



# PHYSICS

## BOOKS - VGS BRILLIANT PHYSICS (TELUGU ENGLISH)

### MECHANICAL PROPERTIES OF FLUIDS

#### Problems

1. Find the excess pressure inside a soap bubble of radius 5 mm. (surface tension is 0.04

$N/m$ ).



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2. Calculate the work done in blowing a soap bubble of diameter 0.6 cm. against the surface tension force. (Surface tension of soap solution =  $2.5 \times 10^{-2} Nm^{-1}$ )



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3. How high does methyl alcohol rise in a glass tube of diameter 0.06 cm? (Surface tension of methyl alcohol =  $0.023 \text{ Nm}^{-1}$  and density =  $0.8 \text{ gm cm}^{-3}$ . Assume that the angle of contact is zero).



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4. What should be the radius of a capillary tube if water has to rise to a height of 6 cm in

it? (Surface tension of water-

$$7.2 \times 10^{-2} Nm^{-1})$$



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5. Find the depression of the meniscus in the capillary tube of diameter 0.4 mm dipped in a beaker containing mercury. (Density of mercury  $=13.6 \times 10^3 kgm^{-3}$  and surface tension of mercury  $=0.49 Nm^{-1}$  and angle of contact  $=135^\circ$ ).



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6. If the diameter of a soap bubble is 10 mm and its surface tension is  $0.04 \text{ Nm}^{-1}$ , find the excess pressure inside the bubble.



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7. IF work done by an agent to form a bubble of radius  $R$  is  $Q$ , then how much energy is required to increase its radius to  $2R$ ?



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8. Two spherical soap bubbles of radii  $r_1$  and  $r_2$  in vacuum combine under isothermal conditions. The resulting bubbles has a radius equal to



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## Very Short Answer Questions

1. Define average pressure. Mention it's unit and dimensional formula. Is it a scalar or a

vector?



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2. Define Viscosity. What are its units and dimensions?



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3. What is the principle behind the carburetor of an automobile?



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4. What is magnus effect?



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5. Why are drops and bubbles spherical?



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6. Give the expression for the excess pressure in a liquid drop.





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7. Give the expression for the excess pressure in an air bubble inside the liquid.



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8. Give the expression for the excess pressure in a soap bubble in air.



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9. What are water proofing agents and water wetting agents? What do they do?



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10. Why water droplets wet the glass surface and does not wet lotus leaf?



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11. What is angle of contact?





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**12.** Mention any two examples (or) applications that Obey Bernoullis theorem and justify them.



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**13.** When water flows through a pipe, which of the layers moves fastest and slowest?



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14. "Terminal velocity is more if surface area of the body is more". Given reasons in support of your answer.



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## Short Answer Question

1. What is the atmospheric pressure and how is it determined using Barometer?



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2. State Dalton's law of partial pressures.



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3. What is gauge pressure and how is a manometer used for measuring pressure differences?



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4. State Pascal's law and verify it with the help of an experiment.



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5. Explain hydraulic lift and hydraulic brakes.



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6. What is hydrostatic paradox?



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7. Explain how pressure varies with depth.



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8. What is torricelli'slaw? Explain how the speed of efflux is determined with an experiment.



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**9.** What is Venturi-meter? Explain how it is used.



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**10.** What is Reynold's number? What is its significance?



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**11.** Explain dynamic lift with examples.





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**12.** Explain Surface Tension and surface energy.



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**13.** Explain how surface tension can be measured experimentally.



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1. State Bernoulli's principle. From conservation of energy in a fluid flow through a tube, arrive at Bernoulli's equation. Give an application of Bernoulli's theorem.



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2. Define coefficient of viscosity. Explain Stoke's law and explain the conditions under which a rain drop attains terminal velocity  $v_t$ . Give the expression for  $v_t$ .



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