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Y—109—2019

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2019

PHYSICS

Paper III

(Heat and Thermodynamics)

(MCQ & Theory)

(Friday, 20-12-2019)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

- N.B. :—*
- (i) Attempt *all* questions.
 - (ii) Use separate answer sheets for MCQ and descriptive.
 - (iii) Negative marking system is applicable to MCQ examination.

MCQ

1. Attempt all multiple choice questions : 10

- (i) The expression for critical volume is.....
 - (a) $a/27b^2$
 - (b) $3b$
 - (c) $a/27b$
 - (d) $3b^2$
- (ii) The coefficient of thermal conductivity of a gas is directly propotional to the square root of.....
 - (a) Absolute Pressure
 - (b) Absolute Temperature
 - (c) Absolute Volume
 - (d) Absolute Pressure & Volume
- (iii) A perfectly black body is that body which.....
 - (a) does not absorb energy
 - (b) absorbs all radiations incident on it
 - (c) radiates all energy
 - (d) is black colour

P.T.O.

- (iv) As the density of gas increases with increase in pressure, mean free path.....
- (a) decreases (b) increases
(c) remains constant (d) does not remain constant
- (v) In carnot heat engine.....is hot body.
- (a) Stand (b) Sink
(c) Source (d) Working substance
- (vi) According to third law of thermodynamics entropy of universe always.....
- (a) remains constant (b) increases
(c) decreases (d) zero
- (vii) The average distance travelled by a molecule between two successive collision is called as.....
- (a) Ideal path (b) Linear path
(c) Mean free path (d) Free path
- (viii) Helmholtz function F of a system is given by :
- (a) $F = U-TS$ (b) $F = U+TS$
(c) $F = UT-S$ (d) None of these
- (ix) According to Stefan-Boltzman law, total rate at which a black body emits heat radiations is propotional to.....
- (a) Absolute Temperature
(b) Square of its Absolute Temperature
(c) Fourth power of its Absolute Temperature
(d) Third power of Temperature
- (x) The critical temperature of CO_2 is.....
- (a) 21.5°C (b) 48.1°C
(c) 31.1°C (d) 41.8°C

Theory

2. Attempt any *five* of the following questions : 10
- (a) State second law (kelvin and clausius) of Thermodynamics.
 - (b) Define Boyle's temperature.
 - (c) State Stefan-Boltzmann law.
 - (d) Draw neat labelled diagram of Andrew's experiment on CO₂.
 - (e) Define Gibb's function.
 - (f) Give the relation between coefficient of viscosity & diffusion.
 - (g) Write the reduced equation of state for a gas.
3. Attempt any *two* of the following questions : 10
- (a) Explain porous plug experiment.
 - (b) Explain Carrot's ideal heat engine.
 - (c) Explain change in entropy in irreversible process.
 - (d) Write a note on deduction of Wein's distribution law.
4. Attempt any *one* of the following question : 10
- (a) Derive and explain van der Waals equation of state for correction of pressure and volume.
 - (b) Explain Carnot's cycle and find the efficiency of Carnot's engine.