001\ m^2}$   
 or  $1 \times 10^{-4}\ m^2$  (4)  
**[30]**

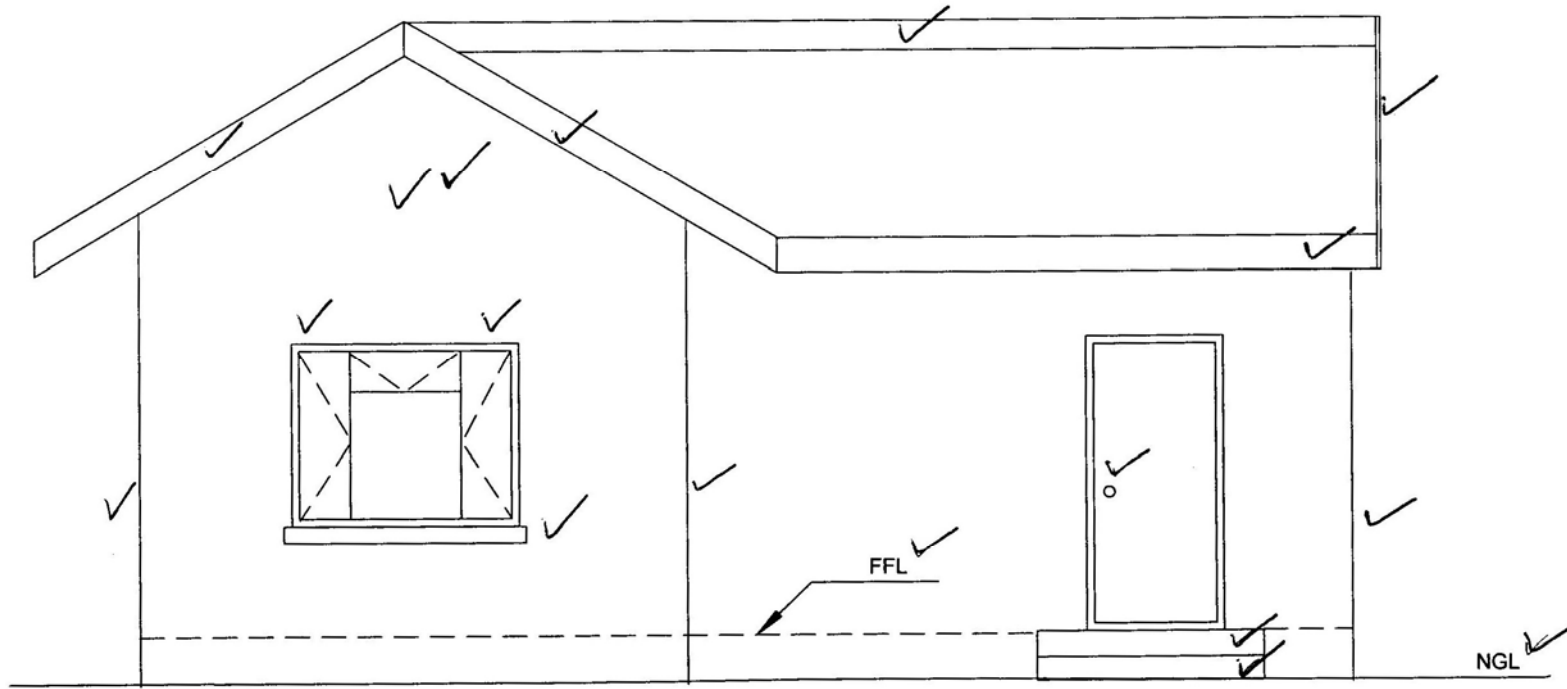
**QUESTION 6.1.1**



**SECTIONAL A-A**

**SCALE 1: 50**

**QUESTION 6.1.2**



20  
Next 5

**WEST ELEVATION** ✓

**SCALE 1: 50** ✓

(25)

[40]

**Total: 200 marks**