Rayat Shikshan Sanstha's

Rajarshi Chhatarapati Shahu College, Kolhapur

B.Sc.Part-II Semester-III (New CBCS)
Preliminary Examination Oct.2019
PHYSICS Paper-V
DSC-C1 THERMAL PHYSICS AND STATISTICAL MECHANICS – I

Day & Date: Thursday 10/10/2019   Time : **12:00 pm to 2:00pm**   Maximum Marks: **50**

N.B.1. All questions are compulsory.

2. Figures to the right indicate the full marks.

3. Use of calculators/logarithmic tables is allowed

4. Draw neat diagrams wherever necessary.

Q.1 Select the correct alternative from the following   **[10]**

A) The temperature interval between the ice point and stream point is ----------

  i) range of thermometer   ii)fundamental interval

  iii) basic interval   iv)normal interval

B) Coefficient of diffusion in gas corresponds to transfer of   --------- of gas.

  i)momentum   ii) energy   iii) mass   iv) entropy

C) The average kinetic energy of a gas molecule is at absolute temperature T is proportional to --

  i) 1/T   ii) T   iii) T^2 iv) $\sqrt{T}$

D) Claussius formula for mean free path of gas molecule is -------------

  $i)\dfrac{1}{\pi\sigma^2 n}$ $ii)\dfrac{3}{4}\dfrac{1}{\pi\sigma^2 n}$ $iii)\dfrac{1}{\sqrt{2}}\dfrac{1}{\pi\sigma^2 n}$ $ii)\dfrac{4}{3}\dfrac{1}{\pi\sigma^2 n}$

E) Thermo e.m.f. produced in a thermocouple is of the order of -----

  i) microvolt   ii) milivolt   iii) volt   iv) kilovolt

F) Zeroth law of thermodynamics leads to the definition of the term ------

  i) temperature   ii)pressure   iii) volume   iv) entropy

G) ---------------- is adiabatic relation

  i) PV = constant   ii) PV^{γ} = constant   iii)$P^{\gamma}V$ = constant   iv) $PV^{\gamma-1}$ = constant

H) Heat conduction through a body is example of ----------- process.

  i) reversible   ii) irreversible   iii) isothermal   iv) adiabatic

I) ---------------- is reversible process.

i) Carnot's heat engine   ii) Free expansion of gas

iii) Heat conduction   iv) Rubbing of stones

J) Heat engine converts heat into --------

i) light energy   ii) mechanical work

iii)electrical energy   iv) potential energy

Q. 2 Attempt ANY TWO of the following   [20]

A) Explain transport of momentum in gases. Obtain expression for coefficient of viscosity of the gas.

B) Explain Carnot's ideal heat engine. Obtain expression for efficiency of Carnot's heat engine working between the temperatures T_1 and T_2.

C) Explain construction and working of platinum resistance thermometer.

Q. 3 Attempt ANY FOUR of the following   [20]

A) State properties of mercury suitable for its use in thermometer.

B) Define mean free path and obtain expression for mean free path using mutual collision cross section method.

C) Explain thermodynamic equilibriums of system.

D) Obtain an expression for work done in an isothermal process.

E) Give physical significance of entropy.

F) Obtain expression for work done during an adiabatic change.