

(b) Write application of e. m. f. measurements.

5+10+5 = 20

10. What is adsorption Isotherm ? Derive the Gibb's adsorption isotherm. What is the application of adsorption ?

5+10+5 = 20

11. (a) What is chain reaction ? Write distinguish features of chain reaction.

(b) Explain consecutive reactions with suitable examples.

(c) What is half life period ? Show that half life period of third order reaction depends on initial concentration of reactant.

8+6+6 = 20

12. Write short notes on any three of the following :

7+7+6 = 20

(a) Hydrogen electrode

(b) Liquid Junction potential

(c) Chemosorption

(d) de-Broglie equation



YK - 13/3 (11,000)

(4)

XE(H-3) — Ch (5)

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XE(H-3) — Ch (5)

2018

Time : 3 hours

Full Marks : 100

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer **five** questions selecting not more than **two** from any Group.

Group – A

1. (a) What do you understand by viscosity and co-efficient of viscosity ? What is the effect of temperature on viscosity ?

(b) What is mean free path ? How mean free path related to co-efficient of viscosity ?

10+10 = 20

2. What do you mean by imperfections or defects in crystals ? Describe the different types of defects in ionic crystals.

20

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(Turn over)

3. (a) State and explain the second law of photochemistry (Stark Einstein Law of Photochemical Equivalence).

(b) Calculate the value of an Einstein of energy in electron volts for radiation of frequency $3 \times 10^{13} \text{ s}^{-1}$. $10+10 = 20$

4. Write short notes on any **three** of the following : $7+7+6 = 20$

(a) Phosphorescence

(b) Radius ratio rule

(c) Collision diameter

(d) Basic principles of different types of absorption

Group – B

5. (a) Derive van't Hoff equation :

$$d\left(\frac{\ln k_p}{dT}\right) = \frac{\Delta H}{RT^2}$$

(b) Define law of mass action. How can it be derived thermodynamically ? $10+10 = 20$

6. (a) Derive Schrodinger equation and write its application to H-atom.

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Contd.

(b) The uncertainty of position and velocity of a particle is 10^{-10} m and $5.27 \times 10^{-24} \text{ ms}^{-1}$ respectively. Find out the mass of the particle, if $h = 6.62 \times 10^{-34} \text{ JS}$. $10+10 = 20$

7. (a) Explain the terms – phase, component and degree of freedom.

(b) Draw phase diagram of cement.

(c) Calculate the degree of freedom for the following :

(i) $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$

(ii) Solid carbon in equilibrium with gaseous CO , CO_2 and O_2 at 100°C .

$7+7+6 = 20$

8. Write notes on any **three** of the following :

$7+7+6 = 20$

(a) Entropy

(b) Heisenberg's uncertainty principle

(c) Third law of thermodynamics

(d) Chemical potential

Group – C

9. (a) What is transport number ? How can you determine transport number by Hittorf's method ?

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(3)

(Turn over)