

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI –600 034.  
B.Sc., DEGREE EXAMINATION - PHYSICS  
I SEMESTER – APRIL 2001  
PHY 500 PROPERTIES OF MATTER & THERMAL PHYSICS

16.04.2001

1.00 – 4.00

Max:100 marks

PART – A

Answer All Questions.

(10 x 2 = 20 marks)

01. What is meant by equipotential surface?
02. Explain: Elastic limit and breaking point.
03. What is lubrication? Give two examples.
04. Define Surface Tension.
05. Write any two assumptions of kinetic theory of gases.
06. What are intensive and extensive variables?
07. What do you mean by entropy? How does it change for a reversible and irreversible processes?
08. State II law of Thermodynamics.
09. What is Joule – Kelvin effect?
10. What are second order phase transitions?

PART – B

Answer any four questions.

(4 x 7.5 = 30 marks)

11. Explain the variation of 'g' with attitude and depth. (7.5 marks)
11. Define Poisson's ratio and describe an experiment for the determination of poisson's ratio for rubber. (2+5.5 marks)
13. Describe in detail Perrin's experiment for evaluation of Avagadro's number. (7.5 marks)
14. Derive Claussius – Clapeyron equation. (7.5 marks)
15. Using Van der Waal's equation, find the critical constants of Van der Waal's gas. (7.5 marks)

PART – C

Answer any four questions.

(4x12.5 = 50 marks)

16. Calculate the gravitational potential and field due to a spherical shell, at a point.
  - a) Outside the shell and (6 marks)
  - b) Inside the shell (6.5 marks)
17. Derive Poiseulle's formula for the flow of a liquid. Apply the correction for pressure head. (8+4.5 marks)
18. a) State the first law of Thermodynamics. (2 marks)  
b) Explain Langevin treatment of Einsteins equation for kinetic theory of gases. (10.5 marks)
19. a) Using the first law of Thermodynamics, derive the Gibbs – Helmholtz equation. (8.5 marks)  
b) Write any two Maxwells equations. (4 marks)
20. Discuss the porous plug experiment and deduce an expression for the Joule – Thomson effect. (4.5 + 8 marks)

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