

21U606

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Name:

Reg.No:

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2024

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U PHY6 B10 / CC20U PHY6 B10 - THERMODYNAMICS

(Physics - Core Course)

(2019 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 3

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. What are the properties involved in the microscopic description of a system
2. What is meant by internal energy of a thermodynamic system?
3. Define specific heat capacity. What is its unit?
4. Show that the internal energy of a system remains the same when it undergoes free adiabatic expansion.
5. Give Planck's statement of second law of thermodynamics.
6. Define thermodynamic scale.
7. Define absolute zero of thermodynamic scale.
8. Express entropy change of ideal gas in terms of temperature and pressure. What enables us to draw TS diagram?
9. What is meant by entropy change of the universe'?
10. What is Joule Thomson expansion or throttling process?
11. Discuss the conditions for exact differential.
12. Distinguish between gas and vapour.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. How equilibrium of two separate systems (X, Y) and (X', Y) be defined?
14. Explain how do you check whether or not two beakers of water are in equilibrium using zeroth law of thermodynamics.
15. State and explain 2nd law of thermodynamics.

16. Explain the Carnot cycle with a neat diagram.
17. Derive an expression for the entropy of ideal gas in terms of temperature and volume.
18. Derive the Clausius - Clapeyron equation.
19. Calculate the melting point of ice under a pressure of 2 atmospheres. It is given that the melting point of ice under one atmospheric pressure is 273.16 K. Latent heat of fusion of ice is 79.6 cal/g and at the melting point specific volume of ice is 1.0908 cc and that of water is 1.0001 cc. One atm = 1.013×10^6 dynes cm^{-2} .

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any *one* question. The question carries 10 marks.

20. Define Quasi static process. Explain different type of quasi static processes. Derive an expression for work in changing the volume of hydrostatic system.
21. State and prove Clausius theorem for entropy and write down Clausius mathematical formulation.

(1 × 10 = 10 Marks)
