

Kolhan University, chaibasa

B. SC. Semester-5 Examination 2020

Chemistry B. SC. (H)

Semester-5

CC-12

Physical Chemistry

By

Dr. Jagdish Prasad

Asst. Prof. of Chemistry

Tata College, Chaibasa

833 202.

Full marks: 70

Time: 3 hrs

General Instructions:

Candidates are required to give their answer in their own words as far as practicable. Their figures in the margin indicate full marks.

Group-A

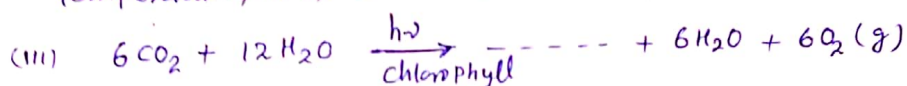
Answer all questions:

1. Fill in the blanks:

10 × 2 = 20.

(i) When an atom/molecule absorbs light of a given frequency, it absorbs only.

(ii) The emission of visible radiation occurs due to some cause other than temperature, it is known as



(iv) Van't Hoff factor (i) for K_3PO_4 is

(v) S.I. unit of molal elevation constant (K_b) is

(vi) Solubility of a gas in a liquid increases by increasing

(vii) The shape of XeO_3 is

(viii) $\Delta P \times \Delta x \geq \text{.....}$

(ix) Bond order of H_2^+ is

(x) Schrodinger wave equation in terms Laplacian operator is

Group-B

Answer any four questions:

4 × 5 = 20

2. What are the basic difference between photochemical reactions and thermochemical reactions?

3. Define photosensitization reaction and explain by giving suitable examples.

- (4) Calculate the energy in calories Per mole / per einstein for radiation of wavelength 10^3 \AA .
- (5) Explain activity and Activity coefficient.
- (6) The boiling point of a solution containing 0.20 gm of a substance X in 20.00 gm of ether is 0.17 K which is higher than that of pure ether. Calculate the molecular weight of X. Boiling point constant of ether per 1 kg is 2.16 kelvin.
- (7) Deduce Compton Effect.
- (8) Calculate the coefficients of A.O's used in sp^2 hybrid orbitals.
- (9) Deduce the Schrodinger wave equation for a particle in a one dimensional potential box.

Group-C

Answer any two questions: $2 \times 15 = 30$

10. (a) Explain Jablonski diagram depicting various process occurring in the excited state.
- (b) Deduce a photochemical combination of H_2 and Br_2 . Find out its chain length. $8+7=15$

11. (a) Derive thermodynamically the relationship between molecular weight of solute and elevation in boiling point. (ΔT_b)
- (b) Explain Non-Ideal (Real) solution. $10+5=15$

12. (a) Write short-notes on:

- (a) Black body Radiation
- (b) Photoelectric effect. $3 \times 5 = 15$
- (c) de-Broglie equation

13. (a) State postulates of Quantum mechanics

(b) Prove that

$$\nabla^2 \psi + \frac{8\pi^2 m}{h^2} (E - V) \psi = 0$$

$5+10=15$

B.Sc. Chem (H) Sem-5

Answer CC-12

Physical chemistry

1 (i) one quanta

(ii) Luminescence

(iii) $C_6H_{12}O_6$

(iv) 4

(v) $\text{kelvin kg mol}^{-1}$

(vi) Pressure

(vii) pyramidal

(viii) $\frac{h}{4\pi}$

(ix) 0.5

(x) $\nabla^2\psi = \frac{\partial^2\psi}{\partial x^2} + \frac{\partial^2\psi}{\partial y^2} + \frac{\partial^2\psi}{\partial z^2}$

$$\text{or, } \nabla^2 = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$$

24.04.2020