



বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

M.Sc. Examinations 2020

Semester IV

Subject: CHEMISTRY

Paper: CEM – 403

(Organic, Inorganic and Physical Special)
(Theory)

Full Marks:40

Time: 2hrs.

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

Paper: CEM 403
(Organic Special)

Answer any one of the following questions:

The questions are of equal value. Candidates are requested to give their answer in their own words (limit: 250 words) as far as practicable.

1. Explain “M” and “P” type chirality as per helicity rule with one example
2. Write briefly about “Allylic 1,3- strain” with an example.
3. (a) What is “Allylic 1,2-strain”? Write in brief with one example.
4. (a) Define “3-alkylketone effect” with an example. (b) Write briefly about “2-alkylketone effect” with an example.
5. (a) Write in brief about ORD. (b) What is “Cotton Effect”?
6. (a) Discuss in short, the usefulness of CD curves. (b) Write briefly about “Sector Rule”.
7. Write a short note on “Octant Rule”?
8. Discuss the stereochemistry of perhydrophenanthrenes in brief and show the different steric interactions including its optical properties



9. Give an account of the stereochemistry of decalones and decalols.
10. Discuss the Curtin-Hammett principle briefly.
11. What do you mean by stereoselective aldol reactions?
12. Write short notes on the Felkin-Ahn model and Bürgi-Dunitz trajectory.

Paper: CEM 403
(Inorganic Special)

Answer any one of the following questions:

The questions are of equal value. Candidates are requested to give their answer in their own words (limit: 250 words) as far as practicable.

1. Write a short note on conjugate base mechanism (CB) with a suitable example.
2. Critically comment on acid catalyzed aquation of chromium complex of ethylenediamine is slower than that of the biguanide complex.
3. Discuss the effect of pH on polarograms.
4. Explain why in acidic medium the rate of ligand exchange reaction of Ni(II)-bipyridine complex is increased, however, for Ni(II)-1,10-phenanthroline complex no change in reaction rate is found.
5. Deduce the relationship between half wave potential and standard redox potential of a system.
6. Explain the TG curve for $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$
7. Write the significance of "half wave potential" and "standard redox potential" of a system.
8. Derive the rate law for associative mechanism.
9. Derive the rate law for dissociative mechanism.
10. Write a short note on inner sphere mechanism.
11. Write a short note on outer sphere mechanism.
12. Write a short note on two term rate law.



**Paper: CEM 403
(Physical Special)**

Answer any one of the following questions:

The questions are of equal value. Candidates are requested to give their answer in their own words (limit: 250 words) as far as practicable.

1. Briefly describe the method of determination of rate constant of a diffusion-controlled reaction.
2. Briefly describe the method to determine the viscosity co-efficient using absolute reaction rate theory.
3. Using appropriate diagram discuss the role of Potential Energy Surfaces (PES) in reaction kinetics.
4. Discuss briefly the statistical mechanical treatment of the rate constant of a gaseous bimolecular reaction.
5. Briefly describe the sedimentation technique to determine the average molecular weight of a polymer.
6. Briefly describe the light scattering technique for determination of average molar mass of a polymer.
7. Briefly describe the acid hydrolysis of protein and subsequent amino acid analysis.
8. Briefly describe the fluid mosaic model of membrane bilayer.
9. Briefly discuss how vapour pressure of a polymer solution can be obtained using Flory-Huggins equation.
10. Briefly describe the method based on measurements of osmotic pressure of solutions of polymers for the determination of their molar masses.
11. Briefly discuss the electro-capillary thermodynamics for polarisable interface.
12. Discuss briefly how the surface tension of a liquid is affected by addition of electrolyte.