Odm connect Homework

Q1. Find pressure due to water at a depth 2m inside it
(Given density of water = $1 g/cm^3$ = $1000 kg/m^3$)

Ans) Hydrostatic pressure = $\rho g h$
Given, $\rho = 1000 kg/m^3$, $g = 10 m/s^2$, $h = 2m$
∴ Pressure = $1000 \times 10 \times 2$
= $20000 Pa$

Q2. A circular pillar of area of cross section $6 \times 10^{-3} m^2$ supports a weight of 60 kg. Calculate the pressure exerted on the pillar.

Ans) Given, area of cross section = $6 \times 10^{-3} m^2$
weight = 60 kg = 600 N
$g = 10 m/s^2$
Pressure $(P) = \dfrac{F}{A}$

= $600 \div 6 \times 10^{-3}$
= $600 \times \dfrac{10^3}{6}$ = $100000 = 10^5$

∴ The pressure on the pillar is $10^5 N m^2$

Q3.(a) The levels of water, in the 2 arms of A and B of a U-tube, are shown in the diagram. A valve is put in between the 2 arms. State the direction of flow of water, when this valve is removed and give the reason for the same.
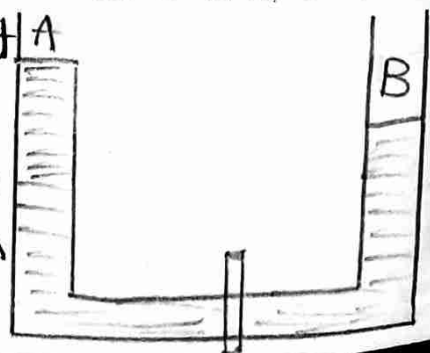
Ans) The water will flow from A to B, when the valve is removed because the water flows from high level to low level.

(b) From which hole water travels, the largest distance? why?

Ans) Pressure in a liquid increases with depth because the further down you go the greater the weight of liquid above. As water spurts out fastest and furthest from the lowest hole, so from 'D' water travels the largest distance.

A
B
C
D
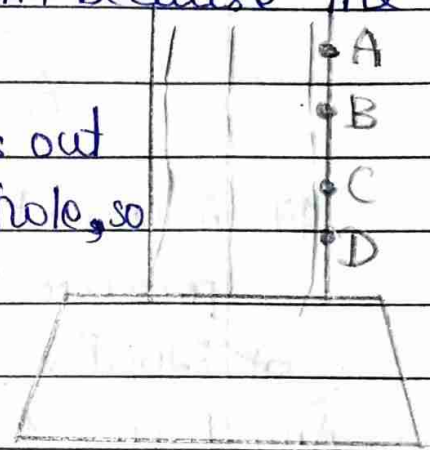
Q4. The pressure of the water at the surface of the pond is lower than that at the bottom of the pond.

a) lower than　　　b) Higher than　　　c) Same as
d) Either lower or Higher than

Q5. Which is not the factor affecting fluid pressure?
a) Height of fluid　　　b) Density of fluid
c) color of fluid　　　d) Acceleration due to gravity

Q6. observe the vessels A, B, C, D carefully.
Arrange them in the order of decreasing pressure at the bottom of the container.

Ans) Decreasing order of the pressure at the bottom of the container is D, B, A, C.

300 ml   50 ml   500 ml   60 ml
A   B   C   D
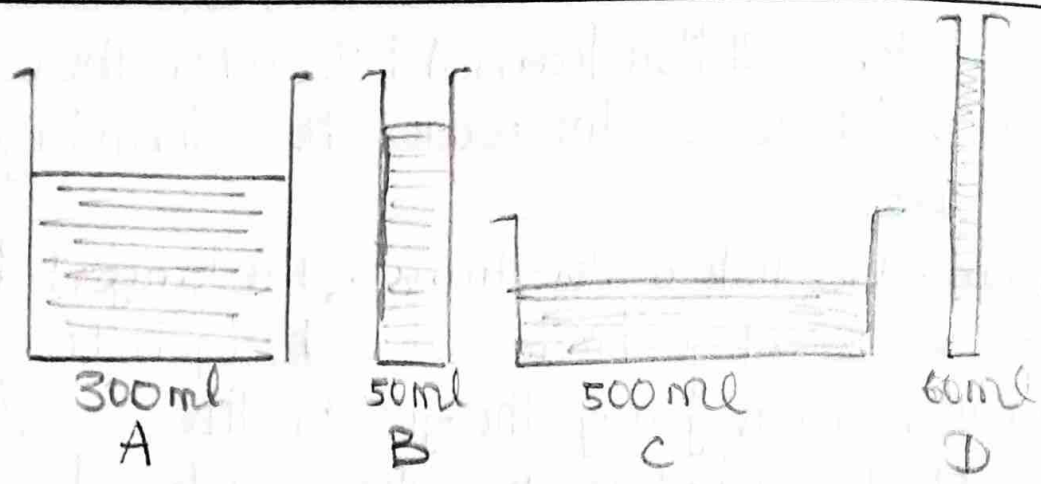
Q7. A force of 16 N acts on an area of 50 cm^2. What is the pressure in pascal?

    a) 3200 Pa   b) 4900 Pa   c) 5200 Pa   d) 9200 Pa

Ans) Force = 16 N , Area = 50 cm^2 = 0.005 m^2

$$P = \frac{Force}{area} = \frac{16}{0.005} = 3200 \ Pa$$

Q8. What force will produce a pressure of 50000 Pa on an area of 0.2 m^2?

    a) 10000 N   b) 5000 N   c) 15000 N   d) 20000 N

Ans) Area (A) = 0.2 m^2 , Force (F) = ? , Pressure (P) = 50000 Pa

$$P = \frac{F}{A} \Rightarrow F = P \times A$$
$$\Rightarrow F = 50000 \times 0.2$$
$$\Rightarrow F = 10000 \ N$$

Q9. A force of 300 N, while acting on an area A, produces a pressure of 1500 Pa. What is the magnitude of A in cm^2?

Ans) $P = \frac{F}{A}$ $\Rightarrow 1500 = \frac{300}{A}$ $\Rightarrow A = \frac{300}{1500} = \frac{1}{5} \ m^2$

$$1m^2 = 10^4 cm^2$$

$$\frac{1}{5}m^2 = \frac{1}{5} \times 10^4 = 2 \times 10^3 cm^2 = 2000 cm^2$$

∴ $2000 cm^2$ is the magnitude of A in cm^2.

Q10. Some piece of impurity (density $= \rho$) is embedded in ice. The ice is floating in water (density $= \rho_w$). When ice melts, level of water will
a) fall if $\rho > \rho_w$ b) remain unchanged, if $\rho < \rho_w$ ✓
c) fall if $\rho < \rho_w$ d) rise if $\rho > \rho_w$
Melted ice water displaces water and occupies volume and over all volume does not change.

Q11. Statement 1: A man sitting in a boat which is floating on a pond. If the man drinks some water from the pond the level of the water in the pond decreases.
Statement 2: According to Archimede's principle the weight displaced by body is equal to the weight of the body.
Ans) Statement 1 is incorrect & Statement 2 is correct

Q12. Statement 1: A needle place carefully on the surface of water may float, whereas a ball of the same materia will always sink. Statement 2: The buoyancy of an object depends both on the material & shape of the object.
Ans) Statement 1 is correct & Statement 2 is incorrect.