



# **basic education**

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

## **SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**CIVIL TECHNOLOGY: CIVIL SERVICES**

**MAY/JUNE 2024**

**MARKING GUIDELINES**

**MARKS: 200**

**These marking guidelines consist of 18 pages.**

## INSTRUCTIONS FOR MARKERS

### 1. Markers should:

- Familiarise themselves with the question and answer before evaluating the responses of candidates.
- Always interpret the responses of the candidates within the context of the question.
- Consider any relevant and acceptable answer during pre-marking but should strictly adhere to the answers after finalisation of the marking guideline.
- There are TWO approaches to answering questions; these are (1) to describe and (2) to explain.
  1. If a candidate is required to explain e.g., a process in 4 steps, only the first 4 responses should be considered.
  2. However, if for example candidate is required to explain or describe a process, we need to consider that that candidates may write a long description, not necessarily well organised. In this case, the marker needs to evaluate the complete statement to judge if the candidate explained the required outcome satisfactorily and allocate marks on merit.
- Mark what the candidate wrote and do not interpret or predict responses.
- Indicate the tick or cross right at the position where the mark needs to be awarded or where the candidate made the error.
- Accept the letter corresponding with the correct answer as well as the answer written in full in multiple-choice questions or similar questions.
- Accept incorrect spelling in answers unless the spelling changes the meaning of the answer.
- If a learner writes two or more answers separated by a slash (/) mark only the first response, unless the additional answer/s are different names for the same item e.g., Yale lock/Night latch. In this case, the answer for the response should be awarded and the slash (/) should NOT be considered as an additional answer.

### 2. For calculations:

- A mark is only awarded if the correct unit is written next to the answer. If the question states that the answer must be in a specific unit, a mark will ONLY be awarded if the answer has the correct unit as indicated in the question.
- Marks will only be allocated for the correct values if the candidates add instead of multiply. NO marks will be awarded for the calculations and the answer.
- Where an incorrect answer is correctly carried over, the marker must recalculate the values, using the incorrect answer from the first calculation. If correctly used, the candidate should receive the full marks for subsequent calculations.
- Alternative methods of calculations must be considered, provided that the correct answer is obtained.
- For the calculation of quantities marks will be awarded for the correct use of the dimension paper.

**3. When marking drawings:**

- The member for which the mark should be awarded should be drawn correctly in the correct position to receive a mark.
- A member incorrectly drawn but wrongfully repeated in another position will be awarded the mark for the repeated incorrect member provided that the marking guideline provide for TWO or more marks for that member (positive marking).
- Marks can only be awarded for a label if the label is correctly indicating the correct member. Do not consider labels for members of which the labels were provided on the answer sheet.
- Scale drawings should always be marked using an appropriate mask.
- If the incorrect/wrong drawing was drawn, the candidate can be awarded for only what was provided for on the marking guideline.
- If a line diagram or an orthographic view instead of a pictorial drawing (isometric/oblique/perspective) is drawn, the first assessment criteria for each member will be marked wrong, but marks will be awarded for the subsequent members if TWO or more marks are awarded for the same member.
- If candidates draw/give more information than what is required, mark strictly according to the assessment criteria.

**4. Incorrect numbering of questions:**

- If a candidate numbered an incorrectly, but the answer is in the correct position according to the sequence of the questions in the question paper, circle then the incorrect numbering and mark the response.
- If questions were answered randomly not following the same sequence as in the question paper and the learner numbered incorrectly, the response should NOT be marked.

**5. Duplication of responses and questions answered in the correct place:**

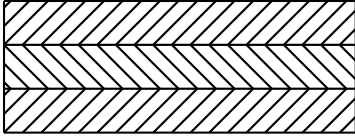
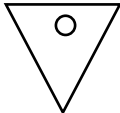
- If a question is answered twice, mark the first response.
- If a question should be answered on an answer sheet and the candidate answered it on both the answer sheet and in the answer book, mark the response on the answer sheet and cancel the response in the answer book.
- If the question was answered in the answer book instead of on the answer sheet, mark the response in the answer book according to the assessment criteria on the marking guideline.

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

1.1	1.1.1	D ✓	(1)
	1.1.2	D ✓	(1)
	1.1.3	B ✓	(1)
	1.1.4	C ✓	(1)
	1.1.5	B ✓	(1)
	1.1.6	B ✓	(1)
	1.1.7	A ✓	(1)
	1.1.8	D ✓	(1)
	1.1.9	C ✓	(1)
	1.1.10	A ✓	(1)
	1.1.11	B ✓	(1)
	1.1.12	A ✓	(1)
1.2.	1.2.1	Rawl plugs/Plastic plugs with screws/Coach screws/Lag bolts ✓	(1)
	1.2.2	Rawl plugs/Plastic plugs with screws/Coach screws/Lag bolts: <ul style="list-style-type: none"> <li>• Are strong fasteners ✓</li> <li>• Resist pull out failure ✓</li> <li>• Have excellent carrying capacity</li> <li>• Easy to install</li> <li>• Are cost effective</li> </ul> <b>ANY TWO OF THE ABOVE</b>	(2)
	1.2.3	<ul style="list-style-type: none"> <li>• Drill holes/Drill holes and remove the debris ✓</li> <li>• Position the cabinet and insert the rawl plugs/plastic plugs into the holes through the cabinet ✓ OR Insert plastic plugs into the holes, position the cabinet and insert the joining fixtures into the holes through the cabinet</li> <li>• Tighten the screws/Insert the screws into the holes and tighten the screws ✓</li> </ul>	(3)
1.3.	1.3.1	Multi detector ✓	(1)
	1.3.2	Laser level/Spirit level ✓	(1)
			<b>[20]</b>

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

NO.	QUESTIONS	ANSWERS	MARKS
1.	Name the type of building that is illustrated by FIGURE A.	Multi-storey building/ Three-storey building ✓	1
2.	Deduce from the building plan the elevation on which the sink is located.	North elevation/North ✓	1
3.	Identify number 1.	Ridge capping/Ridge/Roof/ Roof covering/Hipped end ✓	1
4.	Why are balusters installed at number 2?	To prevent people from falling off ✓	1
5.	What type of material was specified for number 3?	Laminated safety glass/Safety glass ✓	1
6.	Recommend ONE suitable material for number 4.	Timber/Fibre cement ✓	1
7.	Who is the owner of the proposed dwelling?	Mr P Xhosa ✓	1
8.	Identify the number that indicates the downpipe.	5 ✓	1
9.	Name ONE other sanitary fixture, besides a washbasin, that can be installed in the bathroom.	Shower/Bath/Bidet/Urinal ✓	1
10.	Identify number 7.	Distribution board/DB ✓	1
11.	Describe the purpose of number 8.	To access the garage with a vehicle ✓	1
12.	How many fluorescent tubes are indicated in the building?	1 ✓	1
13.	Name the street in which the new building will be erected.	Protea Street ✓	1

14.	What type of finish was specified for the walls?	Stone cladding ✓	1
15.	Deduce from the building plan why it was revised.	Drawing of balustrades/Balustrades were not drawn ✓	1
16.	What must be installed to gain access to the first and second floor?	Stairs ✓	1
17.	Deduce from the building plan who must sign off the building plan.	Architect ✓ and Client ✓	2
18.	What are the prescribed dimensions for the balusters?	40 mm x 40 mm x 1 200 mm ✓	1
19.	How many hinged window openings are indicated on window 2 in the window schedule?	1 ✓	1
20.	Provide a reason for installing solar panels on the roof.	<ul style="list-style-type: none"> <li>To have electricity during load shedding ✓</li> <li>To save on electricity cost</li> <li>To be independent from electricity providers</li> <li>To ensure exposure to sun light</li> </ul>	1
21.	The interior door frames are covered with plywood. Draw the symbol for plywood.	 ✓✓	2
22.	Draw the symbol for a wall mounted urinal.	 ✓✓	2
23.	Describe the top end shape of the baluster.	Square ✓	1

24.	Calculate the total height of the building from the finished floor level up to the top of the roof. Give your answer in m.	$2,6 \checkmark + 0,17 \checkmark + 2,6 \checkmark + 0,17 \checkmark + 2,6 \checkmark + 1,8 \text{ m} \checkmark$ $= 9,94 \checkmark \text{ m}$ <p style="text-align: center;"><b>OR</b></p> $2\,600 + 170 + 2\,600 + 170 + 2\,600 + 1\,800 \text{ mm}$ $= 9\,940 \text{ mm}$ $= 9,94 \text{ m}$	7
25.	Calculate the area of the external wall of the second floor from the top of the floor up to roof height in the west elevation in FIGURE A. Show ALL calculations Give your answer in m <sup>2</sup> .	$= (2,6 \checkmark \times 12 \checkmark) - (2,1 \checkmark \times 1,8 \checkmark)$ $= 31,2 \checkmark - 3,78 \text{ m}^2 \checkmark$ $= 27,42 \checkmark \text{ m}^2$ <p style="text-align: center;"><b>OR</b></p> $= (2\,600 \times 12\,000) - (2\,100 \times 1\,800)$ $= 31\,200\,000 - 3\,780\,000 \text{ mm}^2$ $= 27\,420\,000 \text{ mm}^2$ $= 27,42 \text{ m}^2$	7
		<b>TOTAL:</b>	<b>40</b>

**QUESTION 3: CONSTRUCTION ASSOCIATED WITH CIVIL SERVICES, OHSA  
AND QUANTITIES (SPECIFIC)**

- |     |   |  |     |
|-----|---|--|-----|
| 3.1 | 3.1.1   | 1:90 ✓   | (1) |
|     | 3.1.2   | 150 mm ✓   | (1) |
|     | 3.1.3   | OHSA ✓   | (1) |
|     | 3.1.4   | Orange/Red ✓   | (1) |
|     | 3.1.5   | Loose/Waterlogged ✓  | (1) |
| 3.2 | Soil compaction is the process of increasing the density ✓ of soil by pressing the soil particles closer together. ✓  |  | (2) |
| 3.3 | Precautionary measures to work in excavations: <ul style="list-style-type: none"><li>• The sides of the excavation must be properly supported ✓</li><li>• If the sides are not properly supported, no person is allowed to work in the trench ✓</li><li>• The supervisor must ensure that no load, material or heavy machinery is placed near the edge of any excavation</li><li>• Deep trenches should have shoring</li><li>• The supervisor (competent person) must have precautionary measures in place to prevent any person from being buried or trapped from falling materials in excavations</li></ul> <b>ANY TWO OF THE ABOVE</b> |  | (2) |
| 3.4 | 3.4.1   | Shower rose ✓  | (1) |
|     | 3.4.2   | Chrome/Brass/Plastic/Steel ✓   | (1) |
|     | 3.4.3   | Copper/Galvanised mild steel/Pex-pipe: (Cross linked polythene pipe)/Polythene ✓ | (1) |
|     | 3.4.4   | 15 mm ✓  | (1) |
|     | 3.4.5   | Hot-water pipe ✓   | (1) |
|     | 3.4.6   | Mixer tap ✓  | (1) |
|     | 3.4.7   | Chrome/Brass ✓   | (1) |
|     | 3.4.8   | 90° Elbow ✓  | (1) |



3.5 Length of pipe = 5 000 mm

Fall of drainpipe

$$= \frac{1 \checkmark \times 5\,000 \checkmark}{60 \checkmark \times 1} \\ = 83,3 \\ = 83 \text{ mm}/0,083 \text{ m} \checkmark$$

(4)

3.6

- Spirit level ✓
- Dumpy level ✓
- Laser level
- Incidence board/Gradient template

**ANY TWO OF THE ABOVE**

(2)

3.7

Poling boards/Strut/Walling boards/Solid timber/Shutter board/Folding wedge ✓

**ANY ONE OF THE ABOVE**

(1)

3.8

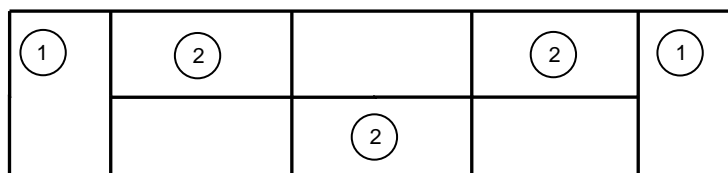
Locations for manholes:

- Close to municipal connections ✓
- Not more than 2 m from boundary
- Every 20 m to 25 m on a straight drain line
- At change of directions
- At important junctions

**ANY ONE OF THE ABOVE**

(1)

3.9

**TOP VIEW****FRONT VIEW**

NO.	ASSESSMENT CRITERIA	MARK
1	Header bricks	2
2	Stretcher bricks	3
	<b>TOTAL:</b>	<b>5</b>

(5)  
[30]

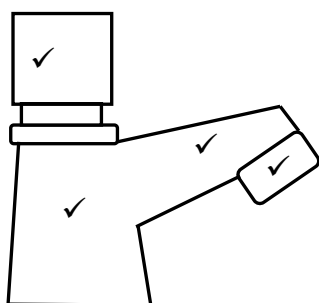
**QUESTION 4: COLD AND HOT-WATER SUPPLY, TOOLS, EQUIPMENT AND MATERIALS (SPECIFIC)**

4.1 4.1.1 Electronic tap/Electric tap/Sensor tap/Automatic tap ✓ (1)

4.1.2 To save water/To reduce water usage/Can be used without touching the tap ✓ (1)

4.1.3 In public bathrooms/Bathrooms/Kitchens ✓ (1)

4.1.4



(4)

4.2 4.2.1 **A** - P-trap ✓

**B** - 90°Waste bend plain/90° bend plain ✓

**C** - Waste pipe/Waste water pipe ✓

(3)

4.2.2 110 mm ✓

(1)

4.2.3 To carry the waste/soil water to the manhole/municipal connection/septic tank/vacuum tank ✓

(1)

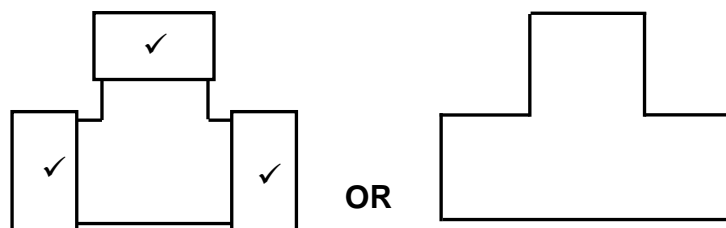
4.2.4 The function of a 135° Waste junction:

- To connect sewer pipes at an angle of 135° ✓
- To connect three sewer pipes
- To join a branch pipe on the main sewer pipe

**ANY ONE OF THE ABOVE**

(1)

4.3 4.3.1



**NOTE (can be drawn in any position)**

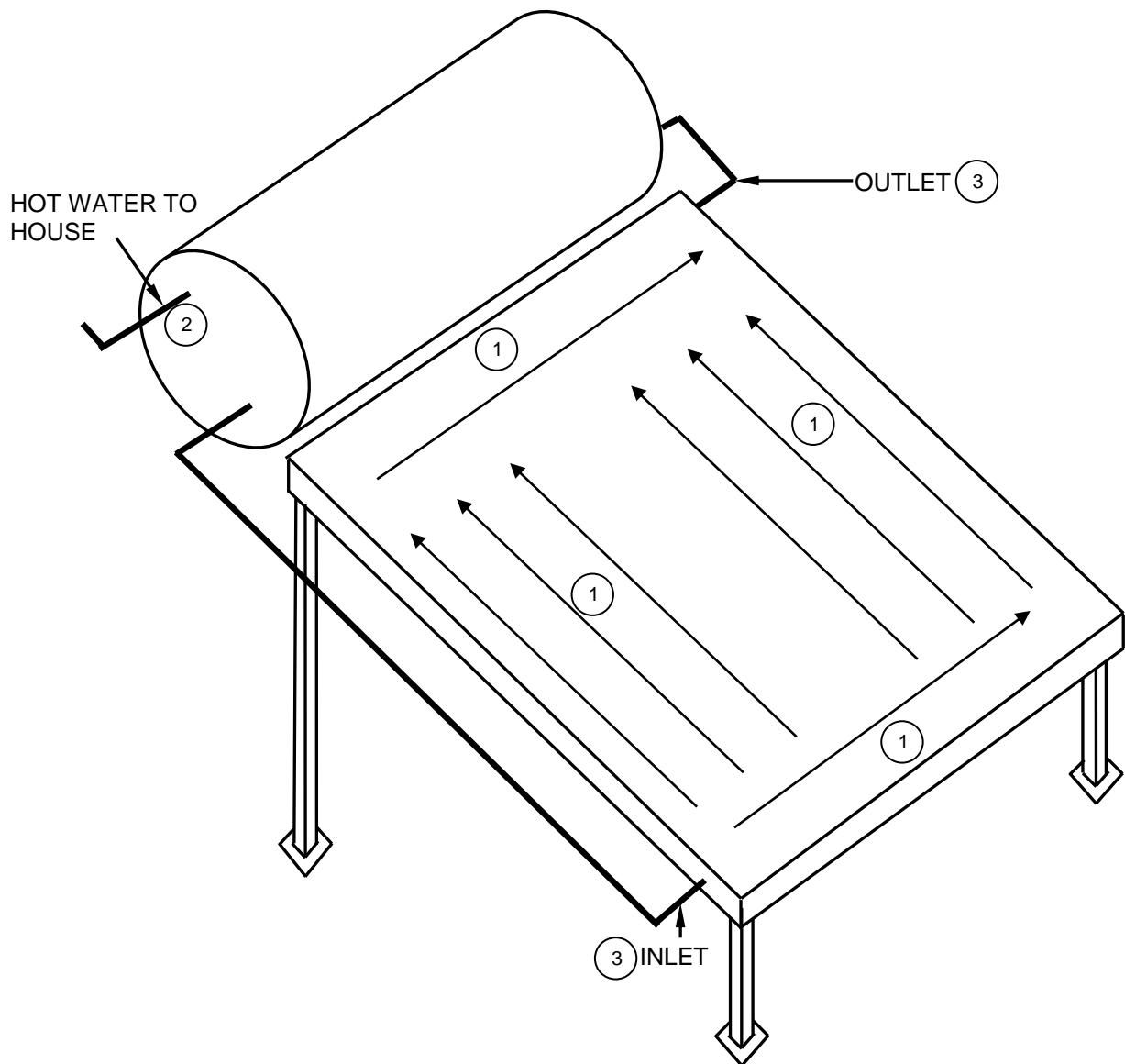
(3)

4.3.2 40 mm/50 mm ✓

(1)

- 4.3.3 Plain T-waste junction:
- Under a double bowl sink ✓
  - Under basins
  - To connect a wash tub and single sink
  - To connect three pipes with the same diameter
  - At sanitary fitments where three pipes must be connected
- ANY ONE OF THE ABOVE** (1)
- 4.4 4.4.1 Full-way valve/Gate valve ✓ (1)
- 4.4.2 Wheel/Hand wheel ✓ (1)
- 4.4.3 The tapering gate will:
- Move down ✓
  - Close the valve ✓
  - Stop the flow of water
  - Reduce the water flow
- ANY TWO OF THE ABOVE** (2)

4.5



NO.	ASSESSMENT CRITERIA	MARK
1	Arrows showing direction of water flow	4
2	Hot-water to house	1
3	Labels: Inlet and Outlet	2
<b>TOTAL:</b>		<b>7</b>

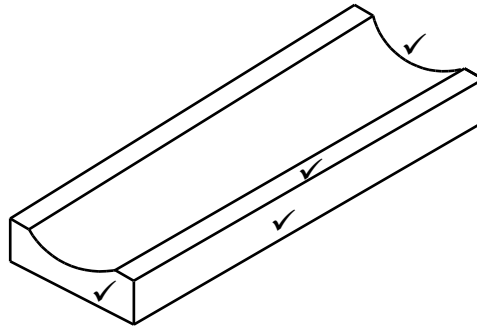
(7)

- |     |       |  |     |
|-----|-------|--|-----|
| 4.6 | 4.6.1 | Storage water heater (domestic type) ✓ | (1) |
|     | 4.6.2 | Expansion control vessel ✓             | (1) |
|     | 4.6.3 | Mixer (Thermostatically controlled) ✓  | (1) |
|     | 4.6.4 | Water meter ✓                          | (1) |

- 4.7 Cleaning of drain cleaning rods:  
• Hose down the drain cleaning rods ✓  
• Wash the drain cleaning rods thoroughly ✓  
• Disinfect the drain cleaning rods  
• Allow the drain cleaning rods to dry  
**ANY TWO OF THE ABOVE** (2)
- 4.8 If it contains any oil. ✓ (1)
- 4.9 Zinc has a very weak atomic bond relative to other metals. ✓ (1)
- 4.10 Consequences of dezincification:  
• Zinc in contact with oxygen and water dissolves and the material that remains is a weak spongy copper layer ✓  
• Can cause leaks if fittings weakens ✓  
• Can cause blockages when debris from dezincification falls into the pipe  
**ANY TWO OF THE ABOVE** (2)
- 4.11 White ✓ (1)
- [40]**

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

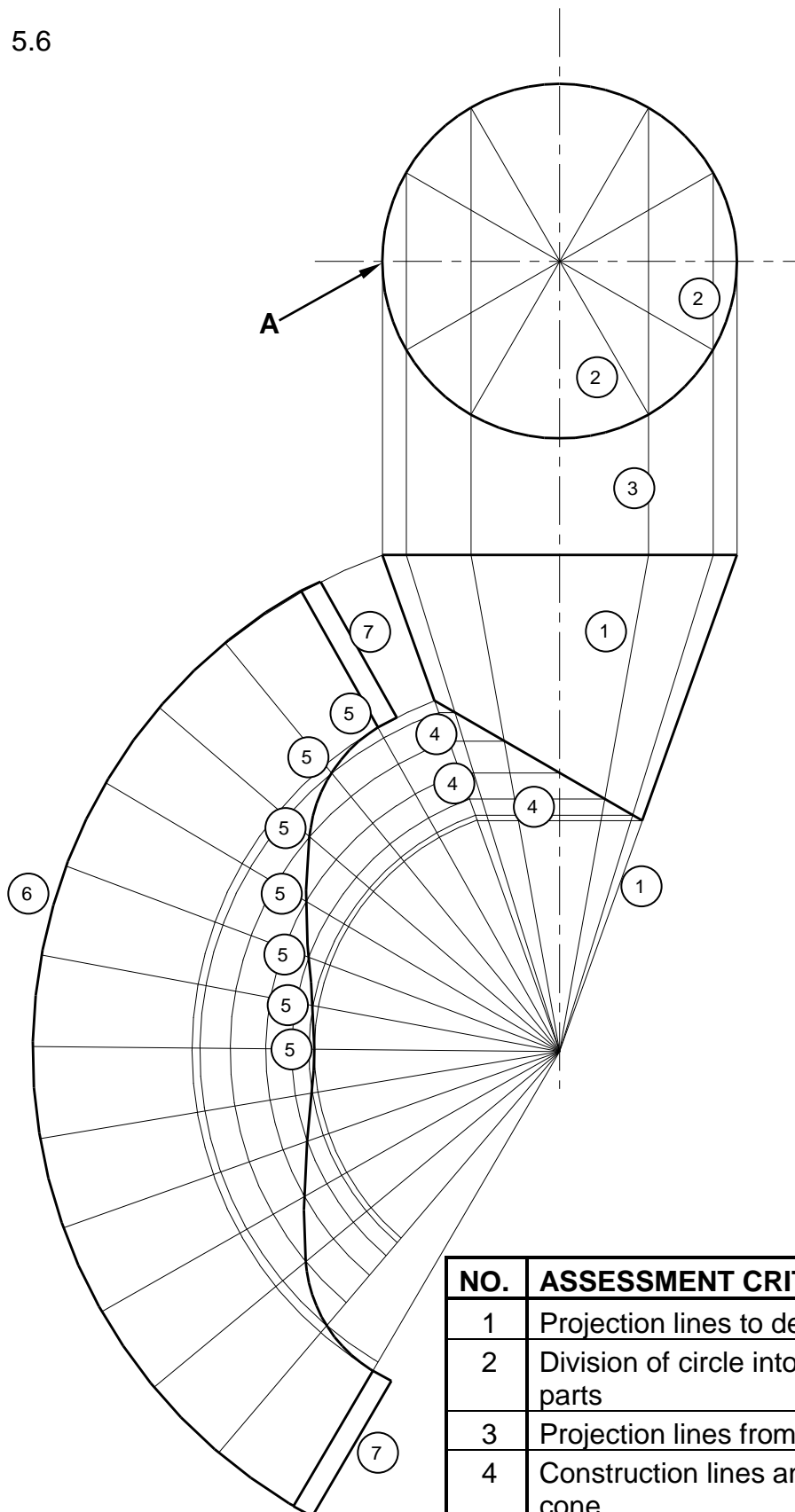
- 5.1 Installation of a PVC gutter:
- Measure and mark out positions of gutter brackets at a slope ✓
  - Attach gutter brackets to fascia board ✓
  - Measure, mark out and cut gutters to the required length ✓
  - Create hole in gutter for outlet and clip on outlet ✓
  - Clip gutter to brackets and join with union clip ✓
- (5)
- 5.2 1 metre ✓ (1)
- 5.3 50/50 solder/Solder with 50% tin and 50% lead mixture ✓ (1)
- 5.4 Dampness/Water will accumulate under the building ✓ (1)
- 5.5



PRE-FABRICATED SURFACE CHANNEL

(4)

5.6



NO.	ASSESSMENT CRITERIA	MARK
1	Projection lines to determine apex	2
2	Division of circle into 12 equal parts	2
3	Projection lines from circle	1
4	Construction lines and arcs from cone	3
5	Development of top of cone	7
6	Development of base of cone	1
7	3 mm seam on both sides	2
TOTAL:		18

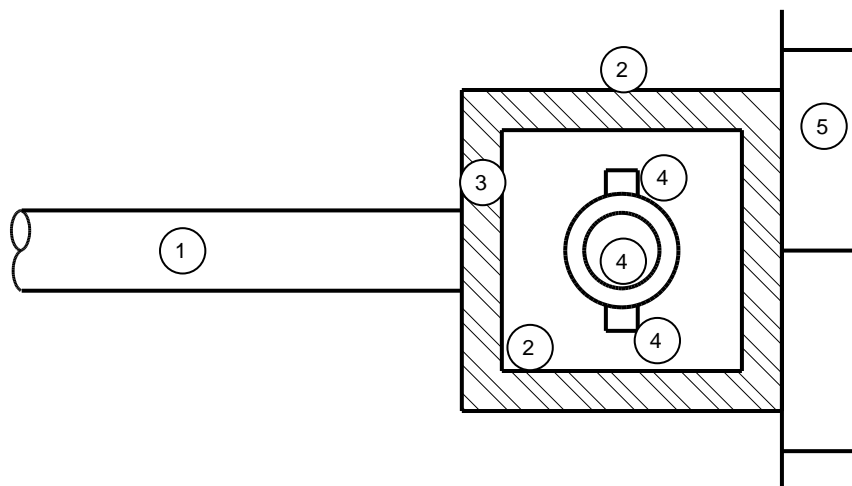
[30]

**QUESTION 6: SEWERAGE, SANITARY FITTINGS AND JOINING (SPECIFIC)**

- 6.1      6.1.1      C ✓ (1)
- 6.1.2      E/B ✓ (1)
- 6.1.3      A ✓ (1)
- 6.1.4      F ✓ (1)
- 6.1.5      B ✓ (1)
- 6.2      PVC pipes are lightweight. ✓  
            Cast iron pipes are heavy. ✓ (2)
- 6.3      6.3.1
- 
- (4)
- 6.3.2      100 mm/110 mm ✓ (1)
- 6.4      6.4.1      Material used to manufacture a washbasin:
- Ceramic ✓
  - Stainless steel/Pressed steel
  - Cast iron
  - Plastic
  - Terrazzo
  - Wood
  - Concrete
- ANY ONE OF THE ABOVE** (1)
- 6.4.2      Waste outlet/Outlet/Waste water outlet ✓ (1)
- 6.4.3      Device to seal the water:
- Rubber plug/Push plug/Plug ✓ (1)
- 6.4.4      To direct overflowing water from the washbasin/hand washbasin to the waste outlet/waste pipe/It prevents the overflow of water from the washbasin/hand washbasin. ✓ (1)
- 6.4.5      The water in the trap prevents odours/sewer gasses from entering the home. ✓ (1)



- 6.5      6.5.1      Allowance for sheet metal joints:  
                          • The thickness of the material ✓  
                          • Discretion of the worker  
                          **ANY ONE OF THE ABOVE** (1)
- 6.5.2      1 mm ✓ (1)
- 6.5.3      Outside of the marked pattern/On the waste side of the pattern ✓ (1)
- 6.5.4      Joining methods:  
                          • Pop rivet joints ✓  
                          • Soldered joints ✓ (2)
- 6.6      Process to install a chemical anchor:  
                          • Mix the chemical resin with the hardening agent and insert into hole ✓  
                          • Insert bolt and allow mixture to cure ✓  
                          • Attach bracket and fix with nut ✓  
                          • Place the bracket in position and fix with nut  
                          **ANY THREE OF THE ABOVE** (3)
- 6.7



NO.	ASSESSMENT CRITERIA	MARK
1	Outlet pipe	1
2	Housing walls	2
3	Hatching of walls	1
4	Draw-off valve	3
5	Kerb	1
	<b>TOTAL:</b>	<b>8</b>

6.8	6.8.1	A-Vent pipe/Ventilation pipe/VP/Vent valve ✓ B-Inspection eye/IE ✓	(2)
	6.8.2	----- ✓	(1)
	6.8.3	Settling chamber ✓ Discharge chamber ✓	(2)
	6.8.4	French drain ✓	(1)
	6.8.5	Rodding eye/RE ✓	(1)
			<b>[40]</b>
		<b>TOTAL:</b>	<b>200</b>