(FOR THE CANDIDATES ADMITTED   SUBJECT CODE 23 UPS 202
 DURING THE ACADEMIC YEAR 2023-26 ONLY)   REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS : MAY – 2024

B.Sc. – PHYSICS   **MAXIMUM MARKS: 75**
SEMESTER: II   **TIME : 3 HOURS**

PART – III
THERMAL PHYSICS
SECTION – A   (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.   **(K1)**

1. The mean kinetic energy of a molecule is directly proportional to……………..

    a) pressure   b) Specific heat   c) temperature   d) volume

2. The dimensional formula for quantity of heat is ………………….

    a) ML^2T^{-2} b) MLT^{-1} c) ML^2T d) $ML^{-1}T^{-1}$

3. Critical temperature of hydrogen is………………….

    a) 240^oC b) -240^oC c) -340^oC)   d) -258^oC.

4. In Carnot cycle, the second step is……………….

    a) Isothermal process   b) Isothermal compression
    c.) adiabatic process   d) adiabatic compression

5. Measure of disorder of the molecules of the system is referred to as …………..
    a) entropy   b) enthalpy
    c) irreversible process   d) degrees of freedom

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES   **(K2)**

6. Write the expression for the pressure exerted by the gases.

7. State "Stefan's law".

8. Which method is utilized for the liquefaction of air?

9. Write the equation for first law of thermodynamics.

10. Define the term 'zero point energy'

SECTION – B   (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING
QUESTIONS.   **(K3)**

11. a) Deduce gas equation PV = RT from the gas pressure equation of kinetic theory of gases.
                              (OR)
     b)   State and explain Dulong- Petit's law.

12. a) Differentiate the process of conduction, convection and radiation. Give examples.
                              (OR)
     b) What is black body? Explain the features of black body with energy spectrum description.

13. a) Explain the process of liquefaction of hydrogen with experimental setup.

(OR)

b) Describe the properties of Helium I and Helium II and discuss λ-Point.

14. a) Discuss the status of mechanical equilibrium while an unbalanced force acting on it, and define the quasi static process.

(OR)

b) . Explain adiabatic process with examples.

15. a) Give a note on third law of thermodynamics with example.

(OR)

b) Calculate the change in entropy when 5kg of water at 100°c is converted into steam at the same temperature.

SECTION – C   (5 X 8 = 40 MARKS)
ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING
QUESTIONS.   (K4 (Or) K5)

16. a) Deduce the expression for pressure exerted by the gases and estimate the RMS speed of molecules.
(OR)
b) Derive and discuss Vander Waal's equation of the state of a gas. Mention its defects.

17. a) Elaborate the Lees's disc method to determine the thermal conductivity of a bad conductor.
(OR)
b) State Stefan's law of radiation. With a neat diagram, describe the experimental setup and procedure to determine the Stefan's constant.

18. a) Describe the Linde's method of liquefaction of air. Explain with diagram how the liquefaction of air is achieved.
(OR)
b) What is known as adiabatic demagnetisation? Describe the necessary theory of the method of production of low temperature by adiabatic demagnetisation of a paramagnetic salt.

19. a) Prove the statement " Heat and work " are path functions. Compare heat and work with five main points.
(OR)
b) Explain working of a heat engine through Carnot's cycle and deduce expressions for the work done at various stages and show that the efficiency $\eta = 1 - T_2/T_1$.

20. a) From P-V diagram deduce the expression for change in entropy and discuss it for reversible and irreversible processes..
(OR)
b) Derive any five important Maxwell's thermo dynamical relations from thermodynamics laws.

ETHICAL PAPER

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