WORKSHOP CALCULATION AND SCIENCE-UNIT 4.MASS, WEIGHT, VOLUME & DENSITY

SEMESTER – 1

1. What is termed as the quantity of matter contained in a body?
   a) Density b) volume c) mass d) specific gravity
   Ans: Volume

2. What is the force with which a body is attracted by the earth towards its centre?
   a) Mass b) weight c) volume d) density
   Ans: weight

3. What is called mass per unit volume of substances?
   a) Mass b) weight c) density d) volume
   Ans: density

4. What is called the ratio between the density of a substances and density of water at 4°C?
   a) Density b) specific gravity c) mass d) weight
   Ans: Specific gravity

5. What is the density of aluminium?
   a) 2.7 g/cm^3 b) 3.7 g/cm^3 c) 4.7 g/cm^3 d) 5.7 g/cm^3
   Ans: 2.7 g/cm^3

6. What is the mass if the density of a body is 7.6 g/cm^3 and its volume is 25 cm?
   a) 190 grams b) 200 grams c) 210 grams d) 220 grams
   Ans: Density = $\frac{Mass}{Volume}$
   Mass = Density x Volume = 7.6 x 25 = **190 grams**

7. What is the specific gravity of the solid, if density of the solid is 19.5 g/cm^3?
   a) 18 b) 18.5 c) 19 d) 19.5
   Ans: Specific gravity = $\frac{Density\ of\ the\ object}{Density\ of\ the\ water\ at\ 4C}$ = $\frac{19.5\ g/cm}{1\ g/cm3}$ = **19.5**
   (Note: Density of the water = 1 g/cm^3; Specific gravity has no unit)

8. What is the density ρ in g/cm^3 of an iron cube, if it weighs (W) 4.8 kg and Volume V is 640 cm^3?
   a) 6.6 g/cm^3 b) 6.2 g/cm^3 c) 7.2 g/cm^3 d) 7.5 g/cm^3
   Ans: Density = $\frac{Mass}{Volume}$ = $\frac{4800}{640}$ = **7.5 g/cm^3**

9. What is the volume V of mercury in cm^3, if mass (m) of mercury is 1 kg and density (ρ) is 13.6 g/cm^3?
   a) 73.53 cm^3 b) 73.43 cm^3 c) 73.33 cm^3 d) 73.23 cm^3
   Ans: Density = $\frac{Mass}{Volume}$
   Volume = $\frac{Mass}{Density}$ = $\frac{1000}{13.6}$ = **73.23 cm^3**

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10. What is the mass in gram, if a force of 15 dynes acting on a mass m producing an acceleration of 2.5 cm/sec^2?
    a) 9 grams b) 8 grams c) 7 grams d) 6 grams

    Ans: Force = Mass x Acceleration (F=ma)

    Mass = $\frac{Force}{Acceleration} = \frac{15\ dynes}{2.5\ cm/sec2} = \frac{15\ g.cm/sec2}{2.5\ cm/sec2}$ = **6 grams** (Note: 1 **dyn** = 1 g·cm/sec^2)

11. What is the specific gravity of the metal, if the piece of metal weights 150 grams in air and 125 grams in water?
    a) 6 b) 10 c) 15 d) 25

    Ans: Specific gravity = $\frac{Density\ of\ the\ object}{Density\ of\ the\ water\ at\ 4C}$ or $\frac{Weight\ of\ the\ object}{Loss\ of\ object's\ weigh\ \ in\ wate}$

    Loss of object's weight in water = Weight of the object in air – Weight of the object in water
    = 150 – 125 = 25

    Specific gravity = $\frac{150}{25}$ = **6**

12. What is the volume of mercury in cm^3, if the mass (m) of mercury is 136 grams and density (ρ) is 13.6 g/cm^3?
    a) 136 cm^3 b) 13.6 cm^3 c) 10.6 cm^3 d) 10.0 cm^3

    Ans: Density = $\frac{Mass}{Volume}$;

    Volume = $\frac{Mass}{Density} = \frac{136\ grams}{13.6\ g/cm3}$ = **10 cm^3**

13. What is the block weighs (W) in kg, if volume V is 320 cm^3 and density 8.9 g/cm^3?
    a) 2.948 kg b) 2.848 kg c) 2.648 kg d) 2.448 kg

    Ans: Density = $\frac{Mass}{Volume}$

    Mass = Density x Volume = 8.9 x 320 = 2848 gram = **2.848 kg**

14. What is the specific gravity of the metal, if the weighs 6.5 kgf in air and 3.5 kgf in water?
    a) 6.166 b) 2.166 c) 2.166 d) 1.166

    Ans: Specific gravity = $\frac{Weight\ of\ the\ object}{Loss\ of\ object's\ weight\ in\ water}$

    Loss of metal's weight in water = Weight of metal in air – Weight of metal in water
    = 6.5 – 3.5 = 3 kgf

    Specific gravity = $\frac{6.5}{3}$ = **2.166**

15. What is the weight force of a car has a mass of 800 kg? (Take g = 9.81 m/sec)
    a) 7848 Newton b) 7748 Newton c) 7847 Newton d) 7487 Newton

    Ans: Weight force = Mass x Acceleration due to gravity (F = ma)
    = 800 x 9.81 = 7848 kg.m/sec
    = **7848 Newton** (1 kg.m/sec = 1Newton)