INVERTIS UNIVERSITY, BAREILLY

Course: B.Sc.(Hons) 1st Year
Subject: Properties of Matter (BHP201)
Numerical Practice Sheet: Surface Tension

Note: (i)   Solve all these problems using given data.

(ii)   Solutions sheet may be submitted online in pdf file.

Q.1   A needle 4.5 cm long can just rest on the surface of water without wetting. Find its weight.

Q.2   A light square wire frame each of side of which 12 cm long hangs vertically in the water with one side just touching the water surface. Find the additional force necessary to pull the frame clear of the water.

Q.3   A rectangular film of water is formed in a frame of wire and a movable rod of length 5 cm. What force must be applied to the rod to keep it in equilibrium?

Q.4   A thin and light ring of the material of radius 2.5 cm is rested flat on the liquid surface. When, slowly raised, it is found that the pull required is 0.05 N more before the film brakes than after. Find the surface tension of the liquid.

Q.5   Calculate the force required to pull away a horizontal circular loop of wire of radius 2.5 cm from the surface of water.

Q.6   A thin wire is bent in the form of rectangle of length 5.5 cm and breadth 4.5 cm. What force due to the surface tension does the side experience when a soap film is formed on the frame?

Q.7   A rectangular glass plate (12 cm X 8 cm X 0.3 cm) rests with the largest face flat on the surface of the water. Find the additional force required to pull the plate clear of the water. What is force due to surface tension acting on the plate it is held vertically with the edge of the longest side just touching the water surface?

Given values:

Surface tension of water (T) = 0.074 N/m

Surface tension of soap solution (T) = 0.031 N/m

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