



# Physics

**20  
25**

**Second secondary  
grade  
Exam Models**

**Week  
14**

**Prepare and review**

**Science Development Office**

## Exam (2)

### ® Multiple Choice Questions

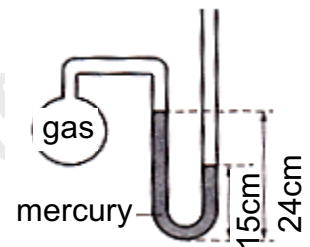
- 1) A **40 Liter** tank has an empty mass of **14 Kg**. If it is filled with a liquid whose relative density is **0.9**, the total mass of the tank is equal to ..... Kg
- (A) 50  
(B) 60  
(C) 40  
(D) 36
- 2) When a cup is completely filled with water, its mass is **1 kg**. If a body with a mass of **0.65 kg** is placed inside it and a quantity of water with a mass of **50 g** is removed from the cup, the relative density of the body's matter is equal to.....
- (A) 6.9  
(B) 9.6  
(C) 20  
(D) 13
- 3) A solid alloy in the shape of a cuboid is placed on a horizontal surface such that its vertical dimension is **70 cm**. If the pressure of the cuboid on the surface is **25200 Pa**, then the density of the alloy is equal to..... (Note  $g = 10 \text{ m/s}^2$ )
- (A)  $2000 \text{ Kg/m}^3$   
(B)  $3600 \text{ Kg/m}^3$   
(C)  $2520 \text{ Kg/m}^3$   
(D)  $1800 \text{ Kg/m}^3$
- 4) A quantity of gas whose pressure **P** is at **20°C**, the temperature necessary for the gas pressure to increase to **3P** while the volume remains constant is equal to ..... K
- (A) 283  
(B) 536  
(C) 606  
(D) 1390

5) A U-shaped tube with a section diameter of **4 cm**, **2 cm** of which contain an appropriate amount of water. An amount of oil is added to the narrow branch until the surface of the water decreases by **8 cm**. If you know that the densities of water and oil, respectively, are **1000 Kg/m<sup>3</sup>**, **800 Kg/m<sup>3</sup>** the height of the water above the dividing surface is equal to..... cm

- (A) 10
- (B) 10.5
- (C) 12.5
- (D) 12

6) In the opposite figure: If you know that the gas pressure is **65 cm.Hg**, the atmospheric pressure is in ..... bar

- (A) 1.013
- (B) 0.986
- (C) 0.967
- (D) 1



7) A horizontally stable submarine in the depths of the sea. The pressure inside it is equivalent to normal atmospheric pressure at sea level. The force acting on one of the submarine's circular windows whose diameter = **42 cm** and its center at a depth of **50 m** from the sea surface is equal to .....N

(Knowing that  $\rho_{\text{sea water}} = \mathbf{1030 \text{ Kg/m}^3}$  and  $g = \mathbf{9.8 \text{ m/s}^2}$ )

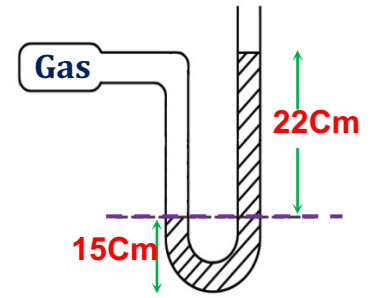
- (A) 55961
- (B) 69951.4
- (C) 223844
- (D) 95961

8) A mercury barometer reads **75 cm.Hg** at the surface of the earth. He placed the highest mountain and its reading became **70 cm.Hg**. The height of the mountain is equal to..... m ( $\rho_{\text{air}} = \mathbf{1.25 \text{ Kg/m}^3}$ )

- (A) 555
- (B) 544
- (C) 455
- (D) 444

9) In the opposite figure: a spring manometer, the pressure of the trapped gas is in cmHg

- (A) 113
- (B) 98
- (C) 91
- (D) 83

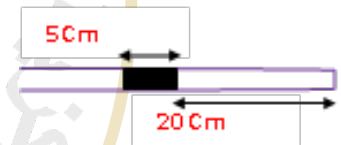


10) A hydraulic piston whose input force on a piston with a diameter of 1.8 cm is equal to 9 N. The output force on a piston with a diameter of 18 cm is equal to..... N

- (A) 3600
- (B) 900
- (C) 90
- (D) 9

11) The opposite figure shows a capillary tube of regular cross-section with a thread mercury traps an amount of air, so if the tube is placed vertically and it's opening downward, as the temperature remains constant, it become the length of the column entrapped air.....cm

- (A) 21.4
- (B) 19
- (C) 15.6
- (D) 16.6



12) A quantity of gas has a volume of 8 L at 27° C. If its temperature is raised by 75° C while its pressure remains constant, its volume becomes ..... L

- (A) 10
- (B) 9
- (C) 22.2
- (D) 9.28



13) Two quantities of two non-reactive liquids **X** and **Y** were mixed together, their volumes **3 V** and **V** respectively. If the density of liquid **X** is **3000 kg/m<sup>3</sup>** and the density of liquid **Y** is **1000 kg/m<sup>3</sup>** and assuming that the total volume does not change when the two liquids are mixed, then the density of the mixture is equal to ..... Kg/m<sup>3</sup>

- (A) 133.3
- (B) 1500
- (C) 1666.7
- (D) 3000

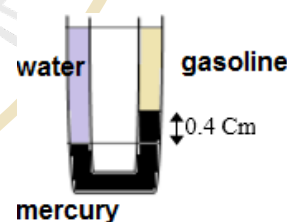
14) A gas bubble with a volume of **V<sub>ol</sub>** at a depth of **10 m** from the surface of the sea, where the temperature is **4°C**, and just before it reaches the surface of the water, where the temperature is **25°C**, its volume is **0.8 cm<sup>3</sup>**, the value of **V<sub>ol</sub>** is equal to... ..

(Note that:  $\rho_{\text{water}} = 1025 \text{ kg/m}^3$ ,  $P_a = 10^5 \text{ N/m}^2$ ,  $g = 10 \text{ m/s}^2$ )

- (A) 1.48 cm<sup>3</sup>
- (B) 0.74 cm<sup>3</sup>
- (C) 0.37 cm<sup>3</sup>
- (D) 0.185 cm<sup>3</sup>

15) The corresponding figure shows a two-pronged tube containing three liquids that do not mix in equilibrium, so the height of the column of gasoline..... cm

- (A) 64.4
- (B) 40.4
- (C) 50.4
- (D) 54.4



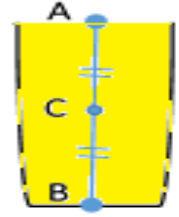
16) Mix **50 cm<sup>3</sup>** of nitrogen gas, pressure **75 cm** of mercury, with **100 cm<sup>3</sup>** of helium gas, pressure **70 cm** mercury in a tank with volume of **120 cm<sup>3</sup>**. The pressure of the mixture of the two gases, given that the temperature remained constant during mixing..... cmHg

- (A) 80
- (B) 91
- (C) 89.58
- (D) 98.85

- 17) A child stands on ice wearing a pair of skates, each with an area of contact with the ice of  $0.2 \text{ m}^2$ . If the mass of the child and the skates together is  $60 \text{ kg}$ , then the pressure exerted by the child's skates on the ice is.....  $\text{N/m}^2$
- (A) 150  
(B) 300  
(C) 1500  
(D) 3000
- 18) A hydraulic piston with two pistons in one horizontal plane and two pistons have cross-sectional areas of  $8A$ ,  $A$ . If a car is placed on the large piston and the piston is moved down a distance of  $0.5 h$ , the height difference between the two pistons equals.....
- (A)  $8h$   
(B)  $4.5h$   
(C)  $3.5h$   
(D)  $4h$
- 19) An oil manometer ( $\rho_o = 850 \text{ Kg/m}^3$ ) was used to measure the pressure of a gas inside a warehouse. If the surface of the oil in the free branch was higher than its surface in the branch connected to the warehouse by  $16 \text{ cm}$ , the value of the pressure of the trapped gas in the unit (bar) is equal to... ..
- (Note that atmospheric pressure =  $74 \text{ cmHg}$ )
- (A) 1.2  
(B) 1.04  
(C) 1  
(D) 1.02
- 20) A water barometer reads atmospheric pressure  $H$ . If the air pressure inside its balloon is equal to atmospheric pressure, then the depth to which the balloon sinks under the surface of the water until the volume of air inside it become  $1/5$  of its original volume is .....
- (A)  $5H$   
(B)  $4H$   
(C)  $3H$   
(D)  $6H$

## © Essay Questions

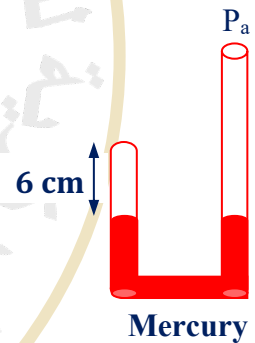
- 21) The figure represents a part of a liquid, and the pressure at point (A) is atmospheric pressure  $P_a$  and the pressure difference between points (A) and (B) is  $4 P_a$ . Determine the pressure value at point (C).



- 22) A hollow sphere weighs  $2 \text{ N}$  and has a volume of  $2 \times 10^{-4} \text{ m}^3$  it is made of a metal with a density of  $2707 \text{ kg/m}^3$ , determine the volume of the hollow space within it.

- 23) In the corresponding figure, determine the ratio of the length of the mercury column required to be poured into the open branch to raise the mercury level in the closed branch by  $2 \text{ cm}$  to the length required to be poured in the case where the other end is open so that the mercury level rises by the same amount.

(Where  $P_a = 76 \text{ cm Hg}$ ).



- 24) In the corresponding figure, there is a relationship between the pressure at a point inside a liquid in units of bars and the depth of the point below the surface of the liquid, if the slope of the straight line is  $10^4$ , determine the value of  $X$  in units of bars

