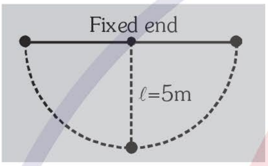
1. The breaking stress of steel is 15.8×10^8 N/m² and density is 7.9×10^3 kg/m³. What should be the maximum length of a steel wire so that it may not break under its own weight ?

(1) 2 km (2) 20 km (3) 1 km (4) 10 km

2. A mass of 4 kg is suspended from a steel wire of length 5 meter to form a pendulum arrangement. If the mass is moved to one side and released from the horizontal position of wire then find the maximum extension in the length of the wire.



(Given $Y_{steel} = 2 \times 10^{11}$ N/m² and area of cross–section of wire = 2 mm², g = 10 m/s²)

(1) 0.2 mm (2) 0.8 mm

(3) 1.5 mm (4) 0.9 mm

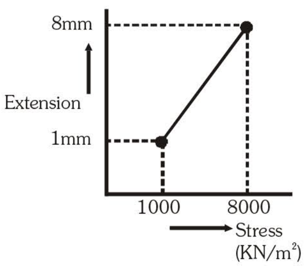
3. Young modulus of elasticity of brass is 10^{11} N/m². The increase in its energy on pressing a rod of length 0.2 m and cross–sectional area 4 cm² made of brass with a force of 40 N along its length, will be ....

(1) 4 μJ (2) 3 μJ (3) 2 μJ (4) 1 μJ

4. A fixed volume of iron is drawn into a wire of length ℓ. The extension produced in this wire by a constant force F is proportional to -

(1) $\frac{1}{\ell^2}$ (2) $\frac{1}{\ell}$ (3) ℓ^2 (4) ℓ

5. In determination of young's modulus of elasticity of wire, a force is applied and extension is recorded. Initial length of wire is '1m'. The curve between extension and stress is depicted then Young's modulus of wire will be :-



(1) 2×10^9 N/m² (2) 1×10^9 N/m²

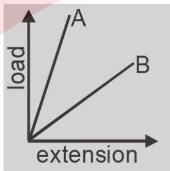
(3) 2×10^{10} N/m² (4) 1×10^{10} N/m²

6. One end of uniform wire of length L and of weight W is attached rigidly to a point in the roof and a weight W_1 is suspended from its lower end. If s is the area of cross-section of the wire, the stress in the wire at a height (L/4) from its lower end is

(1) $\frac{W_1}{s}$ (2) $\frac{\left[W_1 + \frac{W}{4}\right]}{s}$

(3) $\frac{\left[W_1 + \frac{3W}{4}\right]}{s}$ (4) $\frac{W_1 + W}{4}$

7. The dimensions of two wires A and B are the same. But their materials are different. Their load-extension graphs are shown. If Y_A and Y_B are the values of Young's modulus of elasticity of A and B respectively then



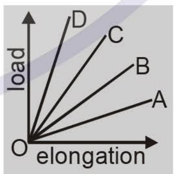
(1) $Y_A > Y_B$ (2) $Y_A < Y_B$

(3) $Y_A = Y_B$ (4) $Y_B = 2Y_A$

8. Two wires of the same material and length but diameters in the ratio 1 : 2 are stretched by the same force. The potential energy per unit volume for the two wires when stretched will be in the ratio.

(1) 16 : 1 (2) 4 : 1 (3) 2 : 1 (4) 1 : 1

9. The load versus elongation graph for four wires of the same material and same length is shown in the figure. The thinnest wire is represented by the line.



(1) OA (2) OB (3) OC (4) OD

10. Copper of fixed volume 'V; is drawn into wire of length 'l. When this wire is subjected to a constant force 'F', the extension produced in the wire is 'Δl. Which of the following graphs is a straight line ?

(1) Δl versus $\frac{1}{l}$ (2) Δl versus l^2

(3) Δl versus $\frac{1}{l^2}$ (4) Δl versus l

11. Two wires are made of the same material and have the same volume. The first wire has cross-sectional area A and the second wire has cross-sectional area 2A. If the length of the first wire is increased by Δl on applying a force 2F, how much force is needed to stretch the second wire by the same amount ?

(1) 8F (2) 6F (3) 4F (4) 2F

12. An increase in pressure required to decrease the 200 litres volume of a liquid by 0.004% in container is : (Bulk modulus of the liquid = 2100 MPa)

(1) 188 kPa 2) 8.4 kPa
(3) 18.8 kPa (4) 84 kPa

13. A ball falling in a lake of depth 400 m shows 0.01% decrease in its volume at the bottom. What is the bulk modulus of the material of the ball :

(1) 19.6×10^{8} N/m^2 (2) 39.2×10^{9} N/m^2
(3) 19.6×10^{10} N/m^2 (4) 19.6×10^{-8} N/m^2

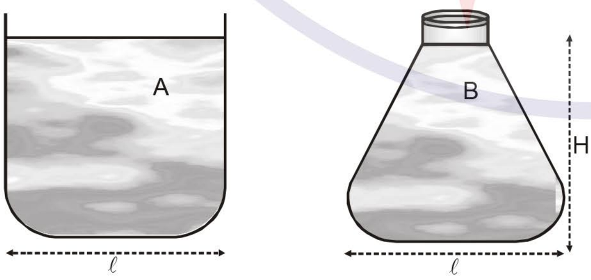
14. The bulk modulus of a spherical object is 'B'. If it is subjected to uniform pressure 'p', the fractional decrease in diameter is :-

(1) $\frac{B}{3p}$ (2) $\frac{3p}{B}$ (3) $\frac{p}{3B}$ (4) $\frac{p}{B}$

15. For a given material, the Young's modulus is 2.4 times that of rigidity modulus. Its Poisson's ratio is :

(1) 2.4 (2) 1.2 (3) 0.4 (4) 0.2

16. Two vessels A and B have the same base area and contain water to the same height, but the mass of water in A is four times that in B. The ratio of the liquid thrust at the base of A to that at the base of B is :-

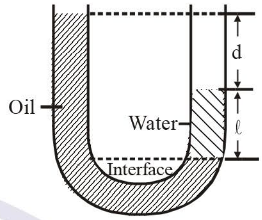


(1) 4 : 1 (2) 2 : 1
(3) 1 : 1 (4) 16 : 1

17. Hydraulic press is based upon

(1) Archimede's principle (2) Bernoulli's theorem
(3) Pascal's law (4) Reynold's number

18. A U-tube contains two liquids in static equilibrium: Water of density ρ_w (=1000 kg/m^3) is in the right arm, oil of unknown density ρ is the left arm as shown in figure. Measurement give ℓ = 135 mm and d = 12.5 mm. The density of oil is :-



(1) 1092 kg/m^3 (2) 961 kg/m^3
(3) 915 kg/m^3 (4) 843 kg/m^3

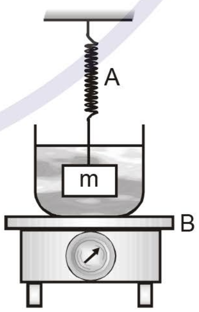
19. A 800 g solid cube having an edge of length 10 cm floats in water. What volume of the cube is outside water ?

(1) 200 cm^3 (2) 300 cm^3
(3) 500 cm^3 (4) 800 cm^3

20. A sphere is floating in water its 2/3rd part is outside the water and when sphere is floating in unknown liquid, its $\frac{3}{4}$th part is outside the liquid then density of liquid is

(1) 4/9 gm/c.c. (2) 9/4 gm/c.c.
(3) 4/3 gm/c.c. (4) 3/8 gm/c.c.

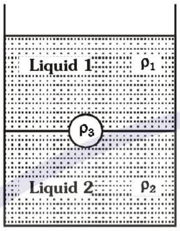
21. The spring balance A read 2 kg. with a block m suspended from it. A balance B reads 5 kg. when a beaker with liquid is put on the pan of the balance. The two balances are now so arranged that the hanging mass is inside the liquid in the beaker as shown in fig. In this situation :–



(1) The balance A will read more than 2 kg.
(2) The balance B will read more than 5 kg.
(3) The balance A will read less than 2 kg. and B will read more than 5 kg.
(4) The balance A and B will read 2 kg. and 5 kg. respectively.

22. A jar is filled with two non-mixing liqudis 1 and 2 having densities ρ_1 and ρ_2, respectively.

A solid ball, made of a material of density ρ_3, is dropped in the jar. It comes to equilibrium in the position shown in the figure. Which of the following is true for ρ_1, ρ_2 & ρ_3



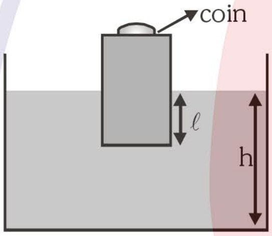
(1) $\rho_3 < \rho_1 < \rho_2$

(2) $\rho_1 > \rho_3 > \rho_2$

(3) $\rho_1 < \rho_2 < \rho_3$

(4) $\rho_1 < \rho_3 < \rho_2$

23. A wooden block, with a coin placed on its top, floats in water as shown in figure. The distance ℓ and h are shown there. After sometime the coin falls into the water. Then :–



(1) ℓ decreases and h increases
(2) ℓ increases and h decreases
(3) both ℓ and h increase
(4) both ℓ and h decrease

24. An object of weight W and density ρ is submerged in a fluid of density ρ_1. Its appearent weight will be

(1) $W(\rho - \rho_1)$ (2) $\frac{(\rho - \rho_1)}{W}$

(3) $W\left(1 - \frac{\rho_1}{\rho}\right)$ (4) $W(\rho_1 - \rho)$

25. A wooden block is taken to the bottom of a lake of water and then released. it rise up with a

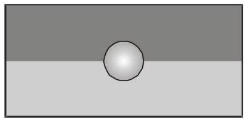
(1) Constant acceleration

(2) Decreasing acceleration

(3) Constant velocity

(4) Decreasing velocity

26. A solid uniform ball having volume V and density ρ floats at the interface of two immiscible liquids as shown in figure.



The densities of the upper and the lower liquids are ρ_1 and ρ_2 respectively, such that $\rho_1 < \rho < \rho_2$. What fraction of the volume of the ball will be in the lower liquid :–

(1) $\frac{\rho - \rho_2}{\rho_1 - \rho_2}$ (2) $\frac{\rho_1}{\rho_1 - \rho_2}$

(3) $\frac{\rho_1 - \rho}{\rho_1 - \rho_2}$ (4) $\frac{\rho_1 - \rho_2}{\rho_2}$

27. Two syringes of different cross section (without needes) filled with water are connected with a tightly fitted rubber tube filled with water. Diameter of smaller and larges piston are 1.0 cm and 3.0 cm respectively. Find the force exerted on the larger piston when a force of 10 N is applied to the smaller piston.

(1) 10 N (2) 30 N (3) 90 N (4) 60 N

28. The cylindrical tube of a spray pump has a radius R, one end of which has n fine holes, each of radius r. If the speed of flow of the liquid in the tube is v, the speed of ejection of the liquid through the hole is :-

(1) $\frac{v}{n}\left(\frac{R}{r}\right)$ (2) $\frac{v}{n}\left(\frac{R}{r}\right)^{1/2}$

(3) $\frac{v}{n}\left(\frac{R}{r}\right)^{3/2}$ (4) $\frac{v}{n}\left(\frac{R}{r}\right)^{2}$

29. The cylindrical tube of a spray pump has radius R, one end of which has n fine holes, each of radius r. If the speed of the liquid in the tube is V, the speed of the ejection of the liquid through the holes is :-

(1) $\frac{V^2R}{nr}$ (2) $\frac{VR^2}{n^2r^2}$

(3) $\frac{VR^2}{nr^2}$ (4) $\frac{VR^2}{n^3r^2}$

30. Fire is caught at height of 125 m from the fire brigade. To extinguish the fire, water is coming out from the pipe of cross section 12.8 cm with rate 3800 litre/min. Find out minimum velocity of water exiting from fire brigade tank ($g = 10 m/s^2$)

(1) 5 m/s (2) 10 m/s (3) 25 m/s (4) 50 m/s

31. Water from a tap emerges vertically downwards with an initial speed of 5.0 m/s. The cross–sectional area of tap is 10^{-4} m². Assume that the pressure is constant throughout the stream of water and that the flow is steady, the cross–sectional area of stream 3.75 m below the tap is :–

(1) 5.0×10^{-4} m²

(2) 1.0×10^{-4} m²

(3) 5.0×10^{-5} m²

(4) 2.0×10^{-5} m²

32. A wind with speed 40 m/s blows parallel to the roof of a house. The area of the roof is 250 m². Assuming that the pressure inside the house is atmospheric pressure, the force exerted by the wind on the roof and the direction of the force will be: ($\rho_{air} = 1.2$ kg/m³)

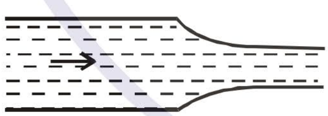
(1) 4.8×10^5 N, upwards

(2) 2.4×10^5 N, upwards

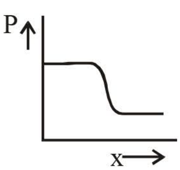
(3) 2.4×10^5 N, downwards

(4) 4.8×10^5 N, downwards

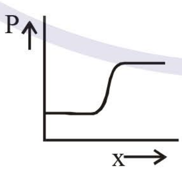
33. Water flows through a frictionless duct with a cross-section varying as shown in figure. Pressure P at points along the axis is represented by



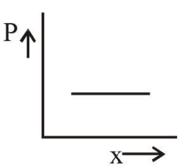
(1)



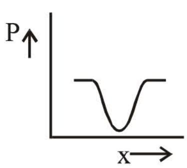
(2)



(3)



(4)

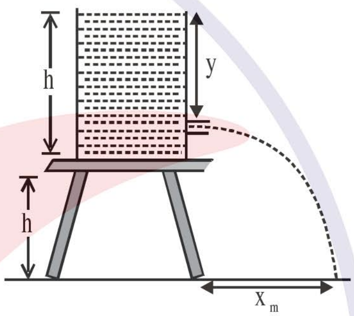


34. The flow speeds of air on the lower and upper surfaces of the wing of an aeroplane are v and $\sqrt{5}$ v respectively. The density of air is ρ and surface area of wing is A. The dynamic lift on the wing is :

(1) $\rho v^2 A$ (2) $\sqrt{2}\, \rho v^2 A$

(3) $(1/2)\, \rho v^2 A$ (4) $2\rho v^2 A$

35. A tank is filled upto a height h with a liquid and is placed on a platform of height h fromt he ground To get maximum range x_m a small hole is punched at a distance of y from the free surface of the liquid. Then :-



(1) $x_m = 3h$ (2) $x_m = 1.5h$

(3) $y = h$ (4) $y = 0.75$ h

36. A tank of height 5 m is full of water. There is a hole of cross sectional area 1 cm² in its bottom. The initial volume of water that will come out from this hole per second is

(1) 10^{-3} m³/s (2) 10^{-4} m³/s

(3) 10 m³/s (4) 10^{-2} m³/s.

37. Scent sprayer is based on

(1) Charle's law

(2) Archimede's principle

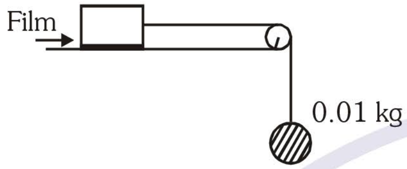
(3) Boyle's law

(4) Bernoulli's theorem

38. A large open tank has two holes in the wall. One is a square hole of side L at a depth y from the top and the other is a circular hole of radius R at a depth 4y from the top. When the tank is completely filled with water, the quantities of water flowing out per second from the holes are both same. Then, R is equal to :–

(1) $\frac{L}{\sqrt{2\pi}}$ (2) $2\pi L$ (3) L (4) $\frac{L}{2\pi}$

39. A metal block of film area 0.10 m^2 is connected to a 0.010 kg mass via a string that passes over an ideal pulley (considered massless & frictionless). A liquid with a film thickness of 0.30 mm is placed between the block and the table. When released the block moves to the right with a constant speed of 0.085 m/s. Find the coefficient of viscosity of the liquid. ($g = 9.8\ m/s^2$)



(1) 6×10^{-2} Pa.s (2) 3.45×10^{-5} Pa.s
(3) 3.45×10^{-3} Pa.s (4) 3.45×10^{-6} Pa.s

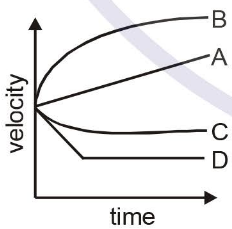
40. A square plate of 1m side moves parallel to a second plate with velocity 4 m/s. A thin layer of water exists between plates. If the viscous force is 2 N and the coefficient of viscosity is 0.01 poise then find the distance between the plates in mm.

(1) 2 mm (2) 4 mm (3) 6 mm (4) 8 mm

41. An air bubble of radius 1 mm is allowed to rise through a long cylindrical column of a viscous liquid of radius 5 cm and travels at a steady rate of 2.1 cm per second. If the density of the liquid is 1.47 g/cc, find its viscosity. Assume $g=980\ cm/s^2$ and neglect the density of air.

(1) 2 poise (2) 3 poise
(3) 4 poise (4) 1.52 poise

42. A small ball is left in a viscous liquid from very much height. Correct graph of its velocity with time after it enters in liquid is :



(1) A (2) B (3) C (4) D

43. A small drop of water falls from rest through a large height h in air. The final velocity is

(1) almost independent of h
(2) proportional to $\sqrt{h}$
(3) proportional to h
(4) inversely proportional to h

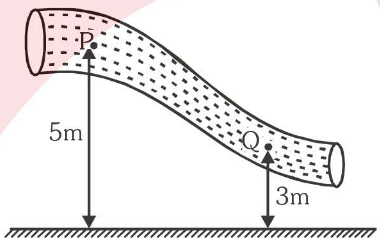
44. If the terminal speed of a sphere of gold (density = 19.5 kg/m^3) is 0.2 m/s in a viscous liquid (density = 1.5 kg/m^3), find the terminal speed of a sphere of silver (density=10.5 kg/m^3) of the same size in the same liquid.

(1) 0.4 m/s (2) 0.133 m/s
(3) 0.1 m/s (4) 0.2 m/s

45. If a ball of steel (density $\rho = 7.8\ g\ cm^{-3}$) attains a terminal velocity of 10 cm s^{-1} when falling in a tank of water (coefficient of viscosity $\eta_{water} = 8.5 \times 10^{-4}$ Pa.s) then its terminal velocity in glycerine ($\rho = 1.2\ g\ cm^{-3}$, $\eta = 13.2$ Pa.s) would be nearly :-

(1) 1.6×10^{-5} cm s^{-1} (2) 3.98×10^{-4} cm s^{-1}
(3) 6.25×10^{-4} cm s^{-1} (4) 1.5×10^{-5} cm s^{-1}

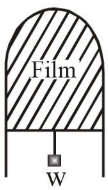
46. A non-viscous fluid of constant density of 1000 kg/m^3 flows in a stream line motion along a tube of variable cross-section.



The area of cross-section at two P and Q at lengths 5 m and 3 m are 80 cm^2 and 40 cm^2 respectively. If velocity of fluid at P is 3 m/s then find velocity of fluid at Q.

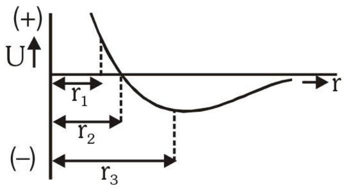
(1) 3 m/s (2) 4 m/s
(3) 5 m/s (4) 6 m/s

47. A thin liquid film formed between a U-shaped wire and a light slider supports a weight of 1.5×10^{-2} N (see figure). The length of the slider is 60 cm and its weight negligible. The surface tension of the liquid film is :-



(1) 0.025 Nm^{-1} (2) 0.0125 Nm^{-1}
(3) 0.1 Nm^{-1} (4) 0.05 Nm^{-1}

48. The potential energy U of two atoms of a diatomic molecule as a function of distance r between the atoms is shown in the given figures.



Read the following statements carefully.

A. The equilibrium separation distance between the atoms is equal to r_2.

B. At $r = r_1$, the force between the atoms is repulsive.

C. For $r > r_3$, the force between the atoms is attractive.

Which of the above statements is true ?

(1) A only (2) B only
(3) C only (4) B and C

49. Spiders and insects move and run about on the surface of water without sinking because :

(1) Elastic membrane is formed on water due to propery of surface tension
(2) Spiders and insects are ligther
(3) Spiders and insects swim on water
(4) Spiders and insects experience up-thrust

50. Adding detergents to water helps in removing dirty greasy stains. This is because

(a) It increases the oil-water surface tension
(b) It decreases the oil-water surface tension
(c) It increases the viscosity of the solution
(d) Dirt is held suspended surrounded by detergent molecules

(1) (b) and (d) (2) (a) only
(3) (c) and (d) (4) (d) only

51. Find the work done in increasing the volume of a soap bubble by 700% if its radius is R and surface tension is T.

(1) $24\pi R^2T$ (2) $12\pi R^2T$
(3) $6\pi R^2T$ (4) πR^2T

52. Two small drops of mercury, each of radius R, coalesce to form a single large drop. The ratio of the total surface energies before and after the change is :–

(1) $1 : 2^{1/3}$ (2) $2^{1/3} : 1$
(3) $2 : 1$ (4) $1 : 2$

53. Consider a soap film on a rectangular frame of wire of area $5 \times 5\ cm^2$. If the area of the soap film is increased to $6 \times 5\ cm^2$, the work done in the process will be (The surface tension of the soap film is 3×10^{-2} N/m)

(1) 12×10^{-6} J (2) 24×10^{-6} J
(3) 30×10^{-6} J (4) 96×10^{-6} J

54. A liquid drop of diameter D breaks into 27 tiny drops. The resultant change in energy is –

(1) $2\pi TD^2$ (2) $4\pi TD^2$
(3) πTD^2 (4) None of these

55. If the surface tension of a liquid is T and its surface area is increased by A, then the surface energy of that surface will be increased by –

(1) AT (2) A/T (3) A^2T (4) A^2T^2

56. The excess pressure inside a soap bubble A is twice that in another soap bubble B. The ratio of volumes of A and B is

(1) 1 : 2 (2) 1 : 4 (3) 1 : 8 (4) 1 : 16

57. A certain number of sphereical drops of a liquid of radius 'r' coalesce to form a single drop of radius 'R' and volume 'V'. If 'T' is the surface tension of the liquid, then :

(1) energy $= 4VT\left(\frac{1}{r}-\frac{1}{R}\right)$ is released

(2) energy $= 3VT\left(\frac{1}{r}+\frac{1}{R}\right)$ is absorbed

(3) energy $= 3VT\left(\frac{1}{r}-\frac{1}{R}\right)$ is released

(4) Energy is neither released nor absorbed

58. Consider a soap film on a rectangular frame of wire of area $4\times4\ cm^2$. If the area of the soap film is increased to $4 \times 5 cm^2$, the work done in the process will be (The surface tension of the soap film is 3×10^{-2} N/m)

(1) 12×10^{-6} J (2) 24×10^{-6} J
(3) 60×10^{-6} J (4) 96×10^{-6} J

59. A rectangular film of liquid is extended from (7 cm × 2 cm) to (5 cm ×4 cm). If the work done is 1.5×10^{-4} J, the value of the surface tension of the liquid is :-

(1) 0.2 Nm^{-1} (2) 8.0 Nm^{-1}

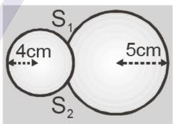
(3) 0.250 Nm^{-1} (4) 0.125 Nm^{-1}

60. If the difference between pressure inside and outside of a soap bubble is 4 mm of water and its radius is 16 mm. What is the surface tension in dynes per cm.

(1) 117.6 (2) 256

(3) 378 (4) 160

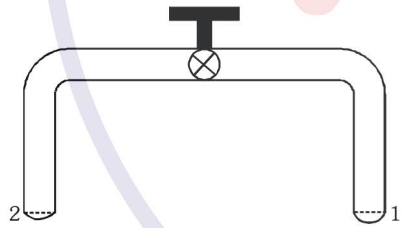
61. Two soap bubbles of radii r_1 and r_2 equal to 4cm and 5 cm are touching each other over a common surface S_1S_2 (shown in figure). Its radius will be :–



(1) 4 cm. (2) 20 cm.

(3) 5 cm. (4) 4.5 cm.

62. A glass tube of uniform internal radius (r) has a valve separating the two identical ends. Initially, the valve is in a tightly closed position.



End 1 has a hemispherical soap bubble of radius r. End 2 has sub–hemispherical soap bubble as shown in figure. Just after opening the valve,

(1) Air from end 1 flows towards end 2. No change in the volume of the soap bubbles.

(2) Air from end 1 flows towards end 2. Volume of the soap bubble at end 1 decreases.

(3) No change occurs

(4) Air from end 2 flows towards end 1. Volume of the soap bubble at end 1 increases.

63. Shape of meniscus for a liquid of zero angle of contact is -

(1) plane (2) parabolic

(3) hemi-spherical (4) cylindrical

64. Three liquids of densities ρ_1, ρ_2 and ρ_3 (with $\rho_1 > \rho_2 > \rho_3$), having the same value of surface tension T, rise to the same height in three identical capillaries. The angles of contact θ_1, θ_2 and θ_3 obey:-

(1) $\frac{\pi}{2} < \theta_1 < \theta_2 < \theta_3 < \pi$

(2) $\pi > \theta_1 > \theta_2 > \theta_3 > \frac{\pi}{2}$

(3) $\frac{\pi}{2} > \theta_1 > \theta_2 > \theta_3 \geq 0$

(4) $0 \leq \theta_1 < \theta_2 < \theta_3 < \frac{\pi}{2}$

65. On dipping one end of a capillary in a liquid and inclining the capillary at angles 37° and 60° with the vertical, the lengths of liquid columns in it are found to be ℓ_1 and ℓ_2 respectively. Find the ratio of ℓ_1 and ℓ_2 ?

(1) 4/5 (2) 8/5 (3) 5/8 (4) 1/2

66. When a capillary tube is dipped inside water, water rises inside the capillary tube up to 0.030 m. If the surface tension of water is 75×10^{-3} N/m calculate the radius of the capillary tube ?

(1) 0.5 mm (2) 2 mm

(3) 1 mm (4) 4 mm

67. If a capillary of radius r is dipped in water, the height of water that rises in it is h and its mass is M. If the radius of the capillary is doubled the mass of water that rises in the capillary will be

(1) 4M (2) 2M (3) M (4) $\frac{M}{2}$

68. A liquid flows through two capillary tubes connected in series. Their lengths are ℓ and 2ℓ and radii r and 2r respectively, then the pressure difference across the first and second tubes are in the ratio......

(1) 4 : 1 (2) 8 : 1

(3) 16 : 1 (4) 64 : 1

69. In a capillary tube experiment, a vertical 50 cm long capillary tube is dipped in water. The water rises up to a height of 20 cm due to capillary action. If this experiment is conducted in a freely falling elevator, the length of the water column becomes :

(1) 50 cm (2) 20 cm (3) 30 cm (4) Zero

70. On dipping a capillary of radius 'r' in water, water rises upto a height H and potential energy of water is u_1. If a capillary of radius 2r is dipped in water, then the potential energy is u_2. The ratio $\frac{u_1}{u_2}$ is

(1) 2 : 1 (2) 1 : 2 (3) 4 : 1 (4) 1 : 1

71. A capillary tube of radius r can support a liquid of weight 6.28×10^{-4} N. If the surface tension of the liquid is 5×10^{-2} N/m. The radius of capillary must be :-

(1) 2×10^{-3} m (2) 2×10^{-4} m

(3) 1.5×10^{-3} (4) 12.5×10^{-4} m

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**3**	**1**	**3**	**2**	**2**	**1**	**1**	**1**	**2**	**1**	**4**	**2**	**3**	**4**
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**3**	**3**	**1**	**3**	**3**	**4**	**4**	**3**	**1**	**3**	**3**	**4**	**3**	**1**
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	**3**	**2**	**1**	**4**	**3**	**1**	**4**	**1**	**3**	**1**	**4**	**3**	**1**	**3**	**3**
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**4**	**2**	**4**	**1**	**1**	**1**	**2**	**3**	**1**	**1**	**3**	**3**	**2**	**4**	**4**
Que.	61	62	63	64	65	66	67	68	69	70	71				
Ans.	**2**	**2**	**3**	**4**	**3**	**1**	**2**	**2**	**1**	**4**	**1**				