

**GAUTENG DEPARTMENT OF EDUCATION**

**SENIOR CERTIFICATE EXAMINATION**

**PLUMBING AND SHEET METALWORK SG**

**TIME: 3 hours**

**MARKS: 200**

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**INSTRUCTIONS:**

- Answer ALL the questions.
  - Question 8 and all other sketches must be done in the answer book.
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**QUESTION 1**  
**WATER PURIFICATION**

- 1.1 Design and draw a labelled single-line drawing of a water purification system for a school swimming pool.

The drawing must indicate the following:

- |       |                                      |     |
|-------|--------------------------------------|-----|
| 1.1.1 | Pipe arrangements                    | (4) |
| 1.1.2 | Valves                               | (3) |
| 1.1.3 | The flow of water by means of arrows | (2) |
| 1.1.4 | The purification apparatus           | (6) |
- 1.2 Name any TEN of the components in Question 1.1. (10)  
**[25]**

**QUESTION 2**  
**DRAINAGE**

- 2.1 When a drainage inspector is requested to test a drain, he also has to pay attention to various other important aspects of the construction. Name SIX of these aspects. (12)
- 2.2 Name THREE materials used in the manufacture of drainpipes. (3)
- 2.3 Name THREE requirements for vent pipes. (6)

2.4 Indicate the standard abbreviation for each of the following:

2.4.1 Soil vent pipe

2.4.2 Cast iron

2.4.3 Inspection eye

2.4.4 Water closet

(4)  
**[25]**

**QUESTION 3**  
**DRAINAGE**

3.1 Name TWO methods that you would recommend as suitable for transferring sewerage water from a basement to a main sewer in a higher position. (2)

3.2 Name the standard colour code used to indicate the following on building construction drawings:

3.2.1 New drains

3.2.2 Existing drains

(4)

3.3 Draw a neat, labelled sectional sketch of a sub-soil drain. (6)

3.4 Explain step by step how you would go about unblocking a drain. (5)

3.5 When opening the coldwater tap, a loud vibrating sound is heard. What steps will you take to rectify the problem? (6)

3.6 What would be the result if the angle of the sewerage pipe work is more than the maximum that is allowed? (2)

**[25]**

**QUESTION 4**  
**TESTING OF DRAINS**

4.1 Explain step by step how you would apply the water test to a drainage system. (12)

4.2 Name another test that can be applied to drains. (2)

4.3 Name THREE advantages of the water test. (3)

4.4 Explain the function of sub-soil drainage. Show why, where and how it is used. (8)

**[25]**

**QUESTION 5**  
**SANITARY FITMENTS**

- 5.1 Name THREE flushing control methods for urinals. (3)
- 5.2 Name TWO instances where you would recommend the use of slab urinals. (2)
- 5.3 Draw a labelled sectional sketch of a stopcock. The drawing must show all the components of the stopcock. (8)
- 5.4 Explain how you would regulate the intervals between the flushing of an automatic cistern. (4)
- 5.5 Draw a labelled single-line sectional sketch of the bottom half of a P-trap, wash-down water closet pan and show the method you would use to connect the closet pan to a P.V.C. soil pipe. (8)  
**[25]**

**QUESTION 6**  
**CENTRAL HEATING**

- 6.1 Name TWO methods of arranging the pipes in a central heating system. (2)
- 6.2 Name the function of the following components of a central heating system:
- 6.2.1 Booster pump (2)
  - 6.2.2 Flow pipe (2)
  - 6.2.3 Return pipe (2)
  - 6.2.4 Expansion tank (2)
- 6.3 Identify TWO advantages of the two-pipe system as compared to the one-pipe system. (2)
- 6.4 A double-storied building is to be upgraded and a one-pipe central heating system is planned, which will be fitted to three heaters on each floor. Design and draw a named single line sketch of a one-pipe system suitable for supplying hot water to three heaters on each floor. (13)  
**[25]**

**QUESTION 7**  
**VENTILATION AND CENTRAL AIR-CONDITIONING**

- 7.1 Name the THREE major gases in the atmosphere. (3)
- 7.2 What is the maximum percentage of carbon dioxide that the municipal health authorities allow in public buildings? (1)

- 7.3 Name TWO advantages and THREE disadvantages of natural ventilation. (10)
- 7.4 What percentage of carbon dioxide will be fatal to humans? (1)
- 7.5 Design and draw a single-line sketch of a supermarket equipped with a combined mechanical up-draught and air-conditioning unit. The sketch must show the following:
- Air-conditioning unit, fan, fresh air vents, air inlet and air outlet, extractor fan, outlet ducts, roof and office. Indicate the air flow by means of arrows. (10)

[25]

### QUESTION 8 PATTERN DEVELOPMENT

**Figure 8** below shows the incomplete front view and top view of two cylinders intersecting each other.

Draw the given views and construct the curve of interpenetration and complete the front view.

Construct the surface development of both cylinders.

[25]

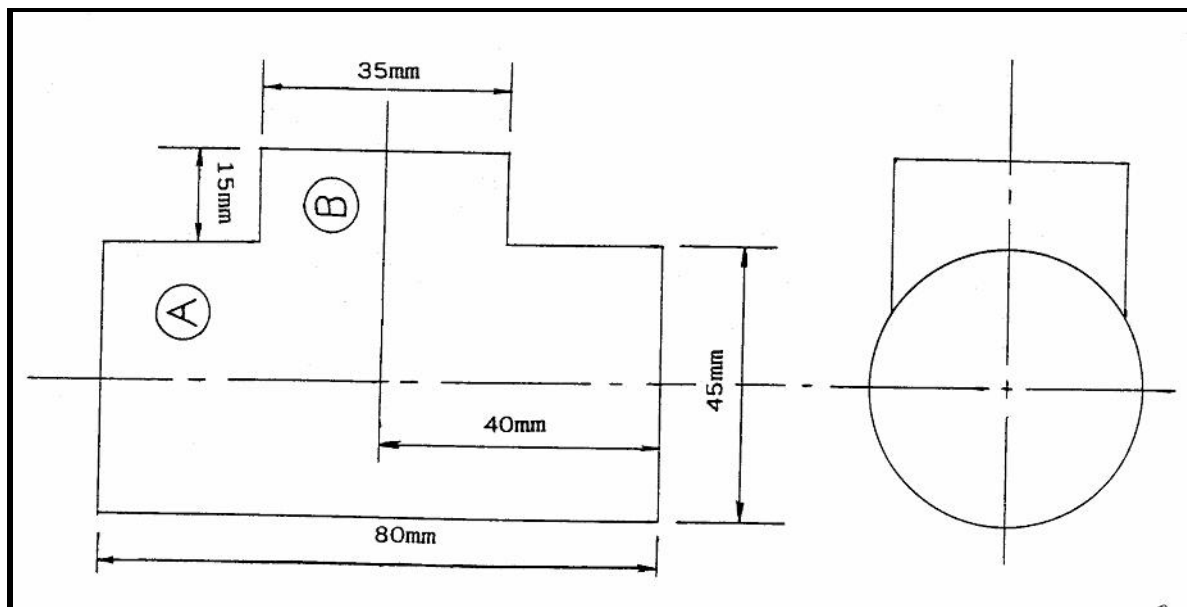


Figure 8

TOTAL: 200

END