5306

CHE 532 / CHE 533 / CHE 534

M.Sc. (IVth SEMESTER) EXAMINATION, 2023-24

(CBCS MODE)

CHEMISTRY

Time : Three Hours] [Maximum Marks : 75

CHE 532

(POLYMER CHEMISTRY)

Note: There are **three** sections (**A**, **B** and **C**) and candidate has to attempt questions from all sections. Marks are indicated against each section.

Section-A

1. Answer **all** questions : 5×3=15

(a) What do you mean by polydispersity of a system ?

(b) Distinguish between 'Organic' and 'Inorganic' Polymers by giving suitable examples.

(c) Define side group elimination.

(d) Briefly describe various types of copolymers.

(e) Explain reaction injection molding.

Section-B

Note: Answer **all** questions of the following : 4×5=20

2. (a) What are the factors influencing mechanical degradation ?

Or

(b) Explain the mechanism of oxidative degradation.

3. (a) Discuss in brief the monometallic mechanism for preparing stereo-regular polymers with the help of Ziegler- Natta catalyst.

Or

(b) Write down the Kinetic equations for catalysed condensation polymerizations.

4. (a) Discuss the viscous flow behaviours of polymers.

Or

(b) Clearly explain the significance of molecular weight distribution curves' in the characterization of a polymer sample. Draw a neat diagram also.

5. (a) Explain stabilizers with suitable examples.

Or

(b) Differentiate between compression Molding and injection molding.

Section-C

Note: Answer any **two** questions of the following : 2×20=40

6. Compare the features of melt spinning dry spinning and wet Spinning.

7. Discuss the mechanism and Kinetics for cationic polymerization. What are living polymers.

8. Define Number average, weight average, viscosity average and sedimentation average molecular weight.

9. Write notes on the following :

   (a) Classification of Polymers

   (b) Antioxidants

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CHE 533

(INORGANIC MATERIALS)

Note: There are **three** sections (**A**, **B** and **C**) and candidate has to attempt questions from all sections. Marks are indicated against each section.

Section-A

1. Answer **all** questions : 5×3=15

   (a) Explain schottky and Frankel defects in solids.

   (b) What do you understand by semiconduction

   (c) Differentiate between extrinsic and intrinsic Semiconduction ?

   (d) What is photonic crystal, name few applications

   (e) Identity the products A, B, C and D

$$[VO_4]^{3-} \xrightarrow[pH12]{} A \xrightarrow[pH10]{} B \xrightarrow[pH1.9]{} C \xrightarrow[pH\angle 1]{} D$$

Section-B

Note: Answer **all** questions from the following : 4×5=20

2. (a) What is LASER ? Explain its principle and briefly describe the fabrication and working in case of Ruby LASER.

Or

   (b) What are Wade's rule ? Explain with Suitable examples.

3. (a) Write the structural aspects of non-stoichiometric defects.

Or

(b) Briefly explain the synthetic approach to transition metal clusters.

4. (a) Describe Soft and Hard magnetic materials.

Or

(b) Explain electrical conductance in terms of band-theory.

5. (a) Mention optical properties of Metals and non-metals ?

Or

(b) Describe magnetism due to defects ?

Section-C

Note: Answer any **two** questions of the following : 2×20=40

6. What are Nano-materials ? Describe Sol-Gel method to prepare Nanomaterials. Mention some important applications.

7. What are two basic approaches for synthesis of Nanomaterial ? Describe structure, properties and applications of carbon nanotubes.

8. What do you mean by high Tc Materials ? Give their applications in details.

9. What are the condition for metal-metal bond formation ? Explain low nuclearity carbonyl clusters with the help of suitable examples ?

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CHE 534

(DRUGS AND AGROCHEMICALS)

Note: There are **three** sections (**A**, **B** and **C**) and candidate has to attempt questions from all sections. Marks are indicated against each section.

Section-A

1. Answer **all** questions : 5×3=15

   (a) What will happen if benzene ring in sulpha drug is replaced with any heterocyclic ring ?

   (b) Explain LD_{50} and its role in toxicity of any compounds .

   (c) Explain the role of gene in Cancer ?

   (d) What is DMDT ? Give its synthesis and applications ?

   (e) Write the difference between natural and synthetic insecticides.

Section-B

Note: Answer **all** questions of the following : 4×5=20

2. (a) What are Sulpha drug ? Give Synthesis and general use of sulpha and thiadiazole Sulphapyridine.

Or

   (b) provide Synthesis and application of Pamaquine and Pentaquine.

3. (a) What is strulural Variation in different penicillins ? Give Synthesis of Penicillin-G.

Or

(b) Give Synthesis and application of PAS.

4. (a) Explain the classification of pesticides. What do you understand by the term Insecticides ?

Or

(b) What are Fungicides ? Give Synthesis and use of Dichlone and Chloranil.

5. (a) What do you understand by Antimetabolites ? Give Synthesis and application of Fluorouracil.

Or

(b) What kind of Pesticides are OMPA and Parathion ? Give their Synthesis and important application.

Section-C

Note: Answer any **two** questions of the following : 2×20=40

6. What do you understand by Nitrogen Mustard ? Explain the mode of action of Nitrogen mustard. How will you synthesise Mustargen ? Give the important application and side effects of Mustargen.

7. How NABAM is useful for the synthesis of ZINEB and MANEB ? Give important application of these compounds in crop production.

8. What are Psycho Pharmacological agent ? What are their roles in different mental disorder ? Give the synthesis and application of Promazine and chloropromazine.

9. Write short notes on any four :

   (a) Synthesis of Nicotine and its application.

   (b) Pyrethrines and its application.

   (c) FSSAI and its role in food protection and regulation.

   (d) Halogenated phenols

   (e) Organochlorine Pesticides and their types.

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