Paper code: 6019

MSc Semester-3 HNGU
July-Sep-2021
Physical Chemistry- CHNN-605(P)-(B)-SE

કુલ સમય :– ૩૦ મીનીટ કુલ પ્રશ્નો : ૩૫ વિદ્યાર્થીએ ટીક કરવાના પ્રશ્નો : ૨૫

નોંધ : વિદ્યાર્થીએ માત્ર ૨૫ પ્રશ્નો જ ટીક કરવાના રહેશે. જો વધારે ટીક કરેલ હશે તો પ્રથમ ૨૫ પ્રશ્નો જ ગણતરીમાં લેવામાં આવશે.

1. What is the term used to refer to the number of collisions per unit volume of the reaction mixture?
(A) Collision force (B) Collision frequency (C) Collision energy (D) Collision time period

2. Two moles of gas occupy a volume of about 500 ml at 300 Kelvin and 50 atmospheric pressure, what is the compressibility factor of the gas?
(A) 1.8631 (B) 0.7387 (C) 0.5081 (D) 1.8754

3. If the value of a is greater, what does it mean?
(A) gas obeys ideal gas law (B) the gas liquefies easily
(C) the gas cannot liquify easily (D) gas particles have random motion

4. During the process of freezing the temperature is ……
(A) constant (B) increasing (C) decreasing (D) none of the above

5. What is the root mean square speed of hydrogen (in m/s) at 27°C?
(A) 2957.54 (B) 2735.43 (C) 5915.17 (D) 6402.98

6. Which of the following is a correct relationship between the molar mass of a gas, its temperature and pressure?
(A) M = PRT/V (B) M = PRT/d (C) M = dRT/P (D) M = PT/nR

7. In van der Waal's equation, constant 'b' is known as …..
(A) volume constant (B) pressure constant (C) volume correction (D) pressure correction

8.Which of the following is the expression for Boyle's law and Charle's law together?
(A) PV = constant (B) V/T = constant (C) P/T = constant (D) PV/T = constant

9. What is considered as absolute zero temperature?
(A) 0°C (B) -273.15°C (C) -273.15 K (D) 273.15 K

10. Which of the following is an extensive property of a gas?
(A) volume (B) boiling point (C) color (D) pressure

11. Which of the following property is used as the dimensionless property?
(A) reduced pressure (B) reduced temperature (C) reduced volume (D) all of the above

12. Use of hot air balloons in sports and meteorological observations is an application of …..
(A) Boyle's law (B) Charle's law (C) Avogadro's law (D) Gay-Lussac's law

13. In van der Waal equation of state of gas laws, the constant 'b' is a measure of
(A) Intermolecular collisions per unit volume (B) Intermolecular attraction
(C) Volume occupied by the molecules (D) Intermolecular repulsions

14. At constant temperature, for a given mass of an ideal gas ……..
(A) the product of pressure and volume always remains constant. (B) pressure always remains constant.
(C) volume always remains constant. (D) the ratio of pressure and volume always remains constant.

15. The theory which explains that a gas consists of molecules, which are in rapid motion is known as:
(A) Dalton's atomic theory (B) Bohr's theory
(C) Rutherford's atomic theory (D) Kinetic molecular theory

16. The rates of diffusion of gases are inversely proportional to square root of their densities. This statement refers to:
(A) Avogadro's Law (B) Graham's Law (C) Dalton's Law (D) Gay-Lussac's law

17. Air at sea level is dense. This is a practical application of …….
(A) Boyle's law (B) Charle's law (C) Dalton's Law (D) Graham's Law

18. If the heat capacity of a 10 g of a substance is 30 J/K, the heat capacity of a 1 kg of the same substance would be equal to …….
(A) 3 J / K (B) 30 J / K (C) 300 J / K (D) 3000 J / K

19. Which of the following is not a type of van der Waal's forces?

(A) Dipole – dipole forces (B) Dipole – induced dipole forces

(C) Ion – dipole forces (D) London forces

20. With decrease of pressure of a gas, the mean free path of the gas particles …….

(A) increases (B) decreases (C) remains constant (D) becomes zero

21. What is the shape of a P-V curve for an ideal gas?

(A) Straight line (B) Parabolic (C) Hyperbolic (D) Ellipse

22. Which of the following is FALSE about ideal gas molecules?

(A) They have negligible size. (B) They do not have attractive forces.

(C) They do not apply pressure. (D) They move in random motion.

23. Which of the following statement is correct for specific heats of the real gases?

(A) specific heats vary appreciably with temperature (B) specific heats vary little with pressure

(C) both of the mentioned (D) none of the mentioned

24. In which condition can real gas obey closely the ideal gas equation?

(A) pressure is very small and temperature is very high (B) pressure is very high and temperature is very low

(C) both pressure and temperature are very high (D) both pressure and temperature are very low

25. What is the kinetic energy, due to translational motion of an ideal gas molecule at T degree K?

(A) k/T (B) T/k (C) 1/kT (D) kT

26. The temperature at which a real gas obeys the ideal gas laws over a wide range of pressure is called the _____ temperature?

(A) Critical (B) Boyle (C) Triple (D) Reduced

27. The vapor pressure of water at 300 K in a closed container is 0.4 atm. If the volume of container is doubled, what will be its vapor pressure at 300 K?

(A) 0.4 atm (B) 0.3 atm (C) 0.2 (D) 0.1 atm

28. Which of the following expression is the Virial equation of state?

(A) $PV = Nrt$ (B) $(P+a/V^2)(V-b) = RT$

(C) $PV = A + B/V + C/V^2 + D/V^3 + \ldots$ (D) $PV = A + B/T + C/T^2 + D/T^3 + \ldots$

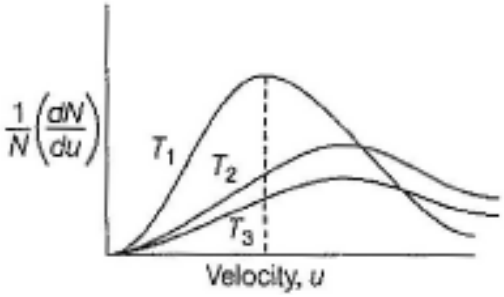
29. What is the degrees of freedom of helium gas particles?

(A) 4 (B) 3 (C) 2 (D) 1

30. Boltzmann constant k_B in terms of universal gas constant R and Avogadro's number N_A is given as:

(A) $k_B = RN_A$ (B) $k_B = R / N_A$ (C) $k_B = N_A / R$ (D) $k_B = nRN_A$

31. Based on following curves, arrange temperatures T_1 , T_2 and T_3 in increasing Order



(A) $T_3 < T_2 < T_1$ (B) $T_2 < T_1 < T_3$ (C) $T_1 < T_3 < T_2$ (D) $T_1 < T_2 < T_3$

32. Lennard-Jones potential goes out when ……

(A) $r \rightarrow 0$ (B) $r \rightarrow 1$ (C) $r \rightarrow r_0$ (D) $r \rightarrow \infty$

33. What is the SI unit of viscosity coefficient?

(A) $kgm^{-2}s^{-2}$ (B) kgm^2s^2 (C) $kgm^{-1}s^{-1}$ (D) $kgm^{-2}s^{-1}$

34. Which of the following method is used to obtain extremely low (0.003 K) temperature?

(A) Isothermal expansion (B) Adiabatic expansion

(C) Isothermal demagnetization D) Adiabatic demagnetization

35. At which distance two molecules start experiencing Van der Waal's force of interaction?

(A) 10 Å (B) 10 µm

(C) 10 nm (D) 10 mm