



**UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER**

**PROGRAMME: BSC ABE. III**

**COURSE CODE: ABE 303**

**TITLE OF PAPER: FLUID AND SOIL MECHANICS**

**TIME ALLOWED: TWO (2) HOURS**

**SPECIAL MATERIAL REQUIRED: NONE**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO  
OTHER QUESTIONS.**

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GRANTED BY THE CHIEF INVIGILATOR**

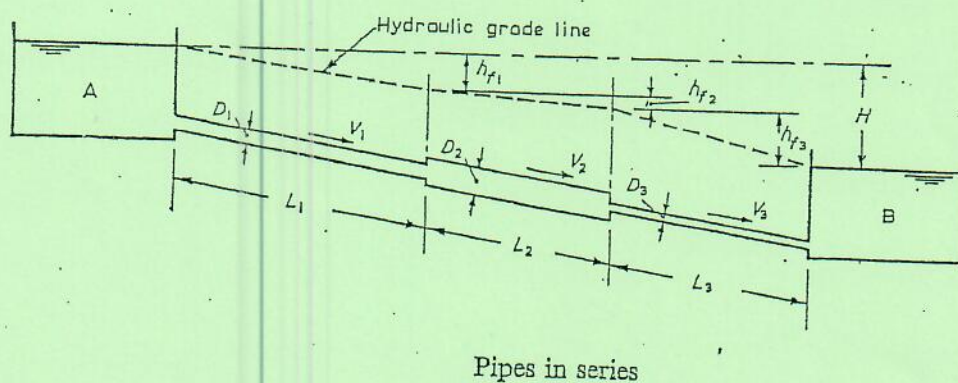
**Question 1: Compulsory**

- Differentiate between pressure head and atmospheric pressure as used in fluid hydraulics, and give formulas for each where possible. [10 Marks]
- You are given that atmospheric pressure at the sea level is 101.3 kPa and a pressure gauge reading is 9.7 kPa. Is it true that absolute pressure then is 101.3 kPa and why? [10 Marks]
- Give an expression for the measurement of pressure at a given depth ( $h$ ) below the surface of a homogeneous fluid, and describe each parameter in the formula. [10 Marks]
- Differentiate between steady and uniform flow as used in fluid Hydraulics. [10 Marks]

**Total [40 Marks]****Question 2**

The figure below shows a hydraulic grade line. The difference in height between the top of reservoir A and the bottom of reservoir B is 120m.

- Calculate, the  $h_{f1}$ ,  $h_{f2}$  and  $h_{f3}$  [20 Marks]
- What is the resultant pressure head at the bottom of reservoir B. show all procedure and calculations. [10 Marks]

**Total [30 Marks]**

Hydraulic Grade Line (Drop in Head)  
or  
Pressure



**Question 3**

- a) What is the purpose of a pump performance curve as used in the design of a pumped water system? Support your answer by using diagrams. [15 Marks]
- b) What is the general description of a fluid and give two types of fluids as used in the hydraulics. [15 Marks]

**Total [30 Marks]****Question 4**

- a) Give and discuss two main characteristics of flow in open channels. [10 Marks]
- b) Give and discuss two principles of designing canals. [10 Marks]
- c) Describe two hydraulic structures that are used in controlling the flow of water. [10 Marks]

**Total [30 Marks]**