# CHE 532/CHE 533/CHE 534

## M.Sc. IV<sup>th</sup> SEMESTER EXAMINATION, 2024-25

### (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 <u>all</u> questions of the following :      3×5=15

(a)     What is co-polymer ? Explain with suitable example.

(b)     Write the full name and monomer unit of SAN and Nylon-6, 10.

(c)     What is ionic chain polymerization ?

(d)     What are antioxidants ? Define 'short' and 'long' term antioxidant.

(e)     With the help of suitable example define 'Laddie' and a 'cross Linked' polymer. Which one will be thermally more stable ?

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## Section-B

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

2.    (a)    Discuss Kinetics and mechanism of cationic polymerization.

### OR

   (b)    Discuss property and application of high density polyethylene's.

3.    (a)    What is average molecular weight of the polymer ? Discuss its type with equation.

### OR

   (b)    Describe wet and dry spinning of polymer.

4.    (a)    What is Ziegler-Natta catalyst ? Discuss the mechanism of co-ordination polymerization.

### OR

   (b)    What is glass transition temperature ? Describe the role of polarity and topology on glass transition temperature.

5.    (a)    What is the significance of molecular weight distribution curve.

### OR

   (b)    Explain viscous flow (Newtonian and Non-Newtonian) in polymers.

## Section-C

**Note :** Attempt any <u>two</u> questions of the following : $20 \times 2 = 40$

6. How fibres are drawn from melt spinning process ? Discuss and describe with the help of neat diagram.

7. What is polymer degradation ? Explain the mechanism of oxidative degradation caused by

 (i) Oxygen (ii) Ozone.

8. Discuss the mechanism and kinetics of Condensation Polymerization in detail.

9. Describe the phenomenon of viscoelasticity in Polymers with the help of various models. Draw neat diagram and also mention necessary equation.

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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 of the <u>all</u> following questions : 3×5=15

   (a) Define point defects occurring in crystalline solids.

   (b) Give co-precipitation method to synthesize inorganic materials.

   (c) Differentiate between extrinsic and intrinsic semiconductors.

   (d) What are the applications of high $T_c$ materials ?

   (e) Explain the term luminescence with an example.

### Section-B

**Note :** Answer <u>all</u> questions from this section : 5×4=20

2. (a) Explain magnetism due to defects. Give its application also.

   **OR**

   (b) What do you understand by photoconductivity ?

3. (a) What do you understand by LASERS ? Give their significance.

   **OR**

   (b) What do you mean by a transistor ? Explain with an example of a p-n-p function transistor.

4. (a) With the help of suitable diagrams, explain conduction in terms of band theory.

**OR**

(b) What are carbon nano-tubes ? Explain with suitable examples.

5. (a) Describe the role of optical fibers in communication.

**OR**

(b) What do you understand by Josephson's effect ? Explain with suitable diagrams.

## Section-C

Note : Answer any <u>two</u> questions from this section : $20 \times 2 = 40$

6. Define non-stoichiometry. Explain the types of non-stoichiometric compounds. Give their significances with examples also.

7. What are nano-materials ? Describe sol-gel method for the preparation of nano-materials. Enumerate important applications of nano-materials.

8. What do you understand by superconductivity ? Which type of materials are superconductors ? Discuss BCS theory of superconductivity with suitable illustrations.

9. What are carbonyl clusters ? Explain with suitable examples of these. Describe the isopoly and heteropoly acids and salts of V and Mo with 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 <u>all</u> questions :  $5 \times 3 = 15$

    (a) What are the different types of antimalarial chemically ? Give one example each with structure.

    (b) What are natural insecticides ? How is nicotinic acid is converted into nicotine ?

    (c) Give structure and applications of pyrethrins.

    (d) Give synthesis of DFDT.

    (e) What do you mean by antimetabolites ? Give synthesis of fluorouracil.

## Section-B

**Note :** Answer <u>all</u> questions :  $4 \times 5 = 20$

2.  (a) What are sulpha drugs ? Give synthesis and general uses of :

    (i) Sulpha thiazole

    (ii) Sulpha guanidine

(b)    Give synthesis and applications of :

     (i)     Chloroquine

     (ii)    Santoquine

3.    (a)    What are general structure of penicillins ? Give synthesis of penicillin-V.

**OR**

(b)    What are antimalarials ? Give synthesis and applications of

     (i)     Pamaquine

     (ii)    Chloroquine

4.    (a)    Give synthesis and applications of following :

     (i)     Malathion

     (ii)    DDT

     (iii)   DMDT

**OR**

(b)    Give synthesis and important use of :

     (i)     Para amino salicylic acid (PAS)

     (ii)    Mepazine

5.    (a)    Discuss advantages & disadvantages of organic phosphorous insecticide.

**OR**

(b)    What are psychopharmacological agents ? Give synthesis and applications of mepazine and promazine.

## Section-C

Note : Answer any <u>two</u> of the following :        2×20=40

6.    (a)    Give evidence in support of

      (b)    How are the following fungicides β-lacam ring penicillin synthesized and give their uses in crop protection ?

             (i)    Zineb

             (ii)   Ferban

7.    What is the importance of fungicides in agriculture and industry ? Give preparation and practical application of dithiocarbonate fungicides.

8.    What are the characteristics of substances to be called an antibiotic ? Give the synthesis of chloramphenicol and penicillin G.

9.    (a)    What is the basis for the choice of a quinolone ring and basic side in designing these antimalarials ?

      (b)    Give a concise account of the following :

             (i)    Thiosemicarbazones as anti-tubercular agents.

             (ii)   Retinoid and nicotinoid as natural insecticides.

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