SURFACE TENSION

Questions on Surface Tension, Paper 4

1. The S.T. of soap solution is 25×10^{-3} N/m. the excess of pressure inside a soap bubble of diameter 1 cm is **(AIIMS 87)**
   (a) 10 Pa (b) 20 Pa
   (c) 5 Pa (d) None of these
   Answer: (b)

2. When a liquid rises inside a capillary tube, the weight of the liquid in the capillary tube is supported
   (a) Entirely by atmospheric pressure
   (b) Entirely by the force due to surface tension
   (c) Partly by the force due to surface tension and partly by atmospheric pressure
   (d) Entirely due to the upward component of the reaction (R) to the surface tension
   Answer: (d)

3. A liquid is kept in a glass beaker. Which molecules of the liquid have the highest potential energy?
   (a) Molecules at the bottom of the beaker
   (b) Molecules near the centre of the liquid
   (c) Molecules lying at half the depth of the liquid and touching the walls of the beaker
   (d) Molecules lying in the surface film
   Answer: (d)

4. Work done in blowing a soap bubble of diameter 2cm, is (S.T. = 3×10^{-2} N/m)
   (a) 7.54×10^{-5} J (b) 7.54×10^{-6} J
   (c) 7.54×10^{-3} J (d) 7.54 J
   Answer: (a)

5. Kerosene in the wick of lantern rises up because **(MNR 86)**
   (a) Of negligible viscosity
   (b) The diffusion of the oil through the wick
   (c) Of the surface tension of the oil
   (d) Wick attracts the kerosene
   Answer: (c)

6. A soap bubble has radius 2 cm. the work done in bobbling the radius is
   (Surface tension is 30 dynes/cm). **(MNR-80)**
   (a) 9050 erg (b) 4525 erg
   (c) 8050 erg (d) 3525 erg
   Answer: (a)

7. Two soap bubbles of radii 4 cm and 3 cm respectively coalesce under isothermal conditions to form a single bubble. What is the radius of the new single bubble?
   (a) 3 cm (b) 4 cm
   (c) 5 cm (d) 6 cm
   Answer: (c)

8. A film of water is formed between two straight parallel wires, each of length 10 cm and separated by 4 mm. how much work should be done to increase their separation by 1 mm, while still maintaining their parallelism?
   ($T = 7.5 \times 10^{-2}$ N/m)
   (a) 0.5×10^{-5} J (b) 1.2×10^{-5} J
   (c) 1.5×10^{-5} J (d) 15×10^{-7} J
   Answer: (c)

9. At the boiling point of water, its surface tension
   (a) Is infinite
   (b) Is zero
   (c) Is the same as that at room temperature
   (d) Is maximum
   Answer: (b)

10. The surface tension of a liquid is 10^8 dyne/cm^2. it is equivalent to **(MHT-CET 1999)**
    (a) 10^7 N/m (b) 10^6 N/m
    (c) 10^5 N/m (d) 10^4 N/m
    Answer: (a)

11. Nacl dissolved (added) in to water than it surface tension is **(MHT-CET-2008)**
    (a) Decreases (b) Increases
    (c) Remains same (d) All of these
    Answer: (b)

12. The work done in splitting a drop of water of 1 mm radius into 10^6 droplets is **(PMT MP 88)**
    (a) 9.98×10^{-5} J (b) 8.95×10^{-5} J
    (c) 5.89×10^{-5} J (d) 5.98×10^{-5} J
    Answer: (b)

13. Out of the following, which is not an example of capillary action **(MHT-CET-2006)**
    (a) Absorption of ink in blotting paper
    (b) Floating of wood on water surface
    (c) Rise of oil wick of a lamp
    (d) Ploughing of the field
    Answer: (b)

14. The radius of a soap bubble is r. the surface tension of soap solution is T. keeping temperature constant, the radius of the soap bubble is doubled, the energy necessary for this will be **(CPMT 91)**
    (a) $24 \pi r^2 T$ (b) $8 \pi r^2 T$
    (c) $12 \pi r^2 T$ (d) $16 \pi r^2 T$
    Answer: (a)

15. The surface of water in contact with glass wall is
    (a) Plane
    (b) Convex
    (c) Concave
    (d) Either convex or concave
    Answer: (c)

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16. Water rises to a height of 16.3 cm in a capillary tube of height 18 cm above the water level. If the tube is cut at a height of 12 cm **(C.P.M.T. 74)**
    (a) Water will come out in the form of fountain from the capillary tube
    (b) Water will stay at height of 12 cm in the capillary
    (c) The height of water in the capillary will be 10.3 cm
    (d) Water will flow down the sides of capillary tube

    Answer: (b)

17. More liquid rises in a thin tube because of **(CPMT 87)**
    (a) Larger value of radius
    (b) Larger value of surface tension
    (c) Smaller value of S.T.
    (d) Smaller value of radius

    Answer: (d)

18. A spherical liquid drop of radius R is divided into eight equal droplets. If surface tension is T, then the work done in this process will be **(CPMT 90)**
    (a) $2\pi R^2 T$ (b) $3\pi R^2 T$
    (c) $4\pi R^2 T$ (d) $2\pi R T^2$

    Answer: (c)

19. Excess pressure inside a soap bubble is **(CPMT 92)**
    (a) Inversely proportional to its radius
    (b) Directly proportional to its radius
    (c) Directly proportional to square roots of its radius
    (d) Independent of its radius

    Answer: (a)

20. When a liquid rises inside a capillary tube, the weight of the liquid in the tube is supported **(MHT-CET-200)**
    (a) By atmospheric pressure
    (b) Partly by atmospheric pressure and partly by surface tension
    (c) Entirely by the force due to surface tension
    (d) Partly by the force due to surface tension

    Answer: (c)

21. The surface tension of a soap solution is 0.035 N/m. the energy needed to increase the radius of the bubble from 4 cm to 6 cm is **(MHT-CET-2007)**
    (a) 1.5×10^{-3} J (b) 1.5×10^{-2} J
    (c) 3×10^{-2} J (d) 1.5×10^{-4} J

    Answer: (a)

22. Two spherical soap bubbles of a radii r_1 and r_2 in vacuum coalesce under isothermal conditions. The resulting bubble has the radius R such that **(MHT-CET-2001)**
    (a) $R = r_1 + r_2$ (b) $R = \frac{r_1 r_2}{r_1 + r_2}$
    (c) $R^2 = r_1^2 + r_2^2$ (d) $R = \frac{r_1 + r_2}{r_2}$

    Answer: (c)

23. When two capillary tube of different diameters are dipped vertically the rise of the liquid is **(MNR 87, NCERT 78)**
    (a) Same in both the tubes
    (b) More in tube of larger diameter.
    (c) Less in tube of smaller diameter
    (d) More in the tube of smaller diameter

    Answer: (d)

24. The work done in blowing a bubble of radius R is W, then the work done in making a bubble of radius 2R from the same solution is, **(MHT-CET 99, 2005)**
    (a) $\frac{W}{2}$ (b) 2W
    (c) 4W (d) $2^{\frac{1}{3}} W$

    Answer: (c)

25. Two drops of a liquid are merged to from a single drop. In this process **(MHT CET 2000, 2005, PMT Delhi 82)**
    (a) Energy is released
    (b) Energy is absorbed
    (c) Energy is remains constant
    (d) First 'B' then 'C'

    Answer: (a)