Inter molecular forces, Types of intermolecular forces and properties of gases

[MHT-CET 2020]

1. The SI unit of pressure is
   a) $kg\ m\ s^{-1}$ b) $kg\ ms^{-2}$ c) $kg\ m^{-1}\ s^{-2}$ d) $kg\ m^{2}s$

2. What type of intermolecular force is present between magnesium chloride and w
   a) Ion-dipole interaction b) Dipole - induced dipole interaction
   c) Dipole - Dipole interaction d) Hydrogen bonding

3. Identify the type of intermolecular force present between benzene and ammonia
   a) Hydrogen bonding b) Dipole - induced dipole interaction
   c) Dipole - Dipole interaction d) Ion - Dipole interaction.

4. Which of the following has intra molecular hydrogen bonding ?
   a) Hydrofluoric acid b) Ammonia
   c) O-Nitrophenol d) Ethyl alcohol

5. Intra molecular hydrogen bond is formed in
   a) Ammonia b) Ethanol c) Water d) Salicylaldehyde

[MHT-CET 2022]

6. Which of the following has maximum value of dipole moment ?
   a) CH_3-Cl b) CH_3-CN c) $CH_3-CH_2-CH_3$ d) CH_3-O-CH_3

7. Which among the following is non-polar ?
   a) $I-Cl$ b) NH_3 c) HCl d) C_6H_6

8. Which of the following molecules has intramolecular hydrogen bonding ?
   a) Ammonia b) Water
   c) Hydrogen fluoride d) Ethylene glycol

Gaseous state, gas law, ideal gas equations and kinetic theory of gases

[MHT-CET 2006]

9. The CO_2 gas does not follow gaseous laws at all ranges of pressure and temperature because.
   a) It is triatomic gas
   b) Its internal energy is quite high.
   c) There is attraction between its molecules
   d) It solidity at law temperature.

[MHT-CET 2019]

0. A cold drink bottle contains 200 ml liquid in which CO_2 is 0.1 molar. Considering CO_2 as an ideal gas, the volume of the dissolved CO_2 at STP is :
   a) 0.448 L b) 22.4 L c) 2.24 L d) 0.224 L

. The volume of a given mass of gas at 0°C is 2 dm^3. What is the new volume of the gas if the temperature is decreased by 10°C ?
   a) 1.86 dm^3 b) 1.44 dm^3 c) 1.93 dm^3 d) 1.79 dm^3

[MHT-CET 2020] MHT-CET

12. If the absolute temperature of a gas having volume V cm^3 is doubled and the pressure is reduced to half, the final volume will be
a) 4 V cm^3 b) 2 V cm^3 c) 0.25 V cm^3 d) 0.50 V cm^3

13. A certain sample of gas has a volume of 0.2 L at one atmosphere pressure and 273.15 K. What is the volume of gas at 273.15°C at same pressure ?
a) 5.406 L b) 2.703 L c) 0.4 L d) 0.2 L

14. A gas has volume of 3.4 L at 25°C. What is the final temperature if the volume increases to 10.2 L at constant pressure ?
a) 694 K b) 394 K c) 1894 K d) 894 K

15. A certain mass of gas occupies a volume of 2 dm^3 at STP. At what temperature the volume of gas will double, keeping the pressure constant ?
a) 540.15°C b) 400.15°C c) 546.15°C d) 273.15°C

16. According to Andrews isothermals, the minimum temperature at which carbon dioxide gas obeys Boyle's law is
a) 48.1°C b) 35.5°C c) 32.5°C d) 31.1°C

17. The volume of given mass of a gas at 'x' K is 2 dm^3. What is the new volume of gas at constant pressure, if temperature is increased to 10 xK ?
a) 4 dm^3 b) 20 dm^3 c) $\left(\frac{1}{4}\right)dm^3$ d) $\left(\frac{1}{20}\right)dm^3$

18. If 2 moles of an ideal gas at 546 K have volume of 44.8 L, then what will be its pressure? (R = 0.082)
a) 3.129 atm b) 2.408 atm c) 1.098 atm d) 1.998 atm

19. Volume of a balloon at 25°C and 1 bar pressure is 2.27 L. If the pressure of the gas in balloon is reduced to 0.227 bar, what is the rise in volume of the gas ?
a) 10.227 L b) 7.73 L c) 12.27 L d) 10 L

20. Isochor is the graph plotted between.
a) Reciprocal of volume on x-axis and pressure on y-axis at constant temperature.
b) Temperature on x-axis and pressure on y-axis at constant volume.
c) Pressure on x-axis and volume on y-axis at constant temperature.
d) Temperature on x-axis and volume on y-axis at constant pressure.

21. A gas occupies a volume of 1.8 dm^3 at 300 K. At which temperature the gas expands to 5.4 dm^3 at constant pressure ?
a) 365.5 K b) 1050 K c) 350 K d) 900 K

22. A certain mass of a gas occupies a volume of 2.5 dm^3 at NTP. Calculate the change in volume of gas at the same temperature if pressure of gas is changed to 1.25 atm.
a) 1.5 dm^3 b) 0.5 dm^3 c) 4.5 dm^3 d) 3.0 dm^3

23. A gas occupies a volume of 4.2 dm^3 at 101 KPa pressure. What volume will the gas occupy if the pressure is increased to 235 KPa keeping the temperature constant ?
a) 1.8 dm^3 b) 0.9 dm^3 c) 3.6 dm^3 d) 2.1 dm^3

24. What will be the minimum pressure required to compress 500 dm^3 of air at 1 bar to 200 dm^3 at 30°C ?
a) 1 bar b) 2.5 bar c) 3 bar d) 2 bar

25. If same amounts of each of following four gases expand from volume V_1 to V_2, maximum work done is observed in expansion of
a) O_2 b) N_2 c) SO_2 d) CO_2

26. 400 cm^3 of oxygen at 27°C were cooled to – 3°C without change in pressure. What is the contraction in volume of oxygen gas ?
a) 44.4 cm^3 b) 30 cm^3 c) 360 cm^3 d) 40 cm^3

27. 300 mL of a gas at 26.85°C is cooled to 6.85°C at constant pressure. What will be its final volume of the gas ?
a) 238 mL b) 210 mL c) 140 mL d) 280 mL

28. 10 g of gas at one atmospheric pressure is cooled from 273.15°C to 0°C keeping its volume constant. What is the final pressure ?
a) 273 atm b) 2 atm c) $\frac{1}{2}$ atm d) $\frac{1}{273}$ atm

29. The volume of 400 cm^3 chlorine gas at 400 mm of Hg is decreased to 200 cm^3 at constant temperature. What is the new pressure of the gas ?
a) 1600 mm of Hg b) 200 mm of Hg c) 800 mm of Hg d) 600 mm of Hg

30. A balloon contains 2.27 L air and has a pressure of 1.013×10^5 Nm^{-2}. The balloon rises to a certain height and expands to volume of 4540 mL. What is the final pressure of air in the balloon ?
a) 2.026×10^2 Nm^{-2} b) 5.065×10^4 Nm^{-2}
c) 4.540×10^4 Nm^{-2} d) 5.065×10^{-4} Nm^{-2}

31. At what temperature the volume of a given mass of a gas at constant pressure becomes twice its volume at 0°C ?
a) 546.3 K b) – 273.15 K c) 373.15 K d) 200 K

32. At what new pressure will 100 mL of gas at pressure 760 mm occupy volume of 84 mL keeping temperature constant ?
a) 816.60 mm b) 712.14 mm c) 857.14 mm d) 604.82 mm

[MHT-CET 2021]

3. A flask has volume of 0.25 dm^3. What volume of air will be displaced from flask if it is heated from 300 K to 360 K ?
a) 0.05 dm^3 b) 0.3 dm^3 c) 0.25 dm^3 d) 0.002 dm^3

What is the initial volume of a gas having pressure 450 mm Hg, if final volume is 750 mL at pressure 650 mm Hg at constant temperature ?
a) 390.0 mL b) 1200.0 mL c) 519.2 mL d) 1083.3 mL

A hot air balloon has a volume of 2.8 m^3 at 99°C. Find the volume when air cools to – 87°C.
a) 0.70 m^3 b) 1.75 m^3 c) 1.40 m^3 d) 1.05 m^3

A gas occupies 11.2 dm^3 at 105 KPa. What is its volume if pressure is increased to 210 KPa?
a) 22.4 dm^3 b) 33.6 dm^3 c) 5.6 dm^3 d) 16.8 dm^3

37. Keeping temperature constant the pressure of 11.2 dm^3 of a gas was increased from 105 kPa to 420 kPa. What is the new volume of gas ?
a) 1.4 dm^3 b) 7.0 dm^3 c) 5.6 dm^3 d) 2.8 dm^3

38. The volume of a gas at 0°C is 2 dm^3. What is its volume if temperature is decreased by 272°C ?
a) $\left(\frac{3}{272}\right)$ dm^3 b) $\left(\frac{2}{272}\right)$ dm^3 c) $\left(\frac{4}{273}\right)$ dm^3 d) $\left(\frac{2}{273}\right)$ dm^3

39. At 300 K, 22 g of CO_2 gas exerts a pressure of 5 atmosphere. What is the volume of the gas at the same temperature ? (R = 0.0821 L. atm K^{-1} mol^{-1}).
a) 5.61 dm^3 b) 8.20 dm^3 c) 2.46 dm^3 d) 3.80 dm^3

40. A certain mass of gas occupies volume of 250 mL at 2 atm. pressure. Calculate the volume of gas if pressure is increased to 2.5 atm at constant temperature.
a) 352.0 mL b) 300 mL c) 200 mL d) 443 mL

41. At 296 K, 0.450 mole of nitrogen gas occupies a volume of 8.21 L. What is the pressure of nitrogen gas at 296 K ?
a) 1.33 atm b) 13.3 atm c) 13.8 atm d) 134 atm

[MHT-CET 2022]

42. Calculate final volume of a gas when pressure of 60 mL gas is increased from 1 to 1.5 atm, keeping temperature constant.
a) 3×10^{-2} dm^3 b) 2×10^{-2} dm^3 c) 4×10^{-2} dm^3 d) 5×10^{-2} dm^3

43. Calculate the pressure of 1.5 mole of gas having volume 3 dm^3 at 300 K. (R = 0.0821 dm^3 atm $Kmol^{-1}$)
a) 15.3 atm b) 14.6 atm c) 10.25 atm d) 12.32 atm

44. Calculate the number of moles of a gas having vol 2.5 litre at 300 K and 4.5 atm. (R = 0.821 atm dm^3 K^{-1} mol^{-1})
a) 0.46 b) 0.70 c) 0.62 d) 0.56

45. Calculate the new volume of a gas at constant pressure when temperature is increased to 546K. (Initial volume of gas at 273 K is 4 dm^3).
a) 5 dm^3 b) 2 dm^3 c) 4 dm^3 d) 8 dm^3

46. What is the volume occupied by 2g of helium gas (molar mass = 4 g mol^{-1}) at STP ?
a) 2.0 dm^3 b) 22.4 dm^3 c) 11.2 dm^3 d) 5.6 dm^3

47. Which of the following is a correct relation for Gay-Lussac law ?
a) $P \propto T$ (at constant vol)
b) $V \propto n$ (at constant temperature and pressure)
c) $P \propto \frac{1}{V}$ (at constant temperature)
d) $V \propto T$ (at constant pressure)

48. What is the value of temperature in degree celsius at absolute zero ?
a) 273.15°C b) 0°C c) – 373.15°C d) – 273.15°C

49. Calculate the final volume of a gas if pressure changes from 0.75 atm to 1.0 atm at same temperature. (Initial volume is 50 mL)
a) 25 mL b) 40 mL c) 50 mL d) 37.5 mL