

(FOR THE CANDIDATES ADMITTED

SUBJECT CODE

25UPS202

DURING THE ACADEMIC YEAR 2025-26 ONLY)

REG.NO.:

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

END-OF-SEMESTER EXAMINATIONS : MAY– 2026

B.Sc. – PHYSICS

MAXIMUM MARKS: 75

II SEMESTER

TIME : 3 HOURS

PART – III
THERMAL PHYSICS

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

1. The ratio of specific heats (C_p / C_v) of a diatomic gas is
a) 1.67 b) 1.4 c) 1.00 d) 2
2. Under steady state, the temperature of a body
a) increases with time b) decreases with time
c) does not change with time and is same at all points of the body
d) does not change with time and can be different at different points of the body
3. Using adiabatic demagnetization, the minimum temperature achievable
a) 1 K b) 10^{-3} K c) 10^{-4} K d) 10^{-5} K
4. The efficiency of a Carnot's engine working between steam point and ice point is
a) 1 b) 0 c) 26.81 % d) 16.81 %
5. When water vapour condenses into water, its entropy
a) Increases b) decreases c) remains unchanged d) first decreases and then increases

ANSWER THE FOLLOWING QUESTIONS IN ONE OR TWO SENTENCES. (K2)

6. Define degrees of freedom.
7. Define thermal diffusivity.
8. Which method is commonly used for liquefaction of Helium gas?
9. State zeroth law of thermodynamics.
10. Define entropy.

SECTION – B

(5 X 5 = 25)

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

11. (a) Derive the expression for critical constants in terms of a , b and R .

(OR)

- (b) List the postulates of kinetic theory of gases.

(CONTD 2)

12. (a) Explain Searle's method to determine the thermal conductivity of a rod.
(OR)
(b) Explain Lee's disc method for determining the thermal conductivity of a bad conductor.
13. (a) Develop the method to convert magnetic temperature to Kelvin temperature
(OR)
(b) Describe the principle of cascaded cooling for liquefaction of oxygen with a neat diagram.
14. (a) Write about reversible and irreversible processes.
(OR)
(b) State and prove Carnot's theorem
15. (a) Explain the change in entropy for a reversible process.
(OR)
(b) Derive the T.dS equations in terms of C_p and C_v

SECTION – C

(5 X 8 = 40)

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

16. a) Derive the expression for pressure exerted by a gas and obtain the rms speeds of molecules
(OR)
b) Determine the Van der Waals equation of state for a gas.
17. a) Explain the experimental determination of Stefan's constant using a laboratory setup.
(OR)
b) Describe Forbes' method to determine thermal conductivity of different metals.
18. a) Discuss the theory and experimental procedure to produce low temperature below 1K using adiabatic demagnetisation.
(OR)
b) Explain the liquefaction of air by Linde's process.
19. a) Obtain an expressions for work done during isothermal and adiabatic processes.
(OR)
b) Summarize the working of an ideal Carnot's engine and obtain its efficiency.
20. a) Derive all the Maxwell's thermodynamic relations.
(OR)
b) Examine the T-S diagram for a reversible process.