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AI—193—2017

FACULTY OF SCIENCE

M.Sc. (Second Year) (Fourth Semester) EXAMINATION

OCTOBER/NOVEMBER, 2017

(CBCS Pattern)

PHYSICAL CHEMISTRY

Paper XXII, CH-543/3

(Molecular Reaction Dynamics and Biophysical Chemistry)

(Thursday, 16-11-2017)

Time : 2.00 p.m. to 5.00 p.m.

Time— Three Hours

Maximum Marks—75

N.B. :— (i) Attempt All questions.

(ii) Use log table and calculator is allowed.

(iii) Solve MCQs in one attempt only.

1. Solve any *three* of the following : 15

(a) Write a note on diffusion controlled reaction.

(b) Explain in brief Helix Coil transition.

(c) Explain chain confⁿ of macromolecules.

(d) Explain in brief structure and function of cell membrane.

(e) Derive Bragg equation.

2. Solve any *three* of the following : 15

(a) Explain synthesis of ATP from ADP.

(b) Write a note on protein folding problems.

(c) Write a note on H⁺ ion titration curve.

(d) Derive Eyring equation ?

(e) Write a note on TST.

3. (a) Explain in brief std. free energy change in biochemical reaction for exergenic and endoergenic process.

(b) Explain in brief Multiple equilibria and various types of binding process in biological systems. 15

P.T.O.

Or

- (a) Explain in brief collision theory of reaction rate.
- (b) At 25°C the density of glucose is 1.35 g cm⁻³ its diffusion coefficient is 6.81 × 10⁻⁶ cm²/s and the coefficient of viscosity of water is 8.937 × 10⁻³ poise. Assuming that the glucose molecule is spherical, estimate its molar mass.
4. (a) Explain in brief Muscular contraction and energy generation in Mechanochemical system.
- (b) The following data were obtained on the osmotic pressure of solution of *v* globulin in 0.15 M NaCl at 37°C :
- | | | | |
|------------------------|-------|-------|------|
| C, g/100 ml | 19.27 | 12.53 | 5.81 |
| Π, mm H ₂ O | 453 | 253 | 112 |
- Calculate molar mass of polymer. 15

Or

- (a) Explain in brief various types of forces involved in biopolymer interaction.
- (b) Derive :
- $$\bar{M}_N = \frac{SRT}{D(1 - \bar{v} \rho)}$$
5. Choose the *correct* answer from the following : 5

- (i) The osmotic pressure of a solution at given temperature is directly proportional to it
- | | |
|----------------------|-------------------|
| (a) Concentration | (b) Pressure |
| (c) Both (a) and (b) | (d) None of these |
- (ii) A semipermeable membrane allow the passage of.....through it.
- | | |
|-----------------------------|------------------------------|
| (a) solvent only | (b) solute only |
| (c) solvent and solute both | (d) either solvent or solute |
- (iii) Osmatic pressure can be measured by an instrument called.....
- | | |
|---------------|---------------|
| (a) manometer | (b) barometer |
| (c) osmometer | (d) nanometer |

- (iv) The solution with liquid osmotic pressure are called :
- (a) Molar solution (b) Molal solution
- (c) Isotonic solution (d) Isomorphous solution
- (v) A reaction in which all reactants are in same phase is called.....
- (a) elementary (b) bimolecular
- (c) homogenous (d) heterogenesis
- (B) Write notes on any *two* of the following : 10
- (i) PE Surface
- (ii) Osmotic pressure
- (iii) Photocoaxlation spectroscopy.