

SURFACE TENSION

Questions on Surface Tension, Paper 2

1. Two soap bubbles have radii in the ratio of 4:3. What is the ratio of work done to blow these bubbles?
(MHT-CET-2003)
(a) 4:3 (b) 16:9
(c) 9:16 (d) 3:4
Answer: (B)
2. A soap bubble (surface tension 30×10^{-3} N/m) has radius 2 cm. the work done in blowing the bubble is
(MNR 80)
(a) Zero (b) 1.1355×10^{-4} J
(c) 2.261×10^{-4} J (d) 4.532×10^{-4} J
Answer: (d)
3. In a surface tension experiment with a capillary tube water rises up to 0.1 m. if the same experiment is repeated on an artificial satellite which is revolving around the earth. The rise of water in a capillary tube will be (Rorkee 92)
(a) 0.1 m
(b) 9.8 m
(c) 0.98
(d) Full length of capillary tube
Answer: (d)
4. Surface tension of a soap solution is 1.9×10^{-2} N/m. work done in blowing a bubble of 2.0 cm diameter will be (PMT MP 90)
(a) $7.6 \times 10^{-6} \pi$ J (b) $15.2 \times 10^{-6} \pi$ J
(c) $1.9 \times 10^{-6} \pi$ J (d) $1 \times 10^{-4} \pi$ J
Answer: (b)
5. At critical temperature, the surface tension of a liquid (A.I.I.M.S 80)
(a) Is zero
(b) Is infinity
(c) Is the same as that at any other temperature
(d) Can not be determined
Answer: (a)
6. Out of the following. Which one is not an example of capillary action?
(a) Ploughing of the field
(b) Absorption of ink in a blotting paper
(c) Floating of wood on the surface of water
(d) Rise of oil in the wick of a lamp
Answer: (c)
7. A capillary tube is placed vertically in a liquid. If the cohesive force is less than the adhesive force, then
(a) The meniscus will be convex upwards
(b) The liquid will wet the solid
(c) The angle of contact will be obtuse
(d) The liquid will drip in the capillary tube
Answer: (b)
8. If the surface of a liquid is plane, then the angle of contact of the liquid with the walls of container is (MHT-CET-2004)
(a) Acute angle (b) Obtuse angle
(c) 90° (d) 0°
Answer: (d)
9. The surface of water in contact with glass wall is (MHT-CET-2004)
(a) Plane (b) concave
(c) convex (d) Both 'b' and 'c'
Answer: (b)
10. Water rises to a height of 10 cm in a capillary tube, and mercury falls to a depth of 3.42 cm in the same capillary tube. If the density of mercury is 13.6 gm/cm^3 and the angle of contact is 135° , the ratio of surface tension for water and mercury is (PMT 88)
(a) 1:0.5 (b) 1:3
(c) 1:6.5 (d) 1.5:1
Answer: (c)
11. Surface tension may be defined as (CPMT 90)
(a) The work done per unit area in increasing the surface area of a liquid under isothermal condition
(b) The work done per unit area in increasing the surface area of a liquid under adiabatic condition
(c) The work done per unit area in increasing the surface of a liquid under both isothermal and adiabatic conditions.
(d) Free surface energy per unit volume
Answer: (a)
12. The surface tension for pure water in a capillary tube experiment is (MHT CET 2002)
(a) $\frac{3g}{2hr}$ (b) $\frac{3}{hr \rho g}$
(c) $\frac{r \rho g}{2h}$ (d) $\frac{hr \rho g}{2}$
Answer: (d)
13. A liquid is kept in a glass vessel. If the liquid solid adhesive force between the liquid and the vessel is very weak as compared to the cohesive force in the liquid, then the shape of the liquid surface near the solid should be
(a) Concave (b) Convex
(c) Horizontal (d) Almost vertical
Answer: (b)

SURFACE TENSION

14. The height of a liquid in a fine capillary tube
 (a) Increases with an increase in the density of a liquid
 (b) Decreases with a decrease in the diameter of the tube
 (c) Decreases with an increase in the surface tension
 (d) Increases as the effective value of acceleration due to gravity is decreased
Answer: (d)
15. When a soap bubble is charged (**MNR 88**)
 (a) It contracts
 (b) It expands
 (c) It does not undergo any change in size
 (d) None of these
Answer: (b)
16. If common salt is dissolved in water, then the S.T. of salt water is
 (a) Increased
 (b) Decreased
 (c) Not changed
 (d) First decreases and then increases
Answer: (a)
17. In a capillary tube, fall of liquid is possible when angle of contact is (**MHT CET 2066**)
 (a) Acute angle (b) Right angle
 (c) Obtuse angle (d) None of these
Answer: (c)
18. Energy needed in breaking a drop of radius R into n drops of radius r, is (**CPMT 82**)
 (a) $(4\pi r^2 n - 4\pi R^2)$ (b) $(\frac{4\pi}{3} n \pi r^2 - \frac{4}{3} \pi R^2)$
 (c) $(4\pi R^2 - 4\pi r^2)nT$ (d) $(4\pi R^2 - n 4\pi r^2)T$
Answer: (a)
19. One thousand small water droplets of equal size combine to form a big drop. The ratio of the final surface energy to the initial surface energy is (Surface tension of water = 70 dyne/cm) (**MHT CET 99**)
 (a) 10:1 (b) 1000:1
 (c) 1:10 (d) 1:1000
Answer: (c)
20. A spherical water drop of radius R is split up into 8 equal droplets. If T is the surface tension of water, then the work done in this process is
 (a) $4\pi R^2 T$ (b) $8\pi r^2 T$
 (c) $3\pi R^2 T$ (d) $2\pi r^2 T$
Answer: (a)
21. Water can rise up to a height of 12 cm in a capillary tube. If the tube is lowered to keep only 9 cm above the water level then the water at the upper end of the capillary will (**MHT-CET 2000**)
 (a) Overflow
 (b) From a convex surface
 (c) From a flat surface
 (d) From a concave surface
Answer: (c)
22. A square frame of length L is immersed in soap solution and taken out. The force experienced by the square plate is (**MHT-CET-2007**)
 (a) TL (b) 2TL
 (c) 4TL (d) 8TL
Answer: (d)
23. A drop of oil is placed on the surface of water. Which of the following statement is correct? (**NCERT 76**)
 (a) It will remain on it as a sphere
 (b) It will spread as a thin layer
 (c) It will partly be as spherical droplets and partly as thin film
 (d) It will float as distorted drop on the water surface.
Answer: (b)
24. A mercury drop of radius 1 cm is broken into 10^6 droplets of equal size. The work done is ($T = 35 \times 10^{-2}$ N/m) (**Roorkee 84**)
 (a) 4.35×10^{-2} J (b) 4.35×10^{-3} J
 (c) 4.35×10^{-6} J (d) 4.35×10^{-8} J
Answer: (a)
25. Plants get water through the roots because of (**CPMT 83**)
 (a) Capillarity (b) Viscosity
 (c) Gravity (d) Elasticity
Answer: (a)