INDIAN SCHOOL DARSAIT
DEPARTMENT OF PHYSICS

Subject : Physics	**Chapter** : Mechanical Properties of Liquids	**Worksheet No**. 10
Resource Person : Mrs. Jayalakshmi Ratish		**Date** :
Name of the Student :_____	**Class & Division** : XI A/B	**Roll Number** : ___

1. A ship made of iron can float in water but an iron needle sinks. Why? 1
2. Why light roofs are blown off during a wind storm? 1
3. A radius of ball A is twice that of B. What will be the ratio of their terminal velocities in a liquid? 1
4. At what speed will the velocity head of a stream of water be equal to 40 cm? 1
5. What should be the minimum velocity of water in a tube of diameter 2.0 cm so that the flow is turbulent? The viscosity of water is $0.001 Nm^{-2}s$. 1
6. The excess pressure in a soap bubble is thrice the excess pressure inside a moving soap bubble. What is the ratio between volume of the first and second bubble? 2
7. Two soap bubbles have radii 2:3. Calculate the ratio of work done in blowing these bubbles? 2
8. Find the velocity of efflux of water from a orifice near the bottom of a tank in which pressure is 500gf/sq cm above atmosphere. 2
9. The flow rate of water from a tap of diameter 1.50cm is 3 litres per min. The coefficient of viscosity of water is 10^{-3}Pa-s. Characterize the flow. 2
10. The reading of pressure meter attached with a closed pipe is $3.5x10^{4}\ Nm^{-2}$. On opening the valve of the pipe, the reading of the pressure meter is reduced to $3.0x10^{5}Nm^{-2}$. Calculate the speed of water flowing in the pipe. 2
11. A liquid is flowing through a horizontal pipe line of varying cross section. At a certain cross section, the diameter of the pipe is $5x10^{-2}$m and the velocity of flow of the liquid is $25x10^{-2}ms^{-1}$. Calculate the velocity of flow at another cross section where the diameter is $1x10^{-2}$m. 2
12. What is the pressure inside a small air bubble of $0.1x10^{-3}$m radius, situated just below the free surface of water? Surface tension of water=$0.072Nm^{-1}$, 1 atm pr =$1.013x10^{5}Nm^{-2}$ 2
13. A capillary tube of inside radius $5x10^{-4}$m is dipped in water of surface tension $0.075Nm^{-1}$. To what height is the water raised by the capillary action above the normal water level? Calculate the weight of water raised. Given angle of contact = 0° 3
14. Calculate the energy evolved when 8 droplets of water (surface tension=$0.072Nm^{-1}$) of radius 0.5mm each combine into one. 3
15. Find the terminal velocity of a steel ball 2mm in diameter falling through glycerin. Given specific gravity of steel and glycerin are 8 and 1.3 respectively, viscosity of glycerin is 8.3 poise. 3

16. Water flows through a horizontal pipe of non-uniform cross-section. The pressure is 0.01 m of Hg where the velocity of flow is 0.35 m/s. Find the pressure at a point where the velocity is 0.65m/s. 3

17. If excess pressure inside a soap bubble of radius 10^{-2} m is balanced by that due to column of oil 2 x 10^{-3} m high, calculate the surface tension of soap solution. Given specific gravity of oil = 0.8. 3

18. A wire ring of diameter 0.03 m is dipped in a liquid and pulled out gently. If a force of 0.1 N is required to break the film, then what is the surface tension of the liquid? 3

19. In a test experiment on a model aeroplane in a wind tunnel, the flow speeds on the upper and lower surfaces of the wing are 70 m/s and 63 m/s respectively. What is the lift on the wing if its area is 2.5 m^2? (density of air = 1.3 kg m^{-3}) 3

20. If a 5 x 10^{-2} m long capillary tube with 0.1 x 10^{-3} m internal diameter open at both ends is dipped in water. State if 3
(i) water will rise half-way in the capillary
(ii) water will rise till the upper end of the capillary
(iii) water will overflow out of the upper end of capillary?
Explain your answer