CHEMISTRY

BOOKS - MBD CHEMISTRY (ODIA ENGLISH)

STATES OF MATTER (GASES AND LIQUIDS)

Question Bank

1. 500 ml oxygen at a pressure of 700 mm, 300 ml hydrogen at a pressure of 750 mm and 700 ml of nitrogen at a pressure of 600 mm are enclosed in a vessel of 1 litre capacity at $25^{\circ} C$. Calculated the total pressure of the gas mixture.

Watch Video Solution

2. If the ratio of rates of diffusion of gases are 6:4, then find the ratio of their molecular mass.

Watch Video Solution

3. In an experiment 300 ml of a gas was collected at $22^{\circ}C$ and 720 mm pressure. What will be the volume of the gas at NTP ?

Watch Video Solution

4. A gas occupies a volume of 23.29L ar NTP, What will be the pressure so that the volume

of the same gas becomes 5 L at 22° C ?

Watch Video Solution

5. A gas occupies a volume of 400 mL at800 mm pressure and at $27^{\circ}C$. Calculate the volume occupied by the same gas at 600 mm pressure and at 127° C.

Watch Video Solution

6. Calculate the weight in g of 1270 mL CO_2 at $37^\circ C$ and at 700 mm pressure. Given: Molecular weight of $CO_2 = 44.$

Watch Video Solution

7. Calculate the volume in mL occupied by 3.5 g nitrogen (mol.wt.28) at $30^\circ C$ and 70.7 cm pressure.

Watch Video Solution

8. Find out the temperature in $.^{\circ} C$ at which 0.225 mole of oxygen will occupy a volume of 6000 mL at 560 mm pressure.Given : R = 0.082 lit. atm $(mole - k)^{-}$.

Watch Video Solution

9. In Victor Meyor's method, 0.2 g of a substance displaced 63 mL of air at $16^{\circ} C$ and 771 mm pressure. Calculated the molecular weight of the substance . At $16^{\circ} C$ aqueous tension = 13.5 mm.

Watch Video Solution

10. A certain quality of a gas occuipes 100 Ml when collected over water at $15^\circ C$ and 750 mm pressure. It occupies 91.9 mL in the dry state at NTP. Find the vapour pressure of water (aqueous tension) at$15^\circ C$.

Watch Video Solution

11. A sperical balloon of 21 cm diameter is to be filled up with hydrogen at NTP from a cylinder containing the gas at 20 atm and $27^{\circ} C$. If the cylinder can hold 2.82 liters of water, calculate the no. of balloons that can be filled up ?

Watch Video Solution

12. In an experiment , 100 mL of H_2 takes 2.5 seconds and 100mL of an unknown gas take 20seconds to penetrate through a porous surface. What is the density of unknown gas with respect to hydrogen ?

Watch Video Solution

13. In 100 seconds, 300 mL of nitrogen diffuse through a porous partition. How long will 400 mL of CO_2 take to diffuse through the same partition under similar conditions ?

Watch Video Solution

14. A hydrocarbon with a molecular formula C_nH_{2n+2} diffuse twice as first as sulphur dioxide at the same temperature.Find the molecular mass of the hydrocarbon. (Atomoc mass of S = 32)

Watch Video Solution

15. Calculate the root mean square velocity and average velocity of nitrogen molecules at $127^\circ C$.

Watch Video Solution

16. Calculate the root mean square velocity of Argon at N.T.P Atomic wt. of Argon is 40.

Watch Video Solution

17. The density of $H_2 at 0^\circ C$ and 760 mm pressure is 0.00009 g/cc. Find te R.M.S velocity of H_2 molecules.

Watch Video Solution

18. Calculate the temperature at which oxygen gas at one atmospheric pressure has the same R.M.S velocity as that of Nitrogen at N.T.P.

Watch Video Solution

19. Convert the following celsius temperature into kelvin temperature : $216^\circ C$.

Watch Video Solution

20. Convert the following celsius temperature into kelvin temperature : $376^{\circ} C$

Watch Video Solution

21. Convert the following celsius temperature into kelvin temperature : $-125.2^{\circ} C$

Watch Video Solution

22. Convert the following absolute temperatures into $\hat{} \ oC$, 400K

Watch Video Solution

23. Convert the following absolute temperatures into $\hat{} \ \circ C$. 0 k

Watch Video Solution

24. Convert the following absolute temperatures into $.^{\circ}C$. 137 k.

Watch Video Solution

25. A given mass of hydrogen has a volume of 510 mL at 60 cm pressure . If the volume is reduced to 402.6 mL at a constant temperature what pressure is applied ?

Watch Video Solution

26. At constant temperature and 740 mm pressure a given sample of air had a volume of 1 litre Find the volume at 760 mm.

Watch Video Solution

27. A gas has a volume 250 mL at $27^{\circ}C$. The volume is doubled by heating the gas at constant pressure. What will be the new temperature ?

Watch Video Solution

28. 200 Ml of a gas had a temperature $27^{\circ}C$ and pressure 750 mm. Find the pressure at which the gas will have a volume 175mL if the temperature is $77^{\circ}C$.

Watch Video Solution

29. 300 mL of a gas at $27^{\circ}C$ and 700 mm pressure was brought under the conditions of $327^{\circ}C$ temperature and 140 mm pressure. What will be the volume ?

Watch Video Solution

30. In an experiment, 35 mL of a gas was collected at $23^\circ C$ and 720 mm pressure. Find its volume at NTP.

Watch Video Solution

31. Under certain conditions 6.7 mL of sulphur dioxide diffuse in 5.5 minutes. Under the same conditions 66.8 Ml of another gas diffuse in 4 minutes. Calculate the molecular weight of the other gas if that of sulphur dioxide is 64.

Watch Video Solution

32. Speeds of diffusion of carbon dioxide and unknown gas under identical conditions were 0.29 and 0.271 mL $(\text{minute})^{-}$ respectively. Calculate the density of the gas if that of carbon dioxide is 1.964 gL^{-1}.

Watch Video Solution

33. Through a given partition 7.5 liters of carbon dioxide diffuse in certain time. Calculate the volume of oxygen that diffuse through the same partition under the same conditions. (Atomic weight of C = 12, O = 16)

Watch Video Solution

34. Calculate the volume occupied by 1.25g methane (mol.wt. 16) at $18^{\circ}C$ and 746 mm pressure (use general gas equation).

Watch Video Solution

35. At 720 mm pressure and at $27^{\circ}C$, 200 mL of gas weight 1.653g . Calculate its molecular weight using general gas equation.

Watch Video Solution

36. Vapour density of a gas is 32. Find the volume of 0.64 g gas at$27^{\circ}C$ and 684 mm pressure .

Watch Video Solution

37. 0.170 g of a volatile liquid displaced 69.1 mL air in Victor Meyor's method. The atmospheric temperature was $15^{\circ}C$ and pressure was 755 mm. (Aqueous tension at $15^{\circ}C$ = 12.7 mm). Find the molecular weight of the liquid.

Watch Video Solution

38. On heating 2.701 g of mercuric oxide, 1.95 mL of dry oxygen at $37^{\circ}C$ and 620 mm pressure were collected. The residue weighed

2.499 g. From this data calculate the molecular weight of oxygen.

Watch Video Solution

39. 2.5 g of pure calcium carbonate, when strongly heated left a residue of 1.400 g. The evolved gas was found to occupy 624 mL at $27^{\circ} C$ and 755 mm pressure. Calculate the molecular weight of the gas.

Watch Video Solution

40. Ammonia chloride when heated with caustic soda gives ammonia gas. What weight of NH_4Cl should be used to get 2460 Ml. NH_3 at 1 atm pressure $827^\circ C$.

Watch Video Solution

41. Between NH_3 and PH_3 gases which will diffuse at a faster rate at a given temp. and pressure ?

Watch Video Solution

42. A hydrogen baloon expands as it goes up in the air. Give reasons in one sentence.

Watch Video Solution

43. Between ammonia and nitrogen gases which is lighter ?

Watch Video Solution

44. What is the absolute temperature ?

Watch Video Solution

45. Between rate of diffusion of SO_2 and CH_4 which is higher ?

Watch Video Solution

46. Pressure remaining constant, what happens to the volume of a certain mass of gas when the absolute temperature is doubled ?

Watch Video Solution

47. What si the value of R, when the pressure is expressed in atmosphere and volume in litres ?

Watch Video Solution

48. Between oxygen and ammonia which gas will diffuse faster at NTP ?

Watch Video Solution

49. What is the relationship between the average K.E. of the gas molecules with the temperature ?

Watch Video Solution

50. Name the measureable properties that describe the behaviour of gases.

Watch Video Solution

51. Define Boyle's law.

Watch Video Solution

52. Define Charles's law.

Watch Video Solution

53. Between SO_2 and NH_3 which gas will diffuse faster at S.T.P ?

Watch Video Solution

54. Write van der Waal's equation for one mole of a gas.

Watch Video Solution

55. What is the value of 'R' in gas equation, when volume is expressed in litres and pressure in atmosphere ?

Watch Video Solution

56. Real gas will approach the behaviour of ideal gas at _____.

Watch Video Solution

57. At constant temperature the product of pressure and volume of a given mass of gas is constant. What is this law called ?

Watch Video Solution

58. The temperature beyond which a gas cannot be liquified even by increase in pressure is called _____.

Watch Video Solution

59. What is the value 'R' in gas equation in calories ?

Watch Video Solution

60. How is the K.E. of a gas molecule related to the temperature ?

Watch Video Solution

61. Under what conditions of temperature and pressure a real gas behaves like an ideak gas ?

Watch Video Solution

62. Write van der Waal's equation for n moles of gas ?

Watch Video Solution

63. How is kinetic energy of a gas molecule related to the temperature ?

Watch Video Solution

64. State Dalton's law of partial pressure.

Watch Video Solution

65. Define Graham's law of diffusion.

Watch Video Solution

66. A gas cylinder cotaining gas at 5 atm. Pressure is stored in a romm at $27^{\circ}C$. The value of the cylinder can with stand pressure upto 10 atm. The room catches fire. At which temperature wil the value brust ?

Watch Video Solution

67. Derive an equation for n moles of an ideal gas.

Watch Video Solution

68. At what conditions , real gas will behave as an ideal gas. Explain in 8 sentences.

Watch Video Solution

69. What are the two reasons for relating the gas volumes to the temperature in kelvin scale rather than Celcius scale ?

Watch Video Solution

70. State Dalton's law of partial pressure.

Watch Video Solution

71. Which of the two graphs will be a straight line at constant temperature ? P versus V or P

versus 1/V ? Explain.

Watch Video Solution

72. Distinguish between ideal gas and real gas.

Write an equation for one mole of a real gas.

Watch Video Solution

73. State and explain boyle's law.

Watch Video Solution

74. What would be the volume of 44 grams of carbon dioxide at NTP ?

Watch Video Solution

75. Describe the kinetic modal of gas and derive Boyle's and Charle's lw on this basis .

Watch Video Solution

76. State and explain boyle's and Charles's law. Derive gas equation from these laws.

Watch Video Solution

77. Derive the equation of state for an ideal gas.What volume will be occupied by 4 grams of CO_2 at $27^\circ C$ and 650 mm pressure ?

Watch Video Solution

78. Define Boyle's law and Charle's law. Derive the combined gas equation from the two laws Find out the value of gas constant 'R'.

Watch Video Solution

79. Define and explain Boyle's law and Charle's law .

Calculate the volume of gram molecule of hydrogen gas at $25^\circ C$ temperature and 700 mm pressure.

Watch Video Solution

80. State and explain the equation of state for an ideal gas. Why real gases deviate from the ideal behaviour ? What is van der Waal's modification of the gas equations ?

Watch Video Solution

81. Define Boyle's and charle's law. Derive gas equation from these laws.

What will be the volume of 3.2 g of oxygen gas at $0^\circ C$ and 760 mm pressure ?

Watch Video Solution

82. What are the main postulates of kinetic theory of gases ? How does it explain the effect of temperature on the volume of a gas ?

Watch Video Solution

83. State and deduce Dalton's law of partial pressure. What are its application in chemistry ?

Watch Video Solution

84. State and explain Boyle's law and Charles's law.

A gas occupies a volume of 200 mL at $27^{\circ} C$ and 700 mm pressure. What volume will it occupy at $47^{\circ} C$ and 800 mm pressure ?

Watch Video Solution

85. Define Boyle's law and Charle's law. Define the combined gas equation from the two laws. Temperature remaining constant, 100 mL of oxygen at 100 mm pressure is transferred to a container of 25 mL capacity. What is the pressure of oxygen in the new container.

Watch Video Solution

86. What are the postulates of kinetic theory of gases ? How Boyle's law and Charle's law can be explained in the light of kinetic model of gas ?

Watch Video Solution

87. State and Explain Boyle's law and Charle's law.A gas occupies a volume of 800 mL at $27^{\circ}C$ and 600 mm pressure. What volume will it occupy ar $37^{\circ}C$ and 800 mm pressure ?

Watch Video Solution

88. The rms velocity of an ideal gas at $27^{\circ}C$ is 0.3ms^{-1}. Its rms velocity at $927^{\circ}C$ (in ms^{-1}) is :

A. 3

B. 2.4

C. 0.9

D. 0.6

Answer: D

Watch Video Solution

89. A gas is said to behave like an ideal gas when the relation $\frac{PV}{T}$ = constant. When do you expect a real gas to behave like an ideal gas ?

A. when the temperature is ow

B. when the temperature and pressure are low

C. when both the temperature and pressure is high

D. when te temperature is high and pressure is low

Answer: D

Watch Video Solution

90. Which of the following statement is wrong for gases ?

A. Gases do not have a definite shape and volume

B. Volume of the gas is equal to the volume of container confining the gas

C. Confined gas exerts uniform pressure on the walls of its container in all directions.

D. Mass of gas cannot be determined by weighing a container in which it is enclosed.

Answer: D

Watch Video Solution

91. The temperature at which real gases obey the ideal gas laws over a wide range of pressure is called :

A. critical temperature

B. Boyle's temperature

C. inversion temperature

D. reduced temperature

Answer: B

Watch Video Solution

92. The van der Walls' equation explains the behaviour of :

A. ideal gases

B. real gases

C. vapours

D. non-real gases

Answer: B

Watch Video Solution

93. In van der Walls equation of state for a non-ideal gas the term that accounts for inter molecular forces is :

A. (V-b)

B. RT

C. $\left(P+\frac{a}{V^2}\right)$

D. $(RT)^{-1}$

Answer: C

Watch Video Solution

94. When there is more deviation in the behaviour of a gas from the ideal gas equation $PV = nRT$?

A. at high temperature and low pressure

B. at low temperature and high pressure

C. at high temperature and high pressure

D. at low temperature and low pressure

Answer: B

Watch Video Solution

95. A container contains 1 mole of a gas at 1 atm pressure and $27^{\circ} C$ and its volume is 24.6 liters. If pressure is 10 atm and temperature $327^{\circ} C$ then the new volume is approximately :

A. 2 liters

B. 48 liters

C. 10 liters

D. 4.92 liters

Answer: D

Watch Video Solution

96. Density of methane at $250^\circ C$ and 6 atm pressure is (R = 0.821 atm) :

A. 2.236 g/L

B. 8 g/L

C. 12 g/L

D. 16 g/L

Answer: A

Watch Video Solution

97. Desnsity ratio of O_2 and H_2 is 16:1 . The ratio of its V_{rms} is :

A. 4:1

B. 16:1

C. 1:4

D. 1:16

Answer: C

Watch Video Solution

98. The compressibility factor of an ideal gas is

:

A. 0

B. 1

C. 2

D. 4

Answer: B

Watch Video Solution

99. The ratio between the root mean square speed of H_2 at 50k and that of O_2 at 800k is :

A. 4

B. 2

C. 1

D. 1/4

Answer: C

Watch Video Solution

100. One mole of N_2O_4 (g) at 300k is kept in a closed container under one atmospheric pressure. It is heated to 600 k when 20 $\%$ by mass of N_2O_4 (g) decomposes to $NO_2(g)$. The resultant pressure is :

A. 1.2 atm

B. 2.4 atm

C. 2.0 atm

D. 1.0 atm

Answer: B

Watch Video Solution

101. 3.2 g oxygen is diffused in 10 minutes. In similar condition 2.8 g nitrogen will diffuse in :

A. 9.3 minutes

B. 8.2 minutes

C. 7.6 minutes

D. 11.8 minutes

Answer: A

Watch Video Solution

102. The compressibility of a gas is less than unity at S.T.P. Therefore :

A. V_m gt 22.4 litres

B. V_m lt 22.4 litres

C. V_m = 22.4 litre

D. V_m = 44.8 litres

Answer: B

Watch Video Solution

103. The rms speed of hydrogen is $\sqrt{7}$ times the rms speed of nitrogen. If T is the temperature of the gas, then :

A. $T(H_2) = T(N_2)$

B. $T(H_2) > T(N_2)$

C. $T(H_2) < T(N_2)$

D. $T(H_2) = \sqrt{7}T(N_2)$

Answer: C

Watch Video Solution

104. The relationship which describes the variation of vapour pressure with temperature is called :

A. Hess law

B. Arrhenius equation

C. Kirchoff's law

D. Claussius-Clapeyron equation

Answer: C

Watch Video Solution

105. Gas equation PV = nRT is obeyed by :

A. Only isothermal process

B. Only adiabatic process

C. BOTH (A) AND (B)

D. None of these

Answer: C

Watch Video Solution

106. When pressure of a given mass of gas is tripled , its volume becomes one third at constant temperature. What is this law called ?

Watch Video Solution

107. What is the order of ideality of the following gases ?

CO_2, H_2, O_2

Watch Video Solution

108. What is the relation between pressure and temperature of a gas at constant volume ?

Watch Video Solution

109. Give the relationship between r.m.s velocity, average velocity and most probable velocity.

Watch Video Solution

110. How is kinetic energy of a gas molecule related to the temperature ?

Watch Video Solution

111. Write van der Waal's equation for n moles of gas ?

Watch Video Solution

112. Define Boyle's law.

Watch Video Solution

113. What si the relationship between pressure and density of a gas ?

Watch Video Solution

114. What is absolute zero temperature ?

Watch Video Solution

115. Between SO_2 and NH_3 which gas will diffuse faster at S.T.P ?

Watch Video Solution

116. How is kinetic energy of a gas molecule related to the temperature ?

Watch Video Solution

117. Under what conditions of temperature and pressure a real gas behaves like an ideak gas ?

Watch Video Solution

118. What is the value 'R' in gas equation in calories ?

Watch Video Solution

119. Write van der Waal's equation for n moles of gas ?

Watch Video Solution

120. At constant temperature the product of pressure and volume of a given mass of gas is constant. What is this law called ?

Watch Video Solution

121. Real gas will approach the behaviour of ideal gas at _____.

Watch Video Solution

122. The temperature beyond which a gas cannot be liquified even by increase in pressure is called _____.

Watch Video Solution

123. What is the value of 'R' in gas equation, when volume is expressed in litres and pressure in atmosphere ?

Watch Video Solution

124. Between SO_2 and NH_3 which gas will diffuse faster at S.T.P ?

Watch Video Solution

125. Define Charles's law.

Watch Video Solution

126. Name the measureable properties that describe the behaviour of gases.

Watch Video Solution

127. Between nitrogen and oxygen which one has higher vapour density ?

Watch Video Solution

128. Arrange the gases, H_2, CO_2, N_2, O_2 in the increasing order of their rate of diffusion.

Watch Video Solution

129. The average K.E. of one mole of any gas is equal to _____.

Watch Video Solution

130. At what pressure 1 mole of any gas occupies 1 litre volume at 273k.

Watch Video Solution

131. What is the relation between most probable, average and root mean square velocity ?

Watch Video Solution

132. Arrange the gases, H_2, CO_2, N_2, O_2 in the decreasing order ..

Watch Video Solution

133. What is the unit of van der Waal's gas constant 'a' ?

Watch Video Solution

134. The value universal gas constant R in joule is _____.

Watch Video Solution

135. Which of the following has the highest rate of diffusion

O_2, CO_2, NH_3, N_2

Watch Video Solution

136. What is the value of a gas constant R in S.I. unit ?

Watch Video Solution

137. Write van der Wall's equation for n moles of a real gas .

Watch Video Solution

138. How does the vapour pressure of a liquid change with intermolecular force of attraction ?

Watch Video Solution

139. What is the effect of pressure on the boiling point of a liquid ?

Watch Video Solution

140. How does the boiling point of a liquid change with decrease in atmospheric pressure ?

Watch Video Solution

141. The vapour pressure of liquid __ with rise of temperature.

Watch Video Solution

142. With increase of altitude, the boiling point of water _____(increase,decreases,remains same)

Watch Video Solution

143. Define viscosity.

Watch Video Solution

144. What is root mean square velocity ?

Watch Video Solution

145. State and explain boyle's law.

Watch Video Solution

146. Which of the two graphs will be a straight line at constant temperature P versus V or P versus 1/V Explain.

Watch Video Solution

147. Distinguish between ideal gas and real gas. Write an equation for one mole of an ideal gas.

Watch Video Solution

148. Calculate the volume of gas evolved with 7 gm of nitrogen gas at 2 atm Pressure and 273.15K .

Watch Video Solution

149. Calculate the volume of 4 gm molecule of hydrogen at $27^{\circ} C$ and 750 mm pressure.

Watch Video Solution

150. What are the causes of deviation of the real gases from ideal gas behaviour ?

Watch Video Solution

151. What are the limitations of van der Waal's equation ?

Watch Video Solution

152. How is pressure of a given mass of gas is related to absolute temperature at constant volume ?

Watch Video Solution

153. A hydrogen baloon expands as it goes up in the air. Give reasons in one sentence.

Watch Video Solution

154. Define Boyle's and charle's law. Derive gas equation from these laws.

What will be the volume of 3.2 g of oxygen gas at $0^{\circ} C$ and 760 mm pressure ?

Watch Video Solution

155. What is absolute zero ?

Watch Video Solution

156. What volume will be occuiped by 4 grams of CO_2 at $27^\circ C$ and 650 mm pressure ?

Watch Video Solution

157. 7 gms of a gas at $300^\circ C$ and 1 atm occupies a volume of 4.1 litre. What is the molar mass of the gas ?

Watch Video Solution

158. 300 cc of a gas are heated from $27^{\circ}C$ to $127^{\circ}C$. What will be the new volume at constant pressure ?

Watch Video Solution

159. Calculate the r.m.s. velocity of oxygen at $47^{\circ}C$ in cm^{-1} .

Watch Video Solution

160. In van der Waal's equation what do the constant a and b represent ?

Watch Video Solution

161. Why are small drops of a liquid spherical ?

Watch Video Solution

162. What do you understand by viscosity of a liquid ?

Watch Video Solution

163. Why surface tension of a liquid decreases with increase of temperature ?

Watch Video Solution

164. Evaporation causes cooling. Explain.

Watch Video Solution

165. Define surface tension.

Watch Video Solution

166. The pressure of a real gas is less than the pressure of an ideal gas because of :

A. Increase in the number of collisions

B. Finite size of the molecules

C. Increase in the kinetic energy

D. Intermolecular forces

Answer: D

Watch Video Solution

167. The compressibility factor for H_2 and He is usally :

A. gt 1

B. lt 1

C. 1

D. Either of these

Answer: A

Watch Video Solution

168. The relation between molecular weight (M) and vapour density (VD) is :

A. $M = 2.5 \times VD$

B. $M = 2 \times VD$

C. $M = 0.5 \times VD$

D. M = VD

Answer: B

Watch Video Solution

169. Which pair of the gaseous species diffuse through a small jet with the same rate of diffusio at same P and T :

A. NO, CO

B. NO, CO_2

C. NH_3, PH_3

D. NO, C_2H_6

Answer: D

Watch Video Solution

170. The rms speed at NTP of the gas can be calculated from the expression :

A. $\sqrt{3P - d}$

B. $\sqrt{3P\frac{V}{M}}$

C. $\sqrt{3R\frac{T}{M}}$

D. All are correct

Answer: D

Watch Video Solution

171. If a gas is explained at constant temperature :

A. Number of molecules of the gas decrease

B. The kinetic energy of the molecules decrease

C. The kinetic energy of the molecules remains the same

D. The kinetic energy of the molecules increases

Answer: C

Watch Video Solution

172. At constant volume , for a fixed number of mole of a gas , the pressure of the gas increase with rise of temperature due to :

A. Increase in average molecular speed

B. Increase in number of mole

C. Increase in molecular attraction

D. Decrease in mean free path

Answer: A

Watch Video Solution

173. Aclosed vessel contains equal number of nitrogen and oxygen molecules at a pressure of P mm. If nitrogen is removed from the system, then the pressure will be :

A. P

B. 2P

C. P/2

D. P^2

Answer: C

Watch Video Solution

174. Four rubber tubes are respectively filled with H_2, O_2, N_2 and he. The tube which will be reinflated forst is :

A. H_2 filled tube

B. O_2 filled tube

C. N_2 filled tube

D. He filled tube

Answer: A

Watch Video Solution

175. Boyle's law may be expressed as :

A. $\left(\frac{dP}{dV}\right)_T = \frac{K}{V}$

B. $\left(\frac{dP}{dV}\right)_T = -\frac{K}{V^2}$

C. $\left(\frac{dP}{dV}\right)_T = -\frac{K}{V}$

D. None of these

Answer: B

Watch Video Solution

176. The vapour density of a gas is 11.2 The volume occupied by11.2 g of rhe gas at NTP is :

A. 1 litre

B. 11.2 litre

C. 22.4 litre

D. 4.8 litre

Answer: B

Watch Video Solution

177. If air contains N_2 and O_2 in volume ratio 4:1, the average vapour density of air is :

A. 14.5

B. 16.5

C. 14.4

D. 29

Answer: C

Watch Video Solution

178. The equation of State corresponding to 8 g of O_2 is :

A. PV = 8RT

B. PV = $\frac{RT}{4}$

C. PV = RT

D. PV = $\frac{RT}{2}$

Answer: B

Watch Video Solution

179. The ratio between the root mean square speed of H_2 at 50k and that of O_2 at 800k is :

A. 4

B. 2

C. 1

D. 1/4

Answer: C

Watch Video Solution

180. Which contains the same number of molecules as 16 g of oxygen :

A. $16gO_3$

B. $32gSO_2$

C. $32gSO_3$

D. All of the above

Answer: C

Watch Video Solution

181. A gaseous mixture contains oxygen and nitrogen in the ration of 1:4 by weight therefore, the ratio of their number of molecules is :

A. 1:4

B. 1:8

C. 7:32

D. 3:16

Answer: C

Watch Video Solution

182. Which has more weight at NTP :

A. one litre of oxygen

B. One litre of hydrogen

C. One litre of nitrogen

D. One litre of chlorine

Answer: D

Watch Video Solution

183. The density of CCl_4 vapour at $0^\circ C$ and 76 cm Hg in g / litre is :

A. 11.2

B. 77

C. 6.88

D. None

Answer: C

Watch Video Solution

184. The mole percentage of hydrogen in a mixture of 6 g of hydrogen and 28 g of nitrogen is :

A. 25

B. 50

C. 75

D. 100

Answer: C

Watch Video Solution

185. The approximate density of CO_2 gas at STP is :

A. 1 mol/litre

B. 2 g/litre

C. 2 g/mL

D. 44 g/Ml

Answer: B

Watch Video Solution

186. The circulation of blood in human body supplies O_2 and releases CO_2 The concentration of O_2 and CO_2 is variable but on the average, 100 mL blood contains 0.02 g of O_2 and 0.08 g CO_2 . The volume of O_2 and CO_2 at 1 atm and body temperature $37^{\circ} C$, assuming 10 litre blood in human body is :

A. 2 litre, 4 litre

B. 1.5 litre, 4.5 litre

C. 1.59 litre, 4.62 litre

D. 3.82 litre, 4.62 litre

Answer: C

Watch Video Solution

187. When an ideal diatomic has is heated at constant pressure the fraction of the heat energy supplied which oncreases the internal energy of the gas is :

A. 2/5

B. 3/5

C. 3/7

D. 5/7

Answer: D

Watch Video Solution

188. The root mean square soeed of hydrogen molecules at room temperature is 2400 ms^{-1}. At room temperature the root mean square speed of oxygen molecules would be :

A. 400 m s^{-1}

B. $300ms^{-1}$

C. $600ms^{-1}$

D. $1600ms^{-1}$

Answer: C

Watch Video Solution

189. The temperature at which H_2 has same rms speed (at 1 atm) as that of O_2 at NTP is :

A. 37 k

B. 17 k

C. 512 k

D. 27 k

Answer: B

Watch Video Solution

190. 10 g of a gas at NTP occupies a volume of 2 litre. At what temperature will the volume of 2 litre. At what temperature will the volume be double, pressure and amount of the gas remaining same :

A. 273 k

B. 546 k

C. $-273^{\circ} C$

D. $546^{\circ} C$

Answer: B

Watch Video Solution

191. The inversion temperature (T_i) for a gas is given by :

A. a /Rb

B. 2a/Rb

C. Rb/a

D. $\frac{2Rb}{a}$

Answer: B

Watch Video Solution

192. Which gas can be most readily liquefied :

A. NH_3

B. Cl_2

C. SO_2

D. CO_2

Answer: C

Watch Video Solution

193. Non reacting gases have a tendency to mix with each other. This property is known is :

A. Diffusion

B. Fusion

C. Mixig

D. None

Answer: A

Watch Video Solution

194. Torr is unit of :

A. Temperature

B. Pressure

C. Volume

D. Density

Answer: B

Watch Video Solution

195. The van der Walls' equation explains the behaviour of :

A. atm litre mol^{-1}

B. $atmdm^{3}mol^{-1}$

C. dyne cm mol^{-1}

D. all

Answer: D

Watch Video Solution

196. An ideal gas obeys:

A. Boyle's law

B. Charle's law

C. Avogadro's law

D. All of these

Answer: D

Watch Video Solution

197. The numerical value of 'a' the van der Waals' constant is maximum for :

A. NH_3

B. H_2

C. O_2

D. He

Answer: A

Watch Video Solution

198. Which set of conditions represents easiest way to liquify a gas :

A. Low temperature and high pressure

B. High temperature and low pressure

C. Low temperature and low pressure

D. High temperature and high pressure

Answer: A

Watch Video Solution

199. The van der Walls' equation explains the behaviour of :

A. Ideal gases

B. Real gases

C. BOTH (A) AND (B)

D. None

Answer: B

Watch Video Solution

200. Gases deviate from ideal gas behaviour because their molecules :

A. Possess negligible volume

B. Have forces of attraction between them

C. Are polyatomic

D. All of these

Answer: B

Watch Video Solution

201. The rms speed of hydrogen is $\sqrt{7}$ times the rms speed of nitrogen. If T is the temperature of the gas, then :

A. $T_{H_2} = T_{N_2}$

B. $T_{H_2} > T_{N_2}$

C. $T_{H_2} < T_{N_2}$

D. $T(H_2) = \sqrt{7}T(N_2)$

Answer: C

Watch Video Solution

202. At $100^{\circ} C$ and 1 atm, if the density of liquid water is 1.0 g cm^{-3}, and that of water vapour is 0.0006 g cm^{-3} , then the volume occupied by water molecules in one litre of stream at that temperature is :

A. 6 cm^{3}

B. $60 cm^{3}$

C. 0.6 cm^{3}

D. 0.06 cm^{3}

Answer: C

Watch Video Solution

203. The density of $CO_2 at 100^\circ C$ and 800 mm of Hg is :

A. 1.51 g/L

B. 1.51 g.Ml

C. 1.51 g$/cm^2$

D. None

Answer: A

Watch Video Solution

204. The gases are at absolute temperature 300K and 350 K respetivily. The ratio of average kinetic energy of their molecules is :

A. 7:6

B. 6:7

C. 36:49

D. 49:36

Answer: B

Watch Video Solution

205. A sample of gas is at $0^\circ C$ The temperature at which its rms speed of molecules will be doubled is :

A. $1103^\circ C$

B. $273^\circ C$

C. $723^\circ C$

D. $819^\circ C$

Answer: D

Watch Video Solution

206. Under identical conditions of temperature the density of a gas A is three times that of gas B while molecular mass of gas B while molecular mass of gas B is twice that of A. The ratio of pressure of A and B will be :

A. 6

B. 1/6

C. 2/3

D. 3/2

Answer: A

Watch Video Solution

207. The molecules of a gas A travel four times faster than the molecules of gas B at the same temperature. The ratio of molecular weights $\left(\frac{M_A}{M_B}\right)$ will be :

A. 1/16

B. 4

C. 1/6

D. 16

Answer: A

Watch Video Solution

208. 32 g of oxygen and 3 g of hydrogen are mixed and kept in a vessel of 760 mm pressure and $0^\circ C$. The total volume occupied by the maximum will be nearly :

A. 22.4 litre

B. 33.6 litre

C. 56 litre

D. 44.8 litre

Answer: C

Watch Video Solution

209. Two g of hydrogen diffuse from a container in 10 minute. How many gram of oxygen would diffuse through the same container in the same time under similar conditions:

A. 5 g

B. 4 g

C. 6 g

D. 8 g

Answer: D

Watch Video Solution

210. A pre-weighed vessel was filled with oxygen at NTP and weighed , It was then evacuated, filled with SO_2 at the same temperature and pressure and again weighed. The weight of oxygen is:

A. The same as that of SO_2

B. 1/2 that ofSO_2

C. Twice that of SO_2

D. 1/4 that of SO_2

Answer: B

Watch Video Solution

211. The ratio of rates of diffusion of CO_2 and SO_2 at the same P and T is :

A. 4:sqrt11

B. sqrt11:4

C. 1:4

D. 1:6

Answer: A

Watch Video Solution

212. At what temperature will be rate of effusion of N_2 be 1.625 times the rate of effusion of SO_2 at $500^\circ C$:

A. 273 K

B. 893 K

C. 110 K

D. 173 K

Answer: B

Watch Video Solution

213. At what temperature will be total kinetic energy (KE) of 0.3 mole He be the same as the total KE of 0.40 mole of Ar at 400 K:

A. 400 K

B. 373K

C. 533 k

D. 300 k

Answer: C

Watch Video Solution

214. Density of ammonia is 0.77 g/litre at NTP. Its vapour density is :

A. 8.65

B. 86.5

C. 4.33

D. 43.3

Answer: A

Watch Video Solution

215. The average molecular speed is greatest in case of a gas sample of :

A. 2.0 mole of He at 140 K

B. 0.05 mole of Ne at 500 K

C. 0.40 mole of O_2 at 400 K

D. 1.0 mole of N_2 at 560 K

Answer: A

Watch Video Solution

216. Which of the following gases would have the highest RMS speed at $0^\circ C$:

A. O_3

B. CO_2

C. SO_3

D. CO

Answer: D

Watch Video Solution

217. The density of neon will be highest at :

A. STP

B. $0^\circ C$, 2 atm

C. $273^\circ C, 1atm$

D. $273^\circ C$, 2 atm

Answer: B

Watch Video Solution

218. At NTP, 5.6 litre of a gas weight 8 g. The vapour density of the gas is :

A. 32

B. 40

C. 16

D. 8

Answer: C

Watch Video Solution

219. At $27^{\circ}C$ the ratio of root square speeds of ozone to oxygen is :

A. $\sqrt{\frac{3}{5}}$

B. $\sqrt{\frac{4}{3}}$

C. $\sqrt{\frac{2}{3}}$

D. 0.25

Answer: C

Watch Video Solution

220. 22 g solid CO_2 or dry ice is enclosed in a bottle of one litre properly closed. If temperature of bottle is raised to $25^\circ C$ to evaporate all the CO_2, the pressure in bottle is :

A. 13.23 atm

B. 12.23 atm

C. 11.23 atm

D. 14.23 atm

Answer: A

Watch Video Solution

221. According to Charles's law :

A. $\left(\frac{DV}{DT}\right)_P = K$

B. $\left(\frac{DV}{DT}\right)_P = -K$

C. $\left(\frac{DV}{DT}\right)_P = -\frac{K}{T}$

D. None of these

Answer: A

Watch Video Solution

222. If a gas is heated at constant pressure, its density :

A. Will increase

B. Will decrease

C. Will remain unchanged

D. May increase or decrease

Answer: B

Watch Video Solution

223. Longest mean free path under similar conditions of P and T stands for :

A. N_2

B. O_2

C. H_2

D. Cl_2

Answer: C

Watch Video Solution

224. Which represents the largest amount of energy :

A. calorie

B. joule

C. erg

D. electron-volt

Answer: A

Watch Video Solution

225. Which gas has the highest partial pressure in atmosphere :

A. CO_2

B. H_2O

C. O_2

D. N_2

Answer: D

Watch Video Solution

226. The compressibility of a gas is less than unity at S.T.P. Therefore :

A. V_m gt 22.4 litres

B. V_m lt 22.4 litres

C. V_m = 22.4 litres

D. V_m = 44.8 litres

Answer: B

Watch Video Solution

227. The van der Waals' equation for equal real gas is :

A. $\left(P+\frac{a}{V^2}\right)(V-b)=RT$

B. $\left(P+\frac{n^2a}{V^2}\right)(V-nb)=nRT$

C. $P=\frac{nRT}{V-nb}-\frac{an^2}{v^2}$

D. All of the above

Answer: D

Watch Video Solution

228. With increase of pressure , the mean free path :

A. Decrease

B. Increase

C. Becomes zero

D. Remains same

Answer: A

Watch Video Solution

229. The value of van der Waals' constant 'a' for gases O_2, N_2, NH_3 and CH_4 re 1.360,1.390,4.170 and 2.253 $litre^2$ atm mol^{-2} respectively. The gas which can most easily be liquefied is :

A. O_2

B. N_2

C. NH_3

D. CH_4

Answer: C

Watch Video Solution

230. A liquid is in equilibrium with its vapours at its boiling point. On the average the molecules in the two phases have equal:

A. Intermolecular forces

B. Potential energy

C. Total energy

D. Kinetic energy

Answer: D

Watch Video Solution

231. Gay-Lussac's law of combining volume is applicable for those gases which on mixing:

A. Do not react

B. React with each other

C. Diffuse

D. All of the above

Answer: B

Watch Video Solution

232. Boyle's law according to kinetic equation can be expressed as :

A. PV = KT

B. PV = RT

C. PV = 3/2kT

D. PV = 2/3kT

Answer: D

Watch Video Solution

233. The joule-Thomson coefficient for a gas is zero at :

A. Inversion temperature

B. Critical temperature

C. Absolute temperature

D. Below $0^\circ C$

Answer: A

Watch Video Solution

234. A gas will approach ideal behaviour at :

A. Low T and high P

B. Low T and low P

C. High T and low P

D. High T and high P

Answer: C

Watch Video Solution

235. Consider an ideal gas contained in a vessel. It the intermolecular interaction suddenly begains to act, which of the following will happen :

A. The pressure decrease

B. The presseure increase

C. The pressure remains unchanged

D. The gas collapses

Answer: A

Watch Video Solution

Watch Video Solution

236. A bottle of dry NH_3 and bottle of dry HCl connected through a long tube are opened simultaneously at both ends, the white (NH_4Cl) ring first formed will be :

A. At the centre of the tube

B. Near the HCl bottle

C. Near the ammonia bottle

D. Throughout the length of the tube

Answer: B

Watch Video Solution

237. At lower temperature, all gases show:

A. Negative deviation

B. Positive deviation

C. Positive and negative deviation

D. None

Answer: C

Watch Video Solution

238. Dalton's law of partial pressure is not applicable to :

A. H_2 and N_2 mixture

B. H_2 and Cl_2 mixture

C. H_2 and CO_2 mixture

D. None

Answer: B

Watch Video Solution

239. A perfectiges of a given mass is heated first in a small vessel and then in a large vessel, The P-T curves are :

A. Parabolic with same curvature

B. Parabolic with different curvature

C. Linear with same slope

D. Linear with different slope

Answer: D

Watch Video Solution

240. The numerical value RT/PV for a gas at critical conditions is .... Times of RT/PV at normal conditions:

A. 4

B. 3/8

C. 8/3

D. 1/4

Answer: C

Watch Video Solution

241. If a mixture of gas has a total pressure of 100 cm Hg and the partial pressure of nitrogen in the mixture is 25 mm Hg, then the per cent of nitrogen in the mixture is :

A. 4%

B. 40%

C. 400%

D. 2.5%

Answer: D

Watch Video Solution

242. If the concentration of water vapour in the air is 1% and the total atmospheric pressure equals 1 atm then the partial pressure of water vapour is :

A. 0.1 atm

B. 1 mm Hg

C. 7.6 mm Hg

D. 100 atm

Answer: C

Watch Video Solution

243. The root mean square speed of the molecules of diatomic gas is u. When the temperature is doubled, the molecules dissociates into two atoms. The new rms speed of the atom is :

A. $\sqrt{2}u$

B. u

C. 2 u

D. 4u

Answer: C

Watch Video Solution

244. The rms speed of the molecules of a gas of density 4 kg m^{-3} and pressure $1.2 \times 10^5 Nm^{-2}$ is :

A. $120ms^{-1}$

B. $300ms^{-1}$

C. $600ms^{-1}$

D. $900ms^{-1}$

Answer: B

Watch Video Solution

245. 380 mL of a gas at $27^{\circ}C$, 800 mm of Hg weight 0.455 g. The mol.wt. of gas is :

A. 27

B. 28

C. 29

D. 30

Answer: B

Watch Video Solution

246. If the pressure and temperature of 2 litre of CO_2 are doubled, the volume of CO_2 would become :

A. 5 litre

B. 4 litre

C. 8 litre

D. 2 litre

Answer: D

Watch Video Solution

247. The rates of diffusion of O_2 and H_2 at same P and T are the ratio :

A. 1:4

B. 1:8

C. 1:16

D. 4:1

Answer: A

Watch Video Solution

248. A vessel has nitrogen gas and water vapours at a total pressure of 1 atm. The partial pressure of water vapours is 0.3 atm.

The contents of this vessel are transferred to another vessel havig one third of the capacity of original volume, completely at the same temperature, the total pressure of the system in the new vessel is :

A. 3.0 atm

B. 1 atm

C. 3.33 atm

D. 2.4 atm

Answer: D

Watch Video Solution

249. 4.4 of CO_2 and 2.24 litre of H_2 at STP are mixed in a container. The total number of molecules present in the container will be :

A. 6.022×10^{23}

B. 1.2044×10^{23}

C. 2

D. 6.023×10^{24}

Answer: B

Watch Video Solution

250. 5 g each of the following gases at $87^{\circ} C$ and 750 mm pressure are taken. Which of them will have the least volume :

A. HF

B. HCl

C. HBr

D. HI

Answer: D

Watch Video Solution

251. Air cotains $79\% N_2$ and $21\% O_2$ by volume.If the barometric pressure is 750 mm Hg the partial pressure of oxygen is :

A. 157.7 mm of Hg

B. 175.5 mm of Hg

C. 315.0 mm of Hg

D. None of the above

Answer: A

Watch Video Solution

252. If the pressure is halved and absolute temperature doubled the volume of the gas will be :

A. 4

B. 2

C. Same

D. 8

Answer: A

Watch Video Solution

253. The average speed of an ideal gas molecule at $27^{\circ} C$ is $0.3 \sec^{-1}$. The average speed at $927^{\circ} C$ will be ...m `sec^(-1).

A. 0.6

B. 0.3

C. 0.9

D. 3

Answer: A

Watch Video Solution

254. The rate of diffusion of SO_2 and O_2 at the same P and T are in the ratio (S = 32, O = 16):

A. 1:32

B. 1:4

C. 1:2

D. $1 : \sqrt{2}$

Answer: D

Watch Video Solution

255. 20 g of hydrogen is present in 5 litre vessel, The molar concentration of hydrogen is :

A. 2

B. 4

C. 3

D. 1

Answer: A

Watch Video Solution

256. Graham's law deals wih the relation between :

A. Pressure and volume

B. Density and rate of diffusion

C. Rate of diffusion and volume

D. Rate of diffusion and viscocity

Answer: B

Watch Video Solution

257. The average kinetic energy of an ideal gas per molecule in SI units at $25^{\circ}C$ will be :

A. $6.17 \times 10^{-21} KJ$

B. $6.17 \times 10^{-21} J$

C. $6.17 \times 10^{-21} J$

D. $7.16 \times 10^{-20} J$

Answer: B

Watch Video Solution

258. Joule-Thomson coefficient (μ_{π}) is given by

:

A. $\left(\left(\delta\frac{T}{\delta P}\right)_{H}\right.$

B. $\left(\left(\delta\frac{T}{\delta P}\right)_{E}\right.$

C. $\left(\left(\delta\frac{P}{\delta H}\right)_{H}\right.$

D. None of these

Answer: A

Watch Video Solution

259. Joule-Thomson coefficient $\left(\left(\delta\frac{T}{\delta P}\right)_H\right.$ for an ideal gas is :

A. zero

B. +ve

C. -ve

D. None of these

Answer: A

Watch Video Solution

260. The ratio of the average speed of an oxygen molecle to the rms speed of a nitrogen molecule at the same temperature is :

A. $\left(\frac{3\pi}{7}\right)^{\frac{1}{2}}$

B. $\left(\frac{7}{3\pi}\right)^{\frac{1}{2}}$

C. $\left(\frac{3}{7\pi}\right)^{\frac{1}{2}}$

D. $\left(\frac{7\pi}{3}\right)^{\frac{1}{2}}$

Answer: B

Watch Video Solution

261. Boyle's law is applicable in :

A. Isobaric process

B. Isochoric process

C. Isothermal process

D. Adiabatic process

Answer: C

Watch Video Solution

262. Charle's law is applicable under

A. Isobaric process

B. Isochoric process

C. Isothermal process

D. Adiabatic process

Answer: A

Watch Video Solution

263. Which represents kinetic equation for gases ?

A. $PV = m\nu^2$

B. $PV = \frac{1}{2} m\nu^2$

C. $PV = \frac{1}{3} m\nu^2$

D. None of these

Answer: C

Watch Video Solution

264. A mixture of two gases, having partial pressure P_1 and P_2 has total pressure P, then according to Dalton's law :

A. $P = P_1 + P_2$

B. $P = \sqrt{P_1 + P_2}$

C. $P = P_1 \times P_2$

D. $P = \frac{P_1 + P_2}{2}$

Answer: A

Watch Video Solution

265. The critical temperature of a gas is that temperature :

A. Above which it can no longer remain in the gaseous state

B. Above which it cannot be liquefied by pressure

C. At which it soldifies

D. At which volume of gas becomes zero

Answer: B

Watch Video Solution

266. The term that accounts for intermolecular force in van der Waals' equation for non ideal gas is :

A. RT

B. V-b

C. $\left(P+\frac{a}{V^2}\right)$

D. $[RT]^{-1}$

Answer: C

Watch Video Solution

267. The mean free path (λ) of a gas sample is given by :

A. λ = sqrt2pisigma^2N`

B. λ = 1/sqrt2pisigma^2N`

C. $\lambda = \sqrt{2}u\pi\sigma^2N$

D. None of these

Answer: B

Watch Video Solution

268. Which does not change during compression of a gas at constant temperature ?

A. Density of a gas

B. The distance between molecules

C. Average speed of molecules

D. The number of collisions

Answer: C

269. As the speed of molecules increase, the number of collisions per second :

A. Decrease

B. Increase

C. Does not change

D. None of these

Answer: B

270. A real gas at high pressure occupies under identical conditions :

A. More volume than that of an ideal gas

B. Less volume than that of an ideal gas

C. Same volume as that of an ideal gas

D. More or less volume than that of an ideal gas depending upon the nature of the gas

Answer: B

Watch Video Solution

271. The unit of van der Waals' constant 'a' is :

A. atm $litre^2 mol^{-2}$

B. dyne $cm^4 mol^{-2}$

C. newton $m^4 mol^{-2}$

D. All of the above

Answer: D

Watch Video Solution

272. The temperature at which the second virial coefficient of a real gas is zero is called :

A. Critical pressure

B. Eutectic point

C. Boiling point

D. Boyle's temperature

Answer: D

Watch Video Solution

273. The cooling caused by the adiabatic expansion of a compressed gas below its inversion temperature (T_i) without doing external work is called :

A. Joule-Thomson effect

B. Adiabatic demagnetism

C. Tyndall effect

D. Compton effect

Answer: A

Watch Video Solution

274. While 'He' is allowed to expland through a small jet under adibatic condition heating effectt is observed. This is due to the fact that:

A. Helium is an inert gas

B. Helium is a noble gas

C. Helium is an ideal gas

D. The inversion temperature of helium is very low.

Answer: D

Watch Video Solution

275. The average speed of gas molecules is equal to :

A. Average speed

B. Most probable speed

C. RMS speed

D. None of these

Answer: B

Watch Video Solution

276. The temperature of a sample of gas is raised from $127^{\circ}C$ to $527^{\circ}C$. The average kinetic energy of the gas :

A. Does not change

B. Is doubled

C. Is halved

D. Cannot be calculated

Answer: B

Watch Video Solution

277. One mole each of a monoatomic, diatomic and triatomic gases are mixed, $\frac{C_p}{C_v}$ for the mixture is :

A. 1.4

B. 1.428

C. 1.67

D. None of these

Answer: B

Watch Video Solution

278. One mole of an ideal monoatomic gas mixed with 1 mole of an ideal diatomic gas.

The molar specific heat of thr mixture at constant vlume is :

A. 3 cal

B. 4 cal

C. 8 cal

D. 9 cal

Answer: B

Watch Video Solution

279. The average speed of O_2at 273 K is equal to that of H_2 at :

A. Same T

B. Higher T

C. Lower T

D. None of these

Answer: C

Watch Video Solution

280. Two sealed containers of the same capacity and at the same T are filled with 44 g of H_2 gas in one and 44 g of CO_2 in other. If the P of CO_2 is 1 atm in other, the P of H_2 in its container will be :

A. 1 atm

B. Zero

C. 22 atm

D. 44 atm

Answer: C

Watch Video Solution

281. For hydrogen gas $C_p - C_v = a$, and for oxygen gas $C_p - C_v = b$, so the relation between a and b is :

A. a = 16b

B. 16a = b

C. a = 4b

D. a = b

Answer: D

Watch Video Solution

282. For a gas $\left(\frac{R}{C_v}\right)$ = 0.67, the gas is made up of molecule which are :

A. Monoatomic

B. Diatomic

C. Polyatomic

D. Mixture of gases

Answer: A

Watch Video Solution

Watch Video Solution

283. The density of air would be maximum at :

A. 373 K and 1 atm

B. 273 K and 2 atm

C. 373 K and 2 atm

D. 273 K and 1 atm

Answer: B

Watch Video Solution

284. At what temperature would the volume of a given mass of a gas at constant pressure be twice to its volume at $0^\circ C$

A. $100^\circ C$

B. $273^\circ C$

C. $373^\circ C$

D. $446^\circ C$

Answer: B

Watch Video Solution

285. A gas is heated from $0^\circ C$ to $100^\circ C$ at 1.0 atm pressure. If the initial volume of the gas is 10 litre, its final volume would be :

A. 7.32 litre

B. 10.0 litre

C. 13.66 litre

D. 20.2 litre

Answer: C

Watch Video Solution

286. A certain gas diffuses from two different vessels A and B The vessel A has a circular orifice while vessel B has square orifice of length equal t the radius of the orifice of vessel A. The ratio of the rates of diffusion of the gas from vessel A to vessel B, assuming same temperature and pressure is :

A. π

B. 7:22

C. 1:1

D. 2:1

Answer: A

Watch Video Solution

287. Equal masses of nitrogen and ethylene are mixed in an empty container at $27^{\circ}C$. The total pressure exerted by the gaseous mixture is 1 atm. The partial pressure exerted by ethylene gas is :

A. 0.67 atm

B. 0.33 atm

C. 0.50 atm

D. 0.20 atm

Answer: C

Watch Video Solution

288. Which of the following pair of gases contain the same number of molecules:

A. $16gO_2 14gN_2$

B. $8gO_2, 22gN_2$

C. $28gN_2, 22gCO_2$

D. $32gO_2, 32gN_2$

Answer: A

Watch Video Solution

289. A mixture of helium and argon contains 3 mole of He for every 2 mole of Ar. The partial pressure of argon is :

A. 2/3 the total pressure

B. 1/3 the total pressure

C. 2/5 the total pressure

D. 1/5 the total pressure

Answer: C

Watch Video Solution

290. One atomosphere is numerically equal to approximately :

A. 10^6 dyne cm^{-2}

B. 10^2 dynecm^{-2}

C. 10^4 dyne cm^{-2}

D. 10^8 dyne cm^{-2}

Answer: A

Watch Video Solution

291. The pressure of a gas is due to :

A. The collision of gas molecules against each other

B. The random movement of gas molecules

C. The intermolecular forces of attraction between the gas molecules

D. The collision of gas molecules against the walls of the container

Answer: D

Watch Video Solution

292. The kinetic energy of molecules at constant temperature in gaseous state is :

A. More than those in the liquid state

B. Less then those in the liquid state

C. Equal to those in the liquid state

D. None of these

Answer: C

Watch Video Solution

293. A real gas most closely approaches the behaviour of an ideal gas at :

A. 15 atmosphere and 200 K

B. 1 atmosphere and 273 K

C. 0.5 atmosphere and 500 K

D. 15 atmosphere and 500 K

Answer: C

Watch Video Solution

294. Pressure remaining the same, the volume of a given mass of an ideal gas increase for every degree centigrade rise in temperature by a definite fraction of its volume at :

A. Zero degree centigrade

B. Its critical temperature

C. Absolute zero

D. Its Boyle's temperature

Answer: A

Watch Video Solution

Watch Video Solution

295. The numerical value of $C_p - C_v$ is equal to :

A. R

B. R/M

C. M/R

D. None

Answer: B

Watch Video Solution

296. The gases showing heating and cooling effect during Joule-Thomson's experiment have Joule-Thomson coeffieient:

A. +ve and -ve respectively

B. -ve and +ve respectively

C. +ve

D. -ve

Answer: B

Watch Video Solution

297. One poise is equal to :

A. 1 dyne $\sec^{-2}$

B. 1 dyne $\sec cm^{-2}$

C. dyne $\sec^{-1} cm^{-2}$

D. dyne $\sec^{-1} cm^{-1}$

Answer: B

Watch Video Solution

298. At a given temperature ad pressure, the rate of diffusion of a gas is :

A. Directly proportional to the density of the gas

B. Directly proportional to the square root of its density of the gas

C. Inversely proportional to the square root of its density.

D. Inversly proportional to the square root of its density

Answer: D

Watch Video Solution

299. At low pressure, van der Waals' equation is reduced to $\left[(P)+\frac{a}{V^2}\right]V=RT$. The compressibility factor can be given as :

A. $1-\frac{a}{RTV}$

B. $1-\frac{RTV}{a}$

C. $1+\frac{a}{RTV}$

D. $1+\frac{RTV}{a}$

Answer: A

Watch Video Solution

300. The average speed of gas molecules is equal to :

A. $\left[\frac{2RT}{M}\right]^{\frac{1}{2}}$

B. $\left[\frac{3RT}{M}\right]^{\frac{1}{2}}$

C. $\left[\frac{8RT}{\pi M}\right]^{\frac{1}{2}}$

D. $\left[\frac{4RT}{\pi M}\right]^{\frac{1}{2}}$

Answer: C

Watch Video Solution

301. Average speed is equal to :

A. 0.9813 rms speed

B. 0.9 rms speed

C. 0.9213 rms speed

D. 0.9602 rms speed

Answer: C

Watch Video Solution

302. The strength of van der Waals' forces increase with :

A. Increase in molecular size

B. Increase in the number of electrons in the molecule

C. Increase in molecular weight

D. All of these

Answer: D

Watch Video Solution

303. Most probable speed, average speed and rms speed are related as :

A. 1:1.128:1.224

B. 1:1.128:1.424

C. 1:2.128:1.224

D. 1:1.428:1.442

Answer: A

Watch Video Solution

304. Which shows combined relationship of Boyle's law and Charles' law :

A. $\frac{P_1}{P_2} = \frac{T_1}{T_2}$

B. PV = K

C. $\frac{P_2}{P_1} = \frac{V_1}{V_2}$

D. $\frac{V_2}{V_1} = \frac{P_1}{P_2} \times \frac{T_2}{T_1}$

Answer: D

Watch Video Solution

305. The unit of van der Waals' constant 'b' is:

A. $cm^3 mol^{-1}$

B. litre mol^{-1}

C. m^3mol^-1`

D. All of these

Answer: D

Watch Video Solution

306. Which expression is valid for an ideal gas :

A. $PV = \frac{RT}{n}$

B. $V_1T_1 = V_2T_2$

C. $P_1V_2 = V_1P_2$

D. $P_1T_2d_2 = P_2T_1d_1$

Answer: D

Watch Video Solution

307. According to the ideal gas laws, the molar volume of a gas is given by :

A. 22.4 litre

B. $\frac{RT}{P}$

C. $\frac{8RT}{PV}$

D. $\frac{RT}{PV}$

Answer: B

308. At STP ,the order of root mean square speed of molecules H_2, N_2, O_2 and HBr is :

A. $H_2 > N_2 > O_2 > HBr$

B. $HBr > O_2 > N_2 > H_2$

C. $HBr > H_2 > O_2 > N_2$

D. $N_2 > O_2 > H_2 > HBr$

Answer: A

309. Which will weigh more at STP:

A. One litre of 02

B. One litre of H,

C. One litre of N2

D. One litre of Cl2

Answer: D

Watch Video Solution

310. Helium atom is two times heavier than a hydrogen molecule. At $15^{\circ} C$ the average KE of helium atom is:

A. Twice that of hydrogen

B. Same as that of.hydrogen

C. Four times that of hydrogen

D. Half that of hydrogen

Answer: B

Watch Video Solution

311. The rms speed of gas, molectfles at a temperature 27K and pressure 1.5 bar is 1×10 cm/sec: If both temperature and pressure are raised three times, the rms speed of the gas will be:

A. $9 \times 10^4 c \frac{m}{\sec}$

B. 3×10^4 cm/sec

C. 1×10^4 cm/sec

D. 1×10^4 cm/sec

Answer: D

Watch Video Solution

312. Two gases A and B , having the mole ratio of 3:5 in a container, exert a pressure of 8 atm. If A is removed , what would be the pressure due to B only, temperature remaining constant:

A. 1 atm

B. 2 atm

C. 4 atm

D. 5 atm

Answer: D

Watch Video Solution

313. Volume occupied by molecules of one mole gas at NTP, each having radius of 10^{-8} cm is :

A. 22.0 litre

B. 22.4 litre

C. 10.09 mL

D. 10.09 litre

Answer: C

Watch Video Solution

314. The ratio of the average molecular kinetic energy of UF_6 to that of H_2, both at 300 K is :

A. 1:1

B. 7:2

C. 176:1

D. 2:7

Answer: A

Watch Video Solution

315. The kinetic energy of any gas molecule at $0^\circ C$ is :

A. $5.66 \times 10^{-21} J$

B. 3408 J

C. 2 cal

D. Zero

Answer: A

Watch Video Solution

316. 24 g of CH_4 at NTP occupy a volume of :

A. 33.6 litre

B. 22.4 litre

C. 11.2 litre

D. 44.8 litre

Answer: A

Watch Video Solution

317. Total energy of one mole of an ideal gas (monoatomic) at $27^{\circ}C$ is :

A. 600 cal

B. 900 cal

C. 800 cal

D. 300 cal

Answer: B

Watch Video Solution

318. For 1 g molecule of an ideal gas :

A. $\frac{PV}{T} = 2\text{cal}$

B. $\frac{PV}{T} = 3/2 \text{ cal}$

C. $\frac{PV}{T} = 8.31 \text{ cal}$

D. $\frac{PV}{T} = 0.831 \text{ cal}$

Answer: A

Watch Video Solution

319. The molecular weight of a gas which diffuses through a porous plug of 1/6th of the speed of hydrogen under identical conditions is :

A. 27

B. 72

C. 36

D. 48

Answer: B

Watch Video Solution

320. Four particals have speed 2,3,4 and 5 cm/s respectively .Their rms speed is :

A. 3.5 cm/s

B. $\frac{27}{2}$ cm/s

C. $\sqrt{54}$

D. $\frac{\sqrt{54}}{2}$ cm/s

Answer: D

Watch Video Solution

321. A and B are two identical vessels. A contains 15 g of ethene at 298 K and 1 atm. The vessel B contains 75 g gas X_2 at the same temperature and pressure. The vapour density of X_2 is :

A. 75

B. 150

C. 37.5

D. 300

Answer: A

Watch Video Solution

322. The temperature of an ideal gas is increased from 140 K to 560 K.If at 140 K the root mean square velocity of the gas molecules is V, at 560 K it becomes:

A. 5V

B. 2V

C. V/2

D. V/4

Answer: B

Watch Video Solution

323. 4.0 g of argonhas pressure P and temeperature T K in a vessel. On keeping the vessel at $50 \circ C$ higher temperature, 0.8 g of argon was given out to maintain the pressure P. The original temperature was :

A. 73 K

B. 100 K

C. 200 K

D. 510 K

Answer: C

Watch Video Solution

324. Which of the following pairs of gases contains same number of molecules ?

A. 11 g of CO_2 and 7 g of N_2

B. 44 g of CO_2 and 44 g of N_2

C. 22 g of CO_2 and 28 g of N_2

D. None is correct

Answer: A

Watch Video Solution

325. The rate of diffusion of methane at a given temperature is twice that of a gas X. The molecular weight of X is :

A. 64

B. 32

C. 4

D. 8

Answer: A

Watch Video Solution

326. The ratio of Boyle's temperature and critical temperature for a gas is :

A. 8/27

B. 27/8

C. 1/2

D. 2/1

Answer: B

Watch Video Solution

327. A flask of methane (CH_4) was weighed Methane was then pushed out and the flask again weighed when filled with oxygen at the same temperature and pressure. The mass of oxygen would be :

A. The same as the methane

B. Half of the methane

C. Double of the methane

D. Negligible in comparison to that of methane

Answer: C

Watch Video Solution

328. In deriving the kinetic equation we make use of the root mean square speed of the molecules which is :

A. The average speed of molecules

B. The most probable speed of molecules

C. The square root of the average of the square of the speed of the molecules

D. The most accurate form in which speed can be used in the calculations

Answer: C

Watch Video Solution

329. The rates of diffusion of SO_2, CO_2, PCl_3, SO_3 are in the following order :

A. $PCl_3 > SO_3 > SO_2 > CO_2$

B. $CO_2 > SO_3 > PCl_3 > SO_3$

C. $SO_2 > SO_3 > PCl_3 > CO_2$

D. $CO_2 > SO_2 > SO_3 > PCl_3$

Answer: D

Watch Video Solution

330. Kinetic theory of gases assumes thaat tiny particles called molecules :

A. Contain average KE proportional to absolute temperature

B. Exert no force during collisions

C. Exert attractive force on each other

D. Contain constant KE at all temperature

Answer: A

Watch Video Solution

331. Graham's law of diffusion gives better results at :

A. High pressure

B. High temperature

C. Low pressure

D. at all conditions

Answer: C

Watch Video Solution

332. The kinetic energy of any gas molecule at $0^\circ C$ is :

A. 819.0 cal

B. 84.43 cal

C. 8.143 cal

D. None

Answer: A

Watch Video Solution

333. The concept of critical temperature for a gas was given by :

A. Andrew

B. Boyle

C. Charles

D. None

Answer: A

Watch Video Solution

334. The kinetic energy of molecule is zero at :

A. $0^\circ C$

B. $273^\circ C$

C. $-273^\circ C$

D. $116^\circ C$

Answer: C

Watch Video Solution

335. The word 'molecule' was first introduced by :

A. Dalton

B. Bohr

C. Avogadro

D. Rutherford

Answer: C

Watch Video Solution

336. In case of hydrogen and helium the van der Waals' forces are :

A. Strong

B. Very strong

C. Weak

D. None

Answer: C

Watch Video Solution

337. If for two gases of molecular weight M_A and M_B at temperature T_A and $T_B, T_A M_B = T_B M_A$, then which property has the same magnitude for both the gases :

A. Density

B. Pressure

C. KE per mole

D. rms speed

Answer: D

Watch Video Solution

338. Solubility of a gas in water:

A. Increases with temperature

B. Decreases with pressure

C. Decreases with temperature

D. None

Answer: C

Watch Video Solution

339. Which gas has the same rate of diffusion as that of CO_2 at same P and T ?

A. N_2O

B. NO_2

C. N_2

D. CO

Answer: A

Watch Video Solution

340. The compressibility factor of a gas is defined as $Z = \frac{PV}{N}rt$. The compressibility factor of an ideal gas is :

A. zero

B. Infinite

C. 1

D. -1

Answer: C

Watch Video Solution

341. The number of collision depends on :

A. Mean free path

B. Pressure

C. Temperature

D. All of these

Answer: D

Watch Video Solution

342. The density of a gas is equal to (P = pressure , V = volume, T = temperature, R = gas constant, n= number of mole and M = molecular weight) :

A. Np

B. $\frac{PM}{RT}$

C. $\frac{P}{RT}$

D. M/V

Answer: B

Watch Video Solution

343. Molecular attraction and size of the molecules in a gas are negligible at :

A. Critical point

B. High pressure

C. High temperature and low pressure

D. Low temperature and high pressure

Answer: C

Watch Video Solution

344. For a real gas, deviations from ideal gas behaviour are maximum at :

A. $-10^{\circ}C$ and 5.0 atm

B. $0^{\circ}C$ and 2.0 atm

C. $0^{\circ}C$ and 1.0 atm

D. $100^{\circ}C$ and 2.0 atm

Answer: A

Watch Video Solution

345. Vapour density of a substance is dependant of :

A. Volume

B. Temperature

C. Pressure

D. Mol. Weight

Answer: D

Watch Video Solution