PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

SURFACE TENSION

Multiple Choice Questions Behavior Of Liquid Surface

1. The force of attraction between molecules of different substances is

A. adhesive force

B. cohesive force

C. molecular force

D. intermolecular force

Answer: B

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2. The force of attraction between molecules of different substances is

A. adhesive force

B. molecular force

C. cohesive force

D. intermolecular force

Answer: A

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3. The maximum distance upto which the intermolecular forces are effective is called

A. molecular range

B. radius of the molecule

C. sphere of influence of that molecule

D. molecular force

Answer: A

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4. In a liquid , every molecule is pulled by every other molecule is pulled by every other molecule by

A. adhesive force

B. intermolecular force

C. cohesive forces

D. all of these

Answer: C

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5. An imaginary sphere drawn with a radius equal to the range of molecular attraction is called

A. range of molecular attraction

B. sphere of influence of that molecule

C. diameter of that molecule

D. radius of molecular attraction

Answer: B

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6. When the adhesive force between a liquid and glass is greater than the force between the liquid molecules , the meniscus of the liquid in a capillary tube is

A. convex

B. concave

C. plane

D. horizontal

Answer: B

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7. If the force of cohesion is equal to the force of adhension , then the liquid surface will be

A. convex

B. concave

C. plane

D. cylindrical

Answer: C

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8. If the cohesive force is greater than the adhesive force , the liquid surface will be

A. plane

B. concave

C. convex

D. horizontal

Answer: C

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9. Surface tension is due to

A. an atomic phenomenon

B. a gravitational phenomenon

C. an electric phenomenon

D. a molecular phenomenon

Answer: D

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10. Mercury does not wet wood . It indicates that its cohesive force is

A. greater than its adhesive force

B. equal to its adhesive force

C. less than its adhesive force

D. none of these

Answer: A

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11. Water does not wet an oily glass because

A. cohesive force of oil $>$ adhesive force between oil and glass

B. cohesive force of oil $<$ cohesive force of water

C. oil repels water

D. cohesive force of water $>$ adhesive force between water and oil molecules

Answer: D

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12. When kerosene is sprinkled on the surface of a pond , mosquitoes can no longer remain sitting over it because

A. oil reduces the surface tension , so liquid membrane is no longer able to support them .

B. mosquitoes are repelled by the smell of the oil

C. swimming is no longer pleasant to the mosquitoes

D. the question is irrelevant

Answer: A

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13. If ice melts under gravity free conditions in vacuum, the final geometrical shape will be

A. straight

B. cubical

C. circular

D. spherical

Answer: D

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14. The liquid which completely wets the solid , the cohesive forces are

A. very weak compared to the adhesive force

B. very strong compared to the adhesive force

C. equal to the adhesive force

D. can not be predicted

Answer: A

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15. Why does an iron needle float on clean water but sink when some detergent is added to this water?

A. addition of detergent increases the density of water

B. addition of detergent reduces the surface tension of water

C. solution of detergent decreases the density of water

D. addition of detergent increases the surface tension of water

Answer: B

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16. Origin of surface tension of a liquid is due to

A. gravitational force between molecules

B. electrical force between molecules

C. adhesive force between molecules

D. cohesive force between molecules

Answer: B

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17. Surface tension is

A. the work done per unit area in increasing surface area of a liquid under isothermal conditions

B. the work done per unit area increasing the surface area of a liquid under adiabatic conditions

C. the work done per unit area decreasing the surface area of a liquid under adiabatic conditions

D. free surface energy per unit volume

Answer: A

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18. The radius of sphere of influence is

A. 10^{-9} m

B. 10^{-9} cm

C. 10^{-10} cm

D. 10^{-8} cm

Answer: A

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Multiple Choice Questions Surface Tension

1. The tangential force per unit length an imaginary line drawn on the surface of a liquid , is

A. surface energy

B. surface tension

C. free surface energy

D. work done

Answer: B

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2. The dimensions of surface tension are

A. $\left[L^{1}M^{0}T^{-2}\right]$

B. $\left[L^{0}M^{0}T^{-1}\right]$

C. $\left[L^{0}M^{1}T^{-2}\right]$

D. $\left[L^{1}M^{1}T^{-2}\right]$

Answer: C

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3. The unit of surface tension in SI system is

A. N/m

B. dyne/cm

C. J/m^2

D. a' and 'c'

Answer: D

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4. A needle made up of iron floats on the water surface due to

A. surface tension of water is greater than the weight

B. free surface energy of water surface

C. surface energy of water surface

D. viscus force of water

Answer: A

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5. If l is the length of an imaginary line drawn on free surface of liquid and F is tangential force acting on it , the surface tension is

A. F/l

B. Fl

C. l/F

D. T/l

Answer: A

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6. When mercury is in contact with glass m then the surface of mercury is

A. concave

B. convex

C. plane

D. irregular shape

Answer: B

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7. The surface of water in contact with glass wall is

A. concave

B. convex

C. plane

D. horizontal

Answer: A

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8. Surface tension is due to

A. adhesive force

B. gravitational force

C. cohesive force

D. electrostatic force

Answer: C

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9. The surface tension of a liquid ___ with rise of temperature.

A. decreases

B. increases

C. remains same

D. independent of temperature

Answer: A

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10. The effect of surface tension causes

A. a needle floats on the surface of water

B. a needle does not float on the surface of water

C. a needle floats partially on the surface of water

D. both 'a' or 'c'

Answer: A

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11. When soap solution dissolves in water, then the surface tension of soap solution is

A. reduced

B. increased

C. remains constant

D. zero

Answer: A

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12. The surface of a liquid has tendency to contract and minimise surface area . This tendency is due to

A. viscosity

B. elasticity

C. friction

D. surface tension

Answer: D

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13. A drop of oil is placed on the surface of water. Which of the following statements is correct

A. it will remain on it as a sphere

B. it will pread as a thin layer

C. it will partly be a spherical droplet and partly a thin film

D. it will float as a distorted drop on the water surface

Answer: B

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14. The surface tension of liuid at its boiling point

A. is zero

B. is infinite

C. is same as that of any other temperature

D. canot be determined

Answer: A

15. At critical temperature, the surface tension of a liquid

A. zero

B. one

C. infinity

D. any finite values

Answer: A

16. Which of the following have same dimensional formula as that of the surface tension ?

A. Viscosity

B. Planck's constant

C. Force constant

D. Young's modulus

Answer: C

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17. A brush is dipped in water and removed . The hair of the brush cling together due to

A. the force of attraction between the hair

B. the characteristic property of the hair

C. viscosity of water

D. surface tension of water

Answer: D

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18. The surface tension of water at freezing point is

A. zero

B. infinity

C. same as that of before

D. any values from zero to infinity

Answer: A

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19. What make it difficult to separate two glass sheets having a drop of water between them .

A. viscosity

B. gravity

C. surface tension

D. atmospheric pressure

Answer: C

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20. When a small quantity of soluable impurity is added to water , then its surface tension

A. increases

B. decreases

C. may increase or decrease depending upon impurity

D. remains same

Answer: A

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21. When a small quantity of partially soluable impurity is added to water , then the surface tension of water

A. increases

B. decreases

C. may increase or decrease

D. remains same

Answer: B

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22. When sugar is added to water , then surface tension of sugar solution is

A. less then that of water

B. same as that of water

C. more that of water

D. some times more and sometimes less than that of water

Answer: C

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23. If the surface tension of a rectangular soap film is T and length l , total force acting on it is

,

A. 2T/l

B. l/2T

C. T/2l

D. 2 Tl

Answer: D

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24. If there is no difference of pressure on the two sides of the surface, then the liquid surface is

A. concave

B. convex

C. cylindrical

D. plane

Answer: D

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25. The molecular forces are

A. short range forces

B. intermediate forces

C. long range forces

D. multi range forces

Answer: A

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26. Two pieces of glass plate one upon the other with a little water between them cannot be separated easily because of

A. surface tension

B. viscosity

C. pressure

D. inertia

Answer: A

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27. The surface energy is numerically equal to

A. work done

B. molecular force

C. surface tension

D. potential energy

Answer: C

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28. The surface tension of molten cadmium with increase of temperature generally

A. increases

B. is infinity

C. remains constant

D. decreases

Answer: A

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29. Two wooden sticks of negliable weight are floating parallel to each other very closely . If a hot metal wire is placed between the two sticks without touching them

A. the two sticks move apart

B. come closer

C. they remain at the same as before

D. they stand erect

Answer: B

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30. The phenomenon of surface tension exhibited liquids is due to

A. electrons

B. atoms

C. molecules

D. gravity

Answer: A

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31. The surface tension of pure water is

A. 0.065N/m

B. 0.072N/m

C. 0.045 N/m

D. 0.045 dyne/cm

Answer: B

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32. The surface tension of a liquid is $70 \mathrm{dyne} / cm$. In MKS system its value is

A. 70 N/m

B. 70×10^{-2} N/m

C. 7×10^{2} N/m

D. 7×10^{3} N/m

Answer: B

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33. If the maximum force in addition to the weight required to pull a wire frame 5.0 cm long from water surface at temperature of 20° C is 720 dyne the surface tension of water will be

A. 72.0dyne/cm

B. 145 dyne/cm

C. 7.28 dyne/cm

D. 7.28 N/m

Answer: A

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34. If the length of a needle floating on water is 2 cm then the additional force due to surface tension required to pull the needle out of water will be

A. 28×10^{-4}N

B. 32×10^{-4}N

C. 14×10^{-4}N

D. 20×10^{-4}N

Answer: A

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35. The surface tension of a liquid is 10^8 dyne cm^{-1}. It is equivalent to

A. 10^7N/m

B. 10^6N/m

C. 10^5N/m

D. 10^4N/m

Answer: C

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36. The force required to take away a flat circular plate of radius 4 cm from the surface of water is

A. 560 π dyne

B. 560 dyne

C. 5.6π

D. 56π dyne

Answer: A

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37. A circular loop of a thin wire of radius $(7/\pi)$ cm is suspended from one arm of a balance . The plane of the loop is in contact with the surface of soap solution . If the pull on the loop due to surface tension is found to be 0.6×10^{-3} kg wt , then the surface tension of soap solution will be ,

A. 11×10^{-3} N/m

B. 21×10^{-5} N/m

C. 21×10^{-3} N/m

D. 41×10^{-3} N/m

Answer: C

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38. A platinum wire ring of radius 2.5 cm floats horizontally on the surface of water . A vertically force of 0.022 N is required to detach the ring from the surface of water . Then surface tension of water is

A. 6×10^{-2} N/m

B. 8×10^{-2} N/m

C. 7×10^{-2} N/m

D. 9×10^{-2} N/m

Answer: C

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39. A wire of length L metres, made of a material of specific gravity 8 is floating horizontally on the surface of water. If it is not wet by water, the maximum diameter of the wire (in mm) upto which it can continue to float is (surface tension of water is $T = 70 \times 10^{-3} Nm^{-1}$)

A. 0.75 mm

B. 1.5 mm

C. 1.5 cm

D. 1.5 m

Answer: B

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40. The length of needle foating on the surface of water is 1.5 cm the force in addition to its weight required to lift the needle from water surface will be (surface tension of water $= 7.5N/cm$)

A. 22.5 N

B. 2.25N

C. 0.25N

D. 225 N

Answer: A

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41. A circular wire of length 0.1 m is touching the surface of the liquid of surface tension 3×10^{-2} N/m The mass of a wire is 10^{-4} kg .

If g = 10 m/s^2 then the force needed to lift the circular wire is

A. 7×10^{-3}N

B. 0.7×10^{-3}N

C. 0.07×10^{-3}N

D. 70×10^{-3} N

Answer: A

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42. The force of surface tension on a ring situated on the surface of water is $14\pi \times 10^{-4}$ N . Then the diameter of the ring is

A. 5 mm

B. 1 cm

C. 2 cm

D. 4 cm

Answer: B

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43. A soap film is formed in a rectangular frame of length 7×10^{-2} m when it is dipped in soap solution. A weight of 0.4×10^{-3} kg is required to pull the frame . Surface tension of the soap solution is

A. 2.8×10^{-2} N/m

B. 0.27×10^{-2}N/m

C. 27×10^{-2}N/m

D. 270×10^{-2}N/m

Answer: A

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44. A ring of radius r, and weight W is lying on a liquid surface . If the surface tension of the liquid is T , then the minimum force required to be applied in order to lift the ring up

A. W

B. 2W

C. $W + 4\pi rT$

D. $W + 2\pi rT$

Answer: C

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45. A straight piece of wire 4 cm long is placed horizontally on the surface of water annd is gently pulled up . It is found that a force of 560 dyne in addition to the weight of the wire is required for this purpose . Then surface tension of the water is

A. 70 dyne/cm

B. 44.8 dyne/cm

C. 700 dyne/cm

D. none

Answer: A

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46. A U-shaped wire is dipped in a soap solution, and removed. A thin soap film formed between the wire and a light slider supports a weight of $1.5 \times 10^{-2} N$ (which includes the small weigh of the slider). The length of the slider is 30cm. What is the surface tension of the film?

A. 0.025N/m

B. 0.050N/m

C. 0.5N/m

D. 0.250N/m

Answer: A

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47. A circular loop of thin wire of radius 7 cm is lifted from the surface of a liquid . An additional force of 44×10^{-2} N is required to detach the loop from the surface of the liquid . The surface tension of the liquid in N/m is

A. 0.5

B. 1

C. 2.86

D. 6.826

Answer: A

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48. A metal ring of internal and external radii 15 mm and 20 mm respectively is placed horizontally on the surface of a liquid of surface tension 0.03 N/m To detach the ring from the liquid surface the force required is

A. 28×10^{-5}N

B. 66×10^{-4}N

C. 6.6×10^{-4}N

D. 425×10^{-4}N

Answer: B

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49. A thin liquid film of thickness 5×10^{-5} m is formed between two glass plates of surface area $1 \times 10^{-2} m^2$, If the surface tension of the liquid is 60×10^{-2} n/m the force that is required to separate the glass plates is

A. 240 N

B. 120 N

C. 24 N

D. 1.2 N

Answer: A

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Multiple Choice Questions Surface Energy And Surface Tension

1. The relation between surface tension and surface energy is

A. W=A/T

B. W=T/A

C. T=W/A

D. T=W.A

Answer: C

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2. The potential energy per unit change in area of the liquid surface , is

A. surface energy

B. work done

C. surface tension

D. total energy

Answer: A

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3. The work done to increase unit area of the liquid surface is equivalent to

A. surface energy

B. surface tension

C. work done

D. energy stored

Answer: B

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4. A drop of water breaks into two droplets of equal size. In this process which of the following statements is correct?

(1). The sum of temperature of the two droplets together is equal to the original temperature of the drop.

(2).the sum of masses of the two droplets is equal to the original mass of the drop.

(3). the sum of the radii of the two droplets is equal to the radius of the original drop.

(4). the sum of the surface areas of the two droplets is equal to the surface area of the original drop.

A. the sum of the temperature of two droplets together is equal to temperature of the original drop

B. the sum of the masses of the two droplets is equal to mass of drop

C. the sum of the radii of the two droplets is equal to the radius of the drop

D. the sum of the surface areas of the two droplets is equal to the surface area of the original drop

Answer: B

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5. A liquid drop of radius R is broken up into n small droplets. The work done is proportional to

A. n

B. $n^{1/3}$

C. n^{0}

D. n^{2}

Answer: B

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6. If a single drop of liquid is splited into large number of droplets all of the same size , then the energy in this process will be

A. liberated

B. absorbed

C. neither liberated nor absorbed

D. some mass is converted into energy

Answer: B

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7. A soap bubble encloses air inside it

A. the soap film consists of two surface layers of molecules back to back

B. the bubble encloses air inside it

C. the pressure inside the bubble is less than the atmospheric pressure has compressed if equally from all sides it a spherical shape

D. because of the elastic property of the film , it will tend to shrink to have as small as surface is possible for the volume it has enclosed

Answer: C

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8. If n drops of a liquid, form a single drop, then

A. some energy will be absorbed in the process

B. some energy will be released in the process

C. some energy absorbed or released in the process

D. energy neither absorbed nor released in this process

Answer: B

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9. Which molecule of a liquid has a higher potential energy ?

A. at the centre of gravity of the liquid

B. at any distance from centre of gravity of liquid

C. on the surface film

D. at the bottom of the vessel

Answer: C

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10. The potential energy of molecule on the surface of a liquid as compared to in side the liquid is

A. greater

B. less

C. equal

D. depending on the liquid , sometimes less, sometimes more

Answer: A

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11. The Zurin's law for a liquid is

A. rh = constant

B. $r^2 h = \text{constant}$

C. $r/h = \text{constant}$

D. $r^3 h = \text{constant}$

Answer: A

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12. A frame made of a metallic wire enclosing a surface area A is covered with a soap film . If the area of the frame of metallic wire will be changed by

A. 1

B. 0.5

C. 0.75

D. 0.25

Answer: B

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13. Calculate the force required to separate the glass plates of area $10^{-2}m^2$ with a film of water 0.05 mm thickness between them (surface tension of water $= 70 \times 10^{-3} N/m)$)

A. 7 N

B. 28 N

C. 10 N

D. 14 N

Answer: B

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14. Energy needed in breaking a drop of radius R into n drops of radii r is given by

A. $4\pi(r^2n - R^2)T$

B. $\left(\frac{4}{3}\pi r^2 n - \frac{4}{3}\pi R^3\right)T$

C. $4\pi(R^2 - r^2)nT$

D. $4\pi(4n - R^2)TP$

Answer: A

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15. Small droplets of a liquid are usually more spherical in shape than larger drops of the same liquid because

A. of the gravitational force acting on the drop

B. of the atmospheric pressure

C. volume of a spherical drop is minimum

D. the liquid surface tends to have a minimum surface area

Answer: D

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16. A drop of water is broken into two droplets . The sum of which property of the two drops is equal to that of the single one ?

A. surface energy

B. radius of the molecule

C. volume

D. surface tension

Answer: C

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17. If two drops of a liquid are merged to form a single drop, then the energy in this process will be

A. released

B. absorbed

C. remains constant

D. can not be predicted

Answer: A

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18. Molecules on the surface of the liquid have

A. maximum kinetic energy

B. maximum potential energy

C. minimum kinetic energy

D. minimum potential energy

Answer: B

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19. Detergents in hot water enable grease to be removed from the dishes by

A. raising the surface tension of water

B. changing te angle of contact between grease and dish to an obtuse angle

C. changing the angle to an acute angle

D. increasing the temperature of water

Answer: C

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20. The work done to split a big drop into n number of identical droplets all of the same size will be

A. $\left(n - n^{2/3}\right)$

B. $\left(n^{1/3} - n^{2/3}\right)$

C. $\left(n^{1/3-1}\right)$

D. $\left(n^{3} - 1\right)$

Answer: C

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21. A number of small drops of mercury adiabatically coalesce to form a single drop. The temperature of the drop will

A. increases

B. decreases

C. remains unchanged

D. may decrease or increase depending upon size

Answer: A

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22. When salt is added to pure water , the suface tension

A. increases

B. decreases

C. may increase depending upon salt

D. can not be predicted

Answer: A

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23. When a small quantity of partially soluable impurity is added to water , then the surface tension of water

A. increases

B. decreases

C. may increase depending upon salt

D. can not be predictd

Answer: B

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24. Soap helps in cleaning clothes, because

A. it reduces the surface tension of liquid

B. it gives strength to solution

C. it absorbs the dirt

D. chemical of soap changes

Answer: A

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25. If a wax coated capillary tube is dipped in water, then water in it will-

A. rise up

B. depress

C. sometimes rise and sometimes fall

D. rise up and come out as a fountain

Answer: B

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26. When two capillary tubes of different diameters are dipped vertically, the rise of the liquid is

A. same in both tubes

B. more in tube of larger diameter

C. more in tube of smaller diameter

D. none of these

Answer: C

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27. The work done in blowing a soap bubble of radius 0.02 cm is ,

A. 12.56×10^{-9}J

B. 25.12×10^{-9}J

C. 251.2×10^{-9}J

D. 6.28×10^{-9}J

Answer: B

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28. If work W is done in blowing a bubble of radius R from a soap solution. Then the work done is blowing a bubble of radius $2R$ from the same solution is

A. 2 W

B. W/2

C. 4 W

D. W/4

Answer: C

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29. The ratio of the work done in blowing the soap bubbles of radii in the ratio 1 :2 is ,

A. $1:4$

B. $4:1$

C. $1:2$

D. $2:1$

Answer: A

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30. The work done in blowing a soap bubble of radius 5 cm is

A. 750 J

B. 1570 J

C. 1.57×10^2erg

D. 1.57×10^4erg

Answer: D

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31. The ration of the work done in blowing the soap bubbles of diameter in the ratio 4 : 5 is ,

A. $4 : 2$

B. $16 : 25$

C. $20 : 4$

D. $10 : 4$

Answer: B

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32. A mercury drop of radius 1 cm is broken into 10^6 droplets of equal size. The work done is $\left(T = 35 \times 10^{-2} \frac{N}{m}\right)$

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

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33. Surface tension of a soap solution is $1.9 \times 10^{-2} N/m$. Work done in blowing a bubble of 2.0 cm diameter will be

A. $45.54\pi \times 10^{6}$ J

B. $15.2\pi \times 10^{-6}$J

C. $1.9\pi \times 10^{-6}$J

D. $1\pi \times 10^{-4}$J

Answer: B

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34. n number of water droplets, each of radius r, coalese, to form a single drop of radius R. The rise in temperature $d\theta$ is

A. $\dfrac{2T}{rJ}$

B. $\dfrac{3T}{\rho J}\left(\dfrac{1}{r} - \dfrac{1}{R}\right)$

C. $\dfrac{-3T}{rJ}$

D. $\dfrac{3T}{\rho J}\left(\dfrac{1}{r} + \dfrac{1}{R}\right)$

Answer: B

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35. A soap bubble of radius $1/\sqrt{\pi}\text{cm}$ is expanded to radius $2/\sqrt{\pi}\text{cm}$. Calculate the work done. Surface tension of soap solution $= 30\text{dyne} \quad cm^{-1}$.

A. 120 erg

B. 360 erg

C. 720 erg

D. 240 ergs

Answer: C

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36. A spherical liquid drop of radius R is divided into eight equal droplets. If the surface tension is T, then the work done in this process will be

A. $8\pi R^2 T$

B. $3\pi R^2 T$

C. $4\pi R^2 T$

D. $2\pi R T^2$

Answer: C

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37. The surface tension of a liquid is 5 Newton per metre. If a film is held on a ring of area $0.02 metres^2$, its surface energy is about :

A. 10^{-1}J

B. 2.5×10^2J

C. 20×10^{-2}J

D. 3×10^{-1}J

Answer: C

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38. 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-

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

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39. A drop of liquid of diameter 2.8 mm breaks up into 125 identical drops. The change in energy is nearly (S.T. of liquid =75 dynes / cm)

A. 100 erg

B. 19 erg

C. 46 erg

D. 74 erg

Answer: D

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40. The surface energy of a liquid drop is E. It is sprayed into 1000 equal droplets. Then its surface energy becomes

A. E

B. 10 E

C. 100 E

D. 1000 E

Answer: B

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41. 8000 identical water drops are combined to form a big drop then the ratio of the final surface energy to the initial surface energy of all the drops together is

A. $20 : 1$

B. $1 : 19$

C. $1 : 20$

D. $19 : 1$

Answer: C

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42. The surface energy of liquid film on a ring of area $0.15m^2$ is (surface tension of liquid $5Nm^{-1}$)

A. 0.75J

B. $\frac{1}{5}$J

C. 2.25J

D. 3.0J

Answer: B

Watch Video Solution

43. The surface tension of soap solution is 2.1×10^{-2} N/m . Then the work done in blowing a soap bubble of diameter 3.0 is

A. 4.4×10^{-5}J

B. 11.9×10^{-5}J

C. 8.95×10^{-5}J

D. 23.10^{-5}J

Answer: B

Watch Video Solution

44. A ring of radius 0.75 cm is floating on the surface of water . If surface tension of water is 0.07 N/m the force required to lift the ring from the surface of water will be

A. 66×10^{-1} N

B. 66×10^{-2}N

C. 1.05×10^{-3} N

D. 66×10^{-4} N

Answer: D

Watch Video Solution

45. A mercury drop of radius 1 cm is sprayed into 10^6 drops of equal size. The energy expended in joule is (surface tension of mercury is $\left(460 \times 10^{-3} N/m\right)$

A. 5.7

B. 5.7×10^{-4}

C. 0.057

D. 5.7×10^{-6}

Answer: C

Watch Video Solution

46. If a drop of water of radius 0.1 cm is broken up into a million droplets all of the same size , then the energy expended in the process will be

A. 197π erg

B. 297π erg

C. 397π erg

D. 497π erg

Answer: B

Watch Video Solution

47. The work done in blowing a soap bubble of a radius 0.02 cm m to radius 0.04 m will be

A. 4.22×10^{-4} J

B. $5.\ 84 \times 10^{-4}$ J

C. 8.45×10^{-4} J

D. 6.45×10^{-4} J

Answer: C

Watch Video Solution

48. What will be the work done in blowing a soap bubble of radius 1 cm to 2 cm ?

(If surface tension of soap solution is 25×10^{-3} N/m)

A. $6\pi \times 10^{5}$ J

B. $6\pi \times 10^{6}$ J

C. $24\pi \times 10^{-5}$ J

D. 20×10^{6} J

Answer: A

Watch Video Solution

49. What will be the work done in blowing a soap bubble of radius 2 cm , the surface tension of the soap solution is 20 dyne/cm at constant temperature ?

A. 320π erg

B. 640π erg

C. 1240π erg

D. 160π erg

Answer: B

Watch Video Solution

50. A big drop of radius R is formed by 1000 small droplets of water, then the radius of small drop is

A. $\frac{R}{100}$

B. $\frac{R}{0.1}$

C. $\frac{R}{2}$

D. $\frac{R}{100}$

Answer: D

Watch Video Solution

51. If work done in blowing a bubble of radius R is in a soap solution , then the work done in blowing a bubble of radius halved in same solution would be ,

A. 2 W

B. W/2

C. 4 W

D. W/4

Answer: D

Watch Video Solution

52. Eight droplets of water each of radius 0.5 mm when coalesce into single drop , then the change in surface energy will be ,

A. $4\pi T \times 10^{-5}$ J

B. $4\pi T \times 10^{7}$ J

C. $4\pi T \times 10^{-6}$ J

D. $4\pi T \times 10^{-8}$ J

Answer: C

Watch Video Solution

53. The surface energy of a liquid drop is U . If it is sprayed into 125 identical drops , then the total surface energy will be

A. 20 U

B. 22 U

C. 5 U

D. 25 U

Answer: C

Watch Video Solution

54. If 64 raindrops combine into a single drop . The ratio of total surface energy of 64 drops to that of a single drop is ,

A. $64:1$

B. $3:1$

C. $16:1$

D. $4:1$

Answer: D

Watch Video Solution

55. The surface tension of a liquid is 0.5 N/m . If a liquid film is formed on a ring of area 0.02 m^2 then its surface energy will be

A. 0.01 J

B. 0.02J

C. 0.03J

D. 0.04 J

Answer: B

Watch Video Solution

56. A soap film in formed on a frame of area $4 \times 10^{-3} m^2$. If the area of the film in reduced to half, then the change in the potential energy of the film is (surface tension of soap solution $= 40 \times 10^{-3} N/m$)

A. 160J

B. 160×10^{-5}J

C. 80×10^{-6}J

D. 1.6×10^{-4}J

Answer: D

Watch Video Solution

57. The surface energy of a soap film formed on a frame of area $2 \times 10^{-3} m^2 is (T = 40 \times 10^{-3}$ N/m)

A. 16×10^{-5}J

B. 32×10^{-5}J

C. 16×10^{-4}J

D. 32×10^{4}J

Answer: A

Watch Video Solution

58. The surface energy of a liquid drop is E. It is sprayed into 1000 equal droplets. Then its surface energy becomes

A. $10E_s$

B. $E_s/2$

C. E_s

D. $1000E_s$

Answer: A

Watch Video Solution

59. The surface tension of soap solution is 10×10^{-2} n/m . The amount of work done in blowing a soap bubble of radius 2 cm is

A. 10.04×10^{-4}J

B. 10.4×10^{-5}J

C. 10.04×10^{-3}J

D. zero

Answer: A

Watch Video Solution

60. A spherical drop of oil of radius 1 cm is broken into 1000 droplets of equal radii. If the surface tension of oil is 50 dynes / cm , the work done is

A. 18π erg

B. 180π erg

C. 1800π erg

D. 18000π g

Answer: C

Watch Video Solution

61. Work W is required to form a bubble of volume V from a given solution. What amount of work is required to be done to form a bubble of volume $2V$?

A. W

B. $2^{1/3}W$

C. 2 W

D. $4^{1/3}W$

Answer: D

Watch Video Solution

62. The amount of work performed to break a spherical drop of radius 1 mm into million drops of equal radius , is

A. 9×10^{-5}J

B. 90×10^{-5}J

C. 9×10^{-6}J

D. 9×10^{-7}J

Answer: A

Watch Video Solution

63. A film is held on a ring of area 0.05 m^2 of liquid of surface tension 0.05 N/m then the surface energy is

A. 25 J

B. 0.01 J

C. 0.5 J

D. 25×10^{-4}J

Answer: D

Watch Video Solution

64. The work done is breaking a water drop of radius 1 cm into 64 equal droplets

(Surface tension of water is 0.07 N/m)

A. 1.6×10^{-4}J

B. 264×10^{-4}J

C. 2.64×10^{-4}J

D. 5.28×10^{-4}J

Answer: C

Watch Video Solution

65. The radius of a soap bubble is reduced rom 5 cm to 1 cm . Then the change in surface energy of the bubble is

A. 1×10^{-3}J

B. 1.2×10^{-3}J

C. 2.4×10^{-3}J

D. 2.8×10^{-3}J

Answer: B

Watch Video Solution

66. A thin soap film is formed in a recangular frame of area $15 \times 10^{-4} m^2$. The energy required to increase its area to $35 \times 10^{-4} m^2$

is

A. 6×10^{-5}J

B. 12×10^{-5}J

C. 20×10^{-4}J

D. 25×10^{-4}J

Answer: B

Watch Video Solution

67. A capillary tube is radius 0.02 cm is dipped vertically in a beaker containing mercury . The level of mercury in the tube with respect to the mercury level in the beaker will be

(Given density of mercury 13.5 g/cc ,Surface tension 540 dyne/cm and the angle of contact 135°)

A. 2.88 cm below

B. 2.88 cm above

C. 4.08cm below

D. 4.08 cm above

Answer: A

Watch Video Solution

68. A liquid film is formed over a ring of area $0.02 \times 10^{4} cm^{2}$. The surace energy is

(Given surface tension of liquid = 0.5 N/m)

A. 0.03 J

B. 0.01J

C. $0.02J$

D. 0.002 J

Answer: C

Watch Video Solution

Multiple Choice Questions Angle Of Contact

1. When a liquid is in contact with a solid the angle between the surface of the solid and the tangent drawn to the surface of the liquid at the point of contact , measured in the side of the liquid is

A. acute angle

B. obtuse angle

C. angle of contact for liquid pair

D. solid angle

Answer: C

Watch Video Solution

2. A liquid which partially wet the solid , the angle of contact is

A. obtuse

B. infinity

C. acute

D. zero

Answer: C

Watch Video Solution

3. A liquid will not wet the surface of a solid if the angle of contact is

A. acute

B. unity

C. obtuse

D. zero

Answer: C

Watch Video Solution

4. A liquid which completely wet the solid , the angle of contact is ,

A. infinite

B. any finite values

C. zero

D. not defined values

Answer: C

Watch Video Solution

5. For impure water - glass surface , the angle of contact is

A. $0^\circ \text{ to } 10^\circ$

B. 18°

C. 38°

D. 48°

Answer: A

Watch Video Solution

6. A liquid will not wet the surface of a solid if the angle of contact is

A. zero

B. less than 90°

C. more than 90°

D. 90°

Answer: C

Watch Video Solution

7. When liquid does not rises in a capillary tube , the angle of contact is

A. 0

B. obtuse

C. 90°

D. 180°

Answer: C

Watch Video Solution

8. The angle of contact is obtuse when liquid

A. does not wet the solid

B. partially wet the solid

C. wets the solid

D. wholly wet the solid

Answer: A

Watch Video Solution

9. The meniscus of mercury in the capillary tube is

A. concave

B. convex

C. plane

D. cylindrical

Answer: B

Watch Video Solution

10. The angle of contact for pure water and clean glass surface is

A. zero

B. 90°

C. 15°

D. 137°

Answer: A

Watch Video Solution

11. The angle of contact between liquid and solid does not depend upon

A. the nature of the liquid and solid

B. the angle of inclination to the solid liquid surface

C. the medium which exists below the free surface of the liquid

D. the cleanness and freshness of the two surface in contact

Answer: B

Watch Video Solution

12. A capillary tube of radius r is placed in a liquid I the angle of contact is θ , the radius of curvature R of the meniscus in the capillary is

A. r

B. $r \sin \theta$

C. $r / \cos \theta$

D. $r \cos \theta$

Answer: C

Watch Video Solution

13. The angle of contact between a solid and a liquid is a characteristic property of

A. solid only

B. liquid only

C. both the solid and liquid

D. shape of the solid

Answer: C

Watch Video Solution

14. A water proofing agent chages the angle of contact from

A. obtuse to acute value

B. acute to obtuse value

C. obtuse to $\pi/2$

D. acute to $\pi/2$

Answer: B

Watch Video Solution

15. Which one of the following represents correctly the variations of surface tension with temperature θ ?

A. $T \propto \theta$

B. $T \propto \theta^{-1}$

C. $T \propto \theta^2$

D. $T \propto \theta^{-2}$

Answer: B

Watch Video Solution

16. Nature of meniscus for liquid having angle of contact as 0° is

A. plane

B. parabolic

C. cylindrical

D. hemispherical

Answer: D

Watch Video Solution

17. A liquid rises in a capillary tube when the angle of contact is:

A. acute

B. obtuse

C. 90°

D. zero

Answer: A

Watch Video Solution

18. When a cylindrical tube is dipped vertically into a liquid the angle of contact is 140°. When the tube is dipped with an inclination of 40° the angle of contact is

A. 100°

B. 140°

C. 180°

D. 60°

Answer: B

Watch Video Solution

19. If the lower end of a capillary tube touches a liquid whose angle of contact is 90° , then the liquid

A. rises in to tybe

B. falls in the tube

C. may rise or fall in tube

D. neither rises nor falls inside the tube

Answer: D

Watch Video Solution

20. The liquid meniscus in a capillary tube will be convex, if the angle of contact is

A. greater than 90°

B. less than 90°

C. equal to 90°

D. equal to 0°

Answer: A

Watch Video Solution

21. If a glass rod is dipped in mercury and withdrawn out, the mercury does not wet the rod because

A. the angle of contact is small

B. cohesive force is greater than the adhesive force

C. cohesive force is less than the adhesive force

D. density of mercury is higher than that of glass

Answer: B

Watch Video Solution

22. Angle of contact varies between

A. $0 \quad \text{to} \quad 2\pi$

B. $\pi/2 \quad \text{to} \quad 3\pi/2$

C. $0 \quad \text{to} \quad \pi$

D. $\pi \quad \text{to} \quad 2\pi$

Answer: C

Watch Video Solution

23. A glass plate is partly dipped vertically in the mercury and the angle of contact is measured. If the plate is inclined, then the angle of contact will

A. increases

B. decreases

C. remains unchanged

D. first increases and then become constant

Answer: C

Watch Video Solution

24. The temperature of a liquid in a vessel is gradually raised the angle of contact

A. increases

B. remains unchanged

C. decreases

D. becomes zero

Answer: C

Watch Video Solution

25. An imaginary line is a drawn in a liquid surface . At what angle with the line , the surface tension acts ?

A. 0

B. 90°

C. 180°

D. 45°

Answer: A

Watch Video Solution

Multiple Choice Questions Shape Of Liquid Drop

1. Small droplets of a liquid are usually more spherical in shape than larger drops of the same liquid because

A. force of surface tension is equal and opposite to force of gravity

B. force of surface tension predominates the force of gravity

C. force gravity predominates the force of surface tension

D. force of gravity and surface tension are equal and in same direction

Answer: B

Watch Video Solution

2. If a water drop is kept between two glass plates, then its shape is

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

3. Drops of liquid tend to assume spherical shapes because

A. the surface tension free

B. the viscous force

C. the gravity effect

D. the elastic force

Answer: A

Watch Video Solution

4. When there are no external forces, shape of the liquid is determined by

A. surface tension of the liquid

B. density of the liquid

C. viscosity of air

D. temperature of air

Answer: A

Watch Video Solution

5. A mass of metal is molded into solids of different shapes . Its surface area is the least when it is

A. a sphere

B. a right circular cylinder

C. a paraboloid

D. a right circular cone

Answer: A

Watch Video Solution

6. If two soap bubble of different radii are in communication with each other

A. air flows from the larger bubble into smaller bubble until they have the same size

B. the size of the bubbles remains the same

C. air flows from smaller bubble into larger bubble and the larger size of the smaller bubble decreases

D. air may flow from the smaller into the larger or from the larger into smaller depending upon the concentration of the soap solution .

Answer: C

Watch Video Solution

7. Rain drops are sphrical because of

A. surface tension

B. capillarity

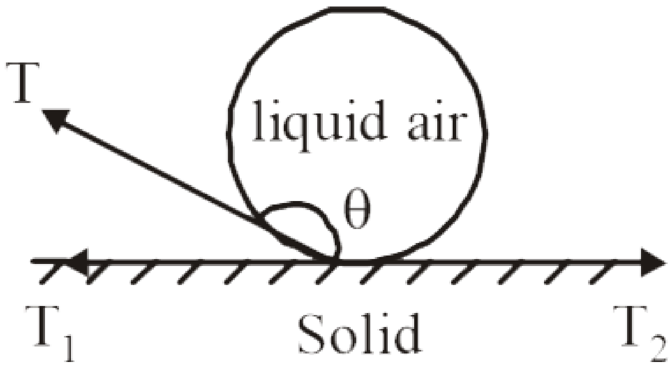
C. downward motion

D. acceleration due to gravity

Answer: A

Watch Video Solution

8. Let T_1 be surface tension between solid and air, T_2 be the surface tension between solid and liquid and T be the surface tension between liquid and air. Then in equilibrium, for a drop of liquid on a clean glass plate, the correct relation is (θ is angle of contact)



A. $\cos\theta = \dfrac{T}{T_1 + T_2}$

B. $\cos\theta = \dfrac{T}{T_1 - T_2}$

C. $\cos\theta = \dfrac{T_1 + T_2}{T}$

D. $\cos\theta = \dfrac{t_1 - T_2}{T}$

Answer: D

Watch Video Solution

9. If the liquid is mercury (drop) then

A. $T_2 < T_1$

B. $T_2 > T_1$

C. $T_1 = T_2$

D. $T = \frac{T_1 + T_2}{2}$

Answer: B

View Text Solution

10. Writing on black board with a piece of chalk is possible by the property of

A. cohesive force

B. adhesive force

C. surface tension

D. viscosity

Answer: B

Watch Video Solution

11. The work done in forming a soap film of size $10cm \times 10$ cm will be , it if the surface tension of soap solution is 3×10^{-2} N/m

A. 3×0^{-4}J

B. 3×10^{-2}J

C. 6×10^{-4}J

D. 6×10^{-3}J

Answer: C

Watch Video Solution

12. When a soap bubble is charged :-

A. it contracts

B. it expands

C. it does not under go any change in size

D. can not judge

Answer: B

Watch Video Solution

13. An astronaut tries to fill ink in an ink pen in an artificial satellite . The ink

A. will be filled into the pen

B. will not be filled

C. filling will depend upon the quality of ink

D. will fill slowly

Answer: B

Watch Video Solution

Multiple Choice Questions Capillarity And Capillary Action

1. Plants get water through the roots because of

A. elasticity

B. capillarity

C. viscosity

D. photosynthesis

Answer: B

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2. A tube of capillary whose lower end is dipped in liquid and the liquid rises to a height of 10 cm . If one end of a capillary of the same bore and height 5 cm is dipped in the liquid then

A. a fountain of the liquid will be obtained

B. the liquid will not rise in the tube at all

C. the liquid will rise up to the top and slowly creep

D. the liquid rises up to the top and stops

Answer: D

Watch Video Solution

3. If a capillary tube is dipped and the liquid levels inside and outside the tube are same. Then the angle of contact is

A. 17°

B. 0°

C. 90°

D. 138°

Answer: B

Watch Video Solution

4. It is difficult to write legibly on a news paper because of

A. capillarity

B. viscosity

C. surface tension

D. inhertia

Answer: A

Watch Video Solution

5. The reason of capillarity is due to

A. surface tension force

B. viscus force

C. gravitational force

D. capillary action

Answer: D

Watch Video Solution

6. The rise of liquid in a capillary tube depends on :

A. radius of capillary only

B. nature of liquid only

C. angle of contact only

D. radius , nature of liquid and angle of contact

Answer: D

Watch Video Solution

7. Capillary action is due to

A. difference in pressure of capillarity

B. due to cohesive force and adhesive force

C. due to gravitational force

D. more in a tube of a larger diameter

Answer: A

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8. In Acca lamp , oil rises through the wick , due to

A. viscosity

B. rigidity

C. capillarity

D. surface tension

Answer: C

Watch Video Solution

9. When two capillary tubes of different diameters are dipped vertically, the rise of the liquid is

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

Watch Video Solution

10. The cause of surface tension is

A. intermolecular forces

B. interatomic forces

C. viscous force

D. gravitational force

Answer: A

Watch Video Solution

11. When a capillary tube stands in water , water rises to a certain height in the tube . A similar experiment is done using another liquid and it is found that the liquid rises more than the water

This difference might be due to

A. the liquid has density greater than that of water

B. the tube used in the second experiment is larger bore

C. the temperature of the liquid is higher than that of water

D. the surface tension of liquid is greater than that of water

Answer: D

Watch Video Solution

12. How does ploughing help to retain some water of soil ?

A. by creatng capillaries

B. by breaking capillaries

C. by turning the soil upsides and down

D. can not judge from the above information

Answer: B

Watch Video Solution

13. A capillary is dipped into a liquid which does not wet , the liquid level

A. remains the same in capillary as normal liquid level

B. changes in the capillary

C. rises in he capillary than normal liquid

D. fall in the capillary than normal liquid level

Answer: D

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14. Kerosene oil rises up the wick in a lantern

A. diffusion of the oil through the wick

B. surface tension

C. buoyance force of air

D. the gravitational pull of the wick

Answer: B

Watch Video Solution

15. If a wax coated capillary tube is dipped in water, then water in it will-

A. rise up

B. depress

C. sometimes rise and sometimes fall

D. rise up and come out as a fountain

Answer: B

Watch Video Solution

16. A capillary tube is made of water proof material and is dipped in water taken in a beaker . The level of water in the capillary tube will be

A. equal to water level in the beaker

B. less than the water level in the beaker

C. more than the water level in the beaker

D. more than the water level in the beaker

Answer: A

Watch Video Solution

17. A square wire frame of L is dipped in a liquid, on taking out a membrane is formed. If the surface tension of liquid is T, force acting on the frame will be

A. 2 TL

B. 4 TL

C. 8 TL

D. 10 TL

Answer: C

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18. A capillary tube is dipped in a water container , so that loss in weight of the capillary tube is

A. equal to the upward buoyant force

B. less than upward buoyant force

C. more than the upward buoyant force

D. half of the buoyant force

Answer: A

Watch Video Solution

19. A capillary tube when immersed vertically in a liquid records a rise of 3cm.if the tube is immersed in the liquid at an angle of 60° with the vertical, then find the length of the liqiud column along the tube.

A. 3 cm

B. 4.5 cm

C. 6 cm

D. 7.5 cm

Answer: C

Watch Video Solution

20. If a vessel has a small hole at the bottom of radius 4 mm, then the rise of water in a vessel without leakage will be

(S.T = 72 dyne/cm , g = 1000 $\mathrm{cm/s}^2 \rho = 1g / cm^3$)

A. 0.36 cm

B. 0.367 m

C. 0.0367 cm

D. zero

Answer: A

Watch Video Solution

21. Two capillaries A and B are dipped in water and held vertical . The diameter of A is twice that of B . The ratio of the heights to which water rises in A and B is

A. $2:1$

B. $1:2$

C. $4:1$

D. $1:4$

Answer: B

Watch Video Solution

Watch Video Solution

22. f the surface tension of water is 7×10^{-2} N/m then the rise of water is 7×10^{-2} N/m then the rise of water in a capillary tube of diameter 0.35 mm will be

A. 4 cm

B. 2 cm

C. 8 cm

D. 3.5 cm

Answer: C

Watch Video Solution

23. A capillary tube when immersed vertically into a liquid records a rise of 3 cm . If the tube is held immersed in the liquid at an angle of 30° with the vertical , the liquid column along the tube will be

A. 3.464 cm

B. 3 cm

C. 4.5 cm

D. 7.5 cm

Answer: A

Watch Video Solution

24. A capillary tube is dipped in water and the water rises in it to a height h . If r be the radius of the bore of the tube , then

A. $h \propto r$

B. $h \propto 1/r$

C. $h \propto r^2$

D. $h \propto 1/r^2$

Answer: B

Watch Video Solution

25. Water rises in a capillary tube through a height l. If the tube is inclined to the liquid surface at 30° the liquid will rise in the tube upto it's length equal to

A. h/2

B. h

C. 2 h

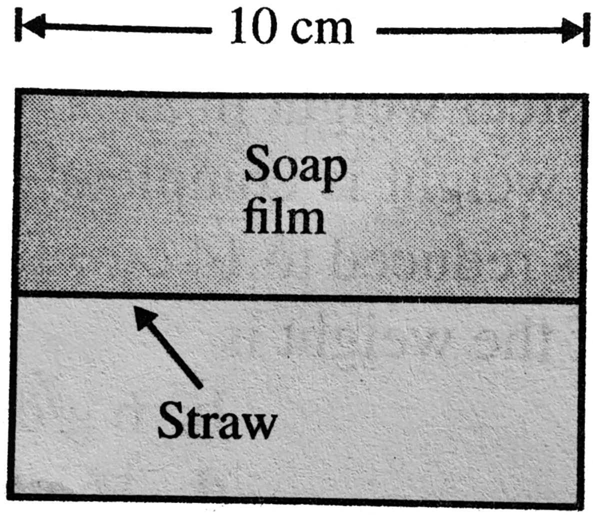
D. 4 h

Answer: C

Watch Video Solution

26. A soap film of surface tension $3 \times 10^{-2} N/m$ formed in a rectangular frame can support a straw as shown in Fig. If

$g = 10ms^{-2}$, the mass of the straw is



A. 0.66 g

B. 60 g

C. 6 g

D. 0.6 g

Answer: D

Watch Video Solution

27. Water rises to a height of 30 mm in a capillary tube , if the radius of the capillary tube is made $(3/4)^{th}$ of the previous value , then the height to which the water rise in the tube will be

A. 30 mm

B. 40 mm

C. 20 mm

D. 10 mm

Answer: B

View Text Solution

28. Water rises to height of 5 cm in glass capillary tube . If the area of cross section of the tube is reduced to $\left(\frac{1}{16}\right)$ th of the former value , the water rises to a height of

A. 20 cm

B. 30 cm

C. 80 cm

D. 40 cm

Answer: A

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29. In a capillary tube , water rises to a height of 4 cm If its cross section area were one forth , the water would have to rises a height of

A. 2 cm

B. 6 cm

C. 4 cm

D. 8 cm

Answer: D

Watch Video Solution

30. A liquid rises to a height of 9 cm in a glass capillary of radius 0.02 cm. What will be the height of the same liquid column in a glass capillary of radius 0.03 cm is

A. 13.5 cm

B. 9 cm

C. 6 cm

D. 12 cm

Answer: C

View Text Solution

31. A liquid rises in a capillary tube of radius r upto height h and tha mass of liquid is 20 gm . If a the radius of capillary tube is half and height is twice , then the new mass of a liquid will be ,

A. 10 gm

B. 80 gm

C. 20 gm

D. 40 gm

Answer: A

Watch Video Solution

32. Water rises to a height of 5 cm when a narrow glass tube is dipped vertically in it . If the tube is inclined at 60° to the vertical , then the rise of water in the capillary tube will be

A. 5 cm

B. 10 cm

C. 7.5 cm

D. 2.5 cm

Answer: B

Watch Video Solution

Multiple Choice Questions Expression For Surface Tension

1. The graph between the height of liquid in a capillary tube against the radius of the tube for a liquid , then the graph is

A. a straight line passing through origin with a positive slope

B. a straight line passing through origin with a negative slope

C. a rectangular hyperbola

D. a parabola

Answer: C

Watch Video Solution

2. The height of liquid column in capillary tube is h the radius of capillary tube is r.ρ is the density of liquid , g is acceleration due to gravity and θ is angle of contact . The surface

tension of the liquid is ,

A. $t = \frac{rh\rho g}{2\cos\theta}$

B. $T = \frac{2\cos\theta}{h\rho g}r$

C. $T = \frac{2\cos\theta}{r\rho hg}$

D. all of these

Answer: A

Watch Video Solution

3. It is possible to produce a fair stable vertical soap film solution but not of pure water . The correct reason is

A. the angles of contact are different

B. water is denser than soap solution

C. the surface tension of soap solution is less that of pure water

D. soap solution has larger surface tension than pure water

Answer: C

Watch Video Solution

4. Water rises in a capillary tube to a height h.

It will rise to a height more than h

A. on the surface of moon

B. in a stationary lift

C. at the poles of earth

D. in a lift moving up with an acceleration a

Answer: A

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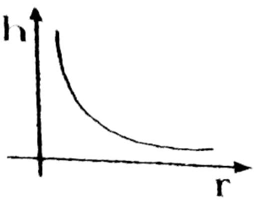
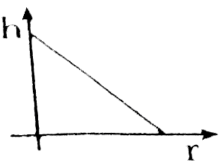
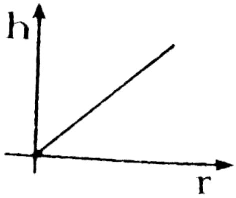
5. Which of the following graphs may represent the relation between capillary rise h and the radius r of the capillary

A. 

B. 

C. 

D. 

Answer: A

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6. A capilary tube is kept vertical and made to touch the surface of the liquid of surface tension T . If the radius of the capillary tube is 'r' . Then the force on the wall of the capillary tube is

A. $\pi r^2 T$

B. $2\pi rT$

C. $4\pi rT$

D. zero

Answer: C

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7. The rise of liquid in a capillary tube depends on :

A. the pressure outside the capillary

B. the inner radius of the tube

C. the outer radius

D. all of the above

Answer: B

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8. The height of water level in a capillary tube on the surface of earth is h . If the whole arrangemaent is taken to a gravity free space , the liquid level will

A. remain unchanged

B. decreases

C. increases a little

D. continous to rise

Answer: D

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9. A vertical U tube has two limbs of unequal radii are 5 cm and 0.1 respectively . The tube is partly filled with mercury of density 13.6 g/cm^3 and surface tension is 550 dyne /cm . Assume the two levels of the limbs is

A. zero

B. 1.1 cm

C. 1.61 cm

D. 0.4 cm

Answer: D

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10. If the liquid rises in a capillary tube of radius 0.1 mm to a height of 6 cm . The angle of contact between the glass and turpentine is 17° and density of is 870 kg/m^3 , g = 9.8 m/s^2 . Then the surface tension of turpentine is , (cos 17 = 0.9563)

A. 0.026 N/m

B. 2.6 N/m

C. 0.26 N/m

D. 2.6 dyne/cm

Answer: A

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11. If a liquid of specific fravity 1 , rises to a height of 2.5 cm in a capillary tube , then another liquid of specific gravity 1.25 will rise to the height in the same tube will be

A. 1 cm

B. 2 cm

C. 1.25 cm

D. 1.5 cm

Answer: B

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12. If a capillary tube of diameter 0.4 m is dipped vertically into water, then the height to which water rises in the capillary tube will be ,

A. 7.143 cm

B. $0.\ 013$ cm

C. 714.3 cm

D. 7143 cm s

Answer: A

Watch Video Solution

13. A capillary tube is ipped in water . It rises to height of 4 cm above the surroundings liquid . If the angle of caontact is zero and radius of tube is 0.4 mm , then the surface tension of liquid will be

A. 78.4 dyne/cm

B. 7.84 dyne / cm

C. 784 dyne/cm

D. 72 dyne/cm

Answer: A

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14. U - shaped film of a liquid is formed between a wire frame and movable wire 5 cm long. Then the force required to hold the wire in equilibrium is ,

(Surface tension of liquid is 0.024 N/m)

A. 2.4×10^{-3} N

B. 24×10^{-3} N

C. $2.\ 4 \times 10^{-3}$ dyne

D. 2.4×10^{-3} dyne/cm

Answer: A

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15. A capillary tube of uniform bore is dipped vertically in water which rises by 7 cm in tube . Then the radius of capillary tube is (S.T of water is 70 dyne/cm , g = 1000 $\mathrm{cm}/\mathrm{s}^2 \theta = 0^\circ$)

A. 0.2 mm

B. 2 mm

C. 0.2 cm

D. 2 cm

Answer: A

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16. A capillary tube of radius r is immersed in water and water rises in to a height h. The mass of water in the capillary tube is 5g. Another capillary tube of radius 2 r is immersed in water. The mass of water that will rise in this tube is

A. 5 g

B. 15 g

C. 10 g

D. 20 g

Answer: C

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17. Water rises to a height of $10cm$ in a capillary tube and mercury falls to a depth of $3.42cm$ in the same capillary tube. If the density of mercury is $13.6g/c.c.$ and the angles of contact for mercury and for water are 135° and 0°, respectively, the ratio of surface tension for water and mercury is

A. $1:0.15$

B. $1:3$

C. $1:6.8$

D. $1:5$

Answer: C

Watch Video Solution

18. A capillary tube of radius R is immersed in water and water rises in it to a height H . Mass of water in the capillary tube is . M If the radius of the tube is doubled, mass of water that will rise in the capillary tube will now be

A. 2 m

B. m

C. m/2

D. 4 m

Answer: A

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19. A U-shaped wire is dipped in a soap solution, and removed. A thin soap film formed between the wire and a light slider supports a weight of $1.5 \times 10^{-2} N$ (which includes the small weigh of the slider). The length of the slider is 30cm. What is the surface tension of the film?

A. 2×10^{-2} N/m,

B. 2.5×10^{-2} N/m

C. 3×10^{-2} N/m

D. 3.5×10^{-2} N/m

Answer: B

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20. If a capillary tube of radius 2×10^{-4} m is is dipped vertically in a water of surface tension 7×10^{-2} N/m and density $10^3 \mathrm{kg/m}^3$ then the height to which water rises will be

A. 7×10^{-2} cm

B. 0.7×10^{-2} cm

C. 14×10^{-2} cm

D. 1.4×10^{-2} cm

Answer: A

Watch Video Solution

21. Pure water rises in a capillary tube upto a height of 8 cm . If surface tension of water and acceleration due to gravity are 80 dyne/cm and 1000 cm/s^2 respectively , then the radius of capillary tube will be

A. 2 cm

B. 0.2 cm

C. 20 cm

D. 0.02 cm

Answer: D

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22. A capillary tube of internal radius 2×10^{-3} m immersed vertically in beaker containing a liquid rising in the capillary tube is 9×10^{5} kg , the surface tension of the liquid is

A. 70 N/m

B. 7 N/m

C. 0.7 N/m

D. 0.07N/m

Answer: D

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Watch Video Solution

23. The capillary rises are found to be in the ration of 3:2 when two capillary tubes are immersed in water of surface tension 7.2×10^{-2} N/m . The ratio of the bore diameters of the capillary tubes is

A. $2:3$

B. $3:2$

C. $4:9$

D. $9:4$

Answer: A

Watch Video Solution

24. A narrow capillary tube when dipped in beaker containing water, the rise is 20 cm . If the area of cross section of the bore is reduced to $(1/4)^{th}$ calue , water will rise to a height of

A. 10 cm

B. 20 cm

C. 40 cm

D. 80 cm

Answer: C

Watch Video Solution

25. The U-tabe with limbs of diameters 5 mm and 2 mm contains water of surface tension $7 \times 10^{-2} Nm^{-1}$. The angle of contact is zero and density $10^3 kgm^{-3}$. If g is $10 ms^{-2}$ then, the difference in levela in the twa limbs is

A. 8.4 cm

B. 8.4 mm

C. 8.4 m

D. 0.84 mm

Answer: B

Watch Video Solution

26. Water rises to a height of 2 cm in a capillary tube . If its diameter is made $(2/3)^{rd}$, the water will now rise to a height of

A. 6 cm

B. 3 cm

C. 2/3 cm

D. 3/2 cm

Answer: B

Watch Video Solution

27. Surface tension of water is 0.07 N/m . The weight of water supported by the surface tension in a capillary tube of radius 1×10^{-4} m will be

A. 440×10^{-6} N

B. 44×10^{-6}N

C. $4.4 \times 10^{-6} N$

D. $0.44 \times 1 - 0^{-6}$N

Answer: B

Watch Video Solution

28. If a capillary tube is 45° and 60° from the vertical then the ratoio of lengths l_1 and l_2 liquid columns in it will be

A. $1:\sqrt{2}$

B. $\sqrt{2}:1$

C. $2:1$

D. $1:4$

Answer: A

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29. Alcohol of density $8 \times 10^4 kg/m^3$ and surface tension 22×10^{-3} N/m rises through a capillary tube of diameter 0.4×10^{-3} m . The vertical height to which the alcohol will rise is ,

A. 28×10^{-4},m

B. 2.8×10^{-4}

C. 0.28×10^{-4}m

D. 0.28×10^{-4}m

Answer: B

Watch Video Solution

30. When water rises in a capillary tube of radius r to height h, then its potential energy U_1 if capillary tube of radius 2r is dipped in same water then potential energy of water is U_2 then $U_1 : U_2$ will be

A. $1:1$

B. $1:2$

C. $2:1$

D. $1:4$

Answer: A

Watch Video Solution

31. Water rises to a height h in a capillary tube when dipped vartically . If another capillary tube of the same material with half the bore cross section is dipped vertically rise of water in this case

A. 2h

B. h/2

C. $\sqrt{2}h$

D. $\dfrac{h}{\sqrt{2}}$

Answer: C

Watch Video Solution

32. Liquid drops are falling slowly one after the other from a vertical capillary tube of bore radius 'r' If W is weight of a liquid drop , surface tension of that liquid is

A. $W/\pi r^2$

B. $W/2\pi r^2$

C. $W/\pi r$

D. $W/2\pi r$

Answer: D

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33. A capillary tube is placed vertically inside the beaker of water of surface tension 7×10^{-2} N/m and the angle of contact is 0° .

The height raised by the water in capillary tube 7×10^{-2} m

The radius of the capillary tube is

A. 2×10^{-4}m

B. 0.2×10^{-4}m

C. 0.02×10^{-4}m

D. 0.002×10^{-4} m

Answer: A

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34. Water rises to a height of $10cm$ in a glass capillary tube. If the area of cross section of the tube is reduced to one fourth of the former value what is the height of water rise now?

A. 5 cm

B. 10 cm

C. 20 cm

D. 2 cm

Answer: C

Watch Video Solution

35. 1000 small drops of water each of radius 'r' are joined together to form a single drop of water During the process the change in energy has raised the temerature . If T is the surface tension of the water , d is density , the rise in temperature is

A. $\frac{100T}{Jr}$

B. $\frac{2.7T}{Jrd}$

C. $\frac{10T}{Jr}$

D. $\frac{T}{Jrd}s$

Answer: B

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36. Two capillary tubes of diameters 1 mm and 2 mm are dipped in water . The rise in water level in 1 mm tube is 1.4 cm . The rise in another tube will be

A. 1.4 cm

B. 0.7 cm

C. 2.8cm

D. 0.28 cm

Answer: B

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37. Two capillary tubes of radius 0.5 mm and 1 mm when dipped in a liquid of surface tension 49 dyne / cm vertically , it is observed that the liquid level difference is found to be 1.25 cm in the tubes . Then the density of the liquid will be $(\theta = 0^\circ)$

A. 0.08 g/cc

B. 0.8 g/cc

C. 0.04g/cc

D. 0.4g/c

Answer: B

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38. A clean plate of length 9.8 cm and thickness 0.2 m is in contact with the water . It appears to weigh 3000 dyne . When the plate is greasy and the angle of contact is 180° , it appears to weigh 6000 dyne . Then the surface tension is

A. 75 dyne/cm

B. 225 dyne/cm

C. 3000 dyne/cm

D. 750 dyne/cm

Answer: A

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39. A capillary tube of length 10 cm and diameter of the bore is 0.5 mm dipped inwater vertically with one fourth of its total length outside the water . The radius of curvature of the meniscus will be (T = 75 dyne/cm and g = 1000 cm/s^2)

A. 0.2 mm

B. $0.02mm$

C. $0.6mm$

D. $0.8mm$

Answer: C

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Multiple Choice Questions Excess Pressure Due To Surface Tension

1. The excess pressure inside a soap bubble is

A. inversely proportional to S.T

B. directly proportional to S.T

C. inversely proportional to its radius

D. both ' b' and 'c'

Answer: D

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2. The excess pressure inside the drop of a liquid of surface tension T and radius of drom r is

A. 4 T/r

B. 2T/r

C. r/2T

D. r/4T

Answer: B

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3. Internal pressure inside a liquid drop of radius r and surface tension T is

A. $\frac{2T}{r} - P_0$

B. $\frac{4T}{r} + P_0$

C. $P_0 + \frac{2T}{r}$

D. $\frac{T}{4r} - P_0$

Answer: C

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4. Excess pressure inside a soap bubble of radius r and surface tension T is

A. $\dfrac{2T}{r}$

B. $\dfrac{4T}{r}$

C. $\dfrac{T}{2r}$

D. $\dfrac{T}{4r}$

Answer: B

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5. Which of the following statement is not correct about a soap bubble ?

A. work done in forming the bubble of radius and surface tension T is $8\pi R^2 T$

B. work done in doubling the radius of a bubble of radius R and surface tension T is $24\pi R^2 t$

C. pressure inside a bubble is greater than inside a drop of the same radius and of same liquid

D. pressure inside a bubble is less than outside the bubble for same radius and surface tension

Answer: D

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6. When a drop of liquid splits upto a number of drops,

A. volume increases and area decreases

B. area increases and energy liberated

C. energy is absorbed

D. area increases and energy absorbed

Answer: D

Watch Video Solution

7. Excess pressure can be $(2T / R)$ for

A. spherical drop in air

B. spherical bubble in water

C. cylindrical bubble in air

D. spherical drop in air and spherical bubble in water

Answer: D

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8. Capillary does not exist when the liquid is at

A. its boiling point

B. its freezing point

C. the angle of contact is 45°

D. at its boiling and its frrzing points

Answer: D

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9. If for a liquid in a vessle, force of a cohesion is twice of adhession :

A. the meniscus will be concave

B. the angle of contact will be obtuse and there will be capillarity descent the liquid will wet the solid

C. no change in liquid level

D. no change in liquid level

Answer: B

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10. The oil is sprinkled on sea waves to calm them down. Why ?

A. surface tension of water decreases so that oil spreads over water

B. surface tension of water increases so that water spreads over

C. does not affect the surface tension

D. only water surface increases

Answer: A

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11. The hot soup taste better than cold soup , surface tension of hot soup is

A. greater than surface tension of cold soup

B. less than surface tension of cold soup so that

C. less than surface tension of cold soup so that hot soup spreads over larger area than cold soup.

D. equal to surface tension of cold soup so that hot soup spreads over larger area than cold sup.

Answer: C

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12. If more aire is pushed in a soap bubble the pressure in it

A. decreases

B. increases

C. remains the same

D. is zero

Answer: A

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13. The pressure just below the meniscus of mercury compared to pressure just above is

A. greater

B. less

C. same

D. always atmospheric

Answer: A

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14. Two tooth - pricks are floating very near and parallel to each other on the surface of water . If a third prick submerged in solution of detergent is touched with the water between the floating pricks , then the pricks

A. move farther away

B. come closer

C. remain in same position

D. are first attracted and then repelled

Answer: A

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15. If two soap bubbles of different radii are connected by a tube

A. air does not flow from one bubble to another

B. air flow from the bigger bubble to the smaller one

C. air flows from the smaller one to the bigger one

D. air flows from the bigger bubble to the smaller one till their radii are interchanged

Answer: B

Watch Video Solution

16. If more air is brown into a soap bubble , the pressure

A. increases

B. ramains same

C. decreases

D. become zero

Answer: C

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17. Excess pressure inside a drop of water of radius 2 mm , is 70 $\mathrm{N/m^2}$. The pressure in a drop of radius 4 mm is

A. $55N / m^2$

B. $35N / m^2$

C. $45n / m^2$

D. $25N / m^2$

Answer: B

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18. The excess pressure inside one soap bubble is three times that inside a second bubble. The ratio of the volume of first bubble to that of the second

A. $1:27$

B. $9:1$

C. $1:9$

D. $27:1$

Answer: A

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19. Two spherical soap bubbles of a radii 1 cm and 2 cm vacuum coalesce under isothermal conditions . The resultant bubble has a radius of

A. $2/\sqrt{5}$ cm

B. $\sqrt{5}$ cm

C. $\sqrt{3}$ cm

D. $\sqrt{6}$ cm

Answer: B

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20. Two capillary tubes of radii 0.2 cm and 0.4 cm are dipped in the same liquid. The ratio of height through which liquid will rise in the tube is

A. $1:2$

B. $1:4$

C. $2:1$

D. $1:4$

Answer: C

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21. Two separate air bubbles (radii $0.002cm$ and 0.004) formed of the same liquid (surface tension $0.07N/m$) come together to form a double bubble. Find the radius and the sense of curvature of the internal film surface common to both the bubbles.

A. 0.004 m

B. 0.04 m

C. 0.002 m

D. 0.02m

Answer: A

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22. A soap bubble in vacuum has a radius of $3cm$ and another soap bubble in vacuum has a radius of $4cm$. If the two bubbles coalesce under isothermal conditions then the radius of the new bubble is :

A. 12 cm

B. 16 cm

C. 25 cm

D. 5 cm

Answer: D

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23. What is pressure due to surface tension in spherical drop of glycerin of diameter 2.8 mm ? Surface tension of glycerin is 0.063 N/m

A. $70N/m^2$

B. $90N/m^2$

C. $80N/m^2$

D. $100N/m^2$

Answer: B

Watch Video Solution

24. A soap bubble of radius 10^{-2} m is formed . The surface tension of the soap bubble is 0.04 N/m The excess of pressure inside the bubble is

A. $160N/m^2$

B. $16N/m^2$

C. $1.6N/m^2$

D. $0.16N/m^2$

Answer: B

Watch Video Solution

25. The ratio of excess pressure inside a soap bubble to the excess of pressure inside an air bubble in a soap solution is

A. $1:2$

B. $2:1$

C. $1:1$

D. $1:4$

Answer: B

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26. If the surface tension of water is 7.3×10^{-2} N/m then the excess pressure inside a spherical drop of water of radius 1×10^{-3} m formed will be

A. $14.6N/m^2$

B. $146N/m^2$

C. $1460N/m^2$

D. $14600N/m^2$

Answer: B

Watch Video Solution

27. Pressure inside two soap bubble are 1.02 and 1.03 atm . Then ratio of their volumes is

A. $8:27$

B. $27:8$

C. $(1.02)^3:(1.03)^2$

D. $(1.03)^3:(1.02)^2$

Answer: B

Watch Video Solution

28. The spherical liquid bubble of diameter 4×10^{-3} m has inner and outer pressure as 1.005 and tension of the lquid of the liquid is

A. 250 N/m

B. 25N/m

C. 2.5N/m

D. 0.25 N/m

Answer: D

Watch Video Solution

29. Two soap bubble of radii 3 mm and 4 mm are in contact radius of curvature of interface between those two bubbles is

A. 1 mm

B. 7 mm

C. 12 mm

D. 12/7 mm

Answer: C

Watch Video Solution

30. Two soap bubbles of radii 1 mm and 2 mm merge isothermally . Then radius of the new bubble formed would be

A. 3 mm

B. 2/3 mm

C. 3/2 mm

D. $\sqrt{5}$ mm

Answer: D

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31. The excess pressure inside a soap bubble of volume V is P . Then excess pressure inside a soap bubble of volume 2V is

A. p

B. $2^{1/3}P$

C. $P/2^{1/3}$

D. P/1

Answer: C

Watch Video Solution

32. If the volume of two soap bubbles are V and 8V bubbles is

A. $1:4$

B. $4:1$

C. $1:2$

D. $2:1$

Answer: D

Watch Video Solution

33. The volumes of three soap bubbles are in the ratio of 27:64:125. Then ratio excess pressures in then is

A. $3 : 4 : 5$

B. $5 : 4 : 3$

C. $20 : 15 : 12$

D. $12 : 15 : 20$

Answer: C

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34. At $20^{\circ} C$ the radius of mercury drop is 3 mm and its surface tension is 4.65×10^{-1} N/m .What is the excess of pressure inside the drop ?

A. $310N/m^2$

B. $210N/m^2$

C. $110N/m^2$

D. $10N/m^2$

Answer: A

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35. What would be the excess pressure in side a small air bubble of 0.2 mm diameter situated just below the surface of water ? (S.T of water = 0.072 N/m)

A. 1.44×10^2 Pa

B. $1. .44 \times 10^3$Pa

C. 1.44×10^4Pa

D. 1.44×10^5Pa

Answer: B

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36. If the surface tension of a soap water is 0.04 N/m Then excess pressure inside a 10 mm diameter soap bubble in N/m^2 will be

A. 4

B. 16

C. 8

D. 32

Answer: D

Watch Video Solution

37. The rise of a liquid due to surface tension in a narrow capillary tube of diameter 'd' is 'h'

If the diameter is reduced to d/2 , the rise will be

A. h

B. 2h

C. h/2

D. h/3

Answer: B

Watch Video Solution

38. P is the excess pressure inside a water drop . If that drop is divided into 8 indentical droplets , excess pressure inside smaller droplet is

A. P

B. P/2

C. 2P

D. P/8

Answer: C

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39. The level of liquid in a capillary tube is plane,because

A. $F_{\text{adhesive}} = F_{\text{cohesive}}$

B. $F_{\text{adhesive}} > F_{\text{cohesive}}$

C. $F_{\text{adhesive}} < F_{\text{cohesive}}$

D. $F_{\text{adhesive}} = F_{cohesive / \sqrt{2}}$

Answer: D

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40. Two soap bubbles are blown. In first soap bubble excess pressure is 4 times of the second soap bubble. The ratio of the radii of the first and second soap bubble is

A. $1:4$

B. $1:2$

C. $2:1$

D. $4:1$

Answer: A

Watch Video Solution

41. The bubbles have radii in the ratio 3 : 4. the ratio of excess pressure inside them is

A. $4:3$

B. $3:4$

C. $2:1$

D. $4:1$

Answer: A

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42. A small air bubble of radius 0.1 mm is situated at a depth of 10 m below the free surface of water .The external pressure on the bubble will be

A. $0.5 \times 10^5 N/m^2$

B. $10^5 N/m^2$

C. $2 \times 10^5 N/m^2$

D. $4 \times 10^5 N/m^2$

Answer: C

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43. The exess pressure inside a drop of soap solution is Pd and that inside a soap bubble of same radius is P_d then

A. $P_d = P_b$

B. $P_b = 2P_d$

C. $P_d = 2P_b$

D. $P_b = 4P_d$

Answer: B

Watch Video Solution

44. If a small air bubble of radius 0.1 mm is formed just below the surface of water, then the pressure inside the air bubble will be

A. $14 \times 10^4 N / m^2$

B. $1.014 \times 10^5 N / m^2$

C. $1.014 \times 10^6 N / m^2$

D. $1.14 \times 10^{-5} N / m^2$

Answer: B

Watch Video Solution

45. Pressure inside two soap bubbles are 1.01 and 1.02 atmospheres. Ratio between their volumes is

A. $2:1$

B. $1:2$

C. $8:1$

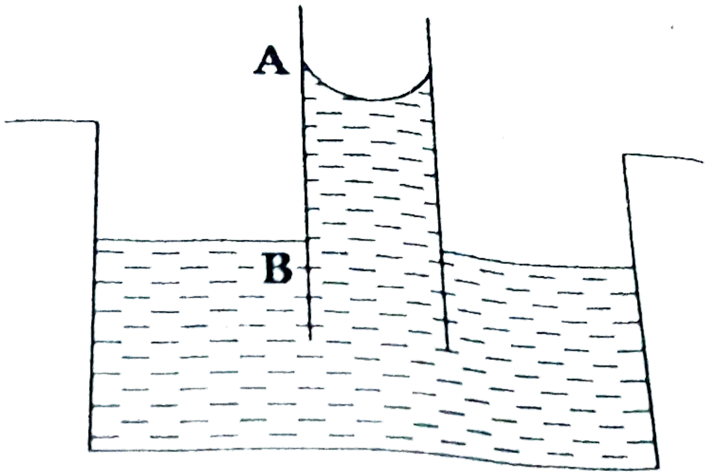
D. $1:8$

Answer: C

Watch Video Solution

46. When a capillary tube of radius r is dipped vertically in a liquid of surface tension T, the liquid rises to a height h in the tube above the level outside the tube . If the angle of contact is θ the density of the liquid is ρ then the pressure difference between the points A and

B is



A. $2Tr\cos\theta$

B. $\dfrac{2T\cos\theta}{r}$

C. $Tr\cos\theta$

D. $\dfrac{T\cos\theta}{r}$

Answer: B

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47. The excess pressure inside a soap bubble P and the radius R of the bubble are related as

A. $p \propto 1/R$

B. $P \propto R$

C. $P \propto R^2$

D. $P \propto 1/R^2$

Answer: A

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48. The excess pressure due to surface tension inside a spherical drop is 6 . If 27 such drops coalesce, the excess pressure inside the new drop is

A. $6N/m^2$

B. $18N/m^2$

C. $12N/m^2$

D. $2N/m^2$

Answer: D

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49. The surface tension of soap water is 0.04 N/m. The excess pressure inside a 10 mm diameter soap bubble in will be

A. 4

B. 8

C. 16

D. 32

Answer: D

Watch Video Solution

50. The excess pressure in dyne/ inside a liquid drop of radius 2 mm and fsurface tension T is

A. 5 T

B. 10 T

C. 15 T

D. 20 T

Answer: B

Watch Video Solution

51. A bubble of radius 10 cm is formed with a solution that has surface tention .What is the excess pressure inside the bubble in

A. 0.16

B. 16

C. 1.6

D. 10

Answer: C

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52. A hollow sphere has a small hole. When the sphere is taken to a depth of 0.5 m inside water the air bubbles started coming out from the hole. If the surface tension of water is the radius of the hole is

A. 2.8×10^{-5} m

B. 1.35×10^{-5}m

C. 0.67×10^{-5}m

D. 0.28×10^{-5}m

Answer: A

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53. An air bubble of radius 0.1 mm is ready to leave the surface of a lake. Then the pressure inside in N/m^2 is (Surface tension of water : 70×10^{-3} N/m, 1 atm = $1 \times 10^5 N/m^2$)

A. $1400 N/m^2$

B. $1.014 \times 10^5 N/m^2$

C. $14 N/m^2$

D. $1.014 \times 10^4 N / m^2$

Answer: D

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54. The excess pressure inside a soap bubble of diameter 2 cm of soap solution of surface tension

A. $100 N / m^2$

B. $10 N / m^2$

C. $1N / m^2$

D. $0.1N / m^2$

Answer: B

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55. In case of a liquid which does not wet a solid surface , the force of adhesion

A. less than $\sqrt{2}$ times the force of cohesion

B. more than $\sqrt{2}$ times the force of cohension

C. less than $1/\sqrt{2}$ times the force of cohension

D. more than $1/\sqrt{2}$ times the force of cohension

Answer: C

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56. The work done in increasing the radius of a soap bubble from R to 3 R is

A. $12\pi R^2 T$

B. $64\pi R^2 T$

C. $8\pi R^2 T$

D. $16\pi R^2 T$

Answer: B

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57. Select the correct statement , if a liquid surface is curved

A. the pressure on the concave side is less than that on the convex side

B. the pressure on the concave side is equal to pressure on convex side

C. the pressure on concave side is more than that on convex side

D. the pressure on the comvex side is atmospheric pressure

Answer: C

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58. If a drop of mercury , 2 mm in diameter is broken up into 1000 small spherical droplets all of the same size , then the work done in this process will be ,

A. 5.2×10^{-5}J

B. 52×10^{-5}J

C. 0.52×10^{-5}J

D. 520×10^{-5}J

Answer: A

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59. Water rises to a height of 16.3 cm in a capillary of height 18 cm above the water leve. If the tube is cut at a height of 12 cm -

A. water will come as a fountain from the capillary tube

B. water will stay at a height of 12 cm in the capillary tube

C. the height of water in the capillary tube will be 10.3 cm

D. water will flow down the sides of the capillary tube

Answer: B

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60. Two capi" ary tubes , A and B are dipped into a liquid which rises 8 cm and 4 cm respectively above the outside level . Compare the diameters of the tubes ,

A. $\frac{2}{1}$

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. $\frac{1}{8}$

Answer: C

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61. The force due to surface tension is

A. normal to free surface

B. normal to free surface downwards

C. along the free surface

D. at an angle of 60° with free surface

Answer: C

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62. How many free surfaces are there in a liquid film ?

A. one

B. two

C. three

D. infinite

Answer: B

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63. Calculate the force required to separate the glass plates of area $10^{-2} m^2$ with a film of water 0.05 mm thickness between them (surface tension of water $= 70 \times 10^{-3} N/m)$)

A. 28 N

B. 14 N

C. 50 N

D. 38 N

Answer: A

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64. A wooden stick 2m long is floating on the surface of water. The surface tension of water 0.07 N/m. By putting soap solution on one side of the sticks the surface tension is reduced to 0.06 N/m. The net force on the stick will be

A. 0.07 N

B. 0.06 N

C. 0.01N

D. 0.02N

Answer: D

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Multiple Choice Questions Question Given In Mht Cet

1. The surface tension of a liquid is 10^8 dyne cm^{-1}. It is equivalent to

A. 10^7 N/m

B. 10^6N/m

C. 10^5N/m

D. 10^4N/m

Answer: A

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2. A capillary tube when immersed vertically in a liquid records a rise of 3cm.if the tube is immersed in the liquid at an angle of 60° with the vertical, then find the length of the liqiud column along the tube.

A. 2 cm

B. 3 cm

C. 6 cm

D. 9 cm

Answer: C

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3. The rain are in spherical shape due to

A. surface tension of water is greater than the weight

B. capillary

C. downward motion

D. acceleration due to gravity

Answer: A

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4. Water can rise upto 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

A. overflow

B. form a convex surface

C. form a flat surface

D. form a concave surface

Answer: C

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5. When a liquid rises inside a capillary tube , the weight of the liquid in the tube is supported

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

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6. The height of water in a capillary tube os radius 2 cm is 4 cm . What should be the radius of capillary , if the water rises to 8cm in tube ?

A. 1 cm

B. 0.1 cm

C. 2 cm

D. 4 cm

Answer: A

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7. Two spherical soap bubbles of radii r_1 and r_2 in vacuume coalesce under isothermal condition. The resulting bubble has radius R such that

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

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8. Amount of energy required to blow a bubble radius 5 cm , is

A. 1.88 J

B. 1.88×10^{-1}J

C. 1.88×10^{-2} J

D. 1.88×10 J

Answer: C

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9. The dimensions of surface tension are

A. $\left[L\ \ \mathrm{M}\ \ T^{-1}\right]$

B. $\left[L^2\ \ \mathrm{M}\ \ T^{-2}\right]$

C. $\left[L^0\ \ \mathrm{M}\ \ T^{-2}\right]$

D. $\left[L^{-1}\ \ \mathrm{M}\ \ T^{-2}\right]$

Answer: C

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10. Two soap bubbles have radii in the ratio of $4:3$. What is the ratio of work done to blow these bubbles ?

A. $4:3$

B. $16:9$

C. $9:16$

D. $3:4$

Answer: B

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11. If the surface of a liquid is plane, then the angle of contact of the liquid with the walls of container is

A. acute angle

B. obtuse angle

C. 90°

D. 0°

Answer: C

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12. Work done is blowing a soap bubble of diameter 2 cm , is

A. 7.54×10^{-5} J

B. 7.54×10^{-6} J

C. 7.54×10^{3} J

D. 7.54 J

Answer: A

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13. The surface of water in contact with glass wall is

A. plane

B. concave

C. convex

D. both 'b' and 'c'

Answer: B

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14. Work done in forming a liquid drop of radius R is W_1 and that of radius 3R is W_2. The ratio of work done is

A. $1:3$

B. $1:4$

C. $1:2$

D. $1:9$

Answer: D

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15. For liquid to rise in a capillary tube , the angle of contact should be

A. obstuse

B. acute

C. 180°

D. 90°

Answer: B

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16. Out of the following , which is not an example of capillary action

A. absorption of ink in blotting paper

B. floating of wood on water surface

C. rise of oil in wick of a lamp

D. ploughing of the field

Answer: B

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17. If a liquid does not wet glass, its angle of contact is

A. obtuse

B. acute

C. 0°

D. 90°

Answer: A

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18. The surface tension of soap solution is 0.035 N/m . The energy needed to increase the radius of the bubble from 4 cm to 6 cm is

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

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19. A square frame of length L is immersed in soap solution and taken out. The force experienced by the square plate is

A. TL

B. 2 TL

C. 4 TL

D. 8 TL

Answer: D

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20. The potential energy of molecule on the surface of a liquid as compared to in side the liquid is

A. maximum

B. same

C. minimum

D. halved

Answer: A

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21. If NaCl is dissolved into water , then its surface tension

A. decreases

B. increases

C. first increases after decreases

D. no change

Answer: B

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22. Absorption of water by filter paper is due to

A. cohesion

B. capillarity

C. adhesion

D. elasticity

Answer: B

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23. S.I. Unit of surface tension is:

A. m/N

B. dyne/cm

C. $\dfrac{J}{m^2}$

D. J/m

Answer: C

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24. A spherical liquid drop of radius R is divided into eight equal droplets. If the surface tension is T, then the work done in this process will be

A. $8\pi R^2 T$

B. $3\pi R^2 T$

C. $4\pi R^2 T$

D. $2\pi R T^2$

Answer: C

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25. The potential energy of molecule on the surface of a liquid as compared to in side the liquid is

A. greater

B. less

C. equal

D. depending on the liquid , sometimes less, sometimes more

Answer: A

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26. n' droplets of equal of radius r coalesce to form a bigger drop of radius R. The energy liberated is equal to (T = Surface tension of water)

A. $4\pi R^2 T\left[n^{1/3} - 1\right]$

B. $4\pi r^2 T\left[n^{1/3} - 1\right]$

C. $4\pi R^2 T\left[n^{2/3} - 1\right]$

D. $4\pi r^2 T\left[n^{2/3}-1\right]$

Answer: A

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27. A big drop of radius R is formed by 1000 small droplets of water, then the radius of small drop is

A. 10 R

B. $\frac{R}{10}$

C. $\dfrac{R}{100}$

D. $\dfrac{R}{1000}$

Answer: B

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28. In which of the following substances , surface tension increases with increase in temperature ?

A. Copper

B. Molten copper

C. Iron

D. Molten iron

Answer: B

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29. The angle of contact for pure water and clean glass surface is

A. acute

B. obtuse

C. 90°

D. 0°

Answer: D

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30. A liquid rises to a height of 1.8 cm in a glass capillary A another glass capillary B having diameter 90% of capillary A is immersed in the same liquid the rise of liquid in capillary B is

A. 1.4 cm

B. 1.8 cm

C. 2.0 cm

D. 2.2 cm

Answer: C

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31. A large number of liquid drops each of radius 'a' coalesce to form a single spherical drop of radish b. The energy released in the process is converted into kinetic energy of the big drops formed. The speed of big drop will be

A. $\left[\frac{6T}{\rho}\left(\frac{1}{a}-\frac{1}{b}\right)\right]^{1/2}$

B. $\left[\frac{6T}{\rho}\left(\frac{1}{b}-\frac{1}{a}\right)\right]^{1/2}$

C. $\left[\frac{\rho}{6T}\left(\frac{1}{a}-\frac{1}{b}\right)\right]^{1/2}$

D. $\left[\frac{\rho}{6T}\left(\frac{1}{b}-\frac{1}{a}\right)\right]^{1/2}$

Answer: A

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