2021

Time : 3 Hours

Maximum Marks : 100

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

Answer any five questions.

D-251

The figures in the margin indicate full marks.

Answer any five questions Q No. 1 is compulsory

1. Explain any four of the following : 5×4=20

(a) De Broglie's equation is true for all particles but applicable to only small particles like electron .

(b) The enthalpy of adsorption is an exothermic process .

(c) CO_2 is non-polar while SO_2 is polar.

(d) Collisions between molecules cannot be the only factor involved in determining the rule of a reaction.

(e) CO molecule shows pure rotational spectra but CO_2 does not .

(f) The energy of a particle in a box is quantized .

2. (A) Write the postulates of quantum mechanics

(B) Derive Schrodinger wave equation .

3. (A) What do you mean by partial molar properties ?

(B) State and explain Third Law of thermodynamics .

4. (A) What are the short comings of Arrhenius theory

(B) Derive an expression for rate constant of a bimolecular gaseous reaction, between two identical molecules, on the basis of collision theory .

5. (A) Explain briefly Fluorescence and Phosphoresce

(B) Explain Einstein's law of photochemical equivalence

6. (A) What do you mean by concentration cell ?

(B) Define an expression for EMF of a concertation cell without transference :

7. (A) Define electromagnetic recitation .

(B) Derive expression for the vibrational energy of a diatomic molecule.

8. (A) Define absorption, adsorption and adsorption isotherm

(A) Derive an expression for Gibb's adsorption isotherm.

9. (A) Explain in brief Diploe moment and Induced Dipole moment .

(B) Explain: Ortho – and meta-isomers of dichloro benzene are polar while the para-isomer is non-polar.

10. Write notes an any two of the following :-

(A) Planck's recitation law.

(B) Entropy of activation.

(C) Quantum efficiently

(D) Eigen function & Eigen value

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