

QAD Series

Mechanics-III

1. Bernoulli's principle is based on the principle conservation of:
 - a) Mass b) momentum c) Energy d) None
2. Pressure exerted by a liquid depends upon:
 - a) Density b) Viscosity
 - c) Critical velocity d) Terminal velocity
3. According to the Hooke's law, if stress is increased, then ratio of effects to strain
 - a) increases b) decreases
 - c) remains constant d) zero
4. The quantity on which the rise of liquid in a capillary tube does not depend is :
 - a) density of liquid b) radius of capillary
 - c) angle of contact d) atmospheric pressure
5. Surface tension of a liquid is zero :
 - a) at critical temp. b) at boiling point
 - c) both a and b d) at m. pt.
6. When soap or any other substance that is less soluble in water is added to water, surface tension:
 - a) increases b) decreases
 - c) may increase or decrease depending on the substance of chemical nature
 - d) none of above
7. When the temperature increases, the angle of contact of a liquid
 - a) increases b) decreases
 - c) remains unchanged
 - d) first increases & then decreases
8. A body is immersed in water filled in a beaker. If the system falls freely the up thrust on the body is equal to
 - a) zero b) wt. of body in air
 - c) wt. of body in water
 - d) half the wt. of body in air
9. Which of the following affects the elasticity of a substance?
 - a) Hammering and annealing
 - b) Change in temperature
 - c) Impurity in substance d) All
10. The value of Young's modulus of a perfect rigid body material is
 - a) Zero b) unit c) infinity d) finite
11. A tank has an orifice at its bottom. The volume of liquid flowing out per second from the orifice does not depend upon
 - a) area of orifice
 - b) height of the liquid level above the orifice
 - c) density of the liquid
 - d) value of acceleration due to gravity
12. The clouds float in atmosphere because of
 - a) its low temperature b) their low viscosity
 - c) their low density d) creation of low pressure
13. The length of a wire increases by 1% on suspending 20N weight from it. The linear strain in the wire is
 - a) 0.1 b) 0.01 c) 0.001 d) 0.0001
14. When the velocity of liquid flowing steadily through a tube increases, its pressure
 - a) increases b) decreases
 - c) remains same
 - d) 1st increases then becomes constant
15. The modulus of elasticity is dimensionally equivalent to
 - a) stress b) surface tension
 - c) strain d) coeff. of viscosity
16. Breaking strength depends upon
 - a) r^1 b) r^2 c) r^{-1} d) r^{-2}
17. Out of solid, liquid and gas which has maximum elasticity
 - a) solid b) liquid
 - c) gas d) cannot be compared
18. When we stretch a wire, a work is performed on the wire. The work done on wire is
 - a) simply wasted
 - b) loss on the form of heat
 - c) stored in the form of elastic potential energy
 - d) used up to overcome the fall in the gravitational potential energy
19. The compressibility of water is $5 \times 10^{-10} \text{ m}^2/\text{N}$, 1 litre of water is subjected to a pressure of $2 \times 10^7 \text{ N/m}^2$. The decrease in its volume is
 - a) 5 cc b) 10 cc c) 4 cc d) 1 cc
20. A stretched rubber has:
 - a) increased K. E. b) increased P. E.
 - c) decreased K. E. d) decreased P.E.
21. A beaker containing a liquid of density ' ρ ' moves up with an acceleration (a). The pressure due to liquid at a depth (h) below the surface of the liquid is
 - a) $h\rho g$ b) $2h\rho g$ c) $h\rho(g + a)$ d) $h\rho(g - a)$
22. The breaking stress of a wire is depends on
 - a) material of wire b) length of wire
 - c) radius of wire d) all of above
23. A body weighs 160g in air, 130g in water and 136g in benzene. Then sp. gr. of a benzene
 - a) 0.2 b) 0.4 c) 0.6 d) 0.8
24. A balloon has a volume of 1000 m^3 . It is filled with hydrogen of density 0.09 kg/m^3 . If the density of air is 1.29 kg/m^3 , it can lift a total weight of
 - a) 18000 kg b) 1200 kg c) 600 kg d) 300 kg

25. When the free surface area of a liquid increased, the surface tension of the liquid
 a) increases b) decreases
 c) remains the same d) none
26. A wire is stretched under a force. If the wire suddenly snaps, the temperature of the wire:
 a) Remains the same b) decreases
 c) increases
 d) first decreases than increases
27. The young's modulus is numerically equal to the stress that arises in a wire when its length changes from l to
 a) 1.25 l b) 1.50 l c) 1.75 l d) 2.00 l
28. A body floats with one third of its volume outside water and $\frac{3}{4}$ of its volume outside another liquid. The density of other liquid is:
 a) (9/4) gm/cc b) (4/3) gm/cc
 c) (8/3) gm/cc d) (3/8) gm/cc
29. If the value of surface area of a liquid increased, the surface tension of the liquid
 a) 70 N/m b) 7×10^{-2} N/m
 c) 7×10^2 N/m d) 7×10^3 N/m
30. The density of ice is 0.9g/cc and that of sea water is 1.1g/cc. An ice berg of volume V is floating in sea water. The fraction of ice berg above water level is:
 a) 1/11 b) 2/11 c) 3/11 d) 4/11
31. The work done to form a layer of soap solution of size 10×10 cm will be (surface tension of soap solution = 3×10^{-2} Nm⁻¹)
 a) 6×10^{-2} J b) 6×10^{-4} J c) 3×10^{-2} J d) 3×10^{-4} J
32. A number of water droplets each of radius r coalesce to form a droplet of radius R . The rise in temperature $d\theta$, is (S.T of water = T , J is mechanical equivalent of heat)
 a) $2T/rJ$ b) $\frac{3T}{J}(\frac{1}{r} - \frac{1}{R})$ c) $\frac{-3T}{rJ}$ d) $\frac{3T}{J}(\frac{1}{r} + \frac{1}{R})$
33. What is the ratio of surface energy of 1 small drop and 1 large drop if 1000 drops combined to form 1 large drop?
 a) 100:1 b) 1000:1 c) 10:1 d) 1:100
34. The excess pressure inside one soap bubble is three times that of a second bubble. The ratio of the volumes of the first bubble to that of second bubble is
 a) 3:1 b) 1:3 c) 1:9 d) 1:27
35. Excess pressure of one soap bubble is four times more than the other. Then the ratio of volume of first bubble to another is:
 a) 1:64 b) 1:4 c) 64:1 d) 1:2
36. A 20 cm long capillary tube is dipped in water. The water rises up to 8 cm. If entire arrangement is put in a freely falling elevator, the length of water column in the capillary tube will be
 a) 4 cm b) 8 cm c) 10 cm d) 20 cm
37. The relative velocity of two parallel layers of water is 8 cm/sec. If velocity gradient will be:
 a) 40 / sec b) 50 / sec c) 60 / sec d) 80 / sec
38. A soap bubble of radius r_1 is placed on another soap bubble of radius r_2 ($r_1 < r_2$). The radius R of the soapy film separating the two bubble is
 a) $r_1 + r_2$ b) $\sqrt{r_1^2 + r_2^2}$ c) $(r_1^3 + r_2^3)^{1/3}$ d) $\frac{r_2 r_1}{\sqrt{r_2 - r_1}}$
39. An incompressible fluid flows steadily through a cylindrical pipe which has radius $2r$ at point A and radius r at B further along the flow direction. If the velocity at point A is v , its velocity at point B is:
 a) $2v$ b) v c) $v/2$ d) $4v$
40. If for a liquid in a vessel, the force of cohesion is twice of adhesion:
 a) the meniscus will be convex upwards
 b) the angle of contact will be obtuse
 c) the liquid will descend in the capillary tube
 d) all of the above
41. Viscosity is a transport phenomenon (in a gas) explained using the concept of transfer of
 a) mass b) kinetic energy
 c) potential energy d) momentum
42. Four identical rods are stretched by same force. Maximum extension is produced in:
 a) $l = 10$ cm, $D = 2$ mm b) $l = 100$ cm, $D = 2$ mm
 c) $l = 200$ cm, $D = 3$ mm d) $l = 300$ cm, $D = 4$ mm
43. The viscous drag on a spherical body moving with a speed ' v ' a viscous medium is directly proportional to
 a) v b) v^2 c) \sqrt{v} d) $\frac{1}{\sqrt{v}}$
44. Bulk Modulus of water is 2×10^9 N/m². The pressure required to increase the density of water by 0.1% in N/m² is:
 a) 2×10^9 b) 2×10^8 c) 2×10^6 d) 2×10^4
45. A spherical body has the terminal velocity V while flowing through a viscous medium. If the radius of the body is doubled the terminal velocity would be:
 a) $V/2$ b) V c) $2V$ d) $4V$
46. When a large bubble rises from the bottom of a lake to the surface, its radius doubles. The atmospheric pressure is equal to that of a column of water of height H . Then depth of the lake is:
 a) H b) $2H$ c) $7H$ d) $8H$
47. A parrot sitting on the floor of a wire cage which is being carried by a body, starts flying. The boy will feel that the box is now:
 a) heavier b) lighter c) same in weight
 d) lighter in the beginning and heavier later
48. A number of small drops of mercury coalesce to form a single drop. The temperature of the drop will:
 a) increase b) remain same
 c) decrease d) depend on size
49. The lower end of a capillary tube touches a liquid whose angle of contact is 90° , the liquid:
 a) rises into the tube b) falls in the tube
 c) may rise or fall inside the tube
 d) neither rises nor falls inside the tube
50. Water is flowing through a horizontal pipe of non-uniform cross-section. At the extreme narrow portion of the pipe, the water will have
 a) maximum speed and least pressure
 b) maximum pressure and least speed
 c) both pressure and speed maximum
 d) both pressure and speed least