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B—109—2019

FACULTY OF SCIENCE

B.Sc. (First Year) (Second Semester) EXAMINATION

MARCH/APRIL, 2019

(CBCS Pattern)

PHYSICS

Paper III

(Heat and Thermodynamics)

(MCQ+Theory)

(Monday, 1-4-2019)   **Time : 10.00 a.m. to 12.00 noon**

Time—2 Hours   *Maximum Marks—40*

N.B. :— (i) *All* questions are compulsory.

       (ii) *All* questions carry equal marks.

(MCQ)

1. Attempt *all* multiple choice questions :   10

   (i) Diffusion is considered as the phenomenon of ....

      (A) Transport of mass   (B) Transport of energy

      (C) Both (A) and (B)   (D) None of these

   (ii) The mean free path is defined as ....

      (A) $\lambda = \dfrac{N}{S}$ (B) $\lambda = S.N$

      (C) $\lambda = N^2 S$ (D) $\lambda = \dfrac{S}{N}$

   (iii) The critical temperature of CO_2 is :

      (A) 13.1°C   (B) 21.5°C

      (C) 31.1°C   (D) 48.1°C

   (iv) The expression for critical pressure is ....

      (A) $3b$ (B) $\dfrac{a}{27b}$

      (C) $\dfrac{8a}{27bR}$ (D) $\dfrac{a}{27b^2}$

P.T.O.

(v)   The enthalpy is given by ....

    (A)   H = U + PV   (B)   H = U − PV

    (C)   H = U + 3V   (D)   H = U + 3PV

(vi)   The entropy is a measure of ....

    (A)   Perfect order   (B)   Disorder

    (C)   Both (A) and (B)   (D)   None of these

(vii) At absolute zero temperature the entropy tends to ....

    (A)   ∞   (B)   0

    (C)   +1   (D)   −1

(viii) The Helmholtz function in thermodynamics is given by ....

    (A)   F = U + TS   (B)   F = U + PV

    (C)   F = U − TS   (D)   None of these

(ix)   According to Stefan's Boltzman law is ....

    (A) $E = \sigma T_0^4$ (B) $E = \sigma T^2$

    (C) $E = \sigma(T^2 - T_0^2)$ (D) $E = \sigma(T^4 - T_0^4)$

(x)   According to Wien's displacement law the proudct $\lambda_m.T$ is ....

    (A)   0   (B)   ∞

    (C)   Constant   (D)   None of these

(Theory)

2.   Attempt any *five* of the following questions :   10

(a)   What is transport phenomenon ?

(b)   Define isothermal process.

(c)   Define critical temperature.

(d)   Draw a labelled diagram of porous plug experiment.

(e)   State third law of thermodynamics.

(f)   Define Gibbs function.

(g)   What is black body radiation ?

3. Attempt any *two* of the following questions : 10

    (*a*) Derive van der Waals equation of state for real gases.

    (*b*) Explain Carnot's heat engine.

    (*c*) Derive Clausius-Clapeyron heat equation.

    (*d*) Give the deduction of Wien's distribution law.

4. Attempt any *one* of the following questions : 10

    (*a*) Derive an expression for coefficient of viscosity of gas.

    (*b*) Explain Andrew's experiment on CO_2.