

**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

**PLUMBING
NQF LEVEL 2**

NOVEMBER 2010

(12020162)

**25 November (X-Paper)
09:00 – 12:00**

This question paper consists of 7 pages.

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| <p>TIME: 3 HOURS MARKS: 100</p> |
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INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Write neatly and legibly.
 5. The sketches and/or diagrams must be done in pencil, be neat, reasonably large, in proportion and fully labelled.
 6. ALL the abbreviations and symbols must comply with the latest National Building Regulations and all relevant SANS (SABS)-codes.
 7. Rule off across the page after each completed question.
 8. $g = 10 \text{ m / s}^2$.
 9. Density of water = 1000 kg / m^3 .
 10. All work you do not want to be marked must be clearly crossed out.
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QUESTION 1: INTRODUCTION TO PLUMBING

- 1.1 Briefly explain the following processes of the water cycle:
- 1.1.1 Evaporation (2)
1.1.2 Precipitation (2)
- 1.2 State the temperature at which pure water will:
- 1.2.1 Freeze (1)
1.2.2 Boil (1)
- 1.3 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.3.1 – 1.3.4) in the ANSWER BOOK.
- 1.3.1 The volume of water decreases if it is heated. (1)
1.3.2 Gravity causes water flow from a lower elevation to a higher elevation. (1)
1.3.3 Raw water is untreated water that has not been purified. (1)
1.3.4 After water is treated and disinfected it should be sparkling, clean and clear with no colour. (1)
- 1.4 In the past lead and galvanised mild steel (GMS) were mostly used for water pipes. Name TWO types of materials commonly used today for the same purpose. (2)
- 1.5 Briefly explain the difference between a 'maintenance plumber' and a 'construction plumber'. (3)
- [15]**

QUESTION 2: PLUMBING PRINCIPLES AND CODE OF PRACTICES

- 2.1 Read the following sentences and write only the missing word/s next to the corresponding number (2.1.1 – 2.1.5) in the ANSWER BOOK.

Choose only from the list given below:

head; drainage; 1020; gully; Pascal; volume; water; Newton; manhole; 1000

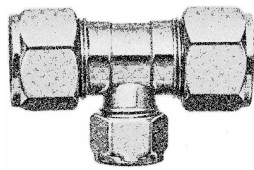
- 2.1.1 Water pressure is measured in ... (1)
2.1.2 The pressure at a tap is dependent on the ... of the water. (1)
2.1.3 The density of pure water is ... kg/m³ at sea level. (1)
2.1.4 SANS 10252 Part 2 is the code of practice for the ... installations for buildings. (1)
2.1.5 A ... is a pipe fitting that incorporates a trap into which waste water is discharged and that is normally connected to a drain. (1)
- 2.2 A water tank is placed on a platform 6 m high. The water level in the tank is 900 mm above the top of the platform. Calculate the pressure at a tap placed 5,5 m below the top of the platform. (4)

2.3 Briefly describe the scope of the following South African National Standards:

- 2.3.1 SANS 10400 (2)
 - 2.3.2 SANS 10252 Part 1 (2)
 - 2.3.3 SANS 10252 Part 2 (2)
- [15]**

QUESTION 3: MATERIAL, TOOLS AND EQUIPMENT

3.1 The sketches in FIGURE 1 show sketches of compression pipe fittings that are used in the construction plumbing industry. Write only the name of each fitting next to the question number (3.1.1 – 3.1.2) in the ANSWER BOOK. (2)



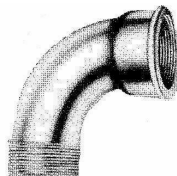
3.1.1



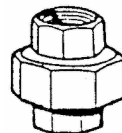
3.1.2

FIGURE 1

3.2 The sketches in FIGURE 2 show sketches of malleable steel pipe fittings that are used in the construction plumbing industry. Write only the name of each fitting next to the question number (3.2.1 – 3.2.3) in the ANSWER BOOK. (2)



3.2.1



3.2.2

FIGURE 2

3.3 The sketches in FIGURE 3 show tools that are used in the construction plumbing industry. Write only the name of each fitting next to the question number (3.3.1 – 3.3.2) in the ANSWER BOOK. (2)



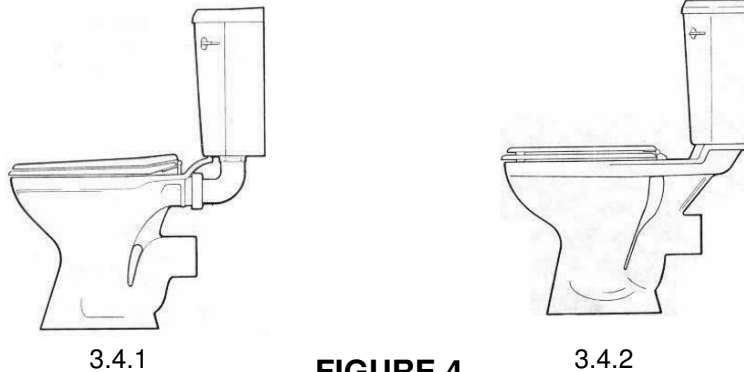
3.3.1



3.3.2

FIGURE 3

- 3.4 The sketches in FIGURE 4 show sketches of typical water closets that are used in the construction plumbing industry. Write only the description of each water closet next to the question number (3.4.1 – 3.4.2) in the ANSWER BOOK. (2)



- 3.5 Briefly explain what is meant by the term 'fall prevention equipment'. (2)
[10]

QUESTION 4: PIPE ASSEMBLIES FOR WATER RETICULATION

- 4.1 List SIX tools/ equipment you would require to measure, cut, thread and assemble GMS pipes work. (6)
- 4.2 Describe the procedure for joining a copper pipe (tube) by making use of a capillary pipe fitting. (6)
- 4.3 List the pipe fitting/s you would use in the following pipe assemblies:
- 4.3.1 Join a 20 mm GMS pipe to a 25 mm pipe fitting. (1)
 - 4.3.2 Cause a 90° change of direction in a GMS pipe. (1)
 - 4.3.3 Install a tap off a straight run of copper pipe. (1)
 - 4.3.4 Secure a copper pipe to the wall. (1)
 - 4.3.5 Join 22 mm copper pipe to a 20 mm GMS pipe. (2)
 - 4.3.6 Join a 15 mm pipe to a 110 mm HDPE main. (1)
- 4.4 Describe the procedure you would apply to cut uPVC (mono layer) pipe, prepare the edges of the pipe and fit a solvent weld fitting to the cut end. (6)
[25]

QUESTION 5: CUTTING AND JOINING OF METALS

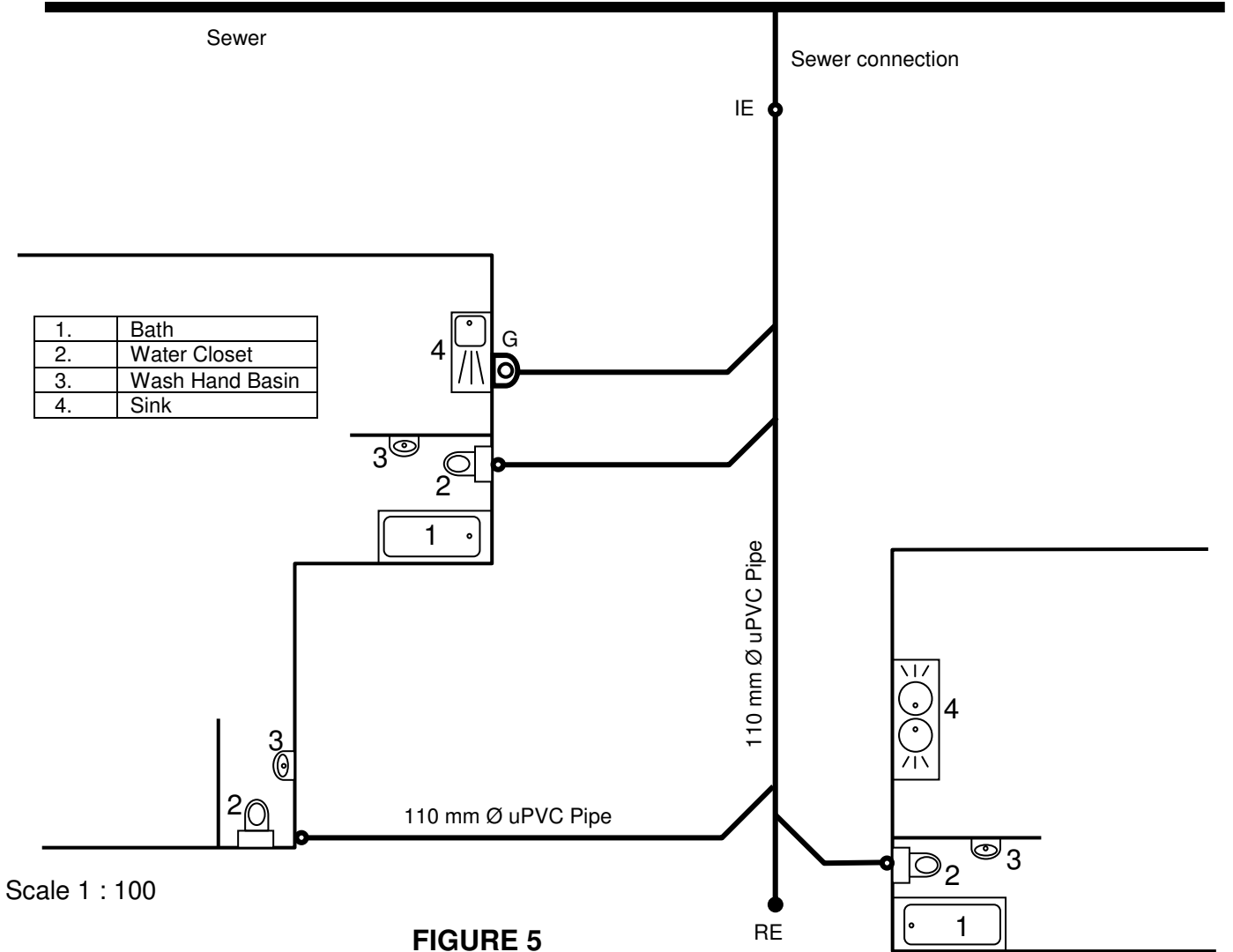
- 5.1 Name TWO types of tin snips that are used to cut thin sheet metal. (2)
- 5.2 Name TWO types of joining methods that can be used to join two sections of thin sheet metal. (2)

- 5.3 Make neat sketches of the following joints used when brazing sheet metal:
- 5.3.1 Lap joint (2)
 - 5.3.2 Square butt joint (2)
 - 5.3.3 Double V butt joint (2)
- [10]**

QUESTION 6: SET OUT BELOW GROUND DRAINAGE SYSTEMS

- 6.1 Name TWO functions of a gully. (2)
- 6.2 Describe the following terms:
- 6.2.1 Drainage installation (4)
 - 6.2.2 Waste water (2)
- 6.3 State TWO advantages of inspection chambers or manholes as compared to rodding eyes as a means of gaining access to the underground drain. (2)

6.4 The drawing shown in FIGURE 5 shows the plan view of a domestic dwelling with a uPVC underground drain. Determine the quantities of material required to complete the drain up to the inspection eye at the septic tank only. Use the plan lengths to determine the quantities of the drain pipe. (10)



6.5 Give the standard abbreviations for the following sanitary ware fixtures:

6.5.1 Bath (1)

6.5.2 Washing machine (1)

6.6 Name THREE types of levelling devices commonly used in the plumbing industry. (3)

TOTAL: 100