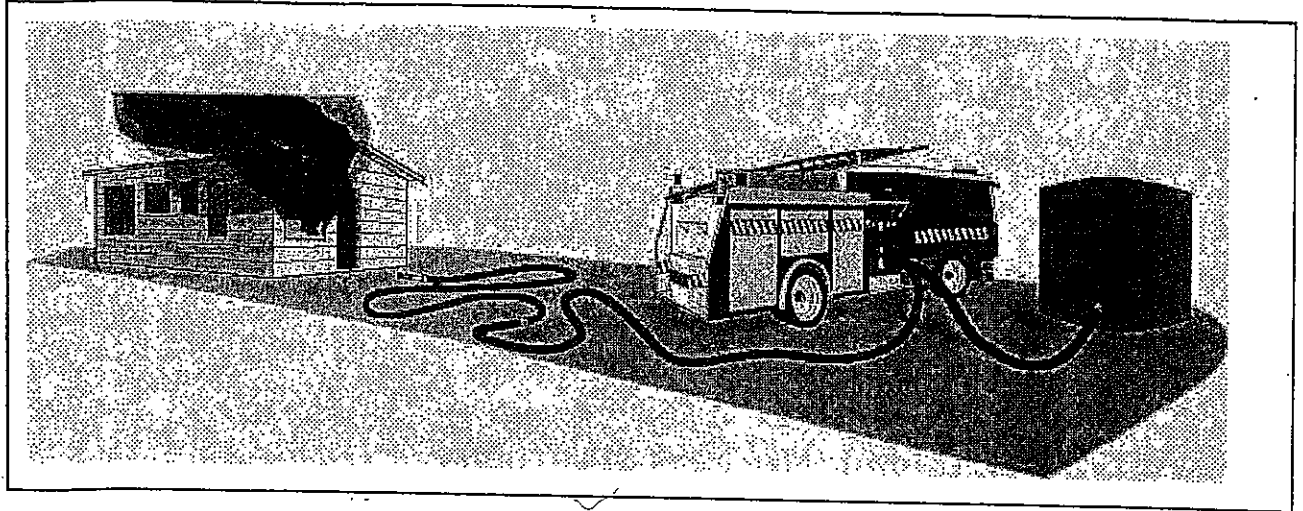
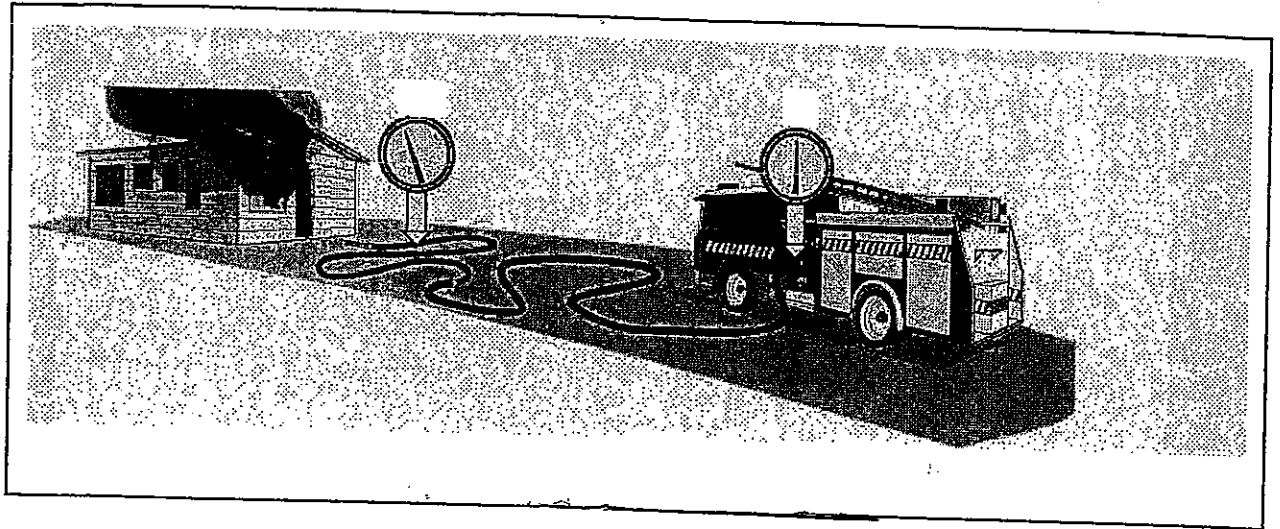


QUESTION 1



- a) A rural domestic water tank is 4m full and 8m circumference. If using a nozzle with output of 8l/s, how long would it take to empty this tank? Show all workings. **(9 marks)**



- b) A pump operator needs to supply to a nozzle discharging 8l/s at a nozzle pressure of 700kPa through 1 length of 70mm and a branch mans length to be deployed on the roof, what pressure does s/he need at the pump? **(3 marks)**

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- c) Calculate how many litres of water in a standard length of hose and show all workings. **(8 marks)**

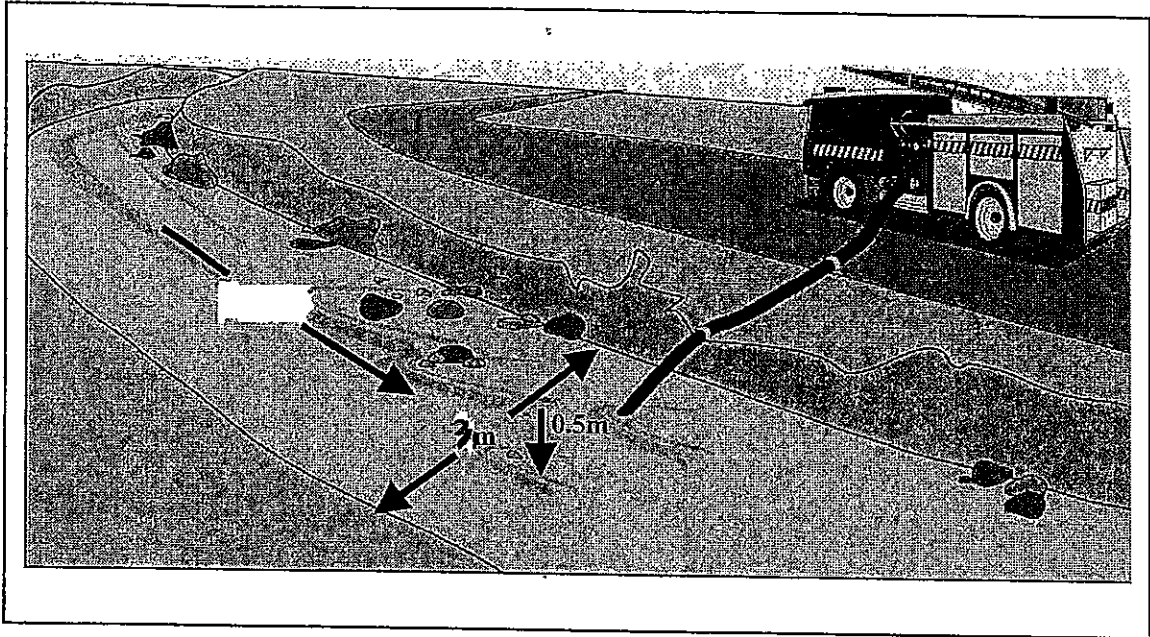
i) 45mm

.....

ii) 70mm

.....

QUESTION 2



- a) This stream has a depth of 0.5m and width of 3m. When a stick is thrown into the river to calculate the rate of flow, it travels 0.5m in 6 seconds. Estimate the volume of water in the stream to find rate of flow in l/s. **(11 marks)**

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QUESTION 3

a) When water travels from the pump through the hose to the nozzle, there is a loss of energy due to what 3 things? **(3 marks)**

i)

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ii)

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iii)

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b) Overrunning a reticulated water supply must be avoided because of possible damage to what 2 things? **(2 marks)**

i)

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ii)

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c) How does water temperature affect suction lift height? **(3 marks)**

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d) How does atmospheric pressure affect suction lift height? **(3 marks)**

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e) Fill in the blanks. **(4 marks)**

When using the largest diameter hose, to reduce friction loss in feeder hoses,

_____ the lines.

Friction loss varies directly with the _____ of the hose.

For the same velocity, friction loss _____ directly with the increase of diameter.

As the roughness of a hose increases, the friction loss _____.

f) List 5 reasons why it is important as a pump operator to know optimal branch pressure of those branches carried on your appliance. **(5 marks)**

i)
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ii)
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iii)
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iv)
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v)
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QUESTION 4

As a fire fighter, it is important to understand the six basic rules governing the principal characteristics of pressure in liquids. Explain five rules and draw diagrams to illustrate. **(20 marks)**

QUESTION 5

Explain the six factors for suction lift that should be considered when pumping water from a static/open water supply to maximise the efficiency of pumps. **(20 marks)**

- i)
-
- ii)
-
- iii)
-
- iv)
-
- v)
-
- vi)
-

QUESTION 6

2 marks for each question
Circle the letter beside the option you wish to select

- 1) What is the maximum working pressure of both 45mm and 70mm hose?
 - a) 1050kPa
 - b) 1250kPa
 - c) 1800kPa
 - d) 2100kPa

- 2) What term refers to excessive internal pressure which may be several times normal operating pressure that can cause damage to pumps, valves, hoses and reticulating water pipe work?
 - a) Flow rate
 - b) Hydraulic Pressure
 - c) Water Hammer
 - d) Tuberculation

- 3) Most fog nozzles perform best at nozzle pressure of
 - a) 550kPa
 - b) 700kPa
 - c) 900kPa
 - d) 1050kPa

- 4) When water is projected from a nozzle it causes the nozzle to recoil in a direction opposite to the flow. What is this known as?
 - a) Jet Reaction
 - b) Water Hammer
 - c) Backdraught
 - d) Velocity

- 5) What is considered the maximum practical suction lift?
 - a) 3m
 - b) 7.5m
 - c) 9m
 - d) 10m

- 6) What is the maximum lift height that can be achieved and still get 100% rated pump capacity?
- a) 0m
 - b) 2m
 - c) 3m
 - d) 4m
- 7) What is the difference between maximum lift of pure water vs. salt water?
- a) 1%
 - b) 3%
 - c) 5%
 - d) 7%
- 8) If using a branch capable of 8 – 16 l/s (475 – 950 l/m), what size hose should only be used?
- a) 41 mm
 - b) 45 mm
 - c) 70 mm
 - d) 90 mm
- 9) What is the fire ground friction loss for 1 length of 45mm hose using 8 l/s nozzle?
- a) 100kPa
 - b) 150kPa
 - c) 200kPa
 - d) 250kPa
- 10) Water mains should be tested through key fire hydrants to measure flow and pressure at least every
- a) 12 months
 - b) 2 years
 - c) 3 years
 - d) 5 years