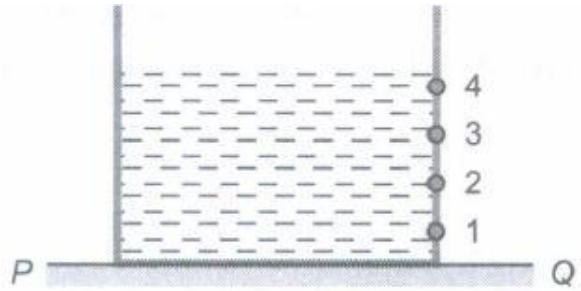
NEET PHYSICS PRACITCE PAPER

Time : 60 Mins **7 PROPERTIES OF BULK MATTER 1** **Marks : 200**

1. The cylinder is placed in a lift which is moving upwards with an acceleration a, then the pressure on the bottom is:
   a) hdg b) $\frac{1}{2}$ hdg c) hd(g + a) d) hd(g -a)
2. The average depth of Indian ocean is about 3000 m. The fractional compression, $\frac{\triangle V}{V}$ of water at the bottom of the ocean (given that the bulk modulus of the water =2.2x 10^9N m^{-2} and g=10ms^{-2})is:
   a) 0.82% b) 0.91% c) 1.36% d) 1.24% e) 1.52%
3. If two liquids of same masses but different densities p_1 and p_2 respectively are mixed, then density of mixture is given by:
   a) $p = \frac{p_1+p_2}{2}$ b) $p = \frac{p_1+p_2}{2p_1p_2}$ c) $p = \frac{2p_1p_2}{p_1+p_2}$ d) $p = \frac{p_1p_2}{p_1+p_2}$
4. One poise is:
   a) 1 dyne sec/cm^2 b) 1/98.1 kg-f-sec/m^2 c) 10^{-1} kg/m-sec d) any of these
5. An open vessel containing water is given a constant acceleration a in the horizontal direction. Then, the free surface of water gets sloped with the horizontal at an angle θ given by:
   a) $\theta = tan^{-1}(\frac{a}{g})$ b) $\theta = tan^{-1}(\frac{g}{a})$ c) $\theta = sin^{-1}(\frac{a}{g})$ d) $\theta = cos^{-1}(\frac{g}{a})$
6. An incompressible fluid flows steadily through a cylindrical pipe which has radius 2R at point A and radius R at point B further along the flow direction. If the velocity at point A is v, its velocity at point B will be:
   a) 2v b) v c) v/2 d) 4v
7. A force of 6 x 10^6 Nm^{-2} is required for breaking a material. The density p of the material is 3 x 10^3 kg $m^{-3.}$ If the wire is to break under its own weight, the length of the wire made of that material should be (Taking g = 10 ms^{-2})
   a) 20 m b) 200 m c) 100 m d) 2000 m
8. A piece of solid weighs 120 g in air, 80 g in water and 60 g in a liquid. The relative density of the solid and that of the liquid are respectively:
   a) 3,2 b) 2,3/4 c) 3/2,2 d) 3,3/2
9. When water flows at a rate Q through a tube of radius r placed horizontally, a pressure difference pdevelops across the ends ofthe tube. If the radius of the tube is doubled and the rate offlow halved, the pressure difference will be:
   a) 8p b) p c) p/8 d) p/32
10. A cylindrical vessel of 90 cm height is kept filled upto the brim. It has four holes 1, 2, 3, 4 which are respectively at heights of 20 cm, 30 cm, 45 cm and 50 cm from the horizontal floor PQ. The water falling at the maximum horizontal distance from the vessel comes from;



   a) Hole number 4 b) Hole number 3 c) Hole number 2 d) Hole number 1
11. The pans of a physical balance are in equilibrium. Air is blown under the right hand pan; then the right hand pan will:

a) move up b) move down c) move erratically d) remain at the same level

12. A large open tank has two holes in its wall. One is a square hole of side a at a depth of x from the top and the other is a circular hole of radius r at depth 4x from the top. When the tank is completely filled with water, the quantities of water flowing out per second from both holes are the same. Then r is equal to:
    a) aπa b) a c) $\frac{a}{2\pi}$ d) $\frac{a}{\pi}$ e) $\frac{a}{\sqrt{2\pi}}$
13. A certain number of spherical drops of a liquid of radius 'T' coalesce to form a single drop of radius 'R' and volume 'V'. If 'T is the surface tension of the liquid, then:
    a) energy = 4VT (l/r -l/R) is released b) energy = 3VT (l/r + l/R) is absorbed
    c) energy = 3VT (l/r - l/R) is released d) energy is neither released nor absorbed
14. Two identical cylindrical vessels with their bases at same level, each contains a liquid of density d. The height of the liquid in one vessel is h_1 and that in the other vessel is h_2. The area of either base is A. The work done by gravity in equalizing the levels when the two vessels are connected is:
    a) $(h_1 - h_2)gd$ b) $(h_1 - h_2)gAd$ c) $\frac{1}{2}(h_1 - h_2)^2gAd$ d) $\frac{1}{4}(h_1 - h_2)^2gAd$
15. A rectangular block of mass m and area of cross-section a, floats in a liquid of density σ. If it is given a small vertical displacement from equilibrium, it starts oscillating with frequency f, then:
    a) $f \propto \frac{1}{\sigma}$ b) $f \propto \sigma$ c) $f \propto m$ d) $f \propto \sqrt{a}$
16. Two non-mixing liquids of densities P and np (n > 1) are put in a container. The height of each liquid is h. A solid cylinder of length L and density d is put in this container. The cylinder floats with its axis vertical and length pL (p < 1) in the denser liquid. The density d is equal to :
    a) {1 + (n + l)p}ρ b) {2 + (n + l)p}ρ c) {2 + (n -1)p}ρ d) {l + (n -1)p}ρ
17. (A) The velocity of flow of a liquid is smaller when pressure is larger and vice-versa.
    (R) According to Bernoulli's theorem, for the stream- line flow of an ideal fluid, the total energy per unit mass remains constant.
    a) If both assertion and reason are true and reason is the correct explanation of assertion
    b) If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false d) If both assertion and reason are false
    e) If assertion is false but reason is true
18. Two capillary tubes of same radius r but of lengths l_1 and l_2 are fitted in parallel to the bottom of a vessel. The pressure head is P. What should be the length of a single tube that can replace the two tubes so that the rate of flow is same as before?
    a) l_1+l_2 b) $\frac{1}{l_1} + \frac{1}{l_2}$ c) $\frac{l_1 l_2}{l_1+l_2}$ d) $\frac{1}{l_1+l_2}$
19. (A) The blood pressure in humans is greater at the feet than at the brain.
    (R) Pressure of liquid column is proportional to height, density of liquid and acceleration due to gravity.
    a) If both assertion and reason are true and reason is the correct explanation of assertion.
    b) If both assertion and reason are true but reason is not the correct explanation of assertion.
    c) If assertion is true but reason is false. d) If both assertion and reason are false.
    e) If assertion is false but reason is true.
20. When a venturimeter is used in an inclined position, it will show:
    a) same reading b) more reading c) less reading d) depends on viscosity of liquid
21. A water barrel having water upto a depth d is placed on a table of height h. A small hole is made on the wall of the barrel at its bottom. If the stream of water coming out of the hole falls on the ground at a horizontal distance R from the barrel, then the value of d is:

a) $\frac{4h}{R^2}$ b) $4hR^2$ c) $\frac{R^2}{4h}$ d) $\frac{h}{4R^2}$

22. More viscous oil is used in summer than in winter in motors due to:
    a) rise in temperature in summer; the viscosity of oil decreases
    b) rise in temperature in summer the viscosity of oil increases c) S.T. of oil decreases
    d) S.T. of oil increases

23. Three liquids of densities Pl' Pz and P3 (with Pl>PZ>P3)' having the same value of surface tension Trise to the same height in three identical capillaries. The angles of contact 91, 92 and 93 obey:
    a) $\pi/2 > \theta_1 > \theta_2 > \theta_3 \geq 0$ b) $0 < \theta_1 < \theta_2 < \theta_3 < \pi/2$ c) $\pi/2 < \theta_1 < \theta_2 < \theta_3 < \pi/2$
    d) $\pi > \theta_1 > \theta_2 > \theta_3 < \pi/2$

24. (A) A parachute descends slowly whereas a stone dropped from same height falls rapidly.
    (R) The viscous force of air on parachute is larger than that of on a falling stone.
    a) If both assertion and reason are true and reason is the correct explanation of assertion
    b) If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false d) If both assertion and reason are false
    e) If assertion is false but reason is true

25. (A) The rate of flow of a liquid through a capillary becomes non-linear when the pressure across capillary is increased.
    (R) With increase of pressure, the bore of capillary increases.
    a) If both assertion and reason are true and reason is the correct explanation of assertion
    b) If both assertion and reason are true but reason is not the correct explanation of assertion
    c) If assertion is true but reason is false d) If both assertion and reason are false
    e) If assertion is false but reason is true

26. A manometer connected to a closed tap reads 3.5×10^5 newton/metre^2. When the valve is opened, the reading of manometer falls to 3.0×10^5 newton per metre 2, then velocity of flow of water is:
    a) 100 m/s b) 10 m/s c) 1 m/s d) $10\sqrt{10}$ m/s

27. Two thermometers are constructed in the same way excepted that one has a spherical bulb and the other a cylindrical bulb, which one will respond quickly to temperature changes
    a) spherical bulb thermometer b) Cylindrical bulb thermometer c) both equally d) None of the above

28. A body of mass 2 kg is floating in water with half its volume submerged. What would be the force required to wholly submerge it into water?
    a) 2 N b) 9.8 N c) 19.6 N d) 4.9 N

29. There is a hole in .the bottom of tank having water. If total pressure at bottom is 3 atm (1 atm = 10^5 N/m^2) then the velocity of water flowing from hole is:
    a) $\sqrt{400}\ \mathrm{m/s}$ b) $\sqrt{600}\ \mathrm{m/s}$ c) $\sqrt{60}\ \mathrm{m/s}$ d) None of these

30. The velocity of a small ball of mass M and density d_1 when dropped in a container filled with glycerine becomes constant after some time. If the density of glycerine is d_2, the viscous force acting on the ball is:
    a) $Mg\left(1-\frac{d_2}{d_1}\right)$ b) $Mg\frac{d_1}{d_2}$ c) $Mg(d_1-d_2)$ d) Mgd_1d_2

31. In a plant, a sucrose solution of coefficient of viscosity 0.0015 N-s/m^2 is driven at a velocity of 10^{-3} m/s through xylem vessels of radius 2 μm and length 5 μm. The hydrostatic pressure difference across the length of xylem vessels (in N/m^2) is:
    a) 5 b) 8 c) 10 d) 15

32. A liquid is allowed to flow into a tube of truncated cone shape. Identify the correct statement from the following:
a) the speed is high at the wider end and low at the narrow end
b) the speed is low at the wider end and high at the narrow end
c) the speed is same at both ends in a stream line flow d) the liquid flows with uniform velocity in the tube

33. An areoplane of mass 3 x 10^4 kg and total wing area of 120 m^2 is in a level flight at some height. The difference in pressure between the upper and lower surface of its wings, (in kilo pascals) is:
a) 2.5 b) 5.0 c) 10.0 d) 12.5

34. The gate of a canal is 8 m wide. The level of water on one side is 30 m and on the other side is 15 m. The resultant force on the gate is :
a) 270 x 10^5 N b) 270 x 10^6 N c) 540 x 10^5 N d) 540 x 10^6 N

35. Why the dam of water reservoir is thick at the bottom?
a) Quantity of water increases with depth b) Density of water increases with depth
c) Pressure of water increases with depth d) Temperature of water increases with depth

36. The speeds of air-flow on the upper and lower surfaces of a wing of an aeroplane are v_1 and v_2 respectively. If A is the cross-sectional area of the wing and 'ρ' is the density of air, then the upward lift is:
a) $\frac{1}{2}\rho A(v_1-v_2)$ b) $\frac{1}{2}\rho A(v_1+v_2)$ c) $\frac{1}{2}\rho A\left(v_1^2-v_2^2\right)$ d) $\frac{1}{2}\rho A\left(v_1^2+v_2^2\right)$

37. A tank is filled with water of density 1 g per cm^3 and oil of density 0.9 g per cm^3. The height of water layer is 100 em and of the oil layer is 400 cm. If g =980 cm/sec^2, then the velocity of efflux from an opening in the bottom of the tank is:
a) $\sqrt{900\times 980}$ cm/sec b) $\sqrt{1000\times 980}$ cm/sec c) $\sqrt{920\times 980}$ cm/sec d) $\sqrt{950\times 980}$ cm/sec

38. A liquid is flowing through a tube of varying diameter. The rate (R) of flow ofliquid in any portion and the diameter (d) of the tube in that portion are related as:
a) R ∝ d b) R ∝ $\frac{1}{d}$ c) R ∝ $\frac{1}{d^2}$ d) none of these

39. A large ship can float but a steel needle sinks because of:
a) viscosity b) surface tension c) density d) none of these

40. A 50 kg girl wearing high heel shoes balances on a single heel. The heel is circular with the diameter 1.0 cm, What is the pressure exerted on the horizontal floor?
a) 3 x 10^6 Pa b) 2 x 10^4 Pa c) 6.24 x 10^6 Pa d) 9 x 10^3 Pa

41. A wind with speed 40 m/s blows parallel to the roof of a house. The area of the roof is 250 m^2. 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 : (ρ_{air} = 1.2kg/m^3)
a) 2.4 x 10^5N, upwards b) 2.4 x 105^N, downwards c) 4.8 x 10^5N, downwards d) 4.8 x 10^5N, upwards

42. Coefficient of linear expansion of brass and steel rods are α_1 and α_2 Lengths of brass and steel rods are l_1 and l_2 respectively. If (l_2- l_1) is maintained same at all temperatures, which one of the following relations holds good?
a) $\alpha_1 l_2$ b) $\alpha_1 l_2 = a_2 l_2$ c) $a_2 l_2 = a_1 l_1$ d) $a_1 l_1 = a_2 l_2$

43. (A) A man sitting in a boat which is floating on a pond. If the man drinks some water from the pond, the level of water in the pond decreases.
(R) In floating, the weight displaced by body is less than the weight of the body.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.
e) If assertion is false but reason is true.

44. The Young's modulus of steel is twice that of brass. Two wires of the same length and same area of cross section, one of steel and another of brass, are suspended from the same roof. If we want the lower ends of the wires to be at the same level, then the weights added to the steel and brass wires must be in the ratio of:
    a) 4:1 b) 1:1 c) 1 :2 d) 2:1

45. A container of large uniform cross-sectional area A resting on a horizontal surface holds two immiscible, non-viscous and incompressible liquids of densities d and 2d, each of height (H/2) The lower density liquid is open to the atmosphere having pressure P_0. A tiny hole of area s (s<< A)is punched on the vertical side of the container at a height h $\left(h << \frac{H}{2}\right)$. The initial speed of efflux of the liquid at the hole is:
    a) (3H-4h)g b) $\frac{(3H-4H)g}{2}$ c) $\sqrt{(3H-4h)g}$ d) $\sqrt{\frac{(3H-4h)g}{2}}$

46. If two liquids of same volume but different densities p_1 and p_2 are mixed, then density of mixture is given by:
    a) $p = \frac{p_1 p_2}{2}$ b) $p = \frac{p_1+p_2}{2p_1p_2}$ c) $p = \frac{2p_1p_2}{p_1+p_2}$ d) $p = \frac{p_1p_2}{p_1+p_2}$

47. A vessel of water is placed on the floor of an elevator. How does the pressure at the bottom of the vessel change if the elevator moves up with uniform acceleration a?
    a) Increases by hpa b) Decreases by hpa c) No change in pressure d) None of these

48. A small drop of water falls from rest through a large height h in air; the final velocity is:
    a) proportional to $\sqrt{h}$ b) proportional to h c) inversely proportional to h d) almost independent of h

49. If A denotes the area of free surface of a liquid and h the depth of an orifice of area of cross-section a, below the liquid surface, then the velocity v of flow through the orifice is given by:
    a) v=$\sqrt{(2gh)}$ b) v=$\sqrt{(2gh)}\sqrt{\left(\frac{A^2}{A^2-a^2}\right)}$ c) v=$\sqrt{(2gh)}\sqrt{\left(\frac{A}{A-a}\right)}$ d) v=$\sqrt{(2gh)}\sqrt{\left(\frac{A^2-a^2}{A^2}\right)}$

50. The wet-ability of a surface by a liquid depends primarily on :
    a) density b) angle of contact between surface and liquid c) viscosity d) surface tension