Chemistry Answers and Explanations Pre by:- Scholastic cluster admins

1, Explanation:-

- **The first quantitative experiments on gases were performed by the Irish chemist, Robert Boyle (1627-1691). His experiment helped to analyze the relationship between the volume and pressure of a fixed amount of a gas at constant temperature. Decreasing the external pressure, causes the gas to expand and to increase in volume. Correspondingly, increasing the external pressure allows the gas to contract and decrease in volume.**
- **Boyle's law states that the volume of a fixed mass of gas is inversely proportional to the pressure at a constant temperature. The inverse relationship between pressure and volume is mathematically given as**

$$V \propto \frac{1}{P} \text{ (at constant } T \text{ and } n)$$

From which follows,

$$V = k\frac{1}{P} \quad \text{or} \quad PV = k;$$

where k is a constant at a specific temperature for a given sample of gas.

Answer:-A

2, Explanation;-

- ✓ **A liquid has a definite volume, but does not have a definite shape. Liquids take the shape of their container.**

Answer:- D

3, Explanation:-

- ✓ **The relationship between the volume of a gas and its number of molecules was explained by Avogadro. Avogadro's law states that equal volumes of different gases, under the same conditions of temperature and pressure, contain the same number of molecules.**
- ✓ **Hence the gasses x and z are different gases they have pressures and temperatures situated under same (equal) volumes so we can conclude that they have the same number of molecules.**

Answer:- C

4, Explanation:-

- **Charles' law states that the volume of a fixed mass of gas at constant pressure varies directly with the Kelvin temperature.**

Mathematically;

$$V \propto T \text{ at constant } P \text{ and } n:$$

$$V = kT, \quad \text{or} \quad \frac{V}{T} = k$$

- **Charles' law can be applied directly to volume-temperature problems using the relationship**

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

- $so\,by\,using\,the\,above\,formula\,that\,is\,\frac{T1}{V1}=\frac{T2}{V2}$

$Given\,T1=200\,,V1=16410\,,T2=100¿\,the\,given\,table$

$Req:V2?$

$Solution:-\frac{T1}{V1}=\frac{T2}{V2},\frac{200}{16410}=\frac{100}{V2}=V2=\frac{100*16410}{200}=8205$

Answer:- B

5, Explanation:-

- ✓ **The relationship between the volume of a gas and its number of molecules was explained by Avogadro. Avogadro's law states that equal volumes of different gases, under the same conditions of temperature and pressure, contain the same number of molecules.**
- **Avogadro's law states that equal volumes of different gases, under the same conditions of temperature and pressure, contain the same number of molecules.**

Answer:- C

6, Explanation:-

Assumptions of the kinetic molecular theory of gases

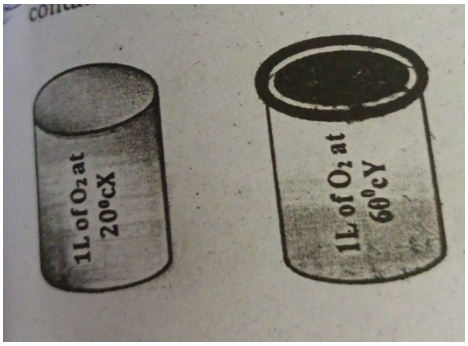
- **1. The particles are in a state of constant, continuous, rapid, random motion and, therefore, possess kinetic energy. The motion is constantly interrupted by collisions with molecules**

or with the container. The pressure of a gas is the effect of these molecular impacts.

- **2. The volume of the particles is negligible compared to the total volume of the gas. Gases are composed of separate, tiny invisible particles called molecules. Since these molecules are so far apart, the total volume of the molecules is extremely small compared with the total volume of the gas. Therefore, under ordinary conditions, the gas consists chiefly of empty space. This assumption explains why gases are so easily compressed and why they can mix so readily.**
- **3. The attractive forces between the particles are negligible. There are no forces of attraction or repulsion between gas particles. You can think of an ideal gas molecule as behaving like small billiard balls. When they collide, they do not stick together but immediately bounce apart.**
- **4. The average kinetic energy of gas particles depends on the temperature of the gas. At any particular moment, the molecules in a gas have different velocities. The mathematical formula for kinetic energy is K.E. = ½ mν2 , where m is mass and ν is velocity of gas molecules. Because the molecules have different velocities, they have different kinetic energies. However, it is assumed that the average kinetic energy of the molecules is directly proportional to the absolute (Kelvin) temperature of the gas.**

Answer:- A

7, Explanation:-



- **According to gay Lussac's law, pressure directly proportional to temperature (p α T) at constant volume.**
- $\frac{P1}{T1}=\frac{P2}{T2}(v=constant)\,where\,P=pressure,T=temperature,V=volume$
- ¿ $containers\,X\wedge Y,the\,volume\,is\,constant.that\,is\,1\,L.The\,temperature\,is\,higher(60\,C)\in Y$

Than in X (20^0C).

- **The molecule in Y exert more pressure according to gay Lussac's law.**

Answer:- B

8, Explanation:-

- **In solids, the particles are highly ordered and there is strong attractive force between them. The particles are very close to each other.**
- **In liquids, the particles are less ordered and are relatively held by weaker attractive force. The particles are not as the solid particles.**
- **In the gases, the particles are highly disordered and very far apart. They are held by weak attractive forces.**
  Thus, Solid< Liquid< Gas in relative distance between the particles.

Answer:- C

9, Explanation:-

- $\frac{P1V1}{T1}=\frac{P2V2}{T2}(Combined\,gas\,law)$

$$\frac{250\,torr\,x\,10\,L}{-173k+273\,K}=\frac{500\,torr\,xV2}{(127+273)K}$$

$$\frac{2500}{100}=\frac{500V2}{400},V2=\frac{2500\,x\,400}{100\,x\,500}=20\,L$$

Answer:- A

10, Explanation:-

- **Graham's law of diffusion states that at constant temperature and pressure, the rate of diffusion of a gas, r, is inversely**

proportional to the square root of its density, d, or molar mass, M.

- **The lower the molecular mass of the gas, the higher its rate of diffusion.**
- **Hence, NO2(46)< NO(30)< N2(28),NH3(17) In rate if diffusion**

Answer:- A

11, Explanation:-

$$pv = nRT$$

$$V = \frac{nRT}{p}$$

$$n = \frac{m}{M} = \frac{2.8\,g}{\frac{28\,g}{mol}} = 0.1\,mol$$

$$T = 27 + 273\,K = 300\,k$$

$$V = \frac{0.1\,mol * 0.082\,L\frac{atm}{molk} * 300\,k}{0.821\,atm} = 3\,L$$

Answer:- C

12, Explanation:-

$$\frac{rkr}{ru.g} = \frac{\sqrt{Mu}.g}{\sqrt{Mkr}}$$

$$\frac{1}{1.73} = \frac{\sqrt{Mu}.g}{\sqrt{83.8}}$$

$(1/1.73)^2$ = Mu.g/83.8

Mu.g = $(1/1.73)^2$ * 83.8 = 28g/mol
Answer:- D

13, Explanation:-

- **An ideal gas is a hypothetical gas that obeys the gas laws.**

- **It obeys the gas laws closely at high temperature and low pressure. Under these conditions, their particles are very far apart.**

Answer:- D

14, Explanation:-

- ✓ **Boyle's law: V α 1/ P (at constant T and n)**
- ✓ **Charles' law: V α T (at constant P and n)**
- ✓ **Avogadro's law: V α n (at constant P and T)**
  - **This relationship indicates how the volume of gas depends on pressure, temperature and number of moles.**

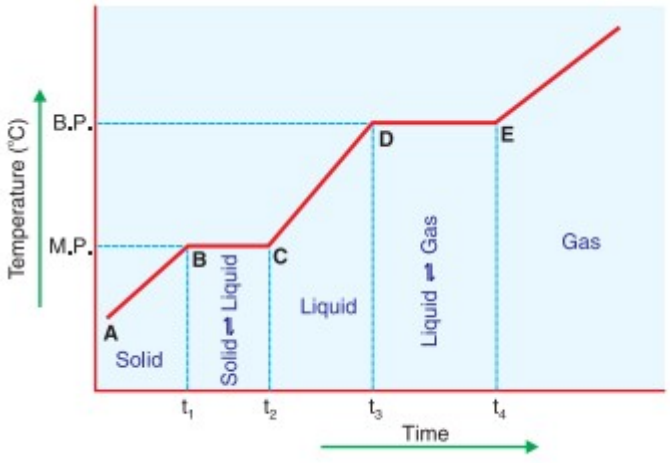
Vα nT /P or V = RnT/ P

Where R, is a proportionality constant called the gas constant

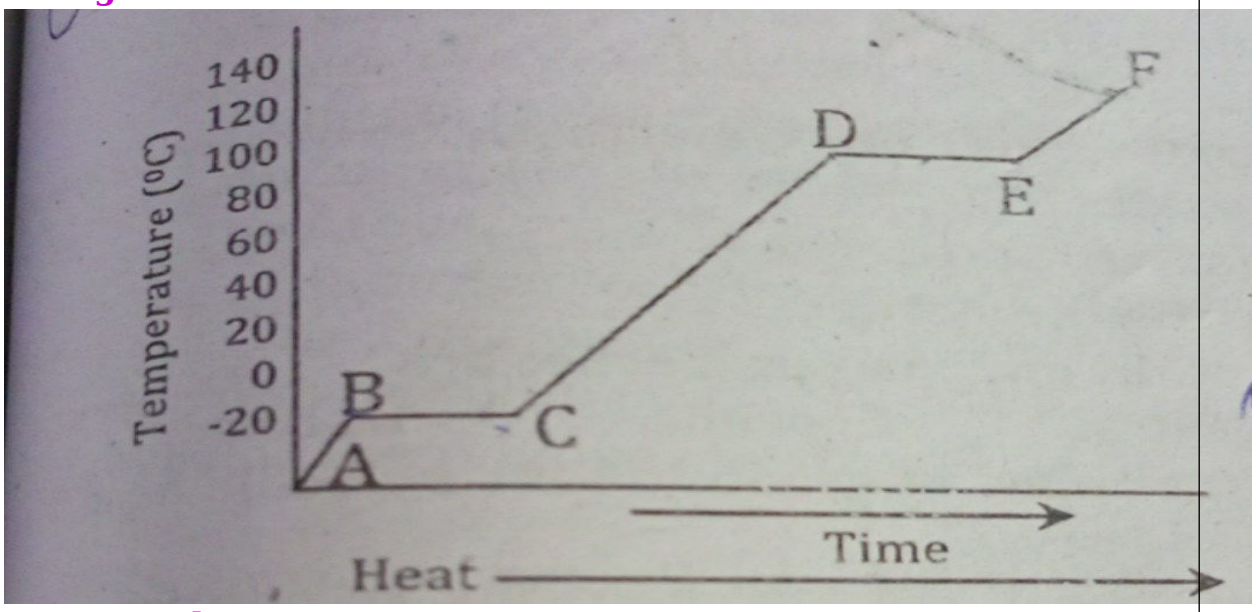
- **From this, PV = nRT(ideal gas equation will be derived)**

Answer:- D

15, Explanation:-



- **Looking the above pic for heating curve the Liquid and gas co existed in a boiling point term at 100 degree centigrade.**



- **Path D to E is the correct ones!**

  Answer:- B

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