(6 pages) **Reg. No. :** .....

Code No. : 20059 E **Sub. Code : CMCH 31**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Chemistry – Core

PHYSICAL CHEMISTRY – I

(For those who joined in July 2021 and 2022 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. At constant pressure $V \alpha T$ is called
   (a) Charle's law
   (b) Avogadro's law
   (c) Boyle's law
   (d) None of these

2. $\sqrt{\frac{2RT}{M}}$ is called
   (a) Average velocity
   (b) Most probable velocity
   (c) Root mean square velocity
   (d) None of these

3. Benzene-Toluene system is example for
   (a) Ideal solution
   (b) Solution with positive deviation
   (c) Solution with negative deviation
   (d) None of the above

4. Surface tension of a liquid is given by the expression
   (a) $\gamma = hr\rho g$ (b) $hr\rho g/2$
   (c) $hr\rho g/3$ (d) none of the above

5. An amorphous substance is
   (a) Isotropic (b) Anisotropic
   (c) Liquid crystal (d) A liquid

6. The total no. of Bravais lattice in a crystal

(a) 7 (b) 32

(c) 230 (d) 14

7. $^{13}_{6}C$ and $^{14}_{7}N$ are

(a) Isotopes (b) Isotones

(c) Isobars (d) Isosteres

8. The massless particles are

(a) Electrons (b) Protons

(c) Gamma rays (d) α – rays

9. The emission for light from yellow phosphorus is due to

(a) Fluorescence

(b) Phosphorescence

(c) Chemiluminescence

(d) Bioluminescence

10. Which of the following law governs photo chemical reaction?

(a) Henry's law

(b) Stark-Einstein law

(c) Raoult's law

(d) Faraday' law

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) List out five important postulates of kinetic theory of gases.

Or

(b) Give the Maxwell Boltzmann equation for molecular velocity and explain all the terms involved in it.

12. (a) Explain surface tension of a liquid.

Or

(b) Explain the characteristics of Ideal solution.

13. (a) Give the differences between amorphous and crystalline solids.

Or

(b) Explain band theory of conductors, semiconductors and insulators.

14. (a) Explain Geiger Nuttal rule.

Or

(b) Write a note on C^{14} dating.

15. (a) Give the laws of photo chemistry.

Or

(b) Explain the kinetics of decomposition of HI.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 600 words.

16. (a) Write a note on the following.

(i) Collision frequency

(ii) Collision diameter.

Or

(b) Explain the effect of temperature and pressure on co-efficient of viscosity.

17. (a) Derive Gibbs-Duhem-Margulus equation.

Or

(b) Write a note on vapour pressure-composition curves of completely miscible liquids.

18. (a) Derive Bragg's equation and give its applications.

Or

(b) Write a note on the following :

(i) Schottky defect

(ii) Frenkel defect.

19. (a) Discuss briefly on Neutron activation analysis.

Or

(b) Write a note on the following :

(i) Nuclear fission

(ii) Nuclear fusion.

20. (a) Write a notes on the following :

(i) Chemiluminescence

(ii) Quantum yield.

Or

(b) Explain the determination of quantum yield.

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