

DR.VIRENDRA SWARUP EDUCATION CENTRE,KIDWAI NAGAR
CHEMISTRY HOLIDAY H.W CLASS 9

Solve the following numericals on gas laws-

1. It is desired to reduce the volume of 1000 cm^3 of a gas by 25%. To what temperature the gas be cooled if the initial temperature is 125°C and the pressure remains constant ?
2. 80 ml of nitrogen is at a pressure of 800 mm Hg. The pressure is then raised to 960 torr. Find by how much the volume would diminish, if temperature remains constant.
3. A gas is collected at 37°C and 10 atm pressure. It is desired to reduce its volume to $1/5^{\text{th}}$ of its original volume at a pressure of 12 atm. To what temperature should it be cooled?
4. Certain amount of a gas occupies a volume of 10L at 20°C . To what temperature should it be heated so that its volume gets (i) doubled (ii) reduced to half.
5. Calculate the volume of dry air in cm^3 at S.T.P that occupies 70L at 24°C and 760 mmHg when saturated with water vapour. The vapour pressure of water at 24°C is 20mmHg.
6. A balloon filled with hydrogen has a volume of 1,00,000 L at 700mmHg and 30°C . It ascends to a height of 3 km where the pressure is 600 mm Hg and temperature is -30°C . What is the volume of the volume after its ascent?
7. 0.185 dm^3 of hydrogen gas is collected over water at a temperature of 23°C and total pressure of 99085 Nm^{-2} . If the vapour pressure of water at 23°C is 2973 Nm^{-2} , what is the pressure exerted by the dry gas? Also calculate the volume of dry gas under 1atm pressure.
8. A gas was allowed to expand from a volume of 800ml to 2400ml at a constant temperature. If the initial pressure of the gas was 3 atm, calculate the final pressure of the gas.
9. The volume of a certain gas at constant temperature was found to be 800ml, when the pressure was 950mmHg. If the volume is decreased to 50% of original volume, what is the change in pressure of the gas.
10. A round bottom flask contains 300ml of the gas at 27°C and 76 cm Hg. What will be its pressure when it is transferred to a conical flask of 100ml at 127°C ?
11. How many cylinders of 1200ml capacity at 1 atm pressure can be filled from a cylinder of 100L capacity under a pressure of 150atm, at the same temperature
12. The given mass of a gas occupies 80ml at 20°C and 740mm Hg pressure. Calculate the volume at N.T.P.
13. A container containing hydrogen gas is heated such that its volume increases by 40% and pressure decreases to 80% of its original value. If the original temperature was -13°C , calculate the temperature to which the gas was heated.
14. The pressure of 1 mole of a gas at S.T.P is tripled and temperature is raised to 546K. What is the final volume of the gas? (1 mole of gas occupies a volume of 22.4 L at S.T.P)
15. 200 cm^3 of hydrogen is collected over water at 300K and 760mmHg pressure. Find the volume of dry gas at S.T.P. The aqueous tension of water at 300K is 20mmHg.
16. A gas collected at a pressure of 90cmHg and a temperature of 50°C . To what temperature should it be cooled so that it occupies a volume which is 80% of its original volume when the pressure of gas is 80cmHg.
17. A 16L capacity metal enclosure contains a gas Y at 10 atm and constant temperature. Calculate the number of sealed tubes of 1 L capacity which can be filled completely when the pressure of gas Y is 760mmHg.
18. At 0°C and 760mmHg pressure a gas occupies a volume of 200 cm^3 . The Kelvin temperature of the gas increased by one-fifth while the pressure is increased two and a half times. Calculate the final volume of the gas in litres.
19. A one litre flask contains air, water vapour and a small amount of liquid water at a pressure of 200mmHg. If this is connected to another one litre evacuated flask, what will be the final pressure of the gas mixture at equilibrium? Assume the temperature to be 50°C . Aqueous tension at 50°C = 93mmHg
20. At a given temperature the pressure of a gas reduces to 75% of its initial value and volume increases by 40 % of its initial value. Find the temperature if its initial temperature was 10°C .

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