



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**CIVIL TECHNOLOGY: CIVIL SERVICES**

**EXEMPLAR 2018**

**MARKING GUIDELINES**

**MARKS: 200**

**These marking guidelines consist of 15 pages.**

**QUESTION 1: OHSA, MATERIALS, TOOLS, EQUIPMENT AND JOINING (GENERIC)**

- |     |        |   |     |
|-----|--------|---|-----|
| 1.1 | 1.1.1  | H ✓   | (1) |
|     | 1.1.2  | A ✓   | (1) |
|     | 1.1.3  | E ✓   | (1) |
|     | 1.1.4  | C ✓   | (1) |
|     | 1.1.5  | D ✓   | (1) |
|     | 1.1.6  | J ✓   | (1) |
|     | 1.1.7  | I ✓   | (1) |
|     | 1.1.8  | G ✓   | (1) |
|     | 1.1.9  | B ✓   | (1) |
|     | 1.1.10 | F ✓   | (1) |
| 1.2 | 1.2.1  | A – Laser level ✓<br>B – Measuring staff ✓<br>C – Tripod ✓  | (3) |
|     | 1.2.2  | <ul style="list-style-type: none"> <li>• Place the laser level in its case after use. ✓</li> <li>• Do not bump the instrument against objects or drop it.</li> <li>• Never open the housing or attempt to disassemble the instrument.</li> <li>• Never store the laser level in hot or extremely cold areas.</li> </ul> <p><b>ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER</b></p>   | (1) |
| 1.3 | 1.3.1  | <ul style="list-style-type: none"> <li>• Do not throw any tools or materials from a scaffold. ✓</li> <li>• Never jump on a scaffold. ✓</li> <li>• Never overload a scaffold.</li> <li>• Remove or cover sharp edges or corners</li> <li>• Always attach free-standing scaffoldings to a building</li> <li>• Never jump on and off a scaffold.</li> <li>• Use a ladder to get on and off a scaffold.</li> </ul> <p><b>ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWERS</b></p> | (2) |
|     | 1.3.2  | <ul style="list-style-type: none"> <li>• It prevents workers from falling off the scaffold. ✓</li> <li>• To prevent materials from falling off the scaffold.</li> <li>• It is used as a hand rail.</li> <li>• It is used to strap on safety harnesses.</li> </ul> <p><b>ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER</b></p>   | (1) |

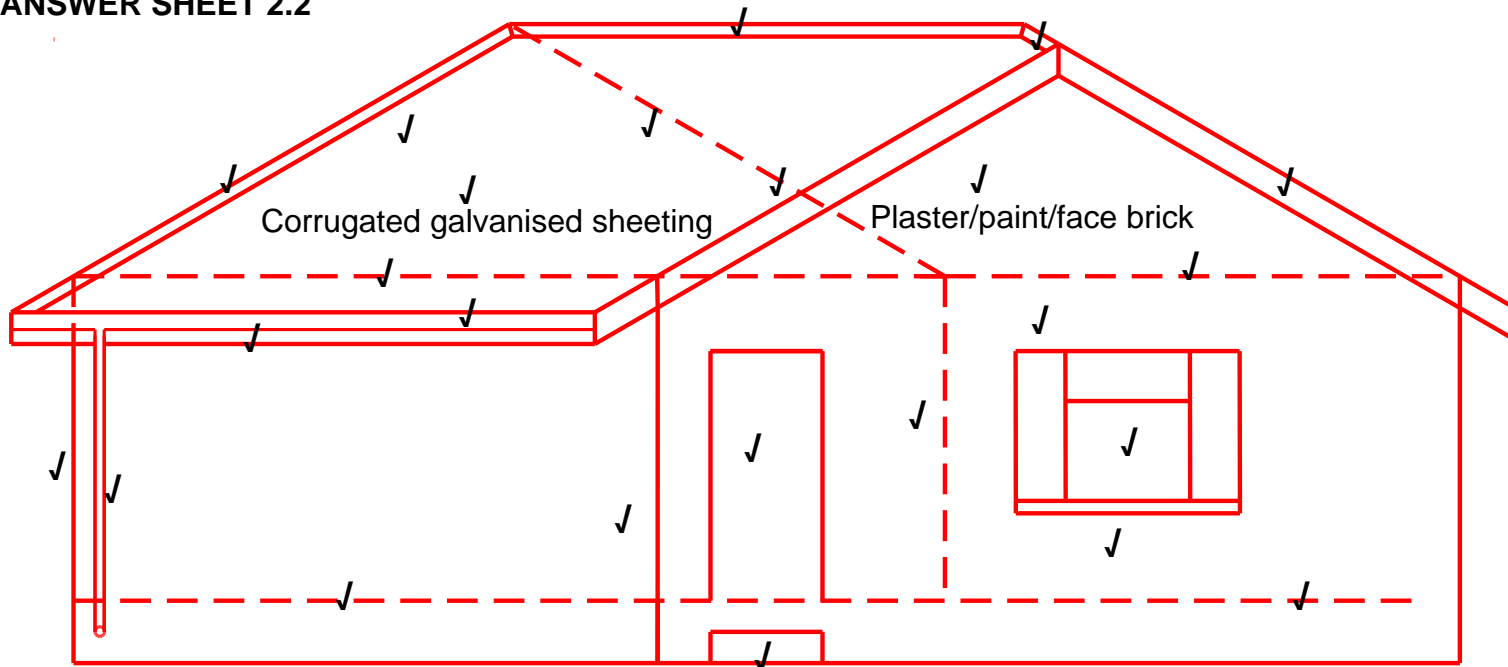
- 1.3.3
- The toe board will prevent tools from sliding of the scaffold. ✓
  - The toe board will prevent workmen from stepping off the scaffold.
- ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER**
- (1)
- 1.3.4
- Vertical standards can sink into the ground. ✓
  - The scaffold may rock to and fro.
- ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER**
- (1)
- 1.4            Bolts and nuts
- (1)  
**[20]**

**QUESTION 2: GRAPHICS AS METHOD OF COMMUNICATION (GENERIC)**

<b>NO.</b>	<b>QUESTIONS</b>	<b>ANSWERS</b>	<b>MARKS</b>
1	Identify FIGURE A.	Floor plan of ground floor	1
2	Identify FIGURE B.	Floor plan of first floor	1
3	Identify FIGURE D.	Site plan	1
4	What do the short dashed lines in FIGURE B indicate?	The roof line of the building	1
5	What type of roof is used on this building?	Gable roof	1
6	Name the scale that was used to draw FIGURE B.	1 : 100	1
7	Name the scale that was used to draw FIGURE D	1 : 500	1
8	On what side of the building is the bathrooms situated?	South side	1
9	What is indicated by number 1?	Proposed building	1
10	What is indicated by number 2?	Gully	1
11	What is indicated by number 3?	Existing building	1
12	What is indicated by number 4?	North direction	1
13	What is indicated by number 5?	Gable wall	1
14	What is indicated by number 6?	Finished floor level of ground floor	1
15	What is indicated by number 7?	One-way switch double pole	1
		<b>TOTAL</b>	<b>15</b>

2.2 GRAPHICS AND COMMUNICATION (GENERIC)

ANSWER SHEET 2.2



Application of scale ✓ ✓ ✓

NOT TO SCALE: USE A MASK TO MARK THIS QUESTION

ASSESSMENT CRITERIA	MARKS	LM
External Walls	3	
NGL (correctly indicated)	1	
FFL (correctly indicated)	1	
Window	1	
Window sill	1	
Door opening	1	
Step	1	
Fascia board	1	
Barge board	2	
Roof (correctly drawn)	3	
Gutter	1	
Rain-water down pipe	1	
Ridge capping	1	
Determining roof height	2	
Any two labels	2	
Application of scale One or two incorrect = 3 Three or four incorrect = 2 More than five incorrect = 1 No measurement correct = 0	3	
<b>TOTAL</b>	<b>25</b>	

[40]

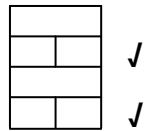
**QUESTION 3: CONSTRUCTION ASSOCIATED WITH CIVIL SERVICES (SPECIFIC)**

3.1 3.1.1 English bond ✓ (1)

3.1.2 Height  $75 \times 4 \checkmark = 300 \text{ mm } \checkmark$

Length  $220 \times 6 \checkmark = 1\,320 \text{ mm } \checkmark$  (4)

3.1.3

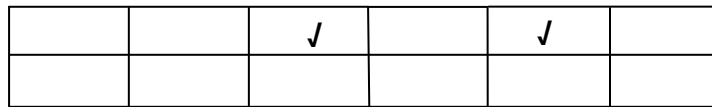


End view

ASSESSMENT CRITERIA	MARK	LEARNER MARK
Stretcher course	1	
Header course	1	
<b>TOTAL</b>	<b>2</b>	

(2)

3.1.4

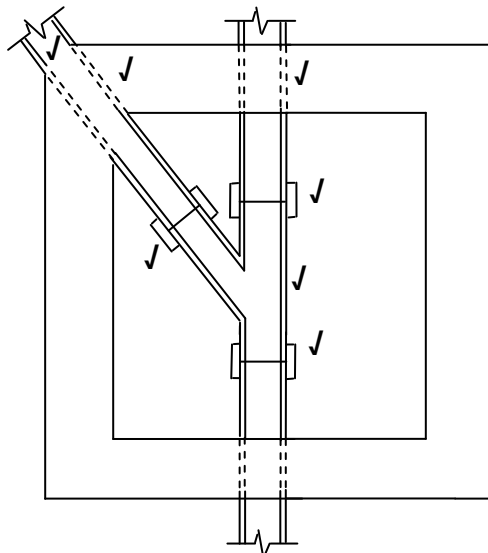


Stretcher course of AA

(2)

ASSESSMENT CRITERIA	MARK	LEARNER MARK
Top view of stretcher course showing two rows of bricks correctly drawn	2	
<b>TOTAL</b>	<b>2</b>	

3.2.1



(7)

ASSESSMENT CRITERIA	MARK	LEARNER MARK
Hidden detail where pipes passes under wall	2	
Open channel. Show double line for cut pipe	1	
Junction correctly drawn	3	
Branch pipe correctly drawn	1	
<b>TOTAL:</b>	<b>7</b>	

- 3.2.2 750 mm ✓ (1)
- 3.2.3
- As close as possible to a municipal connection ✓
  - Every 25 m on a straight section of a drain line ✓
  - At all important changes of direction
  - At changes of gradient or levels
  - At all important junctions
- ANY TWO OF THE ABOVE** (2)
- 3.3 Regulations that need to be adhered to during excavations are:
- Excavation work must be done under supervision of a qualified person. ✓
  - Sufficient steps must be taken to make sure that a worker is not buried or trapped by falling material of sand. ✓
  - All sides must be supported.
  - Supervisor must ensure that no heavy loads or machinery comes close to the excavation.
  - Trenches must be protected by fencing
  - Red warning lights and warning signs should be placed at regular intervals.
- ANY TWO OF THE ABOVE** (2)
- 3.4 3.4.1 Vertical sheeting/shutter board/planks ✓ (1)
- 3.4.2 Wedges are used to tighten the bond between the different parts. ✓ (1)
- 3.4.3
- Wood/plywood ✓
  - Plastic
  - Sheet metal
- ANY ONE OF THE ABOVE** (1)
- 3.4.4
- The gradient must be determined ✓
  - Invert levels must be determined ✓
  - Excavation must be set out
- ANY TWO OF THE ABOVE** (2)
- 3.5
- Backfilling is the process of putting soil back into a trench. ✓
  - Compaction is a process of increasing the density of soil. ✓
- (2)
- 3.6 3.6.1 1 : 40 ✓ (1)
- 3.6.2 1 : 60 ✓ (1)
- [30]**

**QUESTION 4: COLD AND HOT-WATER SUPPLY (SPECIFIC)**

- |     |       |   |     |
|-----|-------|---|-----|
| 4.1 | 4.1.1 | B ✓   | (1) |
|     | 4.1.2 | A ✓   | (1) |
|     | 4.1.3 | C ✓   | (1) |
|     | 4.1.4 | D ✓   | (1) |
|     | 4.1.5 | A ✓   | (1) |
|     | 4.1.6 | D ✓   | (1) |
|     | 4.1.7 | D ✓   | (1) |
| 4.2 | 4.2.1 | Automatic shut off valve ✓  | (1) |
|     | 4.2.2 | Stop cock ✓   | (1) |
|     | 4.2.3 | Non-return valve ✓  | (1) |
|     | 4.2.4 | Pressure-reducing valve ✓   | (1) |
| 4.3 | 4.3.1 | Air will not be able to exit or enter the system. ✓<br>The hot water may be drained through the cold water inlet pipe due to sympmonic action.<br>The life span of the geyser may be compromised.   | (1) |
|     | 4.3.2 | Stop cock ✓   | (1) |
|     | 4.3.3 | Drain cock ✓  | (1) |
|     | 4.3.4 | <ul style="list-style-type: none"> <li>• Solar geyser ✓</li> <li>• Solar heating panel</li> <li>• Gas heater</li> </ul> <b>ANY ONE OF THE ABOVE</b>   | (1) |
|     | 4.3.5 | <ul style="list-style-type: none"> <li>• Moves heat instead of generating it ✓</li> <li>• Greater energy efficiency ✓</li> <li>• Saves electricity</li> <li>• Best for moderate climates</li> </ul> <b>ANY TWO OF THE ABOVE</b>   | (2) |
|     | 4.3.6 | <ul style="list-style-type: none"> <li>• Blocked galvanised pipes ✓</li> <li>• Dirty or blocked pipes and valves ✓</li> <li>• Old low-pressure geyser of 100 kPa</li> <li>• Faulty valves</li> <li>• Low water pressure</li> <li>• Blocked strainer at tap outlet</li> <li>• Air in the system</li> </ul> <b>ANY TWO OF THE ABOVE</b> | (2) |



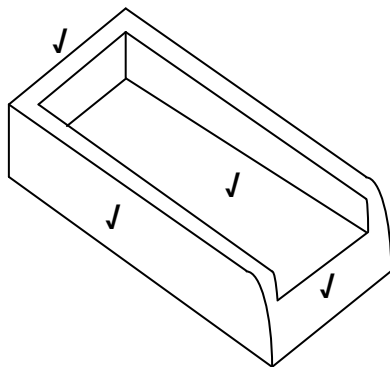
- 4.4 A FIGURE A (Stop cock) allows flow of water only in ONE direction ✓ (1)
- B FIGURE B (Full-way valve/gate valve) allows the flow of water in TWO directions ✓ (1)
- 4.5 4.5.1 A - Bib tap ✓ (1)
- B - Pillar tap ✓ (1)
- 4.5.2 A - This tap is used for sinks, wash troughs and baths. ✓ (1)
- B - This tap is used at sinks, baths and basins ✓ (1)
- 4.6 4.6.1 Ball valve ✓ (1)
- 4.6.2 A ball valve is used to control the flow of water into the cistern of the water closet. ✓  
A ball valve regulates the volume of water in a cistern. (1)
- ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER**
- 4.6.3 Plastic/copper/polystyrene ✓ (1)
- 4.7
- Aerator devices in taps ✓
  - Electronic taps ✓
  - Sensor taps
  - Metered taps
  - Water-saving shower heads
  - Modern cisterns and flushing devices
  - Bottles placed in cistern
- ANY TWO OF THE ABOVE** (2)
- 4.8
- Open both the hot and cold water taps and check the flow of the water. ✓
  - Use duct tape to connect a piece of pipe to the hot and cold water taps. ✓
  - Open the hot water tap. Open the cold water tap, and then open a tap from another hot-water source. ✓ Repeat if water is not flowing.
  - Leave the two taps running for several minutes. ✓ (4)
- 4.9
- Sudden drop in secondary pipes ✓
  - Loose jumpers in taps ✓
  - Pipes in walls are not properly caulked
  - Pipes are not secured in roof space
  - Draw off pipe is bigger than the supply pipe
- ANY TWO OF THE ABOVE** (2)

- 4.10 Pipe-thread cutting machine ✓  
Stocks and dies (1)
- 4.11
- Water meters ✓
  - Plumbing lines ✓
  - Pressure vessels
  - Solar systems
  - Sprinkler systems
- ANY TWO OF THE ABOVE** (2)
- 4.12
- Burst geyser or major leak ✓
  - Drip tray is blocked, cracked or is overflowing
- ANY ONE OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER** (1)
- [40]**

**QUESTION 5: ROOFWORK, STORM WATER AND GRAPHICS AS MEANS OF COMMUNICATION (SPECIFIC)**

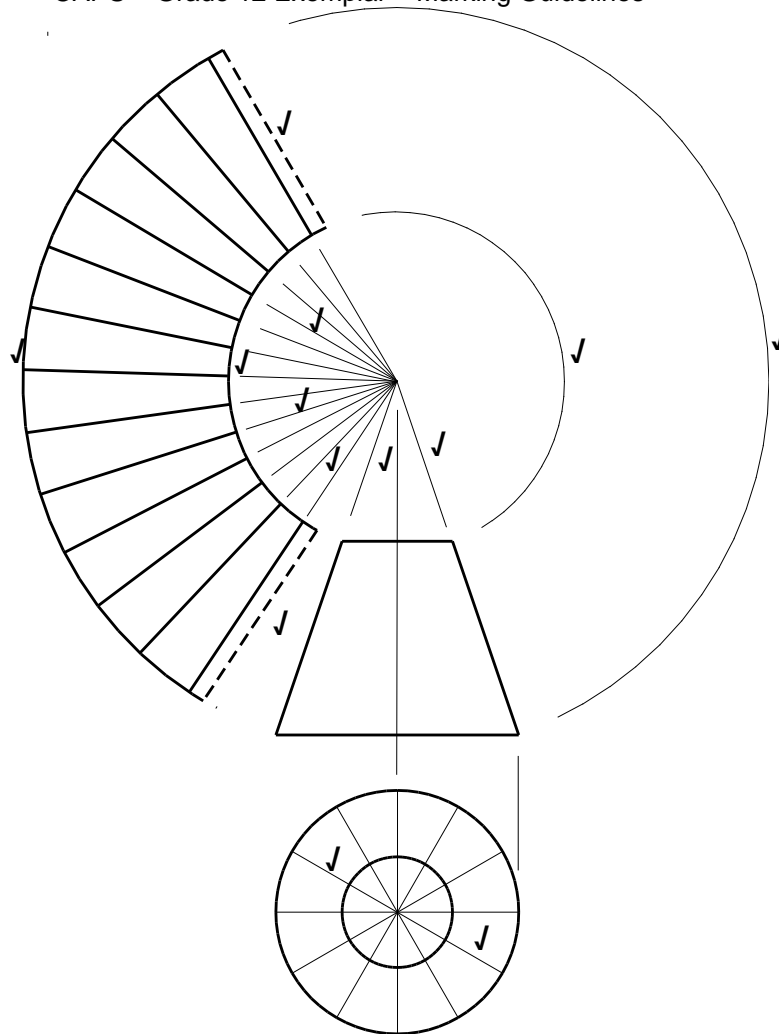
- 5.1      5.1.1      Square gutter ✓ (1)
- 5.1.2      Offset/downpipe ✓ (1)
- 5.1.3      Holder bat ✓ (1)
- 5.1.4      Safety harness ✓ (1)
- 5.2      Water in the gutter will not discharge quickly enough and the gutter will overflow if only one outlet with downpipe is used for the roof. ✓ (1)
- 5.3      • Channels or inclined surfaces. ✓  
             • Roadside gutters guide the storm water to pipes. ✓  
             • Storm water drains with manholes carry the water away.  
             • Furrows can channel the water to catchment areas. (2)
- ANY TWO OF THE ABOVE**
- 5.4      • All public storm water pipes and systems. ✓  
             • Cleaning and maintaining all manholes and storm water systems. ✓ (2)

5.5



(4)

ASSESSMENT CRITERIA	MARK	LEARNER MARK
Front of concrete shoe drawn correctly	1	
Left of concrete shoe drawn correctly	1	
Rear of concrete shoe drawn correctly	1	
Inside of concrete shoe drawn correctly	1	
<b>TOTAL:</b>	4	



ASSESSMENT CRITERIA	MARK	LM
Construction lines to top of cone	2	
Construction line of outer circle	1	
Construction line of inner circle	1	
Calculation of circumference of circle and 12 equal parts	4	
Divide outer circle into 12 parts	2	
Construction lines from top of cone to outer circle	3	
Outside lines of development	2	
3 mm seam on both sides	2	
<b>TOTAL:</b>	<b>17</b>	

**Circumference of a circle into 12 parts**

$$\begin{aligned}
 \text{Ø of circle} &= 44 \text{ mm} \quad \checkmark \\
 &= 44 \times 3.14 \\
 &= \underline{138.16} \quad \checkmark \\
 &\quad 12 \\
 &= 11,5 \text{ mm}
 \end{aligned}$$

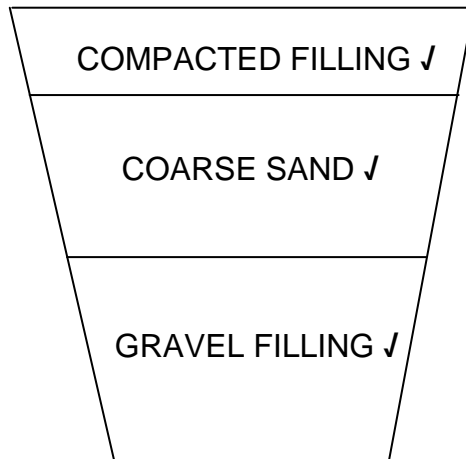
**NOT TO SCALE. USE A MASK TO MARK THIS QUESTION.**

(17)  
[30]

**QUESTION 6: DRAINAGE (SEWERAGE) SYSTEMS AND SANITARY FITTINGS (SPECIFIC)**

6.1	<b>Rodding eye</b>	<b>Man hole</b>	
	Small compared to a manhole ✓	Big and bulky ✓	
	Quicker to install than a manhole ✓	Takes longer to build ✓	(4)

6.2



SECTIONAL VIEW OF FRENCH DRAIN

(3)

- 6.3 6.3.1 Gully trap/P-trap ✓ (1)
- 6.3.2 The water forms a water seal to prevent gases and bad smells from the sewerage system from entering the atmosphere. ✓ (1)
- 6.4 6.4.1 Septic tank ✓ (1)
- 6.4.2 Manhole cover ✓ (1)
- 6.4.3 To collect and treat sewage where no municipal sewerage system is available. ✓ (1)
- 6.4.4 If the outlet pipe is installed higher than the inlet pipe, effluent will not discharge ✓ and the whole system will block. ✓ (2)  
**OR ANY OTHER ACCEPTABLE ANSWER**
- 6.5 6.5.1
- Copper pipe ✓
  - Galvanised pipe ✓
- ANY ONE OF THE ABOVE** (1)
- 6.5.2 The inspection eye on the access bend can be opened to inspect or clear blockages. (1)
- 6.5.3 PVC/Galvanised metal ✓ (1)
- 6.5.4 135° ✓ (1)
- 6.5.5 40 mm/50 mm ✓ (1)

- 6.6
- Scraps of food ✓
  - Newspaper ✓
  - Cans
  - Bottles
  - Sticks
  - Household oil/grease
  - Sanitary towels
- (2)

**ANY TWO OF THE ABOVE OR ANY OTHER ACCEPTABLE ANSWER**

- 6.7
- Blockages can be unblocked by using:
- Drain rods ✓
  - Jetting machine ✓
- (2)

**ANY TWO OF THE ABOVE OR ANY ACCEPTABLE ANSWER**

- 6.8
- 6.8.1 Brown ✓ (1)

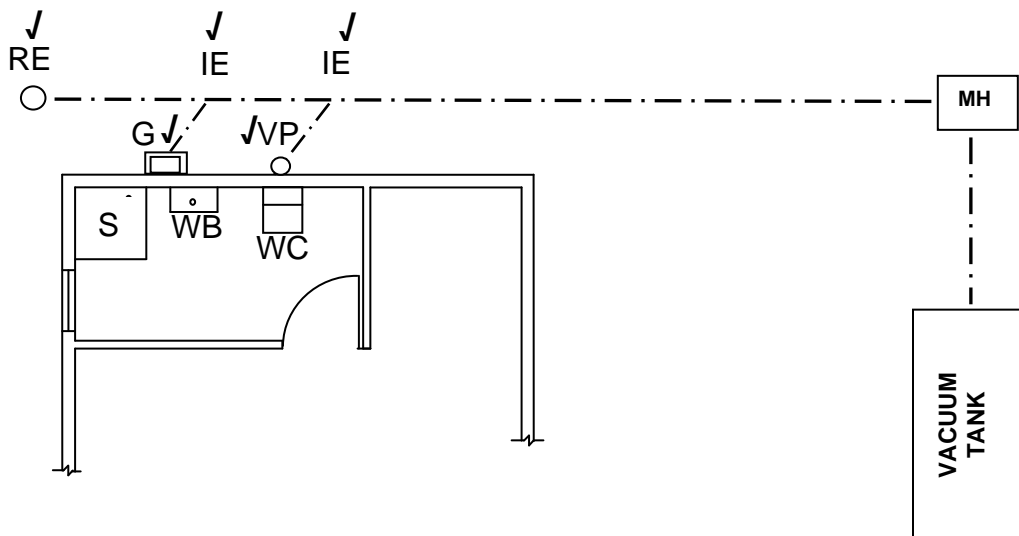
- 6.8.2 Black ✓ (1)

- 6.9
- 6.9.1  ✓✓ (2)

- 6.9.2  ✓✓ (2)

- 6.9.3  ✓✓ (2)

6.10 6.10.1



ASSESSMENT CRITERIA	MARK	CANDIDATE'S MARK
Rodding eye	1	
Gully	1	
Ventilation pipe	1	
Inspection eye	1	
<b>TOTAL</b>	<b>4</b>	

(4)

6.10.2 It is not safe to work alone in deep manholes because you may be exposed to gases in the sewerage system and die if not quickly brought to the surface. ✓

You may drown if a blockage is unblocked and water levels rise suddenly.

(1)

**ANY ONE OF THE ABOVE OR ANY ACCEPTABLE ANSWER**

6.10.3 Length of main pipe:  $118 + 24 = 142 \text{ mm}$  ✓

Length of branch pipes:  $8 + 10 = 18 \text{ mm}$  ✓

Total length:  $142 + 18 = 160 \text{ mm}$  ✓

Length according to scale:  $160 \times 100 = 16\,000 \text{ mm}/16 \text{ m}$  ✓

(4)

**A TOLERANCE OF 2 mm IS ALLOWED**

**NOTE:** The lengths of each pipe on the question papers printed in the province must be verified by provincial internal moderators and chief markers and answers must be calculated according to those lengths.

[40]

**TOTAL: 200**