CBSE

GRAVITATION WS 5

Class 09 - Science

Section A

1. School bags have a broader base to reduce **[1]**

   a) weight
   b) pressure
   c) air resistance
   d) normal reaction

2. If the weight of an object in air and a dense liquid are W_a and W_l respectively, then upthrust **[1]**

   a) $U = W_l + W_a$
   b) $U = 2W_l$
   c) $U = W_a - W_l$
   d) $U = W_l - W_a$

3. A tank 2 m high is half filled with water and then filled to the top with oil of density 0.60 g/cc. What is the pressure at the bottom of the tank due to these liquids? (Take g = 10 m s^{-2}) **[1]**

   a) 1.6×10^2 N m^{-2}
   b) 1.6×10^4 N m^{-2}
   c) 0.8×10^4 N m^{-2}
   d) 0.8×10^2 N m^{-2}

4. If cross - sectional area of an object is more than the pressure applied by the external force is :- **[1]**

   a) Less
   b) More
   c) None of the above.
   d) Remains same

5. In a tank having 'h' height of liquid, two points at a depth $\frac{3h}{4}$ from free surface have pressure P_A and P_B. When point A is closer to the wall than B. Then **[1]**

   a) $P_A > P_B$
   b) $P_A < P_B$
   c) $P_A = P_B$
   d) Depends on density

6. Increase in momentum by 20% will increase the K.E. by **[1]**

   a) 10%
   b) 20%
   c) 40%
   d) 44%

7. A girl stands on a box having 60 cm length, 40 cm breadth and 20 cm width in three ways. In which of the following cases, pressure exerted by the brick will be **[1]**

   a) maximum when width and length from the base
   b) maximum when length and breadth from the base
   c) maximum when breadth and width from the base
   d) the same in all the above three cases

8. A force acting perpendicular on an object is called as _____. **[1]**

   a) thrust
   b) gravitational force

c) force only

d) work done

9. A coil of wire with cross-sectional area 0.50 mm^2 weighs 75N in air and 65N in water. The length of the coil in cm is (Take g = 10 m/s^2) **[1]**

a) $\frac{10^2}{0.50}$

b) $\frac{10^6}{5}$

c) $\frac{10^5}{0.0050}$

d) $\frac{10^2}{50}$

10. A wooden block is floating in water contained in a beaker. During the free fall of the beaker, the upthrust on the block will be **[1]**

a) Slightly less than the weight of the block.

b) Equal to the weight of the block

c) Zero

d) Slightly more than the weight of the block.

11. The upward force experienced by a body when submerged in a fluid is called **[1]**

a) Buoyant force

b) Muscular force

c) Liquid force

d) Frictional force

12. A mass weighing W can float if the upthrust U is related as **[1]**

a) U > W

b) $\cup \geq W$

c) U = W

d) U < W

13. In a spring balance the space between 0 and 25 g marks is divided into 10 equal parts. The least count of spring balance is: **[1]**

a) 15 g wt

b) 2.5 g wt

c) 25 g wt

d) 0.25 g wt

14. If the volume of a body is V and half of it is immersed in the liquid, the upthrust will be proportional to: **[1]**

a) Difference in density of the body and half the density of the liquid.

b) Half the volume

c) Volume

d) Double the volume

15. Upthrust depends on: **[1]**

a) dipped volume of the body immersed

b) density of the liquid

c) volume of the liquid

d) both density of the liquid and dipped volume of the body immersed.

16. The least value of apparent weight of a body in a fluid is **[1]**

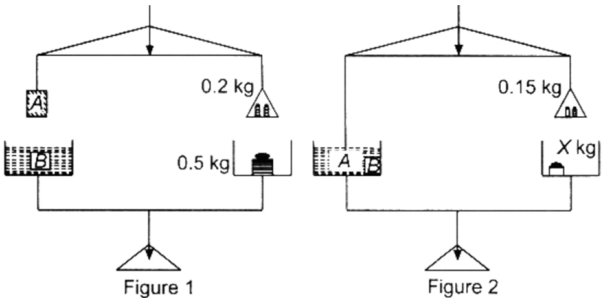
a) = 0

b) depends on the density of solid and fluid

c) < 0

d) > 0

17. Consider the following figures 1 and 2. In figure 1, the mass of the body A in air is 0.2 kg. The mass of the water container (with water in it) is 0.5 kg. In figure 2, when A is completely immersed in the water of the container B, the readings of the respective balances change as shown. **[1]**



What is the value of X?

a) 0.55 kg
b) 0.3 kg
c) 0.15 kg
d) 0.45 kg

18. **Assertion (A):** A school bag has wide straps. **[1]**

Reason (R): The weight of the books may spread over a large area of the child's shoulder.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

19. **Assertion (A):** An object floats if it displaces an amount of liquid whose weight is greater than the actual weight of the object. **[1]**

Reason (R): During floatation an object experiences no net force in the downward direction

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

20. **Fill in the blanks:** **[1]**

(a) If the buoyant force exerted by the liquid is equal to the weight of the object, the object will _____ **[1]** in the liquid.

21. In the experiment to establish the relation between loss in weight of an immersed solid with the weight of water displaced by it, the upthrust experience by the object in tap water and in salty water are U_w and U_s respectively, then : **[1]**

a) $U_w < U_s$
b) $U_w > U_s$
c) $U_w = U_s$
d) $U_s = 2U_w$

22. As the contact area between two objects increases the pressure _____. **[1]**

a) decreases
b) remains constant
c) increases
d) zero

23. If the area of an object is less, then the pressure acting on that object will be _____. **[1]**

a) first, decrease then increase
b) More
c) Independent of area
d) Less

24. What do you mean by buoyancy? **[1]**

25. In what direction does the buoyant force on an object immersed in a liquid act? **[1]**

Section B

26. A solid weighs 100 gm in air and 88 gm when completely immersed in water. Calculate **[2]**

1. the upthrust
2. the volume of the solid
3. the relative density of the solid.

27. i. Why does a bucket of water feel heavier when taken out of water? **[2]**

ii. Lead has greater density than iron and both are denser than water. Is the buoyant force on a lead object greater than, less than or equal to the buoyant force on an iron object of the same volume?

28. i. Name the SI units of thrust and pressure. **[2]**

ii. In which situation, do we exert more pressure on the ground when we stand on one foot or on both feet? Justify your answer.

Section C

29. A cylindrical block of wood of height 4.2 m and mass 100 Kg floats vertically in water. The relative density of wood is 0.8 m/v **[3]**

1) What height of the block will be seen above the water?

2) If block of lead of mass 10 kg is placed, what height of the block will be seen above water?

30. What is the up thrust experienced by a cube of edge - length 5 cm made of iron when completely immersed in ethanol of density 0.8 g/cm^3 **[3]**

Section D

31. **State True or False:** **[5]**

(a) According to Pascal's law, the pressure exerted in any confined mass of fluid is transmitted uniformly in all directions. **[1]**

(b) When an object is partially or wholly immersed in a fluid, an upward force acts on it, which is called upthrust or buoyant force. **[1]**

(c) A fluid exerts pressure in all directions, even upwards. **[1]**

(d) When an object is immersed fully or partially in a fluid, it experiences an upward force which is equal to the weight of the fluid displaced by it. **[1]**

(e) The magnitude of the buoyant force depends on the volume of the object immersed in the liquid and the density of the liquid. **[1]**

32. A stone is dropped from a 100 m high tower. How long does it take to fall? **[5]**

a. the first 50 m and

b. the second 50 m.

33. i. A steel needle sinks in water but a steel ship floats. Explain, how? **[5]**

ii. Why do you prefer a broad and thick handle of your suitcase?