Yashwantrao Chavan College of Science Karad
B.Sc II : Semester III : Paper V
Subject: Thermal Physics and Statistical Mechanics I
Question Bank

Select the most correct alternative

1) The energy of ideal gas molecules depends only on its.
   a) Volume
   b) Pressure
   c) Density
   d) Temperature

2) For diatomic gas, the number of degrees of freedom is.
   a) 1
   b) 3
   c) 5
   d) 6

3) Thermal conductivity of gas is due to the transfer of
   a) Momentum
   b) Energy
   c) Mass
   d) Volume

4) The coefficient of viscosity of gas at absolute temperature T is proportional to...
   a) $\sqrt{T}$
   b) T
   c) $\frac{1}{T}$
   d) T^2

5) On the Reaumer scale, the fundamental interval is divided into . equal parts
   a) 180
   b) 100
   c) 80
   d) 50

6) The temperature of the hot junction at which thermos e.m.f. becomes maximum is.

   a) neutral temperature
   b) inversion temperature
   c) curie temperature
   d) critical temperature

7) On the Rankine scale, the steam point is marked at.

   a) 492Ra
   b) 672Ra
   c) 32Ra
   d) 212Ra

8) Mean free path of a gas molecule is...

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

9) Neutral temperature for Cu-Fe thermocouple is.

   a) 270C
   b) 540C
   c) 200C
   d) 3000C

10) Boltzmann constant $k =$

   a) $\frac{R}{N}$
   b) RN
   c) $\frac{N}{R}$
   d) $\frac{1}{RN}$

11) Zeroth law of thermodynamics leads to the definition of the term.

   a) temperature
   b) pressure
   c) volume
   d) entropy

12) Which of the following represents Joules law?

a) $W = JQ$
b) $W = \frac{J}{Q}$
c) $W = \frac{Q}{J}$
d) $W = \frac{1}{JQ}$

13) The unit of specific heat of gas is.

a) cal/gmC
b) cal.gmC
c) cal C/gm
d) gmC/cal

14) Mayers relation for the specific heat of gas is.

a) $C_p = C_v$
b) $C_p - C_v = R$
c) $C_v + C_v = R$
d) $C_p - C_v = 2R$

15) Efficiency of the Carnot heat engine is

a) $\eta = 1 - \frac{T_1}{T_2}$
b) $\eta = 1 + \frac{T_1}{T_2}$
c) $\eta = 1 - \frac{T_2}{T_1}$
d) $\eta = 1 + \frac{T_2}{T_1}$

16) The entropy of the universe is tending to.

a) Minimum
b) Zero
c) Maximum
d) Constant

17) Heat conduction through a body is an example of process.

a) reversible
b) irreversible
c) isothermal
d) isochoric

18) Which of the following is a reversible process?

a) Carnots heat engine

b) free expansion of gas

c) heat conduction

d) Rubbing of stones

19) All natural processes are.

a) isothermal

b) adiabatic

c) reversible

d) irreversible

20) remains constant during isobaric process

a) pressure

b) temperature

c) volume

d) heat

Answer the following questions in brief

1) Explain the construction and working of the platinum resistance thermometer

2) State and explain the law of equipartition of energy.

3) What is the adiabatic process? Obtain an expression for work done during the adiabatic process.

4) Explain Carnots ideal heat engine. Obtain an expression for the efficiency of Carnots heat engine.

5) Define two specific heats. Obtain the relation between C_p & C_v.

Answer the following questions in short

1) Write a note on degrees of freedom.

2) Determine the average value of the kinetic energy per molecule and per mole of an ideal gas at 0C.

3) Write a note on types of thermometers.

4) Write a note on advantages and limitations of thermistor.

5) Explain different scales of temperatures.

6) Write a note on thermodynamic equilibrium.

7) Explain reversible and irreversible processes.

8) State and explain the equation of state for ideal and real gas.

9) State and explain the first law of thermodynamics.

10) Give the physical significance of entropy.