

20U304

(Pages: 2)

Name:

Reg.No:

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U CHE3 B03 - PHYSICAL CHEMISTRY-1

(Chemistry - 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. Give the Maxwell-Boltzmann law of distribution of molecular velocities and mention the terms used.
2. Give the relationships connecting the van der Waals' constants and the critical constants of a gas.
3. Define an open system.
4. How is the internal energy change in a process related to heat and work?
5. What is meant by Joule-Thomson coefficient?
6. What is Carnot's theorem?
7. Explain the term work function.
8. Obtain the relation: $dA = SdT - PdV$
9. Distinguish between statistical probability and thermodynamic probability.
10. Define K_x . Derive its relationships with K_p and K_c .
11. State and explain Le Chatelier principle.
12. What is meant by the term inversion operation?

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. Calculate the mean free path of N_2 at 300 K and 1 atm pressure. Collision diameter=0.374 nm.
14. Discuss the Virial equation of state.
15. Explain the physical significance of the term entropy.
16. Explain the term standard entropies.
17. How are entropy and probability are related?
18. Derive an equation that relates the change in equilibrium constant, K_{eq} , of a chemical reaction to the change in temperature.
19. Explain the terms symmetry operation and element of symmetry with a suitable example.

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. Derive the van der Waals' reduced equation of state. State the law of states and explain its significance.
21. Discuss Linde's process and Claude's process for the liquefaction of gases.

(1 × 10 = 10 Marks)
