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R – 1684

Reg. No. : .....

Name : .....

Sixth Semester B.Sc. Degree Examination, May 2023

First Degree Programme under CBCSS

Chemistry

Core Course XI

CH 1642 : ORGANIC CHEMISTRY III

(2013-2016 Admission)

(Re examination)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. Name two *biodegradable* polymers.
2. Give the monomers of *bakelite*.
3. What is meant by *condensation polymerisation*?
4. Which is the strongest among the following: acetic acid, benzoic acid, benzene sulfonic acid?
5. What is the hybridisation of oxygen atom in *furan*?
6. Aromatic amines are \_\_\_\_\_ basic than aliphatic amines.
7. A non-linear *n*-atom molecule has \_\_\_\_\_ normal modes of vibration.
8. Name the *internal standard* used in NMR spectroscopy.

P.T.O.



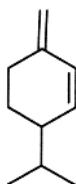
9. The broad band at  $3400-3200\text{ cm}^{-1}$  in the IR spectrum of *phenol* is due to \_\_\_\_\_.
10. The number of heteroatoms present in *indole* molecule is \_\_\_\_\_.

(10 × 1 = 10 Marks)

### SECTION – B

Answer **any eight** questions. **Each** question carries **2** marks.

11. What do you understand by *benzidine rearrangement*?
12. What is the *Ziegler-Natta* polymerisation?
13. What is meant by a *carbylamine reaction*?
14. Distinguish between *natural* and *synthetic rubbers* with one example each.
15. What is *Nef's reaction*?
16. Discuss the term *tosylation* with a suitable example.
17. How can *mucic acid* be converted into *furan*?
18. What are *hyperchromic* and *hypochromic shifts*?
19. Name and formulate  
(a) one *nitrogen* heterocycle, and  
(b) one *sulphur* heterocycle.
20. Define a *normal mode* of vibration.
21. Calculate the  $\lambda_{\text{max}}$  for:



22. What are *chromophores*? Give two examples.

(8 × 2 = 16 Marks)



## SECTION – C

Answer **any six** questions. **Each** question carries **4** marks.

23. Distinguish between *number average molecular weight* and *weight average molecular weight* of polymers.
24. Give the synthesis of *Buna-N* and *Buna-S*.
25. Explain the term *Hofmann elimination* with a suitable example.
26. What are the uses of *sulpha drugs*?
27. Discuss the synthetic uses of *benzene diazonium chloride*.
28. Give three electrophilic substitution reactions of *furan*.
29. Discuss the classification of *heterocyclic compounds* with suitable examples.
30. Discuss the mechanism of *Mc Lafferty rearrangement* with a suitable example.
31. Explain the concept of *group frequencies* related to IR spectroscopy with a suitable example.

**(6 × 4 = 24 Marks)**

## SECTION – D

Answer **any two** questions. **Each** question carries **15** marks.

32. Discuss the synthesis of
  - (a) *methyl orange*,
  - (b) *phenolphthalein*, and
  - (c) *malachite green*.
33. Discuss the 12 principles of *green chemistry*.



34. Discuss the *Hinsberg method* for the separation of primary, secondary and tertiary amines.
35. (a) Discuss with schematic sketches, the PMR spectra of
- (i) *ultrapure ethanol*,
  - (ii) ethyl bromide, and
  - (iii) *toluene*;
- (b) Explain the term *chemical shift* in NMR spectroscopy.

**(2 × 15 = 30 Marks)**

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N – 4604

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Sixth Semester B.Sc. Degree Examination, May 2022

First Degree Programme under CBCSS

Chemistry

Core Course XI

CH 1642 : ORGANIC CHEMISTRY III

(2015 - 2016 Admissions)

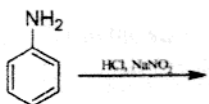
Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions.

1. Name the monomers of Nylon-6, 6.
2. Write the structure of monomer in PMMA.
3. Write the product obtained ....



4. Write the tautomeric structure of nitroalkane.
5. Draw the structure of sulphapyridine.
6. What is systematic nomenclature for Pyridine?

P.T.O.



7. Draw the structure of Ibuprofen.
8. What are the two types of heterocyclic compounds found as base pairs in DNA?
9. Which region of the electromagnetic spectrum is used for NMR spectroscopy?
10. How many  $^1\text{H}$ NMR signals are possible for acetone'?

**(10 × 1 = 10 Marks)**

SECTION – B

Answer any **eight** questions.

11. What are biodegradable polymers? Give two examples.
12. What are the applications of PVC and how is it prepared?
13. What is Zeeigler-Natta Catalyst? What is its use?
14. Explain Benzidine rearrangement.
15. Write about the action of detergent.
16. Give a short note on sulpha drugs with examples.
17. Mention any one reaction that illustrate the basic nature of pyridine.
18. Suggest any two methods for the synthesis of pyrrole.
19. Draw the structure of Pyridine, Pyrimidine, pyridazine and pyrazine.
20. Write any electrophilic substitution product of quinoline.
21. Explain auxochrome and chromophore with examples.
22. Why  $^{12}\text{C}$  is not NMR active while  $^{13}\text{C}$  is NMR active?

**(8 × 2 = 16 Marks)**



## SECTION – C

Answer any **six** questions.

23. Suggest a method for the synthesis of Phenolphthalein and Malachite green.
24. What are the different types of dyes?
25. Explain Sandmeyer reaction.
26. Write the structure, preparation and reactions of diazomethane.
27. Compare the aromaticity and basic character of pyrrole and pyridine.
28. Mention Skraup synthesis for the preparation of quinoline.
29. Explain McLafferty rearrangement with a suitable example.
30. What is finger print region in IR? Interpret the peaks obtained in IR spectra of acetone?
31. Draw the <sup>1</sup>H NMR spectrum of ethyl bromide and acetaldehyde.

**(6 × 4 = 24 Marks)**

## SECTION – D

Answer any **two** questions.

32. What are different types of polymerization reactions? Write the synthesis and applications of Urea-formaldehyde, Bakelite and PVC.
33. Compare the basicity, separation and methods to distinguish primary, secondary and tertiary amines.
34. (a) Explain the classification of drugs with suitable examples.  
(b) Write the principles of green chemistry.
35. Explain the principle of NMR spectroscopy, chemical shift, factors affecting chemical shift value and spin-spin coupling.

**(2 × 15 = 30 Marks)**



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N – 4605

Reg. No. : .....

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**Sixth Semester B.Sc. Degree Examination, May 2022**

**First Degree Programme under CBCSS**

**Chemistry**

**Core Course – XII**

**CH 1643 – PHYSICAL CHEMISTRY – III**

**(2015 & 2016 Admissions)**

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** carry **1** mark.

1. State Le-Chatelier's Principle.
2. Write one example for first order reaction.
3. Calculate the pH of  $10^{-2}$  M HCl.
4. Define CST.
5. Write one example for reference electrode.
6. What is Walden's rule?
7. What is chemiluminescence? Give one example.
8. Give one example for acid buffer.

P.T.O.





9. Write the relation connecting  $\Delta G$  and  $\Delta E$ .
10. Define Grothus-Draper law?

**(10 × 1 = 10 Marks)**

SECTION – B

Answer any **eight** questions. **Each** carry **2** marks.

11. Explain the term Degree of Hydrolysis.
12. What is meant by leveling effect?
13. Explain Azeotropic mixtures.
14. Write the Gibb's free energy equation and explain the terms.
15. Explain liquid junction potential.
16. How is molar conductance related to specific and explain the terms?
17. Define ionic mobility.
18. Write down the Arrhenius equation and explain the terms.
19. Differentiate between activity and activity coefficient of an electrolyte.
20. How will you construct calomel electrode?
21. What is Wein effect?
22. Explain Stark-Einstein law.

**(8 × 2 = 16 Marks)**

SECTION – C

Answer any **six** questions. **Each** carry **4** marks.

23. Discuss different types of metallic electrodes.
24. Explain how quinhydrone electrode can be used to determine pH of solution?



25. Derive Nernst equation for electrode potential taking suitable example.
26. What are fuel cells? Discuss Hydrocarbon-O<sub>2</sub> fuel cell and its cell reaction.
27. Discuss the photochemical reaction of H<sub>2</sub> and Cl<sub>2</sub>.
28. Discuss the influence of temperature on reaction rate.
29. Explain the moving boundary method for determination of transport number.
30. How do you determine the hydrolysis constant of a salt by E M F measurements?
31. Derive the integrated rate equation for the first order reaction.

**(6 × 4 = 24 Marks)**

SECTION – D

Answer any **two** questions. **Each** carry **15** marks.

32. Explain the application of potential measurements. **(15)**
33. (a) Discuss different laws of photochemistry? **(6)**  
(b) Explain Kolarausch's law and its application.
34. What is Le-Chatelier's principle? Explain its application in Haber process and dissociation of PCl<sub>5</sub>.
35. Explain the kinetics of
  - (a) Parallel reaction
  - (b) Consecutive reaction
  - (c) Opposing reaction.

**(2 × 15 = 30 Marks)**



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N – 4603

Reg. No. : .....

Name : .....

Sixth Semester B.Sc., Degree Examination, May 2022

First Degree Programme Under CBCSS

Chemistry

Core Course X

CH 1641 : ORGANIC CHEMISTRY II

(2015 - 2016 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. Answer in **one** word **to** maximum two sentences. Each question carries **1** mark.

1. What is the action of cold conc. HI on ether?
2. Write the chemical name of Urotropine
3. Reduction of carbonyl compounds with Zn/Hg and HCl is known as \_\_\_\_\_
4. Acetaldehyde on oxidation with Tollen's reagent gives \_\_\_\_\_
5. Glycine on heating gives \_\_\_\_\_
6. Phenol reacts with CO<sub>2</sub> at 400K and under pressure forms \_\_\_\_\_
7. Ascorbic acid is also known as \_\_\_\_\_
8. Draw the structure of Alanine

P.T.O.



9. Give an example for a reducing sugar
10. Which is stronger acetic acid or formic acid?

**(10 × 1 = 10 Marks)**

### SECTION – B

Short answer type: Answer any **eight** questions from the following. Each question carries **2** marks.

11. What are crown ethers? What are their importance?
12. What is soap and explain its action
13. Explain a method for the preparation of phenolphthalein
14. What is picric acid? How is it prepared?
15. Convert ethylene to formaldehyde
16. Explain Baeyer — Villiger oxidation
17. What is Coumarin? How is it prepared? Give two uses
18. Explain inversion of cane sugar
19. What is epimerization?
20. What is denaturation of protein?
21. Write the structure of morphine
22. Explain the classification of vitamins with examples

**(8 × 2 = 16 Marks)**

### SECTION – C

Short essay type : Answer any **six** questions from the following. Each question carries **4** marks.

23. What is meant by wolff Kishner reduction? Explain its mechanism
24. What are the different types of RNA? Explain their role in protein synthesis



25. Write note on pinacol-pinacolone rearrangement
26. Glucose and fructose give the same osazone. Explain
27. How will you synthesise (a) Cinnamic acid from benzene (b) aniline from benzoic acid
28. Explain HVZ reaction
29. Write the mechanism of benzoin condensation
30. Explain one test to distinguish 1<sup>o</sup>, 2<sup>o</sup> and 3<sup>o</sup> alcohol
31. Explain (a) Saponification value (b) Iodine value and (c) Isoprene rule

**(6 × 4 = 24 Marks)**

#### SECTION – D

Answer any **two** questions. Each question carries **15** marks.

32. Explain with mechanism (a) Aldol condensation (b) Cross aldol condensation (c) Cannizzaro reaction (d) Reformsky reaction and (e) Beckmann rearrangement.
33. Write brief note on (a) Replication of RNA (b) Chemistry of vision (c) Crown ethers.
34. Describe the structure of glucose.
35. (a) How will you synthesis glycerol from propene.  
(b) How does ethylene glycol react with (i)  $\text{PCl}_5$  (ii)  $\text{PI}_3$  (iii)  $\text{HIO}_4$  and (iv) Sodium

**(2 × 15 = 30 Marks)**

