CHEMISTRY

BOOKS - A N EXCEL PUBLICATION

STATES OF MATTER

Question Bank

1. A balloon is filled with hydrogen at room temperature. It will burst if pressure exceeds 0.2bar. If at 1bar pressure the gas occupies

2.27 L volume, upto what volume can the ballon be expanded?

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2. On a ship sailing in pacific occean where temperature is $23.4^{\circ} C$, a balloon is filled with 2L air. What will be the volume of the balloon when the ship reaches Indian ocean, where temperature is $26.1^{\circ} C$?

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3. At $25^{\circ}C$ and 760 mm of Hg pressure a gas occupies 600mL volume. What will be its pressure at a height where temperature is $10^{\circ}C$ and volume of the gas is 640 mL?

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4. A neon-dioxygen mixture contains 70.6 g dioxygen and 167.5 g neon. Pressure of the mixture of gases in the cylinder is 25 bar, What is the partial pressure of dioxygen and neon in the mixture?

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5. Critical temperatures of ammonia and carbon dioxide are 405.5 K and 304.1 K respectively. Which of these gases will liquify first when you start cooling from 500K to their critical temperature?

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6. At $0^{\circ}C$, the density of a certain oxide of a gas at 2 bar is the same as that of N_2 at 5 bar. What is the molecular mass of the oxide?

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7. Pressure of 1 g an ideal gas A at $27^{\circ}C$ is found to be 2 bar. When 2 g of another ideal gas B is introduced in the same flask at same temperature, the pressure becomes 3 bar. Find

the relationship between the molecular masses of A and B

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8. The drain cleaner, Drainex, contains aluminium which reacts with caustic soda to produce H_2. What volume of H_2 at $20^\circ C$ and 1 bar will be increased when 0.15 g of Al reacts?

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9. Density of a gas is found to be $5.46 g dm^{-1}$ at $27^{\circ} C$ and 2 bar pressure. What will be density at STP?

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10. Calculate the total pressure in bar in a mixture of 8g of O_2 and 4g of H_2 confined in a vessel of $1 dm^3$ at $27^{\circ} C$.

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11. 2.9g of a gas $95^\circ C$ occupied the same volume as 0.184g of H_2 at $17^\circ C$ at the same pressure. What is the molar mass of the gas?

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12. Critical temperature for CO_2 and CH_4 are $30.98^\circ C$ and $-81.9^\circ C$ respectively. Which of these has stronger intermolecular forces. Why?

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13. Out of NH_3 and N_2, which one will have greater value of the van dar Waal's constant 'a'

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14. The theory that attempts to explain the behaviour of gases is known as kinetic molecular theory.

On the basis of this theory, explain the compressible nature of gases and the temperature dependence on kinetic energy.

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15. Liquid drops attain spherical shape. Which property of liquids responsible for this?

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16. Ethanol flows faster than honey. What is the effect of temperature on this?

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17. Give the ideal gas equation and explain the terms.

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18. State the Avogadro law.

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19. What are the conditions under which real gases approach ideal behaviour?

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20. In the Celcius scale, melting point of ice is $0^{\circ}C$. Another scale of temperature is based on absolute zero. Identify the scale.

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21. In the Celcius scale, melting point of ice is $0^{\circ}C$. Another scale of temperature is based on absolute zero. What is the volume of a gas at absolute zero temperature?

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22. In the Celcius scale, melting point of ice is $0^{\circ}C$. Another scale of temperature is based on absolute zero. Draw a graph showing the relationship between volume and temperature of an ideal gas at a constant pressure.

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23. In the Celcius scale, melting point of ice is $0^{\circ}C$. Another scale of temperature is based

on absolute zero. Consider a gas at $0^{\circ}C$. At what temperature will the volume be doubled if the pressure is kept constant?

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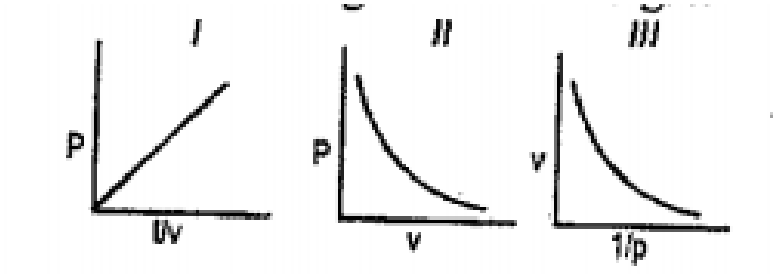
24. Consider the following isothermal of a gas: which gas law is illustrated by these diagrams?



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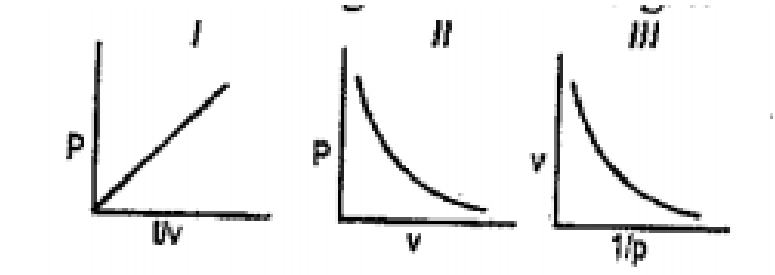
25. Draw the diagram when PV is potted against P?



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26. Name the gas law which gives the relationship between the pressure and temperature of a fixed amount of gas at a constant volume.

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27. Gas laws are relationship between the measurable properties of gases. Draw the graph to illustrate the relationship between temperature and pressure of a fixed amount of gas at constant volume.

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28. Gas laws are relationship between the measurable properties of gases. A definite quantity of an ideal gas is confined in a container of constant volume. When the container is immersed in a bath of melting ice, the pressure of the gas is 800mm of Hg. Find the temperature when the gas pressure is 400mm of Hg.

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29. The combination of Boyl's law, Charle's law and Avogadro's law is known as ideal gas equation. But the real gases deviate from ideal behaviour.

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30. Give the name of modified ideal gas equation and write down it.

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31. The combination of Boyl's law, Charle's law and Avogadro's law is known as ideal gas equation. But the real gases deviate from ideal behaviour. Name the above equation.

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32. Water can boiled more quickly on the top of a mountain.What is the reason?

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33. Give reason for the following. Windows panes of old bulding become thicker at the bottom than at the top.

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34. What is meant by Boyle temperature Boyle point?

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35. Real gases behave ideally only at certain conditions. Write the expression for compressibilty factor. What is its value for an ideal gas?

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36. Real gases behave ideally only at certain conditions. Density of a gas was found to be 5.5 g L at 2 bar pressure. Calculate its molar mass. [R = $0.083\overline{L}mol^{-1}K^{-1}$] t=250 degree C

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37. What is thermodynamic scale of temperature ?

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38. Viscosity of liquids decreases with increase of temprature. Why?

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39. Gases deviate from ideal behaviour due to the faulty assumptions of the kinetic theory of gases. State those faulty assumptions

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40. Van dar Waal's equation explains the behaviour of rea gases. What does the van der Waal's constant 'a' indicate?

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41. Difine critical temperature (Tc)

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42. At $25^{\circ} C$ and 760 mm of Hg pressure a gas occupies 600mL volume. What will be its pressure at a height where temperature is $10^{\circ} C$ and volume of the gas is 640 mL?

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43. What is meant by Boyle temperature or Boyle point ?

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44. Vapour pressure is an important property of liquids. pressure cooker is used for cooking food at higher altitudes. Give reason.

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45. A neon dioxygen mixture contains 70.6g dioxygen and 167.5g neon. If the pressure of the mixture of gases in the cylinder is 25 bar, what are the partial pressure of O_2 and neon in the mixture?

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46. Particles of soil at the bottom of a river remain separated, but they sick together when taken out. Name the property behind this.

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47. Critical temperatures of ammonia and CO_2 are 405.5K and 304K respectively. On cooling these gases from 500K, which gas will liquify first?

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48. Van der Waal's forces are attraction inter molecular forces. Write the names of any two types of van der Waal's forces.

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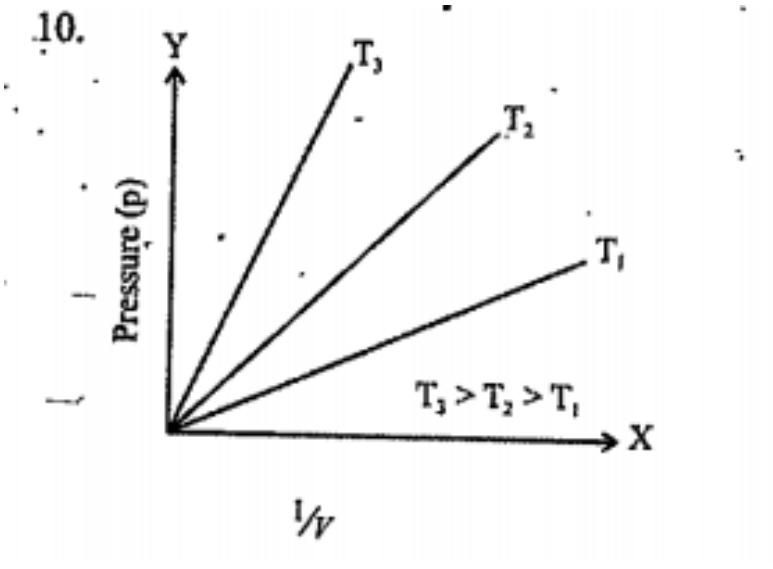

49.

Name the gas law shown by the above graph

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50. State the gas laws.

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51. At $35^{\circ} C$ and 700 mm of Hg pressure, a gas occupies a 500mL volume. What will be its pressure when the temperature is $15^{\circ} C$ and the volume of the gas is 450ml?

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52. The gases which obey Gas Laws at all temperatures and pressures are called ideal gases. Give reasons for the deviation of real gases from the ideal gas behaviour

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53. The gases which obey Gas Laws at all temperatures and pressures are called ideal gases. Calculate the minimum pressure

required to compress 500mL of air at 1 atm to 300mL at the same temperature.

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54. The kinetic molecular theory provides a theoretical basis to experimentally observed facts related to gases. Which one of the following statements is CORRECT with regard to the gaseous state?

A. Molecules have fixed positions.

B. Molecules are in constant random motion

C. All molecules have same speed at a given temperatre

D. The average kinetic energy of the gas molecules is inversely proportional to the absolute temperature.

Answer:

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55. A sample of hydrogen gas occupies a volume of 300 ml at 1.2 bar pressure and $5^{\circ} C$. Calculate its volume ar 0.45 bar pressure and $70^{\circ} C$.

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56. Ideal gas equation is true for ideal gas only. There is a modified form of ideal gas equation applicable to all gases. Give the name of modified form of ideal gas equation and write down it.

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57. Name the allotropes of carbon

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58. What do you know about Dalton's law of partial pressure?

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