UNIVERSITY OF JOHANNESBURG

FACULTY	: Education
DEPARTMENT	: Science and Technology Education
CAMPUS	: APK
MODULE	: CTE10A2 CIVIL TECHNOLOGY 2A
SEMESTER	: First
EXAM	: July 2018

ASSESSOR(S)	: DR CF VAN AS		
MODERATOR	: MR W ENGELBRECHT		
DURATION	: 2 HOURS	**MARKS**	: 120

NUMBER OF PAGES: 6 PAGES

INSTRUCTIONS:

1. Answer ALL the questions.
2. Number your answers clearly.

QUESTION 1

1.1 The water cycle describes the continuous movement of water on, above and below the surface of the earth. By means of a labelled freehand sketch, explain this process. **(6)**

1.2 In drought stricken areas the recycling of wastewater is a way to preserve the natural water sources. Briefly describe the process of recycling wastewater. **(8)**

[14]

QUESTION 2 Cold water supply

2.1 Briefly define the concept potable water. **(2)**

2.2 How will the landowner know what his water consumption is every month? **(2)**

2.3 Cold water supply pressures vary tremendously. According to the building regulations (SANS 10254) it is compulsory to balance cold and hot water pressures. How **and** where will you do this? **(3)**

2.4 Why should the water supply pipe network be laid out to minimise pipe length and directional changes? **(2)**

2.5 Differentiate between three (3) material types that are commonly used for water installations by referring to the following sub-headings:

2.5.1 Name the material, **(3)**

2.5.2 Suitability for cold water and/or hot water. **(3)**

2.5.3 Name one (1) joining method for each type of pipe. **(3)**

[18]

QUESTION 3 Hot water supply

3.1 Figure 1 shows an illustration of an electrical pressurised geyser that is commonly used in domestic buildings in urban areas. Study the illustration thoroughly and answer the following questions:

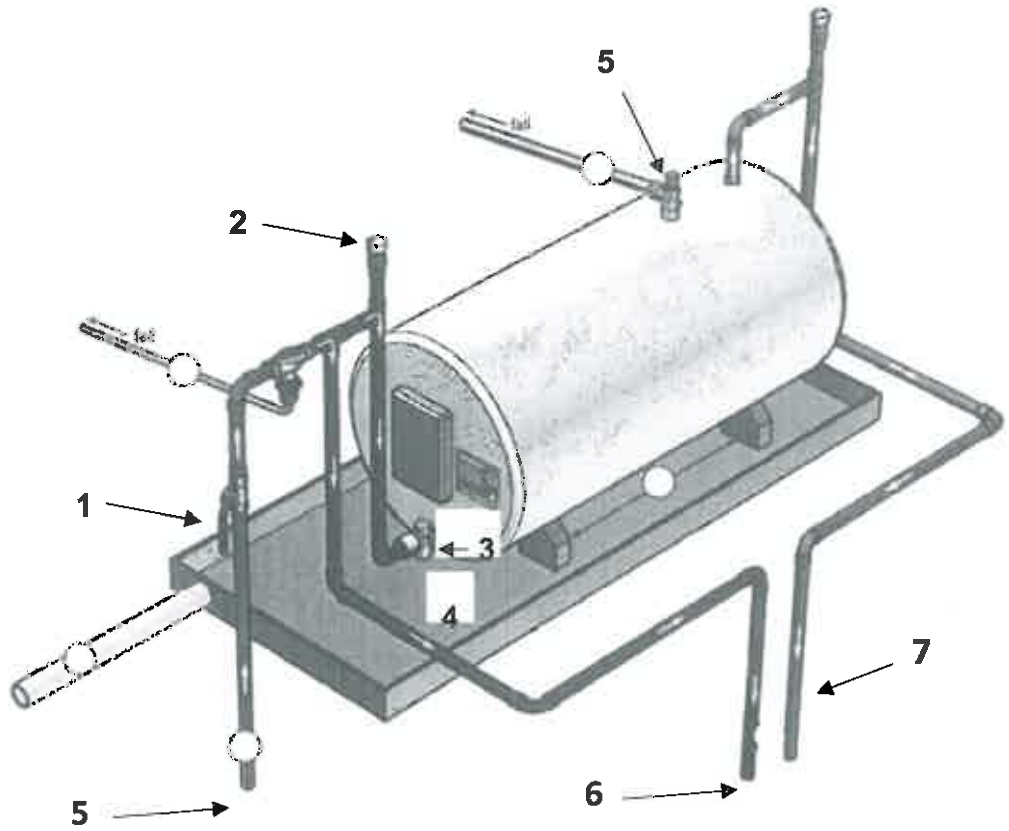

Figure 1

3.1.1 Identify part 1 and state the function thereof. **(2)**

3.1.2 Identify part 2 and state the function thereof. **(2)**

3.1.3 Identify part 3 and state the function thereof. **(2)**

3.1.4 Identify part 4 and state the function thereof. **(2)**

3.1.5 Identify part 4 and state the function thereof. **(2)**

3.1.6 Briefly explain the functioning of an electrical pressurised geyser by referring to Figure 1. **(6)**

3.2 What is the temperature recommended by manufacturers for the storage of hot water in electrical storage heaters? **(1)**

3.2 A developer of a holiday resort in a remote setting where electricity from the national grid is not available needs to install appropriate hot water systems in the chalets. Motivate which system would be the most suitable by comparing the various systems to each other and by referring to, inter alia, functioning, cost, etc. **(6)**
[23]

QUESTION 4 Sewerage

4.1 In most urban areas sewage is collected from domestic buildings and drained into a system of pipes and sewers that ends at a sewage treatment plant. Figure 2 shows an illustration of a water closet drainage installation. Study the illustration thoroughly and answer the following questions:

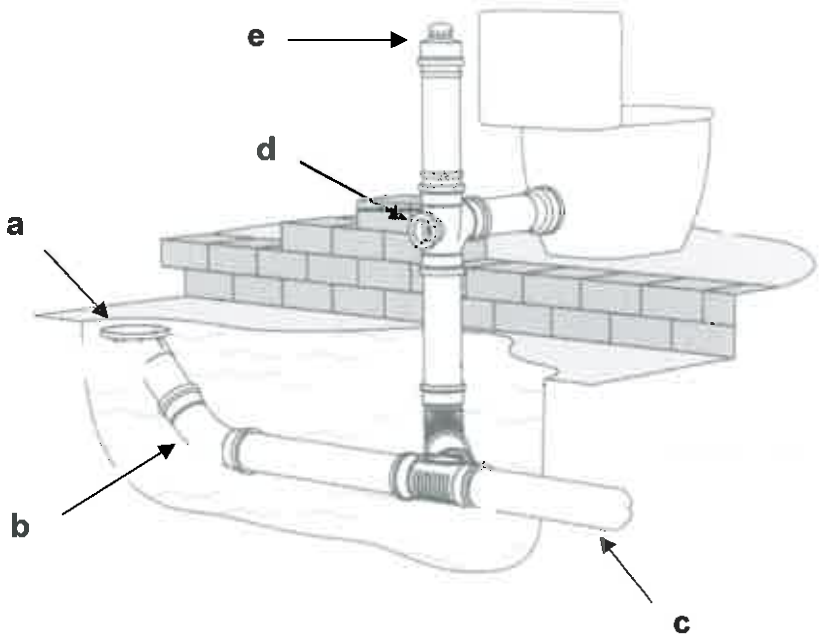

Figure 2

4.1.1 The drainage system shown in Figure 2 consists of pipes, joints, bends and accessories from Marley pipe systems. Which type of material has been used in this case? **(1)**

4.1.2 What do we call part **a**? **(1)**

4.1.3 What is the purpose of part **a**? **(1)**

4.1.4 What is the angle of part **b**? **(1)**

4.1.5 What is the diameter of pipe **c**? **(1)**

4.1.6 What will the minimum slope at **c** be? **(1)**

4.1.7 What do we call part **d**? **(1)**

4.1.8 What is the purpose of part **d**? **(1)**

4.1.9 What do we call part **e**? **(1)**

4.1.10 What is the purpose of part **e**? **(1)**

4.2 In cases where no sewage treatment plant exists, other measures must be taken to collect and remove the sewage. Motivate which system would be the most suitable by comparing the various appropriate systems and referring to, inter alia, functioning, cost, etc. **(10)**
[20]

QUESTION 5 Storm water

5.1 Briefly define the concept storm water management. **(3)**

5.2 Briefly explain how development impacts negatively on the natural drainage system. **(4)**

5.3 Briefly explain how you will deal with rain water in house construction. **(4)**
[11]

QUESTION 6 Electrical system

6.1 What is the voltage that residential electrical installations receive from authorities in South Africa? **(2)**

6.2 Explain, by using a simple freehand sketch, how single phase current is distributed through a normal house. Take the following into consideration: Electrical meter, distribution box, earth leakage unit, circuit breakers, geyser, stove, lights and socket-outlets (plugs). **(10)**
[12]

QUESTION 7 Finishing

7.1 You are a contractor and your client wants the outer walls of his house to be plastered with a rough-textured finish. Motivate which type of plaster would be the most suitable by comparing the following types to each other and by referring to, inter alia, the technique and the final look (aesthetics) of the plaster:

7.1.1 Bagging;

7.1.2 Cement wash; and

7.1.3 Brush plaster. **(7)**

7.2 The following questions are applicable to the installation of a gypsum plaster board ceiling. The size of the boards to be used is 2700mm x 900mm x 6,4mm thick.

7.2.1 What size timber brandering will you use to fix the ceiling board to? **(1)**

7.2.2 What will the maximum distance between the brandering be? **(1)**

7.2.3 How will you fix the ceiling boards to the brandering? **(1)**

7.2.4 How will you finish the gaps between the ceiling boards? **(1)**

7.2.5 How will you finish the room where the walls meet the ceiling? **(1)**
[12]

QUESTION 8 Sustainability of materials

8.1 Wood has a natural beauty that is usually enhanced by the use of transparent coatings called varnishes. Briefly explain how you will prepare the wood and then apply the varnish. **(6)**

8.2 Briefly explain how you will prepare a newly plastered wall for painting. **(4)**
[10]

TOTAL: 120