Assignment-3 (gaseous state)

1. The compressibility factor of an ideal gas is:

(a) Zero   (b) One   (c) Infinity   (d)   Negative

2. The critical temperature of a liquid whose boiling point is 77^0C is nearly equal to

(a) 60^0C (b) 250^0C (c) 240^0C (d) 290^0C

3. The root mean square velocity a certain gas at 300 K is

4×10^4 cm s^{-2} .The temperature at which at which velocity will be 8×10^8 cm s^{-2} is:

(a) 1200K   (b)   600K (c) 300K   (d) 1500 K

4. 240 g of an ideal gas of molar mass 80 g mol^{-1} is confined to a volume of dm^3 at 300 K .If R=0.082 dm^3 atm K^{-1}mol^{-1},the pressure exerted by the gas is:

(a)12.0 atm   (b)2.1 atm   (c) 12.2 atm   (d) 12.3 atm

5. A gas cannot be liquefied if for the gas temperature is greater than

(a) Critical temperature   (b) Critical pressure

(d) Critical volume   (d) Critical density

6. At constant pressure the specific heat of a gas (M=80) is 0.125 .It is:

(a) Monatomic   (b) Diatomic   (c) Triatomic   (d) H_2

7. If rms velocity of gas is 100 cm s^{-1}, its average velocity is:

(a) 100 cm s^{-1} (b) 0.01 cm s^{-1} (c) 92.13 cm s^{-1}

(d) 81.64 cm s^{-1}

8. The unit of Vander Waals constant (a) is:

(a) Mole atm^{-1} (b) atm mol^{-1} (c) lit^2 atm mol^{-2}

(d) atm lit^{-2} mol^2

(9) At 27⁰C, the kinetic energy of 2 moles of an ideal gas is:

(a) 1800 cal   (b) 900 cal   (c) 600 cal   (d) 300 cal

10. The following is known as permanent gas:

(a) NH_3 (b) N2   (c) H2   (d) CO2

11. The ratio of most probable, average and root mean square velocity is:

(a) 1 : 1.224 : 1.128   (b) 1 : 1.128 : 1.224

(c) 1 : 1.128 : 1.1524   (d) 1 : 1.178 : 1.524

12. The Vander Waals equation for n moles of a real gas

Is:

(a) $\left(P + \frac{a}{v^2}\right)(V - b) = nRT$ (b) $\left(P + \frac{na}{v^2}\right)(V - nb) = nRT$

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

13. Which of the following is not the characteristic of an ideal gas

(a) It obeys Boyel's law

(b) The collisions between the molecules of a gas are perfectly elastic.

(c) There is no attraction between molecules of a gas.

(d) When gas is allowed to expand in vacuum, a cooling effect

Is observed

14. Helium atom is two times heavier than a hydrogen molecule. At 300 K, the average kinetic energy of a helium atom is:

(a) Two times that of a hydrogen molecule

(b) Same as that of hydrogen molecule

(c) Half as that of hydrogen molecule

(d) Equal to that of hydrogen molecule

15. For one gram molecule of an ideal gas:

(a) $\frac{PV}{T} = \frac{3}{2} cal$

(b) $\frac{PV}{T} = 2\ cal$

(c) $\frac{PV}{T} = 8.31 cal$

(d) $\frac{PV}{T} = 0.0821 cal$

16. When the universal gas constant (R) is divided by is divided by Avogadro's number (N), the ratio is called:

(a) Planck's constant   (b) Rydberg's constant

(c) Boltzmann's constant (d) Vander Walls constant

17. The rate of diffusion of a gas is:

(a) Directly proportional to its density

(b) Directly proportional to its molecular mass

(c) Directly proportional to square root of its molecular mass

(d) Inversely proportional to square root of its molecular mass

18. The rate of diffusion of hydrogen is about is:

(a) One half that of helium   (b) 1.4 times that of helium

(c) Twice that of helium   (d) four times that of helium

19. The rate of diffusion of methane at a given temperature is twice is twice that of gas X. The molecular mass of gas X is

(a) 64.0   (b) 32.0   (d) 4.0   (d) 8.0

20.. The value of gas constant per degree per mol is approximately:

(a) 1 cal   (b) 2 cal   (c) 3 cal   (d) 4 cal

21. One litre of a gas collected at N.T.P will occupy at 2 atmospheric pressure and 27^0C:

(a) $\dfrac{300}{2\times273}$ (b) $\dfrac{2\times300}{273}$ (c) $\dfrac{273}{2\times300}$ (d) $\dfrac{2\times273}{300}$

Answer key Assignment-3(Gaseous state)

1.(b)	5.(a)	9.(a)	13(d).	17(d)	21.(a)
2.(b)	6.(a)	10.(c)	14.(b)	18(b)	
3.(a)	7.(c)	11.(b)	15.(b)	19.(a)	
4.(d)	8.(c)	12.(c)	16.(c)	20.(b)	