

ISLAMPUR COLLEGE

B.Sc. 6th Semester (FYUGP 23-24) Chemistry Internal Assessment, 2026

[Assignment based]

Date of submission: 03.06.26

Time of submission: 1 pm

Venue: Room No. 219

Subject: Chemistry

Paper: Major 13

Paper Code: UCHEMAJ36013

Paper Name: ORGANIC CHEMISTRY-V

Full marks: 10

Answer any **one** question.

(10×1 = 10)

1. (a) Determine the cyclic structure of D-glucose. (3)
- (b) What are Anomers and Epimers? Give two examples of non-reducing sugars. (2+1)
- (c) Write short note on Killiani-Fischer synthesis and Ruff Degradation. (3)
- (d) How will you detect carbohydrate in laboratory? (1)

2. (a) Explain two methods of preparation of amino acid. (3)
- (b) What is isoelectric point of amino acid? (1)
- (c) Discuss the primary, secondary and quaternary structure of protein. (3)
- (d) Describe the method used for determination of N-terminal and C-terminal amino acids in peptides and protein. (3)

Subject: Chemistry
Paper: Major 14
Paper Code: UCHEMAJ36014
Paper Name: INORGANIC CHEMISTRY-V
Full marks: 10

Answer any **five** questions.

(2 X 5 = 10)

1. What is Zeise's salt and ferrocene? (2)
2. The cyclopentadienyl rings in ferrocene have aromatic character but cyclopentadiene itself have no such character. Explain. (2)
3. Ni forms a mononuclear carbonyl but the cobalt carbonyl is dimeric. Explain. (2)
4. Give two reactions each to highlight similarities and differences between ferrocene and benzene. (2)
5. Write the chemical formula of Wilkinson's catalyst. What reaction does it catalyze? (2)
6. What is trans-effect? (2)
7. Does $V(CO)_6$ satisfy 18-electron rule? (2)
8. Explain why $Mn(CO)_5$ undergoes dimerization? (2)

Subject: Chemistry
Paper: Major 15
Paper Code: UCHEMAJ36015
Paper Name: PHYSICAL CHEMISTRY-V
Full marks: 10

Answer any **one** question.

(10×1 = 10)

- (1) (a) Explain Wien effect and Debye-Falkenhagen effect. 2
- (b) What is equivalence point in conductometric titration? How its differ from end point? 2
- (c) Describe the construction, cell reaction and working principles of calomel electrode. 2
- (d) What is salt bridge? Why KCl or NH₄NO₃ is used for the preparation of salt bridge? 2
- (e) Discuss the potentiometric titration of HCl vs. NaOH. 2
- (2) (a) Explain ionic product of water. Calculate pH of 10⁻⁸ M HCl (aq.) solution. 2
- (b) The ion conductance of Li⁺ ion is less than that of K⁺ ion. — Explain. 2
- (c) Define ‘Standard electrode potential’ and ‘Standard emf of a cell’. 2
- (d) Write short note on the following: 2+2
- (i) Glass electrode
- (ii) Walden’s rule

Subject: Chemistry
Paper: Major 16
Paper Code: UCHEMAJ36016
Paper Name: SPECTROSCOPY
Full marks: 10

Answer any **one** question. (10×1 = 10)

1. (a) Write down the basic principles of Proton Magnetic Resonance.
(b) Write a note on chemical shift and factors influencing it.
(c) Discuss Spin–Spin coupling and coupling constant.
(d) Discuss anisotropic effects in alkene, alkyne, aldehydes and aromatics.

[2.5 × 4 = 10]

2. (a) Write down the IR absorption positions of O, N and S containing common functional groups.
(b) Write a note on effect of H-bonding and conjugation on IR absorptions.
(c) Write a note on Bathochromic and Hypsochromic shifts in UV Spectroscopy.
(d) Applying Woodward Rules calculate λ_{\max} for a α, β unsaturated carbonyl compound, and a conjugated diene of your choice.

[2.5 × 4 = 10]

3. (a) Write a note on Jablonsky diagram in connection with Electronic spectroscopy.
(b) Write a note on Stokes and anti-Stokes lines in Raman spectroscopy.
(c) Write a note on hot bands in Vibrational spectroscopy.
(d) Write a short note on Rotation spectroscopy.

[2.5 × 4 = 10]

Subject: Chemistry
Paper: Minor 3
Paper Code: UCHEMIN30003
Paper Name: CHEMISTRY-III
Full marks: 10

Answer any **one** question.

(10×1 = 10)

1. (a) Describe the mechanism of S_N1 and S_N2 reactions with stereochemical aspects.

S_N1 এবং S_N2 বিক্রিয়ার কৌশলকে ত্রিমাত্রিক রসায়নের (Stereochemical) দৃষ্টিকোণ থেকে বর্ণনা করো। 3

(b) Write a note on Benzyne intermediate or Grignard reagent.

বেঞ্জাইন মধ্যবর্তী বা গ্রিগনার্ড বিকারক সম্পর্কে একটি টীকা লেখো। 3

(c) Write a short note on Joule-Thomson Experiment.

জুল-থমসন পরীক্ষা সম্পর্কে একটি সংক্ষিপ্ত টীকা লেখো। 4

2. (a) Compare the ionic character of BF_3 , NH_3 and NF_3 .

BF_3 , NH_3 এবং NF_3 -এর আয়নিক বৈশিষ্ট্যের তুলনা করো। 2

(b) Bond angle of H_2O is $104^\circ 5'$ – Explain.

H_2O -এর বন্ধন কোণ $104^\circ 5'$ – ব্যাখ্যা করো। 2

(c) Draw the MO diagram of Oxygen (O_2) molecule.

অক্সিজেন (O_2) অণুর MO চিত্র অঙ্কন করো। 2

(d) Write a short note on Carnot Cycle.

কার্নো চক্র সম্পর্কে একটি সংক্ষিপ্ত টীকা লেখো। 4