Surface tension test

Time: - 30 minute **MM:- 20**

Instructions

1. All questions are compulsory.
2. Please give explanation for answers where applicable.
3. Questions 1 to 3 carry 1 marks each, 4 to 6 carry 2 marks each, 7 and 8 carry 3 marks each and question 9 carry 5 marks.

Question 1 Why does free surface of liquid behaves like stretched membrane?
Question 2 Why does wet ink get absorbed by a blotting paper?
Question 3 How will the rise of liquid be affected, if the top of capillary tube is closed?
Question 4 What shape does a liquid take when it weighs nothing? Give reason to support your answer.
Question 5 Water rises in a capillary tube, whereas mercury falls in the same tube. Explain.
Question 6 Define the term surface tension. Show how it is related to surface energy in a liquid.
Question 7 Derive an expression for excess pressure inside a soap bubble.
Question 8 Derive the ascent formula for rise of liquid in a capillary tube.
Question 9 (a) A soap film is formed in a rectangular frame of length 7 cm dipping into soap solution. The framework hangs from the arm of a balance. Extra weight of 0.38 g must be placed in the opposite arm to balance the pull of the film. Calculate the surface tension of soap solution.
(b) Find the difference in excess pressure on the inside and outside of a rain drop, if its diameter changes from 1.003 cm to 1.002 cm by evaporation. Surface tension of rain water is 72 dyne-cm^{-1}.