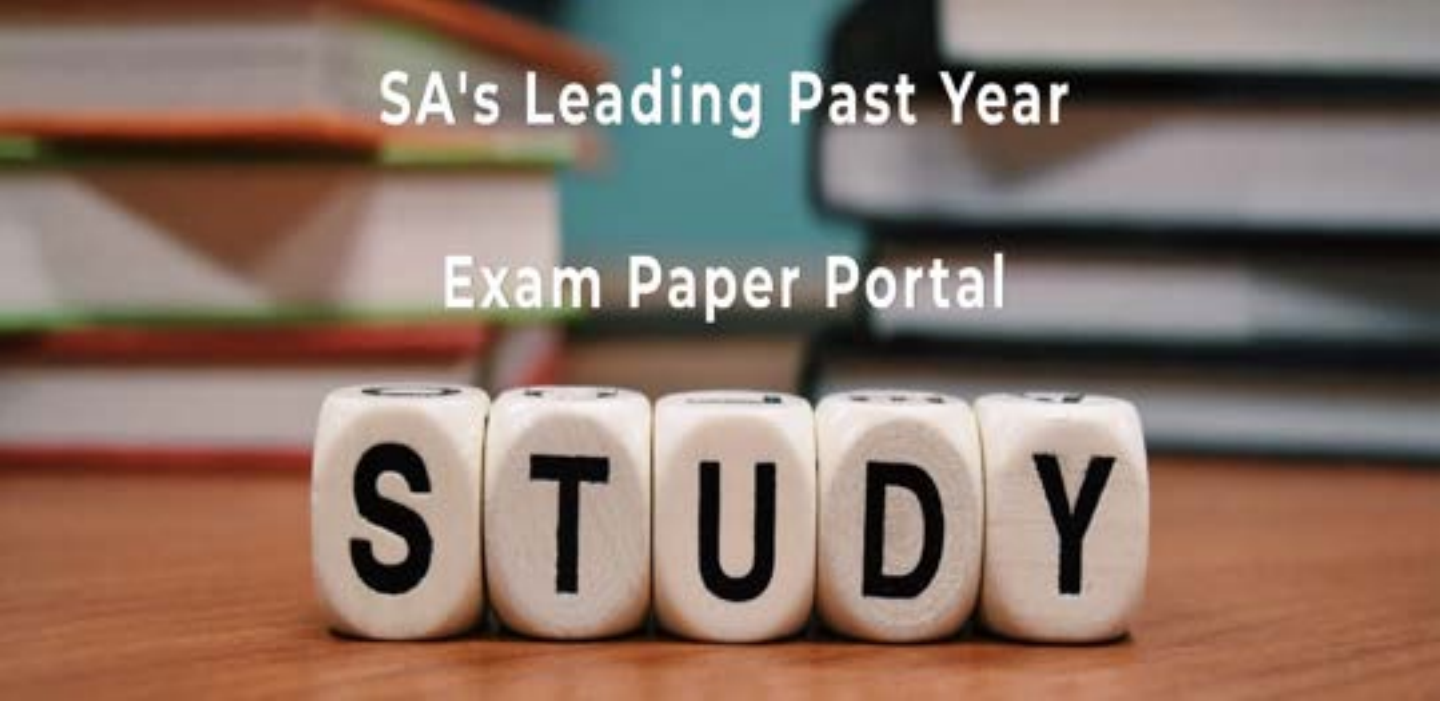

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GRADE 12

CIVIL TECHNOLOGY: CIVIL SERVICES

NOVEMBER 2022

MARKING GUIDELINES

MARKS: 200

These marking guidelines consist of 20 pages

.

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INSTRUCTIONS FOR THE MARKERS

1. Markers should:

- Familiarise themselves with the question and answer before evaluating responses from 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 explain and (2) to describe.
  1. If a candidate is required to explain a process in a specific number of steps, only the first required number of responses should be considered.
  2. However, if for example a candidate is required to explain or describe a process, we need to consider 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 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.

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- Marks will only be allocated for the correct values if the candidates add are 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 must 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 that was drawn. Do not consider labels for members that were provided with labels 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 two-dimensional drawing is required and a line diagram/pictorial/isometric drawing is drawn, members will be marked according to the assessment criteria and no marks will be awarded for the correctness of the drawing.

- If candidates draw/give more information than what is required, mark strictly according to the assessment criteria.

- The marks for the correctness of the drawing will only be awarded if the entire drawing with all members/parts is correctly drawn.

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4. Incorrect numbering of questions:

- If a candidate numbered an answer incorrectly, but the answer is in the correct position according to the sequence of the questions in the question paper, circle 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 incorrect 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.

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

1.1 1.1.1 Oil or water-based paint ✓ (1)

1.1.2 Increases the strength of concrete ✓ (1)

1.1.3 Electrolysis ✓ (1)

1.1.4 Plastic ✓ (1)

1.1.5 Zinc ✓ (1)

1.2 1.2.1
- 50º/50 degrees ✓
- 38°/38 degrees
- 42°/42 degrees

ANY ONE OF THE ABOVE (1)

1.2.2
- Ensures stair rails/handrails/railings and or balustrades are in place ✓
- Keep treads free of dangerous obstacles
- Keep treads free of protruding nails
- Post warning signs
- Ensure there is sufficient lighting
- Ensure the surface is not slippery

ANY ONE OF THE ABOVE (1)

1.2.3
- To keep concrete in position ✓
- To enable the filling of concrete
- To act as formwork
- To shape the treads

ANY ONE OF THE ABOVE (1)

1.3 When transporting/carrying long ladders:
- Ensure that it does not protrude excessively ✓
- Tie a red or orange flag/warning signs to the end of the ladder ✓
- Ensure that the ladder is firmly secured to the vehicle
- Protect the ladder during transportation or while carrying it
- Two people should carry the ladder
- It should be carried horizontally and on the same side

ANY TWO OF THE ABOVE (2)

1.4
- Safety net/Net ✓
- Catch platform

ANY ONE OF THE ABOVE (1)

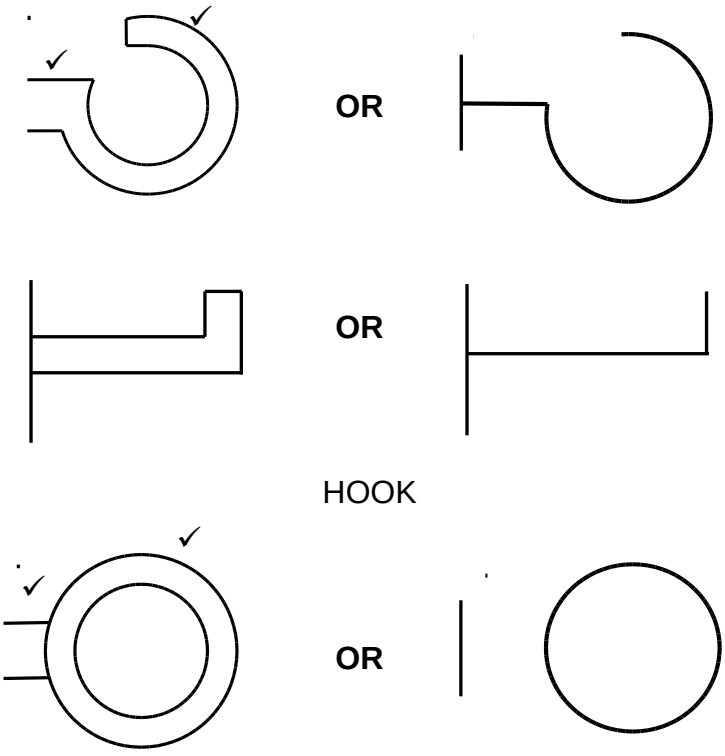
1.5 Brace/Strut ✓ (1)

1.6 If the scaffold planks protrude more than 230 mm beyond the last support:
- The scaffold planks might tilt if worker steps on it ✓
- The worker might fall from scaffold
- It might be hazardous to workers working around the scaffold

ANY ONE OF THE ABOVE (1)

1.7 3 m/3 000 mm ✓ (1)

1.8



(4)

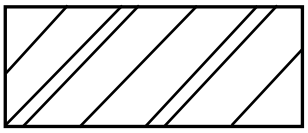
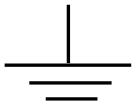
1.9 1.9.1 Multi-detector ✓ (1)

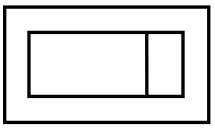
1.9.2 Laser level/Spirit level/Transparent pipe level ✓ (1)

[20]

QUESTION 2: GRAPHICS AS MEANS OF COMMUNICATION (GENERIC)

NO.	QUESTIONS	ANSWERS	MARKS
1	Name the FIGURE that represents the ground floor. Give ONE reason for your answer.	Ground floor: B/FIGURE B ✓ FIGURE B shows: No roofline/ Roofline in FIGURE A/ Garage/Arrows on the staircase/Ramp/Door at lounge/Entrance door/Garage door/ Balcony in FIGURE A ✓	2
2	Deduce the scale that was used to draw the floor plan of the house from the given building plan.	1:100 ✓	1
3	Identify number **1**.	Landing ✓	1
4	Identify number **4**.	Balcony/Cantilever ✓	1
5	Identify number **5**.	Shower ✓	1
6	Identify number **6**.	Wash hand basin/Wash basin/Basin/WHB ✓	1
7	Give the abbreviation for the symbol at number **7**.	WC ✓	1
8	Identify number **8**.	Ramp ✓	1
9	Identify number **9**.	Roll-up door/Garage door ✓	1
10	Identify number **10**.	Fluorescent light ✓	1
11	Identify the number that indicates the wall mounted light.	No 11/11 ✓	1
12	Give the abbreviations for the following: • Finished floor level • Natural ground level	FFL ✓ NGL ✓	2
13	Name a suitable material that can be used for constructing number **2**.	Concrete/Wood/Aluminium/Steel/ Masonry/Bricks/Glass ✓	1

14	Recommend ONE use for the area indicated by number **3**.	Coffee nook/Kitchen/Playroom/ Private lounge/Office/TV room/ Bar/Dining room/Storage space/Any use with utility value ✓	1
15	Recommend ONE permanent fixture for bedroom 1 that can be used for storage.	Built-in cupboard/BIC/Cupboard/ Closet/Bookshelf/Desk/ Drawer unit ✓	1
16	Who is the architect that was responsible for the drawing?	HB Nel ✓	1
17	Describe what is indicated by the arrows on the staircase in FIGURE **B**.	Direction of the rise of the stairs ✓	1
18	State what was done during revision 1 and revision 2 of the house plan.	Revision 1 – Drawing of sanitary fitments ✓ Revision 2 – Drawing of staircase ✓	2
19	Deduce the reference code from the building plan.	QP 6 – 2022 ✓	1
20	Who must be notified when a contractor sets out levels on a site and there are variances?	Architect/HB Nel ✓	1
21	Identify ONE important fixture that is omitted in the bathroom.	Ceiling light/Light/Light switch/ Switch/Fan light/Extractor fan/ Bath/Bidet/Socket outlet/Cabinet ✓	1
22	Draw the symbol for face brick.	 ✓✓	2
23	Draw the electrical symbol for earth.	 ✓✓	2

<table>
<tr><td>24</td><td>Draw the symbol for a grease trap.</td><td>  ✓✓</td><td>2</td></tr>
<tr><td>25</td><td>Prove by means of a control test that the total vertical dimensions on the left and right of the plan in FIGURE B are equal.</td><td>Total vertical dimensions:
<table><tr><td>Control test left</td><td>Control test right</td></tr><tr><td>220 ✓</td><td>2 960 ✓</td></tr><tr><td>5 450 ✓</td><td>110 ✓</td></tr><tr><td>220 ✓</td><td>2 820 ✓</td></tr><tr><td colspan="2">5 890 = 5 890 ✓</td></tr></table>OR
Left side:
220 + 5 450 + 220 = 5 890 mm
Right side:
2 960 + 110 + 2 820
= 5 890 mm
Note: If the alternative method is used, one mark should be allocated if both totals are the same.</td><td>7</td></tr>
<tr><td>26</td><td>Calculate the area of the first floor. Show ALL calculations. Give your answer in m².</td><td>= 5,89 ✓ m x 8,11✓ m
= 47,77 ✓m²
OR
= 5 890 mm x 8 110 mm
= 47,77 m²
(47,7679 m^2/47,8 m^2/48,0 m^2)</td><td>3</td></tr>
<tr><td></td><td></td><td>TOTAL:</td><td>40</td></tr>
</table>

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

3.1 Manholes must be placed at the following locations:

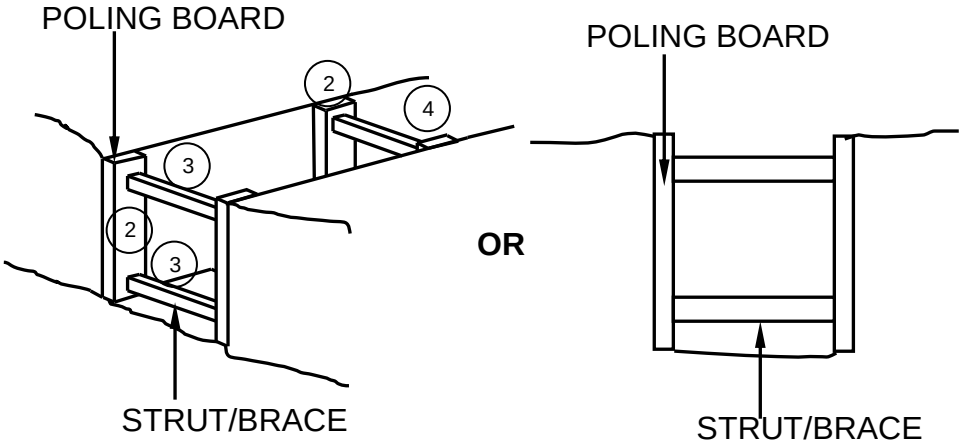
- Close to the municipal connection ✓
- No further than 2 m from the boundary ✓
- Every 20 to 25 m on a straight drain line
- Where the drain changes direction
- At changes of gradients and levels, where the ground is terraced
- At all junctions

ANY TWO OF THE ABOVE (2)

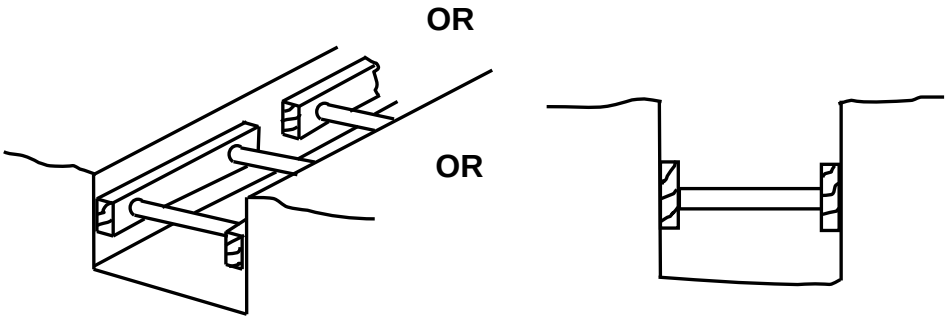
3.2
- To ensure that raw sewage spills will slide back into the channel pipe ✓
- So that vermin can't settle there ✓ (2)

3.3 Jetting/Flowable fill✓ (1)

3.4



CORRECTNESS OF SUPPORT TO FIRM GROUND: (1)



NO	ASSESSMENT CRITERIA	MARK
1	Correctness of support to firm ground:	1
2	Poling boards	2
3	Struts/Braces	2
4	Trench	1
	TOTAL:	**6**

(6)

3.5 Transparent pipe level/Dumpy level/Laser level ✓ (1)

3.6 A qualified person has:
- The knowledge ✓
- Training ✓
- Experience
- The qualifications

ANY TWO OF THE ABOVE (2)

3.7 Safety regulations for open manholes:
- The area must be cordoned off ✓
- Warning signs must be clearly visible ✓
- Only competent persons are allowed to work in a manhole
- The competent person must be accompanied by at least ONE other person

ANY TWO OF THE ABOVE (2)

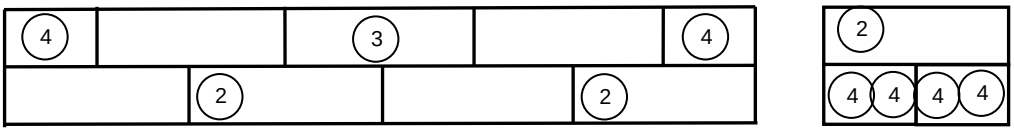
3.8 3.8.1 Rope grab ✓ (1)

3.8.2 Breathing apparatus ✓ (1)

3.9 3.9.1 Volume of a cubic water storage tank
= Area of base x height
= s^3
= 2,9 m ✓ x 2,9 m ✓ x 2,9 m ✓
= 24,39 m^3 ✓ (4)

3.9.2 Volume of water in tank = 24,39 x 1 000 ✓ litres/cubic metre
= 24 390 ℓ ✓/24 389 ℓ (2)

3.10



CORRECTNESS OF CONSECUTIVE BRICK COURSES: (1)

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of consecutive brick courses:	1
	delete row	
2	First course: Stretcher bricks	2
	: delete row	
3	Second course: Stretcher bricks	1
4	Header bricks	2
	TOTAL:	**6**

(6)
[30]

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

4.1 4.1.1 E ✓

4.1.2 K ✓

4.1.3 G✓

4.1.4 F ✓

4.1.5 B ✓

4.1.6 D ✓

4.1.7 L ✓

4.1.8 H ✓ (8)

4.2 4.2.1 Y-waste junction with inspection eye ✓ (1)

4.2.2 To connect three pipes of the same diameter at an angle of 135˚✓/To connect soil pipes at an angle. (1)

4.2.3 To ensure a watertight seal around the pipe.✓ (1)

4.3 4.3.1 Rodding eye/RE ✓ (1)

4.3.2 Drain-cleaning machine/Jetting machine ✓ (1)

4.3.3 By using hot water and cleaning agent/detergent/A hose with a special nozzle that releases water at a high pressure is pushed into a pipe.✓ (1)

4.3.4 The stopper diameter increases when turned. ✓ (1)

4.4
- Water pressure testing pump is used for pressure testing of water systems. ✓
- Compressed-air test apparatus is used to inspect for leakages in sewerage systems. ✓ (2)

4.5 An air-lock occurs when there is an interruption in the water supply✓ when air gets trapped in a high point of the hot-water system. ✓ (2)

4.6 4.6.1

✓ ✓ (2)

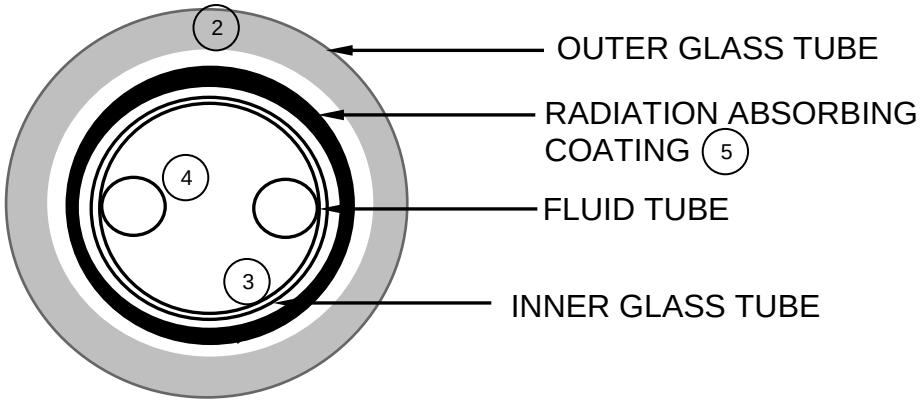
4.6.2

✓ ✓ (2)

4.7 4.7.1

- Solar panels must face North. ✓
- Panels facing North will be exposed to direct sunlight for the longest part of the day in the Southern hemisphere.✓ (2)

4.7.2



CORRECTNESS OF EVACUATED TUBE: (1)

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of evacuated tube:	1
2	Outer glass tube	1
3	Inner glass tube	1
4	Fluid tube	1
5	Label: Radiation absorbing coating	1
	TOTAL:	**5**

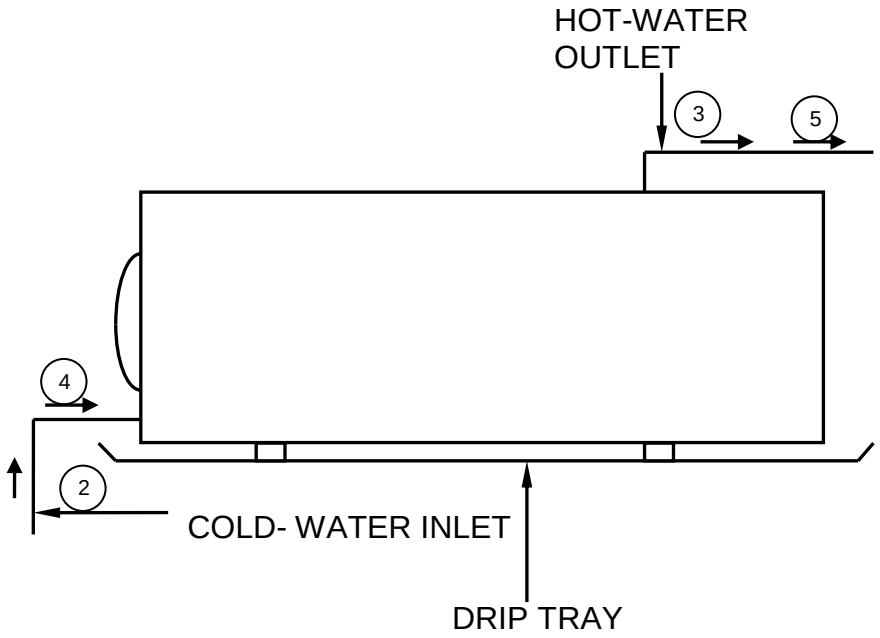
(5)

4.8 4.8.1 Non-return valve ✓ (1)

4.8.2 Locking valve ✓ (1)

4.8.3 Water can only flow in one direction ✓ When the water starts flowing back ✓the lock valve closes on its seating immediately. ✓ (3)

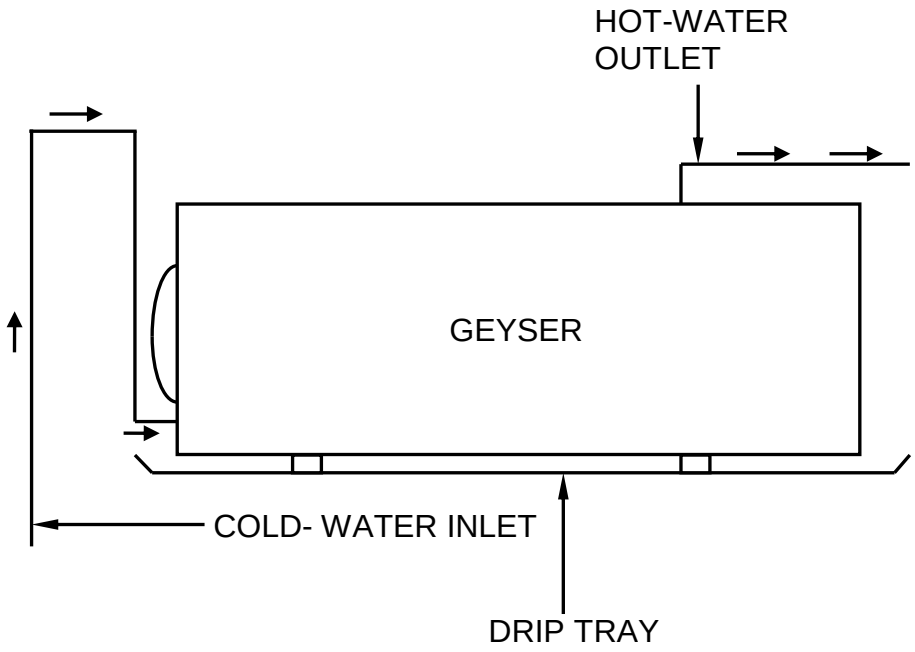
4.9



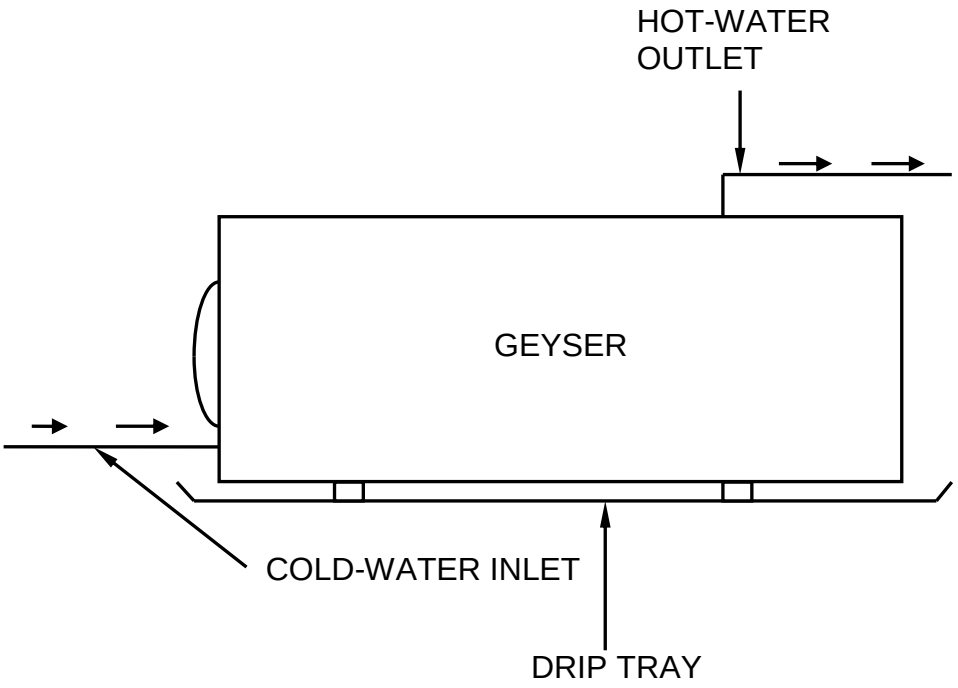
CORRECTNESS OF COLD-AND HOT-WATER PIPES: (1)

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of cold and hot-water pipes	1
2	Cold water inlet Spelling differ from above	1
3	Hot water outlet	1
4	Direction cold water	1
5	Direction hot water	1
	TOTAL:	**5**

OR



OR



(5)
[40]

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

5.1 Flashing can be used:
- At the junction of a roof and a wall (parapet wall) that extends above the roof ✓
- Where a pipe protrudes through the roof covering ✓
- At the junction of a chimney and the roof covering
- Where two parts of a roof meet (valley/ridge)

ANY TWO OF THE ABOVE (2)

5.2 5.2.1 Gutter outlet/Outlet ✓ (1)

5.2.2 It allows/channels water to flow from the gutter through to the downpipe. ✓ (1)

5.2.3 The union clip is used to join two gutters/Prevent leaks where gutters are joined. ✓ (1)

5.2.4 PVC/Polyvinyl Chloride✓ (1)

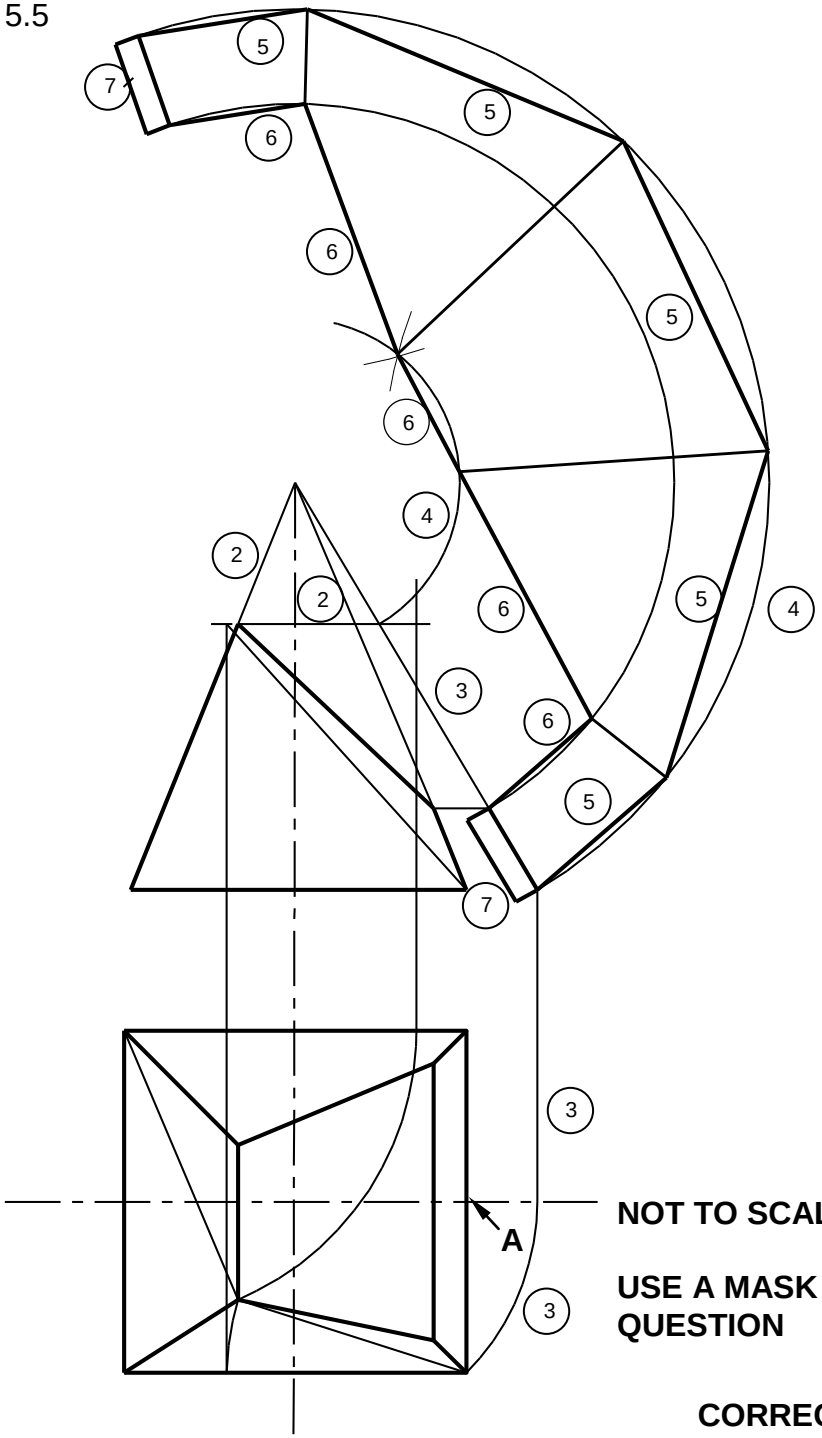
5.3 Dangerous chemicals and solid waste should not be dumped into the storm water system because:
- Water will be contaminated ✓
- The system will be under strain because of the solid waste ✓
- Overflows and flooding can occur
- Can result in blockages of the storm water pipes

ANY TWO OF THE ABOVE (2)

5.4 The municipality is responsible for:
- Cleaning storm water systems ✓
- Maintaining storm water systems ✓
- Upgrading storm water systems
- The installation of storm water systems

ANY TWO OF THE ABOVE (2)

5.5



NOT TO SCALE

USE A MASK TO MARK THIS QUESTION

CORRECTNESS OF DRAWING: (1)

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of development	1
2	Projection lines to determine the apex	2
3	Determine the true length	3
4	Top and bottom arc of pyramid	2
5	Development of base of the pyramid	5
6	Development of top of the pyramid	5
7	3 mm seams on both sides	2
	TOTAL:	**20**

[30]

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

6.1 6.1.1 A ✓ (1)

6.1.2 D ✓ (1)

6.1.3 D ✓ (1)

6.1.4 C ✓ (1)

6.1.5 B ✓ (1)

6.2 Sewerage – a system of pipes and channels that carry sewage. ✓
Sewage – is water that contains urine, faecal matter and other contaminants. ✓ (2)

6.3 6.3.1 Straight pan collar/Pan collar ✓ (1)

6.3.2 Water closet pan/Toilet pan ✓ (1)

6.3.3 110 mm pipe/Soil pipe ✓ (1)

6.4 The vent valve:
- Allows gases that are present in the drain pipeline to be released into the environment ✓
- Allows air into the system so that water can flow freely ✓
- Ensures that the drainage system is vented to prevent anti-siphoning

ANY TWO OF THE ABOVE (2)

6.5 6.5.1 Vacuum tank /Conservancy tank✓ (1)

6.5.2 The vacuum tank can be made of:
- Brick ✓
- Concrete ✓
- Plastic

ANY TWO OF THE ABOVE (2)

6.5.3 Suction pipe /Draw off valve✓ (1)

6.5.4 The purpose of **A** is:
- To connect the pump attachment ✓
- To remove/suck the content from the vacuum tank ✓ (2)

6.5.5 The tank will be installed on a residential property:
- Where there is no waterborne sewerage system ✓
- Where there is no municipal service ✓
- Where pollution of ground water is at risk
- For the disposal of human waste/To channel wastewater away from a residential property

ANY TWO OF THE ABOVE (2)

6.6 Water is chemically treated ✓and chlorine is added. ✓ (2)

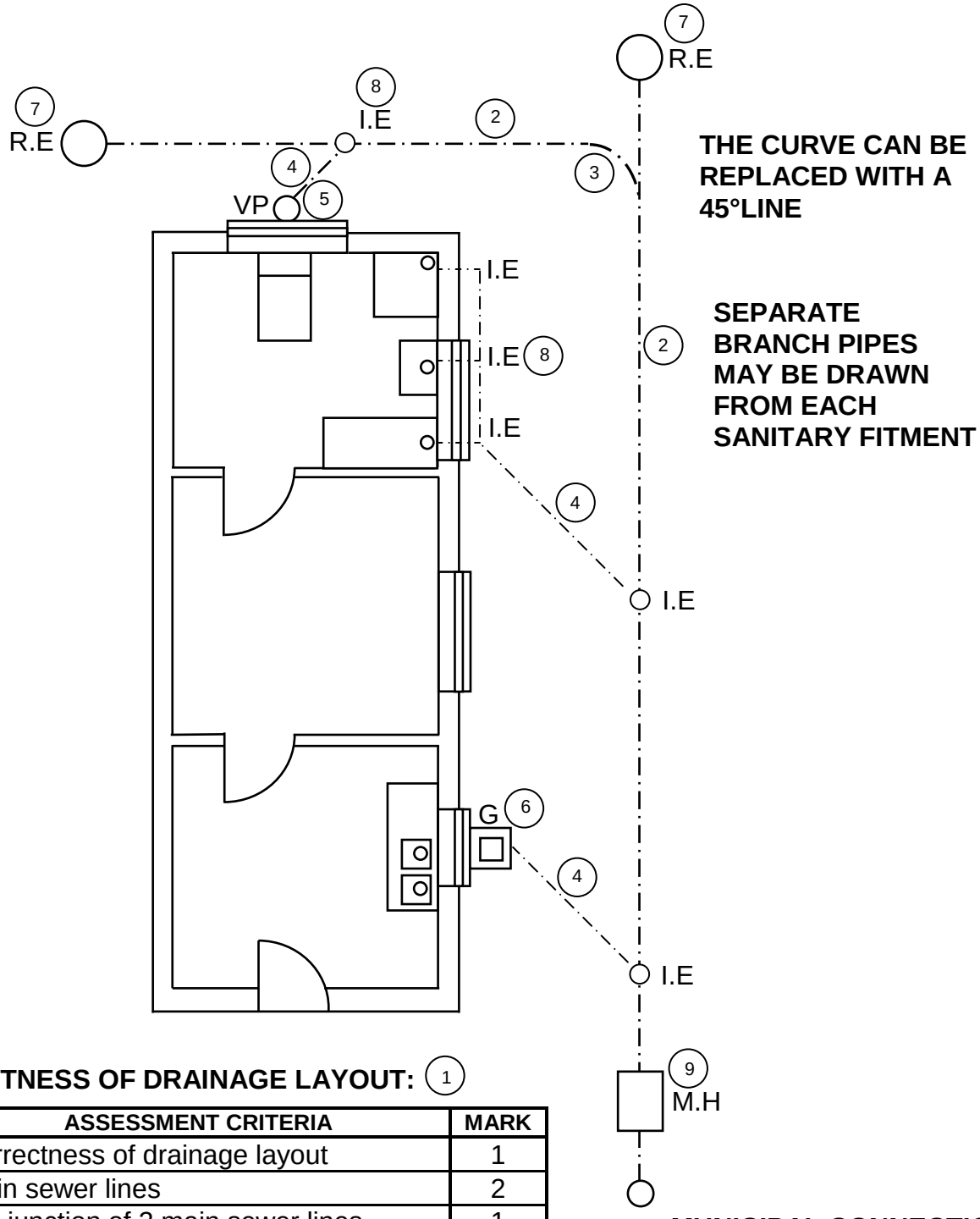
6.7 6.7.1 The bedding mortar supports the bath unit to prevent cracking or breakage when in use. ✓ (1)

6.7.2 Combined bath and trap overflow/P-trap/Water trap✓ (1)

6.7.3 40 mm or 50 mm pipe ✓ (1)

6.7.4 The overflow pipe allows water to exit./Prevent the water in the bath from overflowing.✓ (1)

ANSWER SHEET 6.8



CORRECTNESS OF DRAINAGE LAYOUT: (1)

NO	ASSESSMENT CRITERIA	MARK
1	Correctness of drainage layout	1
2	Main sewer lines	2
3	45° junction of 2 main sewer lines	1
4	Branch pipes	3
5	Vent pipe	1
6	Gully	1
7	Rodding eyes (ANY TWO)	2
8	Inspection eyes (ANY TWO)	2
9	Manhole/Rodding eye near Municipal connection	1
	TOTAL:	**14**

[40]

TOTAL: 200

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