18PHU04

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2019
(Second Semester)

Branch - **PHYSICS**

THERMAL AND STATISTICAL PHYSICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1 The range of mercury thermometer is _____
(i) -39° to 357° C (ii) 39° to 357° C
(iii) -39° to -357° C (iv) 39° to-357° C

2 Which of the following is not reversible?
(i) Joules effect (ii) Peltier effect
(iii) Seeback effect (iv) Thomson effect

3 According to Van der Waal's gas equation, critical coefficient RT_C/P_CV_C i equal to
(i) 8 (ii) 8/3
(iii) 8.3 (iv) 1

4 The rate of coefficient of viscosities of He II and He I is
(i) 10'2 (ii) 10-'
(iii) 10'3 (iv) 10^3

5 Thermal conduction in metals takes place by
(i) free electrons (ii) bound electrons
(iii) vibration of molecules (iv) all the above

6 Rayleigh-Jeans law of radiation
(i) applies to smaller wavelengths (ii) applies to longer wavelengths
(iii) applies to all wavelengths (iv) does not apply to any wavelength

7 Out of the following, the physical quantity that relates with first law of thermodynamics is
(i) temperature (ii) pressure
(iii) Number of moles (iv) Energy

8 Entropy remains constant in
(i) adiabetic process (ii) isothermal process
(iii) isochoric process (iv) isolated process

9 The particles obeying Maxwell-Boltzmann statistics are
(i) Identical (ii) Identiacal & indistinguishable
(iii) Distinguishable (iv) Photons

10 Bosons have spin value
(i) 0 (ii) 1
(iii) !4 (iv) 0 or 1

Cont...

SECTION - B (35 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 7 = 35)

11 a Explain the mercury thermometer.

OR

b Describe the seeback effect.

12 a Explain the Thomson effect.

OR

b List the properties of helium 1 and helium II.

13 a Practical application in science domestic radiation.

OR

b State and prove the Kirchoff s law.

14 a Explain the heat engine.

OR

b Describe T-S diagram.

15 a Describe the Maxwell Boltzmann distribution in terms of temperature.

OR

b Apply Bose-Einstein distribution law to photon gas.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 1 0 = 30)

16 Explain construction and working of scale of temperature standardization.

17 Discuss in detail joule - Thomson effect.

18 Discuss in detail the Forbe's method for finding the coefficient of thermal conductivity of a method bar.

19 Explain in detail Maxwell's thermodynamic relation.

20 Derive and expression of the probability distribution of particles governed by Fermi Dirac statistics.

Z-Z-Z END