

(NO. OF PAGES: 2)

(FOR THE CANDIDATES ADMITTED

SUBJECT CODE: 22UPS202

DURING THE ACADEMIC YEAR 2022-23 ONLY)

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY – 2023

B.Sc. – Physics

MAXIMUM MARKS: 50

II SEMESTER

TIME : 3 HOURS

**PART – III
THERMAL PHYSICS**

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

- The quantity of heat required to raise the temp of unit mass of a substance through one degree is referred as _____.
a) Calorie b) Specific heat c) joule d) radiant
- Thermal conduction in metals takes place by _____.
a) free electrons b) bound electrons c) vibration of molecules d) valance electrons
- For Liquefying air Linde used _____.
a) Joule –kelvin effect b) Principle of regenerative cooling
c) Both (a) and (b) d) Joule –Thomson effect.
- In Carnot cycle, the first step is _____.
a) Isothermal expansion b) Isothermal compression
c) adiabatic expansion d) adiabatic compression
- During an adiabatic reversible process, the entropy _____.
a) increases b) remains constant
c) decreases d) equal to one

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES.

(K2)

- What is an ideal gas?
- Define the term “thermal diffusivity”.
- What is known as the magneto calorie effect?
- State zeroth law of thermodynamics.
- What is known as zero point energy?

(CONTD 2)

SECTION – B

(5 X 3 = 15 MARKS)

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

(K3)

11. a) List any three postulates of kinetic theory of gases
(OR)
b) State Dulong and Petit's law and justify it through law of equipartition of energy.
12. a) Deduce the expression for the coefficient of thermal conductivity and arrive the dimension formula for K.
(OR)
b) Discuss the distribution of energy in the spectrum of blackbody with graph.
13. a) Give the experimental arrangements of the cascade process for the liquefaction of oxygen.
(OR)
b) Discuss the properties of Helium I and Helium II., What do you understand by λ -Point?
14. a) List the various types of thermodynamical equilibrium, discuss the status of mechanical equilibrium while an unbalanced force acting on it, and define the quasistatic process.
(OR)
b) Write any three points about the conditions of reversibility for any heat engine.
15. a) Discuss the change in entropy in reversible process.
(OR)
b) Define enthalpy. Show that initial and final enthalpies are equal while a system undergoes a change of state.

SECTION – C (5 X 5 = 25 MARKS)

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

(K4 (Or) K5)

16. a) Give the Maxwell law of equipartition of energy, and obtain value of γ , C_p and C_v using kinetic theory of gases.
(OR)
b) Derive Vanderwaals equations for gases and calculate the theoretical values of critical constants
17. a) Describe Forbe's method of determining the thermal conductivity of a metal bar.
(OR)
b) What is Stefan's law of radiation? Give a laboratory method for determining the Stefan's constant.
18. a) Describe the method of liquefaction of air by Linde's Process. State clearly the principle underlying the method and explain with diagram how the liquefaction of air is achieved.
(OR)
b) Describe the necessary theory of the method of production of low temperature by adiabatic demagnetisation of a paramagnetic salt.
19. a) Obtain the expressions for the work done during the isothermal and adiabatic process
(OR)
b) Describe 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) Draw the temperature -entropy diagram and explain. Obtain the expression for the entropy of perfect gas.
(OR)
b) Derive any five of Maxwell's thermodynamical relations.