

24U216

(Pages: 2)

Name :

Reg. No :

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2025

(FYUGP)

CC24UCHE2MN101 - QUANTUM MECHANICS, SOLID STATES AND GASEOUS STATES

(Chemistry - Minor Course)

(2024 Admission - Regular)

Time: 2.0 Hours

Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer *all* questions. Each question carries 3 marks.

1. State and explain Heisenberg's uncertainty principle. [Level:2] [CO1]
2. Discuss about one important point of failure of classical physics. [Level:2] [CO1]
3. Interpret the number of atoms per unit cell in body centered cubic lattice. [Level:2] [CO2]
4. Explain in detail about nonstoichiometric defects in crystals. [Level:2] [CO2]
5. Explain the term average velocity. Give equation. [Level:2] [CO3]
6. Explain Avagadro's law. [Level:2] [CO3]
7. Calculate the total K.E in joules of the molecules in 22 g of CO₂ at 27°C. [Level:3] [CO3]
8. Give the equation for Critical pressure. Explain each term. [Level:2] [CO4]
9. Describe the term Boyle temperature. How it related to compressibility factor. [Level:2] [CO4]
10. Describe the term compressibility factor. Give equation. [Level:2] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer *all* questions. Each question carries 6 marks.

11. Explain the defects of the Bohr atom model. [Level:2] [CO1]
12. Discuss in detail about space lattice and unit cell and its parameters [Level:2] [CO2]
13. Describe the difference between paramagnetism and diamagnetism. [Level:2] [CO2]
14. Discuss in details about p-type semiconductors. [Level:2] [CO2]
15. Describe the terms collision diameter, collision frequency and mean free path of a gas. How does mean free path vary with pressure ? [Level:2] [CO3]
16. Discuss in detail about collision diameter and collision number. [Level:2] [CO3]

17. Discuss in detail about van der Waal's equation of state on the basis of deviation from ideal behaviour. [Level:2] [CO4]
18. Describe critical compressibility factor. Explain how it relates to other critical constants. [Level:2] [CO4]

(Ceiling: 36 Marks)

Part C (Essay questions)

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

19. Discuss in detail about Elements of symmetry in crystals. [Level:2] [CO2]
20. Discuss the postulates of Kinetic molecular model of gases and derive RMS velocity using kinetic gas equation. [Level:2] [CO3]

(1 × 10 = 10 Marks)
