Dept. of Physics

DEGLOOR COLLEGE, DEGLOOR DIST. NANDED

Practice Examination
Class: B.Sc. I YEAR
Unit: Transport Phenomena

Select the correct alternative from each sub question

1   The mean free path of molecule distance travelled by the gas molecule in 5 successive collisions are 2µm,4 µm, 5 µm,3 µm,1 µm is

   a) 4 µm   b) 3 µm   c) 5 µm   d) 2 µm

2   The mean free path of a molecule is …..

   a) Directly proportional to diameter of the molecule

   b) Directly proportional to square of diameter of the molecule

   c) inversely proportional to square of diameter of the molecule

   d) inversely proportional to diameter of the molecule

3   The transport phenomena occur only in the…...

   a) non-equilibrium state of gas   b) equilibrium state of gas

   c) steady state of gas   d) All of these

4   The coefficient of viscosity of a gas is independent of …….

   a) square root of its temperature   b) mass of its molecule

   c) diameter of its molecule   d) pressure of a gas at constant temperature

5   The phenomena of presence of gas Ammonia when its container is opened in the room is called---

   a) Diffraction   b) Interference

   c) polarization   d) Diffusion

6   If c is rms velocity of a gas λ is mean free path of its molecules then the coefficient of diffusion of gas is

a) $\frac{1}{3}c\lambda\rho$ b) $\frac{1}{3}c\lambda$

c) $\frac{1}{3}mnc\lambda$ d) $\frac{1}{3}c\lambda^2\rho$

7.   Viscosity of gas is due to transport of

a) Mass   b) Momentum   c) Energy   d) None

8.   Out of the following which has the highest thermal conductivity at the same temperature?

a) Oxygen   b) Helium

c) carbon dioxide   d) hydrogen

9.   In diffusion transport of following occurs

a) Momentum   b) Energy

c) mass   d) None

10.   Thermal conductivity of gas is due to transport of

a) Momentum   b) Energy

c) mass   d) None

11.   An expression for coefficient of diffusion is

a) $D = \frac{1}{3}\rho c c_v \lambda$ b) $D = \frac{1}{3}\rho c\lambda$

c) $D = \frac{1}{3}\rho\lambda$ d) $D = \frac{1}{3}c\lambda$

12.   Coefficient of viscosity of gas is directly proportional to

a) T   b) $\sqrt{T}$ c) T^2 d) $T^{3/2}$

13 An expression for coefficient of viscosity is

a) $\eta = \frac{1}{3}\rho c c_v \lambda$

b) $\eta = \frac{1}{3}\rho c \lambda$

c) $\eta = \frac{1}{3}\rho \lambda$

d) $\eta = \frac{1}{3}c\lambda$

14. An expression for coefficient of thermal conductivity of gas is

a) $K = \frac{1}{3}\rho c c_v \lambda$

b) $K = \frac{1}{3}\rho c \lambda$

c) $K = \frac{1}{3}\rho \lambda$
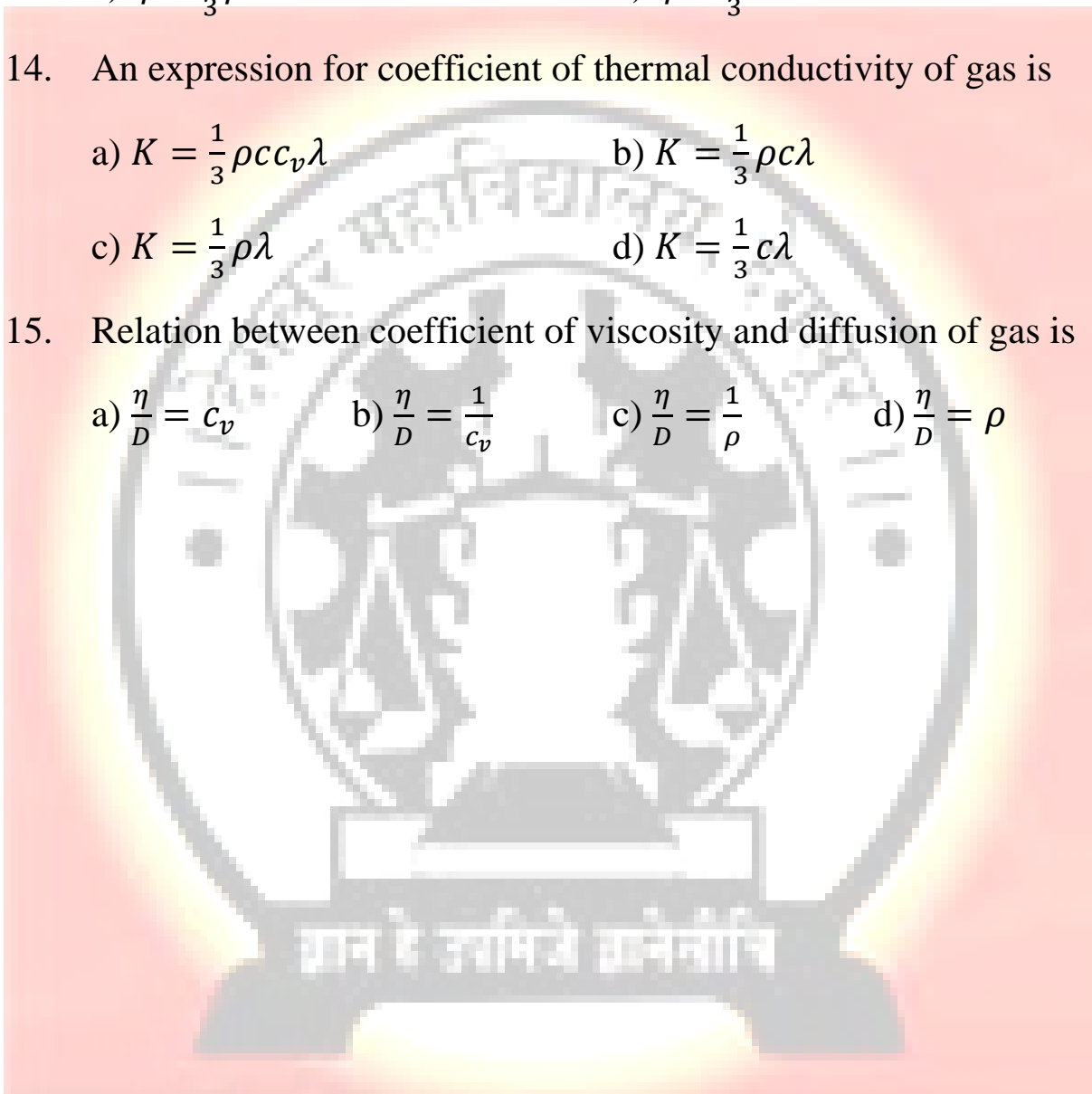
d) $K = \frac{1}{3}c\lambda$

15. Relation between coefficient of viscosity and diffusion of gas is

a) $\frac{\eta}{D} = c_v$

b) $\frac{\eta}{D} = \frac{1}{c_v}$

c) $\frac{\eta}{D} = \frac{1}{\rho}$

d) $\frac{\eta}{D} = \rho$

MCQ's

1.4

i) The average distance between two successive collisions of molecules of a gas is called....

a) free path   b) wavelength   c) mean free path

d) molecular प्रोति̇on. diameter

II) SI unit of mean free path is :

a) centimeter   b) metre   c) newton   d) $\frac{metre}{second}$

III) Maxwell's expression for mean free path is:

a) $\lambda = \frac{1}{\sqrt{2}\pi d^2 n}$ b) $\frac{3}{4\pi d^2 n}$ c) $\frac{1}{\pi d^2 n}$ d) $\frac{1}{2\pi d^2 n}$

IV) Mean free path is . . . .

a) directly proportional to density of gas

b) Inversely proportional to density of gas

c) Inversely proportional to square of density of gas

d) Independent of density of gas.

V) Which of the following statement is /are correct.

a) Mean free path is inversely proportional to square of diameter of molecule

b) Mean free path is directly proportional to absolute temperature

c) mean free path is inversely proportional to density of gas

d) All above are correct

vi). The relation between mean free path (λ) and absolute temperature (T) is:

a) $\lambda \propto T$ b) $\lambda \propto \frac{1}{T}$ c) $\lambda \propto T^2$ d) $\lambda \propto \frac{1}{T^2}$

vii) The ~~relation~~ mean free path (λ) varies :

a) $\lambda \propto d^2$ b) $\lambda \propto d$ c) $\lambda \propto \frac{1}{d}$ d) $\lambda \propto \frac{1}{d^2}$

viii) If the total distance travelled by the molecule in N collisions is S then mean free path is

a) $\lambda = \frac{S}{N}$ b) $\lambda = \frac{N}{S}$ c) $\lambda = SN$ d) All are correct.

ix) If absolute temperature of a gas is increased, its mean free path will be ...

a) decreased   b) increased   c) remains same

d) can't predict.

x). The expression for mean free path (λ) is:

a) $\lambda = \pi d^2 n$ b) $\lambda = \frac{1}{\pi d n}$ c) $\lambda = \frac{1}{\pi d^2 n}$ d) $\lambda = \pi d n$.