$\Rightarrow i = \sqrt{36} = 6A$

<u>WS-1</u> <u>8th</u> <u>integrated</u>

<u>T task</u> ①

①

Given Area $= 10\ cm^2$

$= 10 \times 10^{-4}\ m^2$

$= 10^{-3}\ m^2$

Mass $= 40$ kg.

$\therefore$ Pressure $= \frac{F}{A} = \frac{mg}{A}$ Here the upper part of the body sustained by two thighs

$\therefore P = \frac{mg}{2A} = \frac{\overset{20}{\cancel{40}} \times 10}{\cancel{2} \times 10^{-3}}$

$P = 200 \times 10^{3}$

$= 2 \times 10^{5}\ N/m^2$

(2)

Given Area $A = 0.6\ m^2$

$= 6 \times 10^{-1}\ m^2$

Mass of the body $= 80$ kg.

$\therefore$ Pressure $= \frac{\text{Force}}{\text{Area}} = \frac{Mg}{A}$

$= \frac{80 \times 10}{6 \times 10^{-1}}$

$= \frac{40}{3} \times 10 \times 10$

$= 13.33 \times 10^2$

$= 1.33 \times 10^3\ N/m^2$

(4)

Given Area $= 80\ cm^2$

$= 80 \times 10^{-4}\ m^2$

$= 8 \times 10^{-3}\ m^2$

Mass $= 80$ kg.

$\therefore$ Pressure $= \frac{F}{2A}$ Here the body is supported by 2 feet

$P = \frac{mg}{2A}$

$= \frac{\overset{10}{\cancel{80}} \times 10}{2 \times \cancel{8} \times 10^{-3}}$

$= \frac{1}{\cancel{2}} \times \overset{50}{\cancel{100}} \times 10^3$

$= 50 \times 10^3$

$= 5 \times 10^4\ N/m^2$

(4)

$P_{atm} = 10^5$ Pa

Area $= 40\text{ cm} \times 80\text{ cm}$

$= 3200\text{ cm}^2$

$= 3200 \times 10^{-4}\text{ m}^2$

Pressure $= \frac{F}{A} \Rightarrow$ Force $=$ Pressure $\times$ Area

$= 10^5 \times 3200 \times 10^{-4}$

$= 320\text{N} \times 10^2$

$= 3.2 \times 10^4$ N

(5)

Given density $= 1.29$ kg/m^3

variation of pressure with ~~hig~~ height in

$P = \rho g h$

$P = 1.05 \times 10^5$ N/m^2

$\Rightarrow 1.05 \times 10^{\cancel{5}} = 1.29 \times \cancel{10} \times h$

$\Rightarrow h = \frac{1.05 \times 10^4}{1.29}$

$= 8013$ m

(6)

variation of pressure with depth $P = \rho g h + P_a$

Given $P_a = 10^5$ N/m^2 ; $h = 10$m ; $\rho_w = 10^3$ kg/m^3

$\therefore P = 10^3 \times 10 \times 10 + 10^5$

$= 10^5 + 10^5$

$= 2 \times 10^5 = 2$ atm

(10)

Given pressure at ground floor $P = 270 \text{ k Pa}$

$= 270 \times 10^3 \text{ Pa}$

Variation of pressure with height is given by

$$P = \rho g h$$

$$\Rightarrow 270 \times \cancel{10^3} = \cancel{10^3} \times 10 \times h$$

$$\Rightarrow h = 27 \text{ m.}$$

If we take $g = 9.8 \text{ m/s}^2$ then we get $h = 27.55 \text{ m}$

Here $\rho \rightarrow$ density of water $= 10^3 \text{ kg/m}^3$

(16), (17)

Given mass $= 4 \text{ kg}$

Area $= 2 \text{ m}^2$

weight $= Mg$

$= 4 \times 10 = 40 \text{N}.$

$$\text{Pressure} = \frac{F}{A} = \frac{Mg}{A}$$

$$= \frac{40}{2}$$

$$= 20 \text{ N/m}^2$$

L Task JEE Main level

①

Area of Each thigh bone = $20\ cm^2$
$= 20 \times 10^{-4}\ m^2$

Mass $= 50\ kg$

Here the upper part of the body is supported by 2 thighs

$\therefore$ Pressure $= \frac{\text{weight}}{2 \times \text{Area}}$

$= \frac{Mg}{2 \times A} =$

$= \frac{50 \times 10}{2 \times 20 \times 10^{-4}}$ (2)

$= \frac{50}{4} \times 10^4 = 12.5 \times 10^4\ N/m^2$

②

Given Area of the body of the man $= 0.5\ m^2$

Mass $= 60\ kg$

$\therefore$ Pressure $= \frac{\text{weight}}{\text{Area}} = \frac{Mg}{A}$

$= \frac{60 \times 10}{0.5}$

$= 1200$

$= 12 \times 10^2\ N/m^2$

(3)

Given mass = 90 kg

Area A = 90 mm² = 90×10^{-4} m²

the upper part of the body was supported by 2 feet.

$\therefore$ Pressure $P = \frac{\text{weight}}{2 \times A} = \frac{Mg}{2A}$

$\Rightarrow P = \frac{90 \times 10}{2 \times \cancel{90} \times 10^{-4}}$

$\Rightarrow P = \frac{\cancel{10}^{5}}{\cancel{2}} \times 10^{4}$

$\Rightarrow P = 5 \times 10^{4}$ N/m²

(4)

(4)

Given Pressure = 10^5 Pa

Area = 10cm × 20cm

= 200 cm²

= 200×10^{-4} m²

We know that Pressure = $\frac{\text{Force}}{\text{Area}}$

$\Rightarrow$ Force = Pressure × Area

$= 10^{5} \times 200 \times 10^{-4}$

$= 2 \times 10^{3}$ N

$= 0.2 \times 10^{4}$ N

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(5)

Given density $\rho = 1.29\ kg/m^3$; $g = 9.8\ m/s^2$

At sea level Pressure is = 1 atm

$= 10^5$ Pascals (or) 1.013×10^5 Pa

∴ Pressure with height is given by

$P = \rho g h$

$\Rightarrow 10^5 = 1.29 \times 9.8 \times h$

$\Rightarrow h = \dfrac{10^5}{1.29 \times 9.8} \simeq 8013\ m$

(6)

depth = 5 m ; $\rho_w = 10^3\ kg/m^3$; $g = 10\ m/s^2$

Pressure at a depth = $P_a + \rho g h$

$P = 10^5 + 10^3 \times 10 \times 5$

$= 10^5 + 10^4 \times 5$

$= 10^5 + 0.5 \times 10^5$

$\Rightarrow P = 1.5 \times 10^5 = 1.5$ atm

(10)

Pressure at ground floor $P = 100$ k Pa

$= 100 \times 10^3$ Pa

Variation of Pressure with height $P = \rho g h$

$\Rightarrow \cancel{100}^{10} \times \cancel{10^3} = \cancel{10^3} \times \cancel{10} \times h$

$\Rightarrow h = 10 m.$

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