$\mathrm{D}100523$	(Pages : 2)	Name
		D. W

SIXTH SEMESTER U.G. (CBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry/Polymer Chemistry

CHE 6B 09—INORGANIC CHEMISTRY—IV

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer questions up to 20 marks.

Each question carries 2 marks.

- 1. Give one example each for reference electrode, working electrode and counter electrode of cyclic voltammetry.
- 2. Give any *two* radiation source in AFM.
- 3. Explain why does colour of KMnO₄, disappear when oxalic acid is added to its solution in acidic medium.
- 4. Why $[Fe(CN)_6]^{3-}$ is weakly paramagnetic while $[Fe(CN)_6]^{4-}$ is diamagnetic?
- 5. Arrange the following complexes in the increasing order of conductivity of their solution : $[\text{Co(NH}_3)_3\text{Cl}_3], [\text{Co(NH}_3)_4\text{Cl}_2] \text{ Cl}, [\text{Co(NH}_3)_6]\text{Cl}_3, [\text{Cr(NH}_3)_5\text{Cl}] \text{ Cl}_2.$
- 6. Why are low spin tetrahedral complexes not formed?
- 7. Calculate CFSE of low spin and high spin d⁶ metal complexes of octahedral geometry in terms of Δo .
- 8. Classify the organometallic compounds based on the nature of metal ligand bond with one example each.
- 9. Arrange the following ligands in the increasing order of field strength H₂O, Cl⁻, CO and NH₃.
- 10. Illustrate 18-electron rule taking ferrocene as example.
- 11. Draw the structure of Fe₂(CO)₉.
- 12. Explain any two biological role of Calcium in human body.

(Ceiling of marks: 20)

2 **D 100523**

Section B (Paragraph)

Answer questions up to 30 marks. Each question carries 5 marks.

- 13. Draw the TGA of ${\rm CuSO_4~5H_2O}$ and explain.
- 14. List out the different detectors used in AAS and its working principles.
- 15. Explain the metallic properties of transition metal based on the band theory.
- 16. Discuss the different factors affecting crystal field splitting.
- 17. Explain the hydrogenation of alkene by using Wilkinson catalyst.
- 18. Briefly explain the structure and bonding in Zeise's salt.
- 19. Illustrate inner orbital and outer orbital complexes.

(Ceiling of marks: 30)

Section C (Essay)

Answer any **one** question.

The question carries 10 marks.

- 20. (a) Discuss the importance of beach sands in Kerala.
 - (b) Explain the Jahn Teller distortion of octahedral complex.
- 21. Explain the following:
 - (a) Sodium potassium pump.
 - (b) Structure and significance of carboplatin and auranofin.

 $(1 \times 10 = 10 \text{ marks})$

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS-UG)

Chemistry

CHE 6B 09—INORGANIC CHEMISTRY—IV

(2019 Admissions)

Time: Two Hours

Maximum: 60 Marks

Section A

Answer atleast **eight** questions. Each question carries 3 marks. All questions can be attended. Overall ceiling 30.

- 1. What is AAS?
- 2. Discuss the principle of FES.
- 3. La(OH)3 is more basic than Lu(OH)3. Why?
- 4. Copper is a transition element. Predict its four important properties.
- 5. What are d block elements? Give their electronic configuration.
- 6. What is meant by stability constant?
- 7. What is spectrochemical series?
- 8. While $Co[(H_2O)_6]^{2+}$ is pink in colour, $Co(Cl)_4]^{2-}$ is blue in colour. Why?
- 9. What is Zeise's salt? Write its structure.
- 10. What is Wilkinson's catalyst? Write its structure.
- 11. How does Haemoglobin differ from myoglobin?
- 12. Why Arsenic is considered as a toxic metal?

 $(8 \times 3 = 24 \text{ marks})$

2 C 20539

Section B

Answer atleast **five** questions. Each question carries 5 marks. All questions can be attended. Overall ceiling 25.

- 13. What are the factors affecting DTA curves?
- 14. What are actinides? Why are they so called?
- 15. Discuss the paramagnetic behaviour of d and f block elements.
- 16. What is lanthanide contraction? What are its consequences?
- 17. Cobalt (III) easily forms low spin complexes whereas Cobalt (II) does not. Explain.
- 18. Discuss any five factors influencing the stability of complexes.
- 19. Give an account of the bio-chemistry and significance of Zinc in living systems.

 $(5 \times 5 = 25 \text{ marks})$

Section C

Answer any **one** questions. Each question carries 11 marks.

- 20. (a) Describe the ion exchange method for the separation of lanthanides from monazite.
 - (b) Comment on the industrial importance of Lanthanides.
- 21. Write an account on the Molecular orbital theory of octahedral complexes containing only sigma bonds.

 $(1 \times 11 = 11 \text{ marks})$

D 100524	(Pages: 2)	Name
		Rog No

SIXTH SEMESTER U.G. (CBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry/Polymer Chemistry

CHE 6B 10—ORGANIC CHEMISTRY—III

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short answers)

Answer questions up to 20 marks.

Each question carries 2 marks.

- 1. What are red shift and blue shift?
- 2. Calculate the λ_{max} of :

- 3. Write a short note on spin-spin splitting observed in NMR spectroscopy?
- 4. What is mutarotation?
- 5. What is Biuret test?
- 6. What are nucleosides and nucleotides?
- 7. Draw the structure of vitamin C.
- 8. What is denaturation of proteins?
- 9. Define Saponification value and iodine value.
- 10. What are the physiological actions of nicotine?
- 11. What are HDL and LDL?
- 12. What are electrocyclic reactions?

(Ceiling of marks: 20)

D 100524

Section B (Paragraph)

2

Answer questions up to 30 marks. Each question carries 5 marks.

- 13. Discuss the UV-Vis spectra shown by polyatomic molecules.
- 14. Write a short note on paper chromatography.
- 15. Convert glucose to fructose and fructose to glucose.
- 16. Differentiate DNA and RNA.
- 17. What are lipids? How are they classified? Explain.
- 18. Write a short note on Sanger's method for the structure elucidation of peptides.
- 19. Discuss the mechanism of Cope and Claisen rearrangements.

(Ceiling of marks: 30)

Section C (Essay)

Answer any **one** questions.

Each question carries 10 marks.

- 20. (i) Discuss with mechanism of the solid phase synthesis of peptides.
 - (ii) What is meant by DNA fingerprinting? What are its applications?
- 21. (i) Write a short note on the cyclic structure of glucose.
 - (ii) What is Chemical shift? What are the factors affecting it?

 $(1 \times 10 = 10 \text{ marks})$

C 20540	(Pages : 2)	Name	•••••
		Reg No	

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Chemistry

CHE 6B 10—ORGANIC CHEMISTRY—III

(2019 Admissions)

Time: Two Hours

Maximum: 60 Marks

Section A

Answer at least **eight** questions.

Each question carries 3 marks.

All questions can be attended.

Overall Ceiling 24.

- 1. What is a chromophore? Give an example.
- 2. Write the fingerprint region in IR spectroscopy. What is its significance?
- 3. Give one example each for mobile phase and stationary phase in column chromatography.
- 4. Represent the ¹H nmr spectrum of CH₃CH₂Br.
- 5. Draw the Fischer projection of D(+) Glucose.
- 6. What are osazones?
- 7. What are polysaccharides? Give two examples.
- 8. Write the hydrolysis product of sucrose.
- 9. Define isoelectric point.
- 10. What is biuret test?
- 11. Name the bases present in nucleic acids.
- 12. Draw the structure of Vitamin C.

 $(8 \times 3 = 24 \text{ marks})$

2 C 20540

Section B

Answer at least **five** questions. Each question carries 5 marks. All questions can be attended. Overall Ceiling 25.

- 13. How is IR spectroscopy useful for distinguishing inter and intramolecular H -bonding in alcohols?
- 14. Write notes on electronic transitions in organic molecules giving suitable examples.
- 15. Give an account on structure of starch and glycogen.
- 16. Draw the structure of cholesterol. Give any two biological functions of cholesterol.
- 17. Discuss conrotation and disrotation in electrocyclic reactions.
- 18. Explain the Woodward-Hoffmann selection rules for sigmatropic reactions.
- 19. Write the mechanism of Claisen rearrangement.

 $(5 \times 5 = 25 \text{ marks})$

Section C

Answer any one question.

The question carries 11 marks.

- 20. Describe the structure of nucleic acids and their role in heredity and protein biosynthesis.
- 21. (a) Give an account on structure of natural rubber.
 - (b) Write notes on vulcanization of rubber and show the substitution at allylic carbon and addition across double bond.

 $(1 \times 11 = 11 \text{ marks})$

D 100525	(Pages : 2)	Name		
		Reg. No		

SIXTH SEMESTER U.G. (CBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry/Polymer Chemistry/Industrial Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY—III

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer questions up to 20 marks.

Each question carries 2 marks.

1. Give Nernst equation for galvanic cell for which overall cell reaction is:

$$aA + bB \leftrightarrow cC + dD$$

- 2. Discuss Debye Falkenhagen effect.
- 3. Briefly describe $H_2 O_2$ fuel cell.
- 4. Define Vant Hoff factor.
- 5. Define Molar refraction, Write the equation.
- 6. Explain the hydrolysis of salt of strong acid-weak base with equation.
- 7. Define the term Colligative properties
- 8. Calculate the p^H of 0.01M NaOH.
- 9. What is common ion effect?
- 10. What are the applications of liquid crystals?
- 11. What are unit cell and space lattice?
- 12. What is hexagonal close packing?

(Ceiling of marks: 20)

D 100525

Section B (Paragraph)

 $\mathbf{2}$

Answer questions up to 30 marks. Each question carries 5 marks.

- 13. Discuss the determination of solubility product from EMF measurements.
- 14. Describe the moving boundary method for determination of transport number.
- 15. Write a short note on electrochemical theory of the corrosion of metals.
- 16. What are potentiometric titrations? Illustrate with any one example.
- 17. What is a buffer? How is it classified? Discuss the mechanism of buffer action.
- 18. Explain the non-stoichiometric defects in crystals.
- 19. Write a short note on conductometric titrations involving strong acid vs strong base

(Ceiling of marks: 30)

Section C (Essay)

Answer any one questions.

The question carries 10 marks.

- 20. Discuss the hydrolysis of (i) Salt of weak acid and strong base; and (ii) Salt of weak acid and weak base.
- 21. Derive the relations, $\Delta T_b = K_b \times m$ and $\Delta T_f = Kf \times m$.

 $(1 \times 10 = 10 \text{ marks})$

C 20541	(Pages : 2)	Name
		Reg. No.

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY—III

(2019 Admissions)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer at least **eight** questions. Each question carries 3 marks. All questions can be attended. Overall Ceiling 24.

- 1. The specific conductance decreases with dilution while the molar conductance increases to certain extend. Why?
- 2. Using suitable example write the importance of solubility product in qualitative analysis.
- 3. Write the advantages of conductometric titration over titrations using indicators.
- 4. What happen when nitrogen gas is bubbled through ammonia solution?
- 5. Calculate the osmotic pressure of a 0.1 M aqueous solution of an organic solute at 17°C. $(R = 0.0821 L \text{ atm } K^{-1} \text{ mol}^{-1}).$
- 6. Hydrogen chloride gas is passed through common salt for its purification process. What is the principle involved?
- 7. What do you understand by space lattice and unit cell?
- 8. Calculate the Miller indices of a crystal plane which passes through the crystal axes at 2a, 3b, c.
- 9. What is Frenkel defect? How it affect the density of the crystal?
- 10. What do you mean by intrinsic conductors? Write two examples.
- 11. What is salt bridge why it is used?
- 12. Write the oxidation-reduction process involved in the hydrogen-oxygen fuel cell.

 $(8 \times 3 = 24 \text{ marks})$

2 C 20541

Section B (Paragraph)

Answer at least **five** questions. Each question carries 5 marks. All questions can be attended. Overall Ceiling 25.

- 13. Briefly discuss the band theory of metals.
- 14. Briefly discuss the hep and ccp arrangements in crystal.
- 15. How will you determine the molecular mass of a non-ionic solid by elevation in boiling point method?
- 16. How will you determine viscosity of a liquid using Ostwald Viscometer?
- 17. Briefly discuss the mechanism of buffer action in a mixture of weak base and its salt and derive the Henderson equation.
- 18. How will you determine pH of a solution using quinhydrone electrode.
- 19. How e.m.f. measurements help for the calculation of the thermodynamic parameters, ΔH , ΔS and ΔG .

 $(5 \times 5 = 25 \text{ marks})$

Section C (Essay)

Answer any **one** question. The question carries 11 marks.

- 20. Derive Bragg's equation. Explain how you will determine the crystal structure of NaCl by rotating crystal method. Predict the difference that can observed in the interplanar distance of KCl and NaCl even though both have same type unit cell.
- 21. Briefly discuss the Debye-Huckel theory for strong electrolytes. Write Debye-Huckel-Onsager equation and explain the terms involved. Briefly explain the effect of high AC frequencies and High potential gradients in the conductivity of strong electrolytes.

 $(1 \times 11 = 11 \text{ marks})$

C 20566	(Pages : 2)	Name
		Reg. No

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS—UG)

Polymer Chemistry

PCH 6B 01—POLYMER CHEMISTRY—I

(2019 Admissions)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer at least **eight** questions.

Each question carries 3 marks.

All questions can be attended.

Overall Ceiling 24.

- 1. What is condensation polymerisation? Give two examples.
- 2. What is degree of polymerisation?
- 3. Give preparation and uses of PAN.
- 4. Differentiate isotactic and syndiotactic polymers.
- 5. What is the significance of poly dispersity index?
- 6. Distinguish natural and synthetic polymers.
- 7. What is SBR? Write its uses.
- 8. Write down the steps involved in free radical polymerisation.
- 9. Write down the synthesis and one use of poly urethane.
- 10. What is step growth polymerization?
- 11. Give the preparation of urea formaldehyde resins.
- 12. Define viscosity average molecular mass.

 $(8 \times 3 = 24 \text{ marks})$

2 C 20566

Section B (Paragraph)

Answer at least **five** questions. Each question carries 5 marks. All questions can be attended. Overall Ceiling 25.

- 13. Explain classification of polymers based on intermolecular forces
- 14. Write a short note on LDPE and HDPE.
- 15. Write a short note on conducting polymers.
- 16. Explain number average and weight average molecular weights.
- 17. Explain briefly thermal degradation process.
- 18. Give the preparation and uses of any two synthetic rubbers.
- 19. Explain briefly Zeigler- Natta polymerization.

 $(5 \times 5 = 25 \text{ marks})$

Section C (Essay)

Answer any **one** question. The question carries 11 marks.

- 20. Explain briefly: (i) Bulk polymerization; (ii) Solution polymerization; (iii) Suspension polymerization; and (iv) Emulsion polymerization
- 21. Explain cationic and anionic polymerizations with mechanisms.

 $(1 \times 11 = 11 \text{ marks})$

D 100536	(Pages : 2)	Name
		Rog No

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2024

(CBCSS—UG)

Polymer Chemistry

PCH 6B 01—POLYMER CHEMISTRY—I

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer questions up to 20 marks. Each question carries 2 marks.

- 1. What is meant by tacticity of polymers?
- 2. Distinguish between elastomers and plastics.
- 3. What is Zeigler Natta catalyst? Give an example.
- 4. What are the advantages of suspension polymerisation?
- 5. How is viscosity related to molecular weight of the polymer?
- 6. What is meant by group transfer polymerisation?
- 7. What is meant by glass transition temperature?
- 8. What is meant by degree of polymerisation?
- 9. What does recycle code $\overset{4}{4}$ means?
- 10. Explain the significance of molecular weight distribution in polymers.
- 11. What are conducting polymers? Give an example.
- 12. Distinguish between HDPE and LDPE.

(Ceiling of marks: 20)

D 100536

Section B (Paragraph)

2

Answer questions up to 30 marks. Each question carries 5 marks.

- 13. Compare bulk and solution polymerisation.
- 14. Discuss any two classification of polymers.
- 15. Distinguish condensation polymer from addition polymer.
- 16. Calculate the weight average of molecular weight for a polymer sample comprising of 9 moles of polymer molecules having molecular weight of 30.000 g/mol and 5 moles of polymer molecules having molecular weight of 50.000 g/mol.
- 17. Briefly discuss about free radical polymerisation with an example.
- 18. Differentiate between step growth polymerisation and chain polymerisation.
- 19. What is SBR? How is it prepared?

(Ceiling of marks: 30)

Section C (Essay)

Answer any **one** question. The question carries 10 marks.

- 20. Describe the synthesis of four types of synthetic rubbers.
- 21. Briefly discuss about different types of polymer reactions.

 $(1 \times 10 = 10 \text{ marks})$

D 100537	(Pages : 2)	Name
	, 8	
		Reg. No

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2024

(CBCSS—UG)

Polymer Chemistry

PCH 6B 02 (E1)—POLYMER PROCESSING AND TECHNOLOGY

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer questions up to 20 marks. Each question carries 2 marks.

- 1. Write the structure and IUPAC name of the monomer of natural rubber.
- 2. What are RSS and TSR in rubber?
- 3. What is the coagulation of rubber?
- 4. Give examples of reinforcing and fibrous fillers.
- 5. Name the techniques used for making hollow articles.
- 6. What is the heat distortion temperature?
- 7. What are torpedo and parrison in plastic processing?
- 8. What is skim rubber?
- 9. What are Extenders?
- 10. Give examples of organic and inorganic colourants.
- 11. What is the Modulus?
- 12. Name two national standard testing organisations.

(Ceiling of marks: 20)

2 D 100537

Section B (Paragraph)

Answer questions up to 30 marks. Each question carries 5 marks.

- 13. Briefly discuss cellulose based polymers.
- 14. Write notes on plasticisers and antioxidants.
- 15. Explain extrusion moulding with a neat diagram.
- 16. How will you distinguish schorch cure time and optimum cure time.
- 17. Briefly discuss ASTM, BIS and ISO
- 18. What do you mean by compounding? Write notes on any two compounding ingredients.
- 19. What are dipping, moulding and casting in latex processing?

(Ceiling of marks: 30)

Section C (Essay)

Answer any **one** question.

The question carries 10 marks.

- 20. Discuss the latex collection, treatment, composition and structure of natural rubber.
- 21. Explain injection moulding, blow moulding and thermo foaming techniques.

 $(1 \times 10 = 10 \text{ marks})$

C 80171	(Pages : 2)	Name
		Reg. No
SIXTH SEMESTER	B.A./B.Sc. DEGREE EXAM	MINATION, MARCH 2020
	(CUCBCSS—UG)	
	Polymer Chemistry	
PC 6B 02 (E1	POLYMER PROCESSING	AND TECHNOLOGY
Time: Three Hours		Maximum: 80 Marks
	Part A	
	Answer all questions.	
	Each question carries 1 mar	rk.
1. What is cordite?		
2. Give any one application	of cellulose acetate.	
 Name the moulding technique that having uniform cross see 		noulding of thermoplastics into article
4. What are laminates?		
5. Name the material used	as filler tyre industry.	
6. What is the function of	antioxidants in plastic processing	g ?
7. Name the mechanical p	roperties that can be tested in a I	Universal Testing Machine.
8. What is crepe rubber?		
9. What is the limitation of	of using sulphur as a vulcanizing	agent?
	blowing agent in rubber processing	
•		$(10 \times 1 = 10 \text{ marks})$
	Part B	
	Answer any ten question	s.
	Each question carries 2 ma	
11. What is the function of	plasticizers in polymer processin	g ?
12. Explain fatigue in poly	mers.	

13. How is impact strength of a polymer measured?

14. What are the different types of natural rubber?

- 15. Write a brief note on accelerators used during latex compounding.
- 16. What are extenders?
- 17. What is mastication?
- 18. List the advantages of Technically Specified Rubber.
- 19. What are the methods adopted for the preservation of rubber latex?
- 20. List the advantages of peroxide cure over sulphur cure.
- 21. Write a note on inorganic and organic colourants used in plastic industry.
- 22. What is parison?

 $(10 \times 2 = 20 \text{ marks})$

Part C

Answer any five questions. Each question carries 6 marks.

- 23. Explain the major advantages and disadvantages of an internal batch mixer.
- 24. Describe the tests for determining the hardness of rubber.
- 25. Explain the different methods used for the concentration of rubber latex.
- 26. Discuss the criteria for latex compounding.
- 27. Write a note on polymer film casting with a neat sketch.
- 28. Compare the use of aryl amines and hindered phenols as antioxidants in rubber industry.
- 29. Illustrate the various steps in transfer moulding.
- 30. Discuss the importance of Melt Flow Index.

 $(5 \times 6 = 30 \text{ marks})$

Part D

Answer any two questions. Each question carries 10 marks.

- 31. Explain the mechanism of sulphur and non sulphur vulcanization.
- 32. With a neat sketch explain extrusion moulding of plastics.
- 33. Discuss in detail the synthesis and properties of important types of rayon derived from cellulose.
- 34. Explain the principle, working and advantages of Universal Testing Machine.

 $(2 \times 10 = 20 \text{ marks})$

01		
21	0	10

(Pages: 2)

Nan	ne
Reg	. No

SIXTH SEMESTER B.Sc. DEGREE (SUPPLEMENTARY/IMPROVEMENT) EXAMINATION, MARCH 2017

(UG-CCSS)

Chemistry

		CH	6B 20 (E4) – CHEMISTRY A	ND 7	TECHNOLOGY OF POLYMERS	
Time: Tl	hree	e Hours			Maximum: 30 Weightage	
	I. Answer all the questions. Each question carries a weightage of ¼. This section contains multiple choice, fill in the blank and one word answer questions:					
	1.	Give an	example of synthetic fibre			
	2.	Melamin	e-formaldehyde is an exampl	e of	resin.	
	3.		is a catalyst for the synthes	sis of	stereo regular polymer.	
	4.		is a method of forming shap	oe by	forcing through a die.	
	5.	Copolym	er having the sequence -AAA	BBI	B- is a:	
		(2)	Block copolymer.	(b)	Cross-linked polymer.	
		(c)	Graft copolymer.	(d)	Homopolymer.	
	6.	Crystalli	nity in polymer is due to:			
		(a)	Random alignment.	(b)	Intra-molecular alignment.	
		(c)	Inter-molecular alignment.	(d)	Both intra-and inter-molecular alignment.	
	7.	Polymer used in the manufacture of celluloid is:				
		(a)	Polypropylene.	(b)	Epoxy resin.	
		(c)	Cellulose nitrate.	(d)	Polymethyl methacrylate.	
	8.	Thiokol is a condensation polymer obtained by the reaction between sodium tetra-sulphide and:				
		(a)	Ethylene amine.	(b)	Di-iso-cyanate.	
		(c)	Vinyl chloride.	(d)	Ethylene chloride.	
	9.	Blow mo	oulding is used for the prepar	ation	n of:	
		(a)	Hollow articles.	(b)	Lacquers.	
		(c)	Films.	(d)	Fibres.	
	LO.	Give an	example of linear polymer.			
	The second of	Silicone	havelinkages.			
	12.	Calenda	ring is most conveniently use	ed fo	r the formation of	
					$(12 \times \frac{1}{4} = 3 \text{ weightage})$	

- II. Answer all questions. Each carries a weightage of 1.
 - 13. What are thermoplastic resins?
 - 14. How is nylon 6 prepared?
 - 15. Explain, how abrasion resistance can be measured.
 - 16. Describe the process of compounding in rubber.
 - 17. Discuss the application of injection moulding.
 - 18. Mention any two materials used for the preparation of synthetic fibres.
 - 19. Distinguish between graft and block copolymers.
 - 20. Describe the synthesis and applications of PVC.
 - 21. What is resilience?

 $(9 \times 1 = 9 \text{ weightage})$

- III. Answer any five questions. Each carries a weightage of 2:
 - 22. Describe the advantages of synthetic rubber over natural rubber.
 - 23. Describe the different kind of tacticity exhibited by polymers.
 - 24. Write down the main steps involved in the cationic polymerisation.
 - 25. Describe the process of retardation and relaxation.
 - 26. What is glass transition temperature? Give its significance.
 - 27. Write a note on the advantage of composites over resins.
 - 28. Describe the method of open milling used in the rubber industry.

 $(5 \times 2 = 10 \text{ weightage})$

- IV. Answer any two questions. Each carries a weightage of 4:
 - 29. With an example, discuss the step growth polymerization.
 - 30. Describe the method for determining the number average molecular weight of polymers.
 - 31. Discuss the synthesis, properties and application of : (a) PMMA; (b) PU; and (c) silicone resins.

 $(2 \times 4 = 8 \text{ weightage})$

~	OUVED
	80052

(Pages: 3)

Name	

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2015

(UG-CCSS)

Elective Course

		Cl	remist	ry
	\mathbf{CH}	6 B20 (E4)—CHEMISTRY A	ND T	ECHNOLOGY OF POLYMERS
me : Thr	ee Hour	rs		Maximum: 30 Weightage
				es a weightage ¼. This section contains multiple
		in the blanks, and one word ar		question:
1	A ther	rmoplastic fibre is	•	
- 17-	(a)	Nylon.	(b)	Bakelite.
	(c)	polystyrene.	(d)	PVC.
2	Which	one of the following is an exam	mple fo	or an elastomer?
	(a)	Polyester.	(b)	Polypropylene.
	(c)	Poly vinylchloride.	(d)	Polybutadiene.
3	Natur	al rubber is :		
	(a)	Cis-polyisoprene.	(b)	Trans-polyisoprene.
	(c)	Chloroprene.	(d)	Gutta-percha.
4	Molec	ular weight of strongly cross li	nked p	oolymer is ———.
	(a)	100.	(b)	1000.
	(c)	10000.	(d)	Infinite.
5	Elong	ation is maximum for:		
	(a)	Neoprene.	(b)	Butyl rubber.
	(c)	Natural rubber.	(d)	Thiokol.
6	Sugge	est a method for producing holl	ow pla	stic articles?
	(a)	Blow moulding.	(b)	Transfer moulding.
	(c)	Injection moulding.	(d)	compression moulding.
7	The s	tereoisomerism in polymer cha	in is d	efined as ———.
3,0		turated monomers are usually		
		and the program period continues of the	The state of the s	

- 9 Polytetrafluoroethylene is prepared by ———— polymerization using peroxide catalyst.
- The temperature at which an amorphous polymer undergoes a change from rubbery state to glassy state is termed as ————.
- 11 In rubber processing, mixing by smearing and wiping is called ———.
- 12 The most suitable moulding technique for producing thermoplastic articles is ———

 $(12 \times \frac{1}{4} = 3 \text{ weightage})$

- II. Answer all the nine questions. Each question carries a weightage of 1:
 - 13 What is meant by anionic polymerization?
 - 14 Define tensile property of polymers.
 - 15 What are crystallites?
 - 16 What is meant by kneading in rubber processing?
 - 17 Write a short note on milling.
 - 18 Define the 'extrusion' process of rubbers.
 - 19 What is plasticizer?
 - 20 What is meant by viscoelasticity of polymers?
 - 21 Define extrusion moulding.

 $(9 \times 1 = 9 \text{ weightage})$

- III. Answer any five questions. Each question carries a weightage of 2:
 - 22 Differentiate thermoplastic and thermosetting polymers? Give one example for each.
 - 23 What is ring opening polymerization? Write the mechanism.
 - 24 What are silicones? Give their uses.
 - 25 Differentiate tear and abrasion resistance of an etastomer.
 - 26 Describe the differences between foarming and thermofoarming.
 - 27 Write a note on vulcanization of rubber.
 - 28 Compare pressure bag and vacuum bag moulding techniques.

 $(5 \times 2 = 10 \text{ weightage})$

- IV. Answer any two questions. Each carries a weightage of 4:
 - 29 Define the following terms:
 - (i) Functionality of monomer.
 - (ii) Polydispersity index.
 - (iii) Number average molecular weight.
 - (iv) Degree of polymerization.

- 30 Write notes on:
 - (i) Coordination polymerization. (ii) Step growth polymerization.
 - (iii) Zeigler-Natta catalyst.
 - (iv) Tacticity.
- 31 (i) What are elastomers? Give any four examples.
 - (ii) Discuss the structure and composition of natural rubber.

 $(2 \times 4 = 8 \text{ weightage})$

	- 474	-	the way	Zar	00.00
*	0.45	-	*****		
12.	1	9	19	100	3
4:	15 m	75.25	12.93	2	-

1 6	age		GE Y
	34 64 600		1
***	me and we	-> 0	42 /

the Santaket to be and the	the the test to the transfer to the contract of the contract o
Reg. No.	

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2016

(UG-CCSS)

Elective Course—Chemistry

		CH 6B 20(E4)—CHEMISTRY AND	TECHNOLOGY OF POLYMERS		
'ime :	: Thr	ee Hours	Maximum: 30 Weightage		
I.	An	swer all twelve questions:			
	1	Nylon 66 is a copolymer of adipic acid ar	d ———.		
	2	Give one example of Thermoplastic.			
	3	Protein is an example of:			
		(a) Synthetic polymer. (b)	Natural polymer.		
		(c) Semisynthetic polymer. (d)	None of these.		
	4	The monomer of CR is ———.			
	5	is an example of biodegradable	oolymer.		
	6	——— is an example for a plasticiser.			
	7	One example for an antioxidant is			
	8	8 RSS is ——— sheet of rubber.			
	9	9 Tensile strength of a polymer depends on:			
		(a) Temperature. (b)	Strain.		
		(c) Both (a) and (b). (d)	None of these.		
	10	The equation for calculating number aver	age molecular weight is ———.		
	11	Rubber latex can be coagulated by adding			
		(a) Acetic acid. (b)	Formic acid.		
		(c) Sulphuric acid. (d)	Acetic acid or Formic acid.		
	12	The resistance to wearing away of the sur	face by friction is called		
			$(12 \times \frac{1}{4} = 3 \text{ weightage})$		
11.	Ans	ver all nine questions:			
	13	What is the molecular structure of SBR po	lymer?		
	11	Define Tensile strength.			
	IF	How a hard polymer can be made soft and	pliable?		
	16	What is meant by casen of a polymer?			

- 17 What are virgin polymers?
- 18 Give two examples of bifunctional monomers.
- 19 What is meant by parison in blow moulding?
- 20 In what way NBR and SBR differ?
- 21 Give the use of Zeigler Natta catalyst in synthesis of polymers.

 $(9 \times 1 = 9 \text{ weightage})$

III. Answer any five questions. Each carries a weightage of 2:

- 22 Distinguish between Vulcanised rubber and Non-vulcanised rubber.
- 23 Discuss briefly the structure and properties of Teflon.
- 24 Give the mechanism of cationic polymerisation with one example.
- 25 What is meant by co-ordination polymerisation?
- 26 Give the structure and composition of natural rubber.
- 27 What is meant by calendering?
- 28 Explain the process transfer moulding.

 $(5 \times 2 = 10 \text{ weightage})$

IV. Answer any two questions:

- 29 What is meant by:
 - (i) Molecular weight distribution of a polymer:
 - (ii) Poly dispersity index.
 - (iii) Viscoelasticity of polymers.
- 30 (a) Give an account of Butadiene rubbers.
 - (b) Distinguish between LDPE and HDPE.
- 31 Discuss briefly about Rubber processing.

 $(2 \times 4 = 8 \text{ weightage})$

~	0	Λ	1	=	^
\mathbf{C}	O	v	1	อ	y

(Pages: 2)

Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS-UG)

Chemistry

CHE 6B 09—INORGANIC CHEMISTRY-IV

Time: Three Hours

Maximum: 80 Marks

Part A

Question No. 1-10 answer all in one word/sentence Each question carries 1 mark.

- 1. Give an example for tridentate ligand.
- 2. Draw the structure of Trans-dichloro tetra-ammine cobalt (III) ion.
- Write the composition of Brass.
- 4. What is Wilkinson catalyst?
- 5. What is kroll process?
- 6. Draw the structure of KMno4.
- 7. Write the IUPAC name of the complex $[P + (IV)(NH_3)_4 Br_2]Br_2$.
- 8. Draw the structure of Myoglobin.
- 9. What is the role of calcium ion in biological systems?
- 10. Name three Zinc containing enzymes.

 $(10 \times 1 = 10 \text{ marks})$

Part B

Question No. 11-22 answer any ten. Each question carries 2 marks.

- 11. Explain sodium-potassium pump.
- Write short note on spectrochemical series.
- 13. What is intrameduallary rod?
- 14. Discuss briefly structural isomerism in co-ordination compounds.
- 15. Discuss briefly catalytic properties of transition metals.

- 16. What are the causes of Lanthanide contraction?
- 17. What is 18 electron rule?
- 18. Write short note on zone refining.
- Discuss the structure of Iron Pentacarbonyl, Fe(CO)₅.
- 20. What are the uses of k2Cr2O7?
- 21. What are the factors affecting stability of complexes?
- 22. What are the general properties of actinides?

 $(10 \times 2 = 20 \text{ marks})$

Part C

Question No. 23-30 answer any five. Each question carries 6 marks.

- 23. What are the limitations of VBT of Co-ordination compounds?
- 24. Write short note on Ellingham diagram.
- 25. How is Titanium extracted from its ore?
- 26. Discuss the applications of complexes in quantitative analysis.
- Give the importance of metals in medicine.
- 28. Analyse the biochemical functions of haemoglobin and myoglobin.
- 29. Discuss the preparation and properties of ferrocene.
- 30. Write short note on open hearth process.

 $(5 \times 6 = 30 \text{ marks})$

Part D

Question No. 31-34 answer any two. Each question carries 10 marks.

- 31. Discuss classification of steel. What are the uses of alloy steels?
- 32. Discuss Geometrical Isomerism in co-ordination compounds.
- Discuss the electronic configuration and general characteristics of Lanthanides. Also compare with Actinides.
- 34. (a) Write short note on chlorophyll and photosynthesis.
 - (b) Discuss the toxicity of Lead and Arsenic.

 $(2 \times 10 = 20 \text{ marks})$

01	A	O	7
21	U	0	1

(Pages: 2)

Nam	e
Reg.	No

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2017

(CUCBCSS--UG)

Chemistry

CHE 6B 09—INORGANIC CHEMISTRY

Time: Three Hours

Maximum: 80 Marks

Part A

(Q. No. 1-10 answer all in one word/sentence)

- 1. Give the composition of German Silver.
- 2. What is zone refining?
- 3. Hg is a liquid metal. Why?
- 4. All transition elements are metals. Why?
- 5. Give an example for anionic ligand.
- 6. Write the IUP AC name of the complex: $[Cr(NH_3)_6][Co(CN)_6] \text{ Hexaamminechromium(III)Hexacyanocobaltate(III)}$
- 7. What is Wilkinsons catalyst?
- 8. Draw the structure of a mononuclear carbonyl of Fe.
- 9. Name the metal present in Haemoglobin.
- 10. Draw the structure of carboplatin.

 $(10 \times 1 = 10 \text{ marks})$

Part B

(Q.No. 11-22 Answer any ten. Each carries 2 marks)

- 11. Explain the term ore.
- 12. Discuss oxidative refining of metals?
- 13. What is electrometallurgy?
- 14. Draw the structure of K₂Cr₂O₇.
- 15. Transition elements form a large number of complexes. Give reason.
- 16. Discuss the position of transition metals in the periodic table.
- 17. What are co-ordination compounds? How do they differ from double salts?

- 18. Explain the hybridization expressed by [Fe(H₂O)₆]Cl₃.
- 19. $[CoF_6]^{3-}$ is paramagnetic while $[Co(NH_3)_6]^{3+}$ is diamagnetic. Why?
- 20. Give one method of preparation of ferrocene.
- 21. Discuss the toxicity of lead.
- 22. Name the trace metal ions in human body.

 $(10 \times 2 = 20 \text{ marks})$

Part C

(Q.No. 23-30 Answer any five. Each carries 6 marks)

- 23. Write a note on the classification of steel.
- 24. Write a note on Ellingham diagrams.
- 25. Explain the magnetic properties of transition metals.
- 26. Compare any *three* important characteristics of 1st transition series with those of 2nd and 3rd transition series.
- 27. Discuss the splitting of d orbitals in square-planar complexes.
- 28. Discuss Sidgwick's Effective Atomic Number rule.
- 29. Write a note on "Structure and bonding in Ni(CO)₄".
- 30. Discuss sodium-potassium pump.

 $(5 \times 6 = 30 \text{ marks})$

Part D

(QNo. 31-34 Answer any two. Each carries 10 marks)

- 31. Discuss the extractive metallurgy of nickel.
- Why do some lanthanides exhibit unusual oxidation states? Discuss this on the basis of their electronic configuration.
 - (b) How do transition elements differ from inner transition elements? Explain.
- 33. Discuss the structural isomerism in co-ordination compounds.
- 34. Draw the structure of haemoglobin. Explain the oxygen binding mechanism.

 $(2 \times 10 = 20 \text{ marks})$

C 40514	(Pages : 2)	Name
		Rog No

SIXTH SEMESTER U.G. DEGREE EXAMINATION MARCH 2023

(CBCSS—UG)

Chemistry/Polymer Chemistry
CHE 6B 09—INORGANIC CHEMISTRY—IV

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer all questions.

Each question carries 2 mark.

Ceiling 20.

- 1. What is the difference between DTA and DSC?
- 2. What is the use of thermogravimetric analysis?
- 3. Cupric salts are coloured while cuprous salts are colourless. Give reason.
- 4. Write the formula for spin only magnetic moment of transition ions based on number of unpaired electrons.
- 5. Why is the increase in the first ionization energy of transition elements not vary regularly with an increase in atomic number?
- 6. What is the difference between labile and inert complexes?
- 7. What is spectrochemical series?
- 8. While $Co[(H_2O)_6]^{2+}$ is pink in colour, $Co(Cl)_4]^{2-}$ is blue in colour. Why?
- 9. Draw the shapes of Fe $(CO)_5$ and Ni $(CO)_4$.
- 10. What is Zeise's salt? Write its structure.
- 11. Write a note on effect of mercury on living body.
- 12. How does Hemoglobin differ from myoglobin?

(Ceiling of marks: 20)

2 C 40514

Section B (Paragraph)

Answer all questions.

Each question carries 5 marks.

Ceiling 30.

- 13. Differentiate between SEM and TEM.
- 14. Why do lanthanoids form coloured complexes?
- 15. What is lanthanide contraction? What are its consequences?
- 16. What are actinides? Why are they so called?
- 17. Cobalt (III) easily forms low spin complexes whereas Cobalt (II) does not. Explain.
- 18. Give an account of the classification of organometallic compounds by nature of bonding.
- 19. Give an account of the biological significance of Cobalt in living systems

(Ceiling of marks: 30)

Section C (Essay)

Answer any one questions.

The question carries 10 marks.

- 20. (a) Describe briefly the general characteristics of the f block elements in the periodic table with emphasis on their electronic configuration,
 - (b) Comment on the industrial importance of Lanthanides.

Any 10 points full mark.

- 21. (a) Write in detail the preparation and properties of Ferrocene.
 - (b) Discuss the nature of bonding in metal carbonyls.

 $(1 \times 10 = 10 \text{ marks})$

Name.

Reg. No....

SIXTH SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION, MARCH 2021

Chemistry

CHE 6B 09-INORGANIC CHEMISTRY-IV

Time: Three Hours Maximum: 80 Marks

Section A (One Word)

Answer all questions.

Each question carries 1 mark.

1.	The common oxidation state of lanthanides is ————.
2.	The ore of titanium is —
3.	The stability of complexes — with increase of charge density on the central metal ion.
4.	Zeise's salt is ————.
5.	The effective atomic number of copper in [Cu(CN) ₄] ³ -is
6.	Give the structure of oxaliplatin.
7.	Peligot's salt is ————.
8.	The composition of gunmetal is ————.
9.	The IUPAC name of Na ₂ [ZnCl ₄] is ————.
10.	In a given transition series the atomic volume — towards the end of the series.
	$(10 \times 1 = 10 \text{ marks})$

Section B (Short Answer)

Answer at least five questions.

Each question carries 4 marks.

All questions can be attended.

Overall Ceiling 20.

- 11. Explain why there is no low spin tetrahedral complexes.
- 12. Differentiate between calcination and roasting.
- 13. What are the uses of potassium permanganate?
- 14. Which is more basic, La(OH)3 or Lu(OH)3. Why?

- 15. Explain the crystal field splitting in square planar complexes.
- 16. Give the structure and use of Wilkinson's catalyst.
- 17. Briefly describe the structure of Fe₂(CO)₉.
- 18. [Ni(CN)₄]²⁻ is diamagnetic whereas [Ni(Cl)₄]²⁻ is paramagnetic. Explain.
- 19. Give the structure and significance of cisplatin.
- 20. Write a note on trace elements in biological system.
- 21. Briefly describe the limitations of valence bond theory.
- 22. How is steel classified?

 $(5 \times 4 = 20 \text{ marks})$

Section C (Paragraph)

Answer at least four questions.

Each question carries 7 marks.

All questions can be attended.

Overall Ceiling 28.

- 23. Explain lanthanide contraction, its cause and consequences
- 24. Write a note on factors influencing stability of complexes.
- 25. Briefly describe the toxicity of lead and mercury.
- 26. Describe zone refining and electrolytic refining.
- 27. Explain preparation and bonding in ferrocene.
- 28. Give a brief account of structural isomerism of co-ordination compounds.
- 29. Give a comparison of 3d, 4d and 5d transition series.
- 30. Write a note on application of complexes in qualitative and quantitative analysis.

 $(4 \times 7 = 28 \text{ marks})$

Section D (Essay)

Answer any two questions.

Each question carries 11 marks.

- 31. Describe the metallurgy of Aluminium.
- 32. Write notes on (a) Sodium potassium pump; (b) Biochemistry of calcium.
- 33. Discuss the M.O. theory of octahedral complexes with onlyo bond.
- 34. Give an account of the preparation, properties, structure and uses of potassium dichromate.

~	80	1	C	n
	OU		U	v

(Pages: 2)

Name

Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS-UG)

Chemistry

CHÈ 6B 10-ORGANIC CHEMISTRY-III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. Sketch the NMR spectrum of ethanol.
- 2. What is isoelectric point?
- 3. What is Tollen's reagent?
- 4. Draw the structure of methandrostenolone.
- 5. State Isoprene rule.
- 6. Draw the structure of geraniole.
- 7. State the occurance of citral.
- 8. What are steroid hormones? Give an example.
- 9. Give the chemical names of vitamins A, B, and B2.
- 10. What are nucleosides and nucleotides?

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions.

Each question carries 2 marks.

- 11. What are the different steps in the biosymthesis of proteins?
- 12. Write short note on nutarotation.
- 13. Write short note on strecker synthesis.
- 14. Discuss in detail Denaturation of proteins.
- 15. Write short note on Killiani Fischer synthesis.
- 16. What are the applications of carbohydrates.

- 17. What are epimers and anomers?
- 18. What are the biological functions of lipids?
- 19. What are carbohydrates? How are they classified?
- 20. Discuss the uses of waxes with examples.
- 21. Write short note on chemical shift.
- 22. What is meant by Zwitterion? How does isoelectric point influence the properties of an amino acid?

Section C

Answer any five questions. Each question carries 6 marks.

- 23. Briefly discuss secondary and teritiary structure of proteins.
- 24. How will you distinguish between the following pairs of compounds on the basis of IR spectroscopy:
 - (a) Ethyl alcohol and diethyl ether.
 - (b) Acetic acid and ethyl acetate.
- 25. What is meant by spin-spin splitting? Illustrate taking the case of ethyl alcohol.
- 26. Discuss the structure of starch and cellulose.
- Discuss the structural details of RNA and DNA and make a critical comment on the functions of mese molecules.
- 28. Discuss the uses of lemon grass oil and Eucalyptus oil.
- 29. Write short note on Diels-Alder reaction.
- 30. How are vitamins classified? Give the structure of one vitamin belonging to each class.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any two questions. Each question carries 10 marks.

- 31. Discuss the source, structure and physiological functions of coniine and piperine.
- 32. Explain in detail DNA fingerprinting and its applications.
- 33. (a) Write short note on Anabolic steroids and their abuse.
 - (b) Write short note on Hydrogenation and drying of oils.
- 34. (a) Discuss colour tests for proteins.
 - (b) Inversion of cane sugar.

~	97	10	O	O
C	4	LU	O	0

(Pages: 3)

Name	*************
Reg No	-17

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2017

(CUCBCSS—UG)

Chemistry

CHE 6B 10—ORGANIC CHEMISTRY—III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. How many absorption peaks are present in the NMR spectrum of toluene?
- 2. What is Benedict's reagent?
- 3. Write the structure of Methandrostenolone.
- 4. Give two examples of disaccharides.
- 5. Write the zwitter ionic form of Alanine.
- 6. Name the pyrimidine bases present in DNA.
- 7. Write an example for a ketohexose.
- 8. Write the structure of Lecithin.
- 9. Which chemical bonds in DNA molecules must be broken for replication to occur?
- 10. Which vitamin is called sunshine vitamin?

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions. Each question carries 2 marks.

- 11. What is Fehling solution? How will it react with Glucose?
- 12. What are anomers? Draw the two anomeric forms of glucose.
- 13. Explain the biological functions of lipids.
- ·14. What is meant by saponification value?
- 15. What are nucleosides and nucleotides?
- 16. What is Isoprene rule? Explain citing one example.
- 17. Explain Diels Alder reaction.

- 18. What is isoelectric point?
- 19. Briefly explain HDL and LDL Cholesterol.
- 20. Write the Xanthoproteic test for proteins.
- 21. Calculate the λ_{max} for the given structure.

22. Explain Strecker synthesis.

 $(10 \times 2 = 20 \text{ marks})$

Section C

Answer any five questions.

Each question carries 6 marks.

- 23. Write a short note on solid phase peptide synthesis.
- 24. Write a note on reducing and non reducing sugars.
- 25. Explain protein sequencing using Edman degradation.
- 26. How vitamins are classified? Draw the structure of Vitamin B_3 and B_6 .
- 27. Discuss on cyclic structure of Fructose.
- 28. Explain the structure and uses of Citral and Geraniol.
- 29. (i) Discuss the replication of DNA.
 - (ii) Difference between DNA and RNA.
- 30. Explain sigmatropic rearrangement with examples.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any **two** questions. Each question carries 10 marks.

- 31. (i) Explain Chemical shift in NMR.
 - (ii) What are essential oils? How are they extracted from plants?
- 32. How will you convert Glucose into Arabinose and vice versa?
- 33. Discuss on Primary, Secondary, Tertiary and quaternary structure of proteins.
- 34. (i) Explain DNA finger printing and its applications.
 - (ii) Write the structure and physiological functions of nicotine, quinine, and piperine.

T	4	1	1		0
D	1	()	11	1	X
	I	V	V	U	U

(Pages: 2)

Name.	•••	••	• •	VI.	•	• •	•	•	•	•	• •	•	•	•	•	•	•	•	• 1	•	•	•	•	•	• •	•	•

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2018

(CUCBCSS—UG)

Chemistry

CHE 6B 10-ORGANIC CHEMISTRY-III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. Name the four bases present in RNA molecule.
- 2. What is the name given to the linkage which holds together two monosaccharide units in a disaccharide?
- 3. Give the name and structure of optically inactive α-amino acid.
- 4. Draw the structure of Citral.
- 5. Give an example of a peptide hormone.
- 6. What is the monomer unit present in natural Rubber?
- 7. What is Tollen's reagent?
- 8. Give the name of a non-reducing disaccharide.
- 9. How many proton signals would you expect to find in the 1H-NMR spectrum of propanoic acid?
- 10. Name the heterocyclic residue present in coniine.

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions. Each question carries 2 marks.

- 11. What is meant by inversion of sugar?
- 12. What are derived lipids?
- 13. What is the basic structural difference between starch and cellulose?
- 14. Why aldehyde proton appears much downfield in the PMR spectrum?
- 15. Discuss in brief the denaturation of proteins.
- 16. Define the term chemical shift.
- 17. What is meant by drying of oils?

- 18. Why are vitamin A and vitamin C essential to us? Give their important sources.
- 19. What is mutarotation?
- 20. Explain the Hopkins Cole test for proteins.
- 21. Explain Diels Alder reaction.
- 22. What is iodine number?

Section C

Answer any five questions. Each question carries 6 marks.

- 23. Explain the classification of amino acids.
- 24. Discuss on secondary and tertiary structure of proteins.
- 25. Write a short note on steroid hormones.
- 26. Explain the structure and physiological functions of conine and piperine.
- 27. Discuss on the cyclic structure of glucose.
- 28. Explain the double helical structure of DNA.
- 29. Write briefly on Solid Phase Peptide Synthesis.
- 30. What are essential oils? How are they extracted from plants?

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any **two** questions. Each question carries 10 marks.

- 31. (a) Explain DNA finger printing and its applications.
 - (b) Write short note on epimers and anomers.
- 32. (a) Explain the Strecker and amino malonate synthesis of amino acids
 - (b) What are enzymes? Explain the main characteristic features of enzymes.
- 33. Explain with suitable examples: (a) Killiani Fischer synthesis; (b) Ruff degradation.
- 34. (a) Sketch the MO diagram of 1, 3-butadiene and show the HOMO and LUMO in the ground state.
 - (b) Using the Frontier orbital diagram show the mode of cyclisation of 1, 3-butadiene under photochemical conditions.

~	7	1	1	4
\mathbf{C}	T	1	T	4

(1	'n	ges	:	3)

Name	••
	•

Reg. No.....

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION **MARCH 2021**

Chemistry

CHE 6B 10—ORGANIC CHEMISTRY—III

Time: Three Hours Maximum: 80 Marks

Section A (One Word)

Answer all questions. Each question carries 1 mark

	Buch question curries 1 mark.
1.	How many absorption peaks are present in the HNMR spectrum of pentan-3-one?
2.	——— is an example of aldopentose.
3.	The monosaccharides which differs only in the configuration of C-2 are known as ———.
4.	The base pair of Adenine in DNA is ———.
5.	———— is a non-reducing sugar.
6.	——— structure of protein is unaffected during denaturation.
7.	———— is an example of [3, 3] sigmatropic rearrangement.
8.	Monomer of natural rubber is ———.
9.	Deficiency disease of Vitamin C is ———.
16.	The process by which DNA duplicate creating two exactly identical molecules is known
	as ———,
	$(10 \times 1 - 10 \text{ morbs})$

Section B (Short Answer)

Answer at least five questions. Each question carries 4 marks. All questions can be attended. Overall Ceiling 20.

- 11. Write any four IR frequencies of benzoic acid.
- 12. How will you distinguish the presence of ethyl group $(CH_3 CH_2)$ in a NMR spectrum?

- 13. Write an evidence to show that glucose contains a straight chain of six carbon atoms.
- 14. Draw the cyclic structure of glucose.
- 15. What is inversion of cane sugar?
- 16. What is the general structure of amino acids?
- 17. Define iodine number.
- 18. Draw the structure of a female sex hormone.
- 19. Write the differences between DNA and RNA.
- 20. State isoprene rule.
- 21. What are alkaloids? Give the structure of any two.
- 22. With FMO explanation show that Diels-Alder reaction is thermally allowed and photochemically forbidden.

Section C (Paragraph)

Answer at least four questions. Each question carries 7 marks. All questions can be attended. Overall Ceiling 28.

- 23. How will you convert glucose to fructose?
- 24. How will you distinguish the following molecule by IR spectroscopy: (i) Ethanol and acetone; and (ii) Benzaldehyde and phenol?
- Describe solid phase peptide synthesis of a dipeptide.
- 26. Draw the cyclic structure of maltose and sucrose.
- 27. What are biological functions of lipids?
- 28. Explain Transcription and translation.
- 29. Write examples of [1, 3], [1, 5] and [3, 3] sigmatropic rearrangements.
- 30. What is vulcanization and how does it change the properties of rubber?

 $(4 \times 7 = 28 \text{ marks})$

Section D

Answer any two questions.

Each question carries 11 marks.

31. Identify the compound:

Molecular formula : $C_8H_8O_2$, UV λ_{max} : 276 nm.

IR spectra : 3100, 3018, 2968, 1699, 1602, 1496 $\rm cm^{-1}$.

 $^{1}\mbox{H}$ NMR spectra : $_{\delta}$ (ppm) 3.7 (2 H) singlet, 6.8 – 7.2 (5 H) multiplet – 11.2 (1 H) singlet.

- 32. Describe the structure of nucleotides and DNA.
- 33. Draw the molecular orbitals of 4n and 4n + 2 system and explain the «iectro cyclic reactions of butadiene and hexatriene systems.
- 34. How hormones are classified? Explain the secreting organ, biological function and structure of one example of each group.

C 40515	(Pages : 2)	Name
		Reg No

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2023

(CBCSS—UG)

Chemistry/Polymer Chemistry

CHE 6B 10—ORGANIC CHEMISTRY—III

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A

Answer all questions.

Each question carries 2 marks.

- 1. State Beer -Lambert Law.
- 2. Write the chromophore present in nitrobenzene.
- 3. What is R_f value in TLC?
- 4. Predict the λ max of 3-methylpent-3-en-2-one.
- 5. Draw the structure of epimer of D(+) Glucose.
- 6. What are products formed when glucose is treated with periodic acid?
- 7. Give one example of a disaccharide. Draw its structure.
- 8. Write the composition of invert sugar.
- 9. Represent the zwitter ion of an amino acid.
- 10. What is ninhydrin test?
- 11. What are the constituents of nucleic acids?
- 12. What is the effect of hydrogenation of double bonds in oils?

(Ceiling 20)

2 C 40515

Section B

Answer all questions.

Each question carries 5 marks.

- 13. What are Anomers? Explain mutarotation.
- 14. Give an account on classification of vitamins. List the diseases caused by their deficiency.
- 15. Write notes on physiological functions of nicotine and coniine. Draw their structures.
- 16. Describe the general principle of extraction of alkaloids. Draw the structure of quinine
- 17. Represent the molecular orbitals of ethylene and 1, 3- butadiene. Write the number of nodes present.
- 18. Explain the feasibility of thermal and photochemical reactions of 2+2 cycloaddition reaction using FMO approach.
- 19. Describe the mechanism of Claisen rearrangement.

(Ceiling 30)

Section C

Answer any **one** questions. The question carries 10 marks.

- 20. (a) What is chemical shift?
 - (b) Explain spin-spin splitting. Predict the ¹H nmr spectra of ethyl acetate and propanoic acid
- 21. (a) Describe the Strecker synthesis of Phenyl alanine
 - (b) Explain the principle of solid -phase polypeptide synthesis

~	OI	0	0	0
U	21	U	X	H

(Pages: 3)

Nam	e
Reg.	No

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2017

(CUCBCSS—UG)

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY—III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer in one word or sentence.

Answer all questions.

- 1. Write the relation between specific conductance and equivalent conductance.
- 2. Ionic product of water is ——— mol² dm⁻² at 25°C.
- 3. The electrode potential of standard hydrogen electrode is ______.
- 4. Write the Nernst equation for electrode potential.
- 5. The pH of a solution is 5, its hydrogen ion concentration is ______.
- 6. Name one acid buffer.
- 7. The solubility product of sparingly soluble salt AB at room temperature is $1.21 \times 10^{-6} \text{ mol}^2 \text{ dm}^{-6}$. Calculate its solubility.
- 8. When a non-volatile solute is dissolved in a pure solvent, the vapour pressure of the pure solvent ———.
- 9. Calculate the Miller indices for crystal planes with intercepts 2a, 1b, 2c.
- 10. Calculate the number of atoms in face centred cubic unit cell.

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions.

Each carries 2 marks.

- 11. How will you determine the solubility product of sparingly soluble salt by conductance measurement.
- 12. Write the Debye-Huckel -Onsager equation.
- 13. Write down the electrode reaction and cell reaction in the following cell:

Pt; H₂(g), H⁺(aq) // Cl⁻(aq), Hg₂Cl₂, Hg: Pt.

- 14. How will you determine the pH of a solution by EMF measurment.
- 15. What is a standard cell? Give an example.
- 16. A solution containing 2.5 g of a solute dissolved in 75 g of water boiled at 100.5°C. Calculate the molar mass of the solute. (K_b for water = 0.52 K mol⁻¹).
- 17. Why is a solution of ammonium chloride acidic?
- 18. Abnormal molar masses are obtained in the case of certain solutes in colligative property methods. Why?
- 19. What are intrinsic semiconductors? Give examples.
- 20. At what angle would a first order reflection be observed in the X ray diffraction of a set of crystal planes for which d = 0.285 nm, if the X rays used have a wavelength of 0.075 nm.
- 21. What is liquid junction potential? How can we eliminate liquid junction potential?
- 22. Draw the (123) and (211) planes in the unit cell of a cubic lattice.

Section C

Answer any five questions. Each carries 6 marks.

- 23. State and explain Faraday's laws of electrolysis.
- 24. Outline Hittorf's method of determination of transport number.
- 25. Derive the expression for the EMF of concentration cell without transference.
- 26. Explain the Bronsted- Lowry concepts of acids and bases.
- 27. Discuss the construction and working of a calomel electrode.
- 28. 1.50 g of NaCl was dissolved in 500 g of water and the elevation in boiling point observed is 0.05deg. Calculate the Van't Hoff factor $Kb = 0.514 \text{ deg mol}^{-1}$.
- 29. Derive the Bragg equation.
- 30. What are liquid crystals? How are they classified? Discuss the properties and applications of liquid crystals.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any two questions. Each carries 10 marks.

- 31. (a) State and explain Kohlrausch's law of independent migration of ions. Mention any two of its applications.
 - (b) The molar conductances of sodium acetate, hydrochloric acid and sodium chloride at infinite dilution are 91.0×10^{-4} , 426.2×10^{-4} and 126.5×10^{-4} Sm² mol⁻¹ respectively. Calculate he molar conductance at infinite dilution of acetic acid.
- 32. (a) Discuss the hydrogen-oxygen fuel cell.
 - (b) Derive the Henderson equation for the pH of an acidic buffer.
- 33. State and explain:
 - (a) Henry's law and its applications.
 - (b) Raoult's law, ideal and non-ideal solutions.
- 34. (a) Discuss the principle and applications of EMF measurements in acid base titrations,

(b) Briefly explain the stoichiometric defects in crystals.

	1	1	1	
C	T	T	T	O

(Pa	ges	:	3)

Name

Reg. No.....

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MARCH 2021

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY-III

Time: Three Hours

Maximum: 80 Marks

Section A (One Word)

Answer all questions.

Each question carries 1 mark.

- In galvanic cell, the positive electrode is ———.
- 2. Write the reaction in the cell $Zn(s) |Zn^{2+}(aq)| Ag^{+}(aq) |Ag(s)|$
- 3. is the conductance of a conductor of unit length and unit area of cross-section.
- 4. The Henderson-Hasselbalch equation is ———
- 5. The pKa values of four acids are given below. Arrange them in the increasing order of acidity.

Acid	СН ₃ СООН	$ClCH_2COOH$	(CH ₃) ₃ CCOOH	$\mathrm{CH_{3}OCH_{2}OH}$
pKa	4.8	2.86	5.05	3.53

- 6. The van't Hoff equation for osmotic pressure of a dilute solution is ———.
- 8. Mathematically, the point groups can produce 230 space groups.
- 9. Imperfection due to missing atoms, displaced atoms or extra atoms is called ———.
- An example for body centred cubic lattice is ———.

 $(10 \times 1 = 10 \text{ marks})$

Section B (Short Answer)

Answer at least **five** questions. Each question carries 4 marks. All questions can be attended. Overall Ceiling 20.

- 11. What is Debye Falkenhagen effect?
- 12. Write down the Debye-Huckel Onsagar equation and explain the terms.

- 13. In the electrochemical cell Zn | Zn²+ (0.001M) | Ag⁺ (0.1M) | Ag at 298 K, given E° Zn²+/Zn is -0.76 V and E° Ag⁺/Ag is 0.80V. Calculate the EMF of the cell.
- 14. How will you set up a calomel electrode?
- 15. What is meant by over voltage?
- Define pH of a solution. The pH of a solution is 5.2. Calculate the concentration of hydrogen ions in dm⁻³.
- 17. What is molal depression constant? How it is related to depression in freezing point?
- 18. What is: i) van't Hoff factor; and ii) abnormal molecular mass.
- 19. What is law of rational indices?
- 20. A metallic element has a cubic lattice and each edge of the unit cell is 2.88 A°. Taking density of the metal as 7.20 g/cm³, calculate the number of unit cells in 100g of the metal.
- 21. Define radius ratio. How the co-ordination number vary with radius ratio?
- 22. Distinguish between amorphous and crystalline solids.

Section C (Paragraph)

Answer at least four questions. Each question carries 7 marks. All questions can be attended. Overall Ceiling 28.

- 23. State Ostwald's dilution law. What are its uses and limitations?
- 24. Discuss the application of Gibbs-Helmholtz equation to electrochemistry.
- 25. Explain the principle and applications of potentiometric titration.
- 26. How to measure the pH using glass electrode?
- Define degree of hydrolysis. Derive the relation between hydrolysis constant and degree of hydrolysis
 of salt of strong acid and weak base.
- 28. Briefly explain the Rast method for determination of molar mass of solutes.
- 29. Explain the Swarm theory of liquid crystals. Mention any two applications.
- 30. Discuss briefly metal deficiency and metal excess defects.

Section D (Essay)

Answer any two questions. Each question carries 11 marks.

- 31. Write detailed notes on any four applications of conductance measurements.
- 32. i) What is meant by osmotic pressure of a solution?
 - ii) Describe Berkley and Hartley's method for the determination of osmotic pressure.
- 33. Derive the relation between lowering of vapour pressure and depression in freezing point.
- 34. a) Derive Bragg's equation for the diffraction of X-rays by crystal lattice.
 - b) Discuss briefly Debye Scherrer powder diffraction method.

C 80161

(Pages: 2)

Name.....

Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS-UG)

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY-III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. How does the value of Henry's constant will change when the pressure of a gas is increased?
- 2. Give any one application of electrolysis.
- 3. Name the most symmetric crystal system.
- 4. State Ostwald's dilution law.
- 5. Calculate the pH of 0.00001M solution.
- 6. Define electrochemical series.
- 7. Write the Conjugate base of NH3.
- 8. Give mathematical expression for Raoult's law.
- 9. List one advantage of fuel cell.
- 10. Why is it necessary to use a salt bridge in a Galvanic cell?

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions. Each question carries 2 marks.

- 11. What is Henderson equation?
- 12. The solubility of AgCl is 1.05×10^{-5} mol/L. Calculate the solubility product.
- 13. What is Calomel electrode?
- 14. What are liquid crystals? How they are classified?
- 15. What is reverse osmosis?
- 16. What is common ion effect?
- 17. Define cryoscopic constant and ebullioscopic constant.

- 18. What do you meant by Van't Hoff Factor?
- 19. What are buffer solutions?
- 20. Write down the crystal angles of a unit cell of tetragonal, and monoclinic crystal systems.
- 21. Give the Debye-Huckel-Onsager equation and show its experimental verification.
- 22. Calculate the ionic strength of solution containing 0.2 M CaCl₂ and 0.05M NaCl.

Section C

Answer any five questions.

Each question carries 6 marks.

- 23. Differentiate between ideal and non-ideal solutions.
- 24. Write a short note on concentration cells without transference.
- 25. Explain Kohlrausch's law. What are its applications?
- 26. Give an account of modern concepts of acids and bases.
- 27. Explain Wein effect and Debye -Falkennhagen effect.
- 28. Derive Bragg's equation.
- 29. What is quinhydrone electrode? What is its application and limitations?
- 30. Discuss the structure of NaCl.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any two questions.

Each question carries 10 marks.

- 31. Explain Stoichiometric and Non stoichiometric defects.
- 32. Explain the terms (i) Liquid junction potential (ii) Fuel Cell (iii) glass electrode.
- 33. Discuss potentiometric and conductometric titrations.
- 34. (a) Define Hydrolysis constant and Degree of hydrolysis of a salt.
 - (b) Illustrate the relationship between hydrolysis constant (K_h) with K_w of (i) salt of strong acid and weak base (ii) salt of weak acid and weak base.

40	-	200	-
1	14 1	F	u
2 4 V		•)	7
	40	400	4005

(Pages: 3)

Name	**********	•••••••
4		

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2018

(CUCBCSS—UG)

Chemistry

CHE 6B 11-PHYSICAL CHEMISTRY-III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer in one word or sentence.

Answer all questions.

- 1. Write the equation relating equivalent conductance and concentration of a strong electrolyte.
- 2. Define electrochemical series.
- 3. What is a fuel cell?
- 4. Write the Nernst equation for electrode potential.
- 5. Why is it necessary to use a salt bridge in a Galvanic cell?
- 6. Define buffer capacity.
- 7. Why does specific conductance of a solution decreases with dilution?
- 8. What is meant by imperfection or defect in a crystal?
- 9. Which colligative property is preferred for the molar mass determination of macromolecules?
- 10. Calculate the Miller indices for crystal planes with intercepts 2a, 1b, 3c.

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions.

Each question carries 2 marks.

- 11. How will you determine ionic product of water by conductance measurement?
- 12. Explain the Lewis concepts of acids and bases.
- 13. Write down the electrode reaction and cell reaction in the following cell:

Pt,H₂(g), H+(aq) // Cl_(aq), AgCl, Ag.

- 14. Write two advantages of H_2 - O_2 fuel cell over ordinary cell.
- 15. What is a standard cell? Give an example.

- 16. A 5% solution (by mass) of cane sugar (mol. mass 342) in water has a f.p of 271K. Calculate the f.p of 5% solution (by mass) of glucose (mol. mass 180) in water . F.p of pure water is 273.15K.
 - Why is a solution of ferric chloride is acidic?
- 18. Under what condition van't Hoff factor is (i) equal to 1 and (ii) greater than one? Explain your
- Evaluate the spacing between (111) planes in a face centred cubic lattice (edge length = a).
- Specific conductance of a decimolar solution of NaCl at 25°C is 1.24 Sm⁻¹. The resistance of the cell containing solution was 65 ohm. What is the cell constant?
- What are liquid crystals? How are they class fied?
- 22. Calculate the ionic strength of a solution containing 0.2 M NaCl and 0.1 M $\rm BaCl_2$.

Section C

Answer any five questions. Each question carries 6 marks.

- The specific and equivalent conductance of a saturated solution of of AgBr respectively are 2.44×10^{-5} $10^{-7}\,\mathrm{S\,cm^{-1}}$ and $140.3\,\mathrm{S\,cm^{-2}\,eq^{-1}}$. Calculate the solubility of AgBr. The conductivity of water used for solution = 1.21×10^{-7} S cm⁻¹.
- 24. State and explain Kohlrausch's law of independent migration of ions. How can it be used to find the degree of dissociation of a weak electrolyte?
- 25. Explain Potentiometric titrations by taking examples of strong acid strong base titration
- 26. Derive the Bragg equation.
- 27. Derive an equation to calculate the pH of a buffer solution.
- 28. Distinguish between ideal and non ideal solutions.
- 29. How can you determine the solubility product of a sparingly soluble salt using EMF measurement?
- $2.0\mathrm{g}$ of benzoic acid in $25\mathrm{g}$ of benzene show a freezing point depression of $1.62\mathrm{K}$. $\mathrm{K_f}$ of benzene is 4.9K kg mol⁻¹ Calculate the degree of association.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any two questions. Each question carries 10 marks.

- 31. (a) State and explain Faraday's laws of electrolysis.
 - (b) A current was passed in series through a solution of a salt of a metal X and a solution of ZnSO₄, using Pt electrodes. After a certain time 0.348g of X and 1.264g of Zn were deposited. Calculate the equivalent mass of X. Equivalent mass of Zn is 32.7.
- 32. (a) What are concentration cells? How are they classified? Give one example for each type and also write the electrode and cell reaction.
 - (b) Calculate the EMF of the cell: $Pt,Br_2(g;0.1 \text{ atm})/Br^-(aq;0.5 \text{ M})/Br_2(g;1 \text{ atm}),Pt$ at 298K.
- 33. (a) Explain the terms:
 - (i) Colligative property.
 - (ii) Osmotic pressure.
 - (iii) Liquid junction potential.
 - (b) A solution containing 8.4g per dm³ urea (molar mass = 60) is isotonic with a 5% solution of an organic nonvolatile solute. Calculate the molar mass of the latter.
- 34. (a) Discuss the principle and applications of EMF measurement in acid base titration.
 - (b) Briefly explain the stoichiometric defects in Crystals.

C 40516	(Pages : 2)	Name
		Dom No

SIXTH SEMESTER U.G. (CBCSS—UG) DEGREE EXAMINATION MARCH 2023

Chemistry/Industrial Chemistry/Polymer Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY—III

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer **all** questions.

Each question carries 2 marks.

Ceiling 20.

- 1. Explain the limitations of Ostwald's dilution law.
- 2. For the cell : Mg(s)/Mg²⁺(aq)//Ag⁺(aq)/Ag(s), calculate the standard Gibbs free energy change. Given : $E^0_{Mg2+/Mg} = -2.37 \text{ V}$ and $E^0_{Ag+/Ag} = +0.80 \text{ V}$.
- 3. Explain the construction of a glass electrode.
- 4. State Raoult's law of vapour pressure lowering.
- 5. Calculate the osmotic pressure of an aqueous solution containing 10g of glucose in 600 mL of it at 27° C.
- 6. Potassium acetate in its 0.01 M solution undergoes hydrolysis to the extent of 0.023 %. Calculate its hydrolysis constant and the concentration of hydroxide ions.
- 7. Explain common ion effect.
- 8. Define solubility product of a salt.
- 9. Mention the applications of buffer solutions.
- 10. Differentiate between intrinsic and extrinsic semiconductors.
- 11. Explain briefly band theory for metals.
- 12. Which are the types metal excess defects?

(Ceiling of marks: 20)

2 C 40516

Section B (Paragraph)

Answer all questions.

Each question carries 5 marks.

Ceiling 30.

- 13. Illustrate the applications of conductivity measurements.
- 14. Describe the set up and working of a hydrogen-oxygen fuel cell.
- 15. Explain the electrochemical theory of corrosion of metals.
- 16. Explain reverse osmosis and its applications.
- 17. Differentiate between positive deviation and negative deviation of Raoult's law using suitable examples.
- 18. Derive Bragg's equation.
- 19. Explain the various cubic systems of solid crystals. Define liquid crystals and give examples.

(Ceiling of marks: 30)

Section C (Essay)

Answer any **one** questions. Each question carries 10 marks.

- 20. Explain Hittorf's method.
- 21. Explain various close packing in solids with examples.

\mathbf{C}	6	0	0	7	6
-		•	•	•	•

(Pages : 2)

Name

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2019

(CUCBCSS)

Chemistry

PC 6B 02 (E1)—POLYMER PROCESSING AND TECHNOLOGY

Time: Three Hours

Maximum: 80 Marks

Part A

Answer all questions.

Each question carries 1 mark.

- 1. What is natural rubber?
- 2. Define dynamic fatigue.
- 3. Give an example for Thermo Plastics.
- 4. What is mean by mastication?
- 5. Give the expansions of ASTM and BIS.
- 6. Define cure time.
- 7. Who is the father of polymer science?
- 8. What is an elastomer?
- 9. What is blowing agent?
- 10. What are extenders?

 $(10 \times 1 = 10 \text{ marks})$

Part B

Answer any ten questions.

Each question carries 2 marks.

- 11. Define melt flow index?
- 12. What is plasticization? Why is it needed in polymer processing?
- 13. Write a note on casting of rubber.
- 14. How is rayon prepared?
- 15. Define the term viscoelasticity.
- 16. What are the benefits of adding fillers to polymers?

- 17. Write a short note on the Creep behaviour of polymers.
- 18. What is milling?
- 19. Write a short note on thermo foaming process.
- 20. What is lamination?
- 21. What are accelerators?
- 22. Write a short note on latex spreading?

Part C

Answer any **five** questions. Each question carries 6 marks.

- 23. Write a note on Vulcanization.
- 24. Describe the process of calendering.
- 25. Write a short note on rotational moulding.
- 26. How can you determine the density of polymeric materials?
- 27. What is the difference between thermoplastic and thermosetting plastics?
- 28. Write a short note on plastimeters and viscometers?
- 29. What is UTM? How is it helpful for the testing of polymers?
- 30. Discuss Scorch cure time and optimum cure time?

 $(5 \times 6 = 30 \text{ marks})$

Part D

Answer any **two** questions. Each question carries 10 marks.

- 31. Discuss various techniques employed in the testing of polymers?
- 32. Explain about cellulose based polymers. What are their commercial applications?
- 33. Give the various compounding additives used in rubber processing. Write their function.
- 34. Make a comparative study of injection moulding, compression moulding and blow moulding.

~	001	70
U	801	.7U

(Pages: 2)

Name.....

Reg. No.....

SIXTH SEMESTER B.A./B.Sc. DEGREE EXAMINATION, MARCH 2020

(CUCBCSS-UG)

Polymer Chemistry

PC 6B 01-POLYMER CHEMISTRY-I

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. Give an example for a condensation polymer.
- 2. What are elastomers?
- 3. What is tacticity?
- 4. Define glass transition temperature.
- 5. Give two uses of teflon.
- 6. What is PAN?
- 7. What is SBR?
- 8. What is vulcanisation?
- 9. Give two uses of PVC.
- 10. Give an example for a natural polymer.

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions.

Each question carries 2 marks.

- 11. Give preparation and uses of polystyrene.
- 12. What is addition polymerization? Give two examples.
- 13. Define weight average molecular mass.
- 14. What are conducting polymers?
- 15. What is neoprene? Write its uses.
- 16. Explain chain growth polymerization.

- 17. What is calendaring?
- 18. What is poly dispersity index?
- 19. Write two uses of poly urethanes.
- 20. What is terylene? Write its uses.
- 21. Give the synthesis of melmac.
- 22. Distinguish homo and hetero polymers.

Section C

Answer any five questions. Each question carries 6 marks.

- 23. Write short note on HDPE and LDPE.
- 24. Distinguish thermoplastics and thermosetting plastics.
- 25. Write short note on Urea formaldehyde resins and phenol formaldehyde resins.
- 26. Briefly discuss different polymer degradation processes.
- 27. Write short note on polymers in medical field.
- 28. Write short notes on rotational and injection moulding.
- 29. Write a note on high temperature and fire resistant polymers.
- 30. Write short notes on saran and dynel.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any two questions. Each question carries 10 marks.

- 31. Explain the classification of polymers based on origin, synthesis and structure.
- 32. Briefly explain various polymerization techniques.
- 33. Explain the free radical, ionic and coordination polymerizations with mechanisms.
- 34. Write down the preparation, properties and uses of any three synthetic rubbers.

(Pages: 2)

Name	 	
1.4110	 	

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2018

(CUCBCSS—UG)

Polymer Chemistry

PC 6B 01—POLYMER CHEMISTRY—I

Time: Three Hours

Maximum: 80 Marks

Part A

Answer all questions. Each question carries 1 mark.

- 1. Give the structure of PS.
- 2. Who invented nylon?
- 3. Give an example for natural polymer.
- 4. Give structure of teflon.
- 5. What is a polyamide?
- 6. Which is the first synthetic rubber?
- 7. What is meant by liquid resin.
- 8. Name two biodegradable polymers.
- 9. Give an example for thermosetting polymer.
- 10. What is weight average molecular weight?

 $(10 \times 1 = 10 \text{ marks})$

Part B

Answer any ten questions. Each question carries 2 marks.

- 11. What is a graft copolymer?
- 12. What is SBR, give two uses?
- 13. How are polyurethanes prepared?
- 14. What are flame retardants?
- 15. What are fillers, give examples?
- 16. Write on polymer additives.
- 17. What are high temperature polymers?
- 18. What is creep?

- 19. Distinguish between addition and condensation polymers.
- 20. What are speciality polymers?
- 21. What is meant by recycling of plastics?
- 22. What are conducting polymers?

Part C

Answer any **five** questions. Each question carries 6 marks.

- 23. How will you use TGA to study polymer degradation.
- 24. Give the important uses of polymers in medical field.
- 25. Write short note on morphology of crystalline polymers.
- 26. What is viscous flow, rubber like elasticity and visco elasticity?
- 27. Draw a graph to show the relation between Tg, Tm and MW of polymers.
- 28. What are engineering plastics?
- 29. What are the different types of PE, give difference between them?
- 30. Explain thermal, oxidative and photochemical degradations of polymers.

 $(5 \times 6 = 30 \text{ marks})$

Part D

Answer any two questions. Each question carries 10 marks.

- 31. Discuss the preparation, properties and applications of any three commercial polymers
- 32. Compare free radical, ionic and coordination polymerizations.
- 33. Explain ultracentrifugation.
- 34. Derive expression for kinetics of stepwise polymerisation.

C 40527	(Pages : 2)	Name
		Reg. No

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2023

(CBCSS-UG)

Polymer Chemistry

PCH 6B 01—POLYMER CHEMISTRY—I

(2019 Admission onwards)

Time: Two Hours

Maximum: 60 Marks

Section A (Short Answers)

Answer questions up to 20 marks. Each question carries 2 marks.

- 1. Differentiate addition and condensation polymerization.
- 2. What is Glyptal? Write any two uses.
- 3. What is PAN? Write its synthesis.
- 4. What are syndiotactic polymers?
- 5. Explain poly dispersity index.
- 6. Distinguish elastomers and fibers.
- 7. What is BuNa-S? Write its uses.
- 8. What are the uses of Polyaniline?
- 9. Write down the synthesis and use of any *one* fluoro polymer.
- 10. Define viscosity average molecular mass
- 11. Give the preparation of Melmac.
- 12. Explain glass transition temperature.

(Ceiling of marks: 20)

2 C 40527

Section B (Paragraph)

Answer questions up to 30 marks. Each question carries 5 marks.

- 13. Give the synthesis and uses of Nylon-6 and Nylon-6,6.
- 14. Explain the synthesis of any *two* formaldehyde resins.
- 15. Distinguish thermoplastics and thermosetting plastics.
- 16. Write short note on average molecular weights.
- 17. Explain Bulk polymerization.
- 18. Give the preparation and uses of any two synthetic rubbers.
- 19. Write short note on polyethylenes.

(Ceiling of marks: 30)

Section C (Essay)

Answer any **one** questions.

The question carries 10 marks.

- 20. Explain briefly:
 - (i) Zeigler-Natta polymerization; and
 - (ii) Solution Polymerisation.
- 21. Explain different types of polymer degradation.

	1	1	25	
\mathbf{C}	T	T	40	

(Pages: 2)

Name	

Reg. No.....

SIXTH SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION, MARCH 2021

Polymer Chemistry

PC 6B 01-POLYMER CHEMISTRY-I

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. Give an example for a homo polymer.
- 2. What are fibers?
- 3. Give the structure of PVC.
- 4. Write any two uses of neoprene.
- 5. What is PMMA?
- 6. Give the structure of glyptal.
- 7. Give any two examples of synthetic polymers.
- 8. What is terylene?
- 9. Give an example of thermosetting polymer.
- 10. Give any two uses of polypropylene.

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer at least five questions. Each question carries 4 marks. All questions can be attended. Overall Ceiling 20.

- 11. Differentiate isotactic and syndiotactic polymers.
- 12. What is addition polymerisation?
- 13. Define viscosity average molecular mass.
- 14. Explain any two factors affecting Tg.
- 15. What is butyl rubber? What are its uses?

		KEEKIHANA A A
18	KKASSPO019	NIMISHA K B
19	KKASSPO020	SEETHAL K S

- 16. Explain step growth polymerization.
- 17. What is PAN? Write its uses.
- 18. What is the significance of poly dispersity index?
- 19. Write down the synthesis and use of poly urethane.
- 20. What is teflon? What are its uses?
- 21. Give the synthesis and uses of PVP.
- 22. Distinguish natural and synthetic polymers.

Section C

Answer at least four questions. Each question carries 7 marks. All questions can be attended. Overall Ceiling 28.

- 23. Explain the preparation, properties and uses of polystyrene and polythene.
- 24. Explain the number average and weight average molecular weights.
- Write a short note on formaldehyde resins.
- 26. Briefly explain photochemical and thermal degradation process.
- 27. Write a short note on polymers in medical field.
- 28. Briefly explain bulk polymerization and solution polymerization.
- Write a note on high temperature and fire resistant polymers.
- 30. Give the preparation and uses of any two synthetic rubbers.

 $(4 \times 7 = 28 \text{ marks})$

Section D

Answer any two questions.

Each question carries 11 marks.

- 31. Explain the classification of polymers based on intermolecular forces, synthesis and structure.
- 32. Briefly explain different methods of polymer processing.
- 33. Explain different types of polymerizations with mechanisms.
- 34. Write down the preparation, properties and uses of any three commercial polymers.

	1	1	0	0
\mathbf{C}	T	T	Z	v

(Pages: 3)

Name	•
Reg. No	

SIXTH SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION, MARCH 2021

Polymer Chemistry

PC 6B 02 (E1)—POLYMER PROCESSING AND TECHNOLOGY

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. Write the composition of latex.
- 2. Why articles having undercuts cannot be injection moulded?
- 3. Name the co-polymer of acrylonitrile and 1, 3 butadiene.
- 4. Expand ASTM.
- 5. What is the range of tensile strength exhibited by elastomers?
- 6. What is ductile rupture?
- 7. Give an example of thermosetting plastic.
- 8. Who invented mercerization of cotton?
- 9. Name one organic pigment used in plastic industry.
- 10. Which is the process used for the manufacture of cellophane sheets?

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer at least **five** questions. Each question carries 4 marks. All questions can be attended. Overall Ceiling 20.

- 11. Write a note on latex preservation.
- 12. How is Ribbed Smoked Sheet prepared?
- 13. How is a glove manufactured by latex dipping?

- 14. What is the difference between internal plasticization and external plasticization?
- 15. Discuss any one classification of fillers used in plastic industry.
- 16. What information is provided by ISO 527-1 tensile testing of plastics?
- 17. Explain mastication.
- 18. What is Creep?
- 19. Discuss the principle of Ostwald's viscometer.
- 20. List the properties of a plasticizer.
- 21. What is thermoforming?
- 22. Explain the role of antioxidants in plastic industry.

Section C

Answer at least four questions.

Each question carries 7 marks.

All questions can be attended.

Overall Ceiling 28.

- 23. Explain the general characteristics of different grades of Technically Specified Rubber.
- 24. With a neat sketch explain compression molding.
- 25. Discuss the general pattern of a stress strain curve for a polymer.
- 26. Explain the theory of sulphur vulcanization.
- 27. Describe calendaring with a diagram.
- 28. Discuss the mechanism of hindered phenols as antioxidants.
- 29. Write a note on melt flow index.
- 30. Explain the importance of carbon black in rubber industry.

 $(4 \times 7 = 28 \text{ marks})$

Section D

Answer any two questions.

Each question carries 11 marks.

- 31. With a neat diagram explain the injection molding of plastics.
- 32. Discuss in detail the ASTM D 638 method of tensile testing of plastics.
- 33. Explain the following terms involved in latex technology:
 - a) Compounding.

b) Dipping.

c) Molding.

d) Casting.

- e) Spreading.
- 34. Discuss with suitable examples the various additives used in plastic industry.

- 10000	${f D}$	4	0	0	6	9
---------	---------	---	---	---	---	---

Name	 •••••	 •••••

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2018

(CUCBCSS-UG)

Polymer Chemistry

PC 6B 02 (E1)—POLYMER PROCESSING AND TECHNOLOGY

Time: Three Hours

Maximum: 80 Marks

Part A

Answer all questions.
Each question carries 1 mark.

- 1. Give the name of a plasticizer.
- 2. Who is the father of polymer science?
- Give an example for a synthetic rubber.
- 4. Give the name of a cellulose derivative.
- 5. What is curing?
- 6. Name a cationic initiator?
- 7. Give an example of a filler.
- 8. Name a polymer industry.
- 9. Give an example for thermoplastic.
- 10. What is used to store rubber latex?

 $(10 \times 1 = 10 \text{ marks})$

Part B

Answer any ten questions. Each question carries 2 marks.

- 11. What is meant by impact strength?
- 12. What is nitrile rubber, give the uses?
- 13. What is meant by melt flow index?
- 14. What are blowing agents?
- 15. What is meant by modulus?
- 16. Write on vulcanisation.
- 17. What is mastication?
- 18. Explain latex spreading.

- 19. What is transfer moulding?
- 20. What is milling?
- 21. How will you prepare rayon?
- 22. What is meant by lamination?

Part C

Answer any **five** questions. Each question carries 6 marks.

- 23. Explain ASTM standard values for tensile strength of three polymers.
- 24. Discuss the use of plasticizers and colorants in rubber processing.
- 25. How will you test elastic properties?
- 26. Write short notes on Scorch cure time and optimum cure time.
- 27. Distinguish between tensile strength, modulus and elongation at break.
- 28. Write short notes on viscometers and plastimeters.
- 29. How will you determine density of polymers?
- 30. What are friction properties?

 $(5 \times 6 = 30 \text{ marks})$

Part D

Answer any **two** questions. Each question carries 10 marks

- 31. Discuss testing of polymers.
- 32. Explain compounding in rubber processing
- 33. Compare and contrast blow moulding, transfer moulding and rotational moulding.
- 34. Write short notes on processing aids.

C 1770	(Pages: 2)	Name
		Reg. No
SIXTE	TH SEMESTER B.Sc. DEGREE EXAMINA	TION, MARCH/APRIL 2016
	(UG—CCSS)	
	Core Course—Chemist	ry
	CH6 B15—INORGANIC CHEM	MSTRY-II
Time : Thr	Three Hours	Maximum: 30 Weightage
	Answer all the <i>twelve</i> questions. Each question carries multiple choice, fill in the blanks and one word answer t	
25. 1	1 What is the ligancy of ethylene diamine ligand	?
	2 Write the EAN of Fe in the complex K ₄ [Fe (CN) ₆].
	3 Tetraminecopper (II) ion is square planar comp to VB theory, the hybrid state of copper should	
	(a) sp^3 ; (b) sp^2 ; (c) dsp^2 ; and (d) sp^2d .	
	4 Hexaflouroferrate (III) ion is an outer orbital c	omplex.The number of unpaired electrons
MADE 2	5 · Which of the following is not an example for or	rganometallic compounds ?
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(a) trimethyl boron. (b) trime	thyl aluminium
	(c) trimethoxy titanium chloride (d) tetrac	earbonyl nickel.
	6 Write an example for π -bonded organo metalli	c compounds.
	7 The porphyrin structure contains a central —	—— membered ring.
	8 TEM image of a part of an aligned nanotube be mixture.	oundle is obtained from the pyrolysis of the
	9 Write the chemical formula of Zeolite.	
	10 Complete the following equation:	
	$4\text{CaO} + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3 \rightarrow$	

What is the other name of ordinary glass?

What is hard glass?

 $(12 \times \frac{1}{4} = 3 \text{ weightage})$

- II. Answer all the nine questions. Each question carries 1 weightage:
 - 13 What is a bridging ligand?
 - 14 Write the IUPAC name of [CoCl(NO2)(en)2]Cl.
 - 15 Write an example of a complex showing d²sp³ hybridization.
 - 16 What is Zeise's salt?
 - 17 Write the photosynthesis reaction.
 - 18 What is the function of haemoglobin and myoglobin?
 - 19 How will you prepare NbS₂ nanotubes?
 - 20 Describe the preparation of gallium nitride nanowire.
 - 21 What is safety glass?

 $(9 \times 1 = 9 \text{ weightage})$

- III. Answer any five questions. Each question carries 2 weightage:
 - 22 Draw the structure of complex [Co(NH3)6]3+ and write the hybridization and geometry.
 - 23 On the basis of VB theory explain the hybridization of [Ni(CO)4].
 - Write a note on the uses of organo mercury compounds in medicine.
 - 25 Describe polynuclear metal carbonyls.
 - 26 Explain the biochemistry of magnesium.
 - 27 Illustrate the application of nanotechnology in nanoswitches.
 - 28 Explain potash fertilizers.

 $(5 \times 2 = 10 \text{ weightage})$

- IV. Answer any two questions. Each question carries 4 weightage:
 - 29 Explain optical isomerism in co-ordination compounds.
 - 30 Illustrate the preparation, properties and structures of different sulphides of phosphorus.
 - 31 Write briefly about carbides and borides.

 $(2 \times 4 = 8 \text{ weightage})$

OFTON
25730

Nan	ıe

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2012

(CCSS)

Chemistry—Core Course

CH 6B 15—Core Course VIII—INORGANIC CHEMISTRY—II

	ree Hou	urs		-	14.57		Maximum:	30 Weighta
				Section	n A			
I. A	nswer a	all questions:						
	1. The r	name of the co	omplex Na ₂ [SiF6] is: .				
7	(a)	Sodium teta	rafluorosilicate ()	IV).				
	(b)	Sodium hex	afluorosilicate (I	V).		A. Carrier		
	(c)	Sodium difl	uorosilicate (VI).					
	(d)	None of the	above.					= 1
. 2	2 Which	h of the follow	ring is an exampl	e for hi	gh spin Octahed	lral com	plex ?	
	(a)	$[Fe(H_2O)_6]^3$		(b)	[Fe(CN) ₆] ⁴⁻ .			
	(c)	[Co(NH ₃) ₆] ³	t -p ³ 2	(d)	[Fe(CN) ₆] ⁴			
3	Cs+CI	H is an examp	le for :	iet, i				
	(a)	Ionic compo	ınd.	(b)	Ionic organo m	etallic co	ompound.	
·	(c)	Transition c	ompound.	(d)	Ylides.	*. *		
4	The gl	lass used in a	utomobiles and a	eroplan	nes is:			
	(a)	Safety glass.		(b)	Ground glass.			
	. (c)	Crooke's glas	ss.	(d)	Crown glass.			
5	Si is a	n	atrient in biologi	cal syst	em.			
6	The foo	otball shaped	cage like structu	res of c	arbon atoms are	called -		
7	Phosph	nazenes are cy	clic or chain poly	mers v	which contain —	-	repeating un	its.
8	A fertil	lizer which co	ntains more than	one of	the major nutri	ents is c	alled a —	
9	Name t	the complex [(Co(NH ₃) ₅ CO ₃]Cl.					
10:	What is	s the Hybridiz	ation in [Ni(CO)] ?				
	3 4 5 6 7 8 9	1 The (a) (b) (c) (d) 2 Whic (a) (c) 3 Cs+Cl (a) (c) 4 The g. (a) (c) 5 Si is a 6 The fo 7 Phospl 8 A ferti 9 Name	1 The name of the co (a) Sodium tetr (b) Sodium hex (c) Sodium diff (d) None of the 2 Which of the follow (a) [Fe(H ₂ O) ₆] ³ (c) [Co(NH ₃) ₆] ³ 3 Cs+CH is an examp (a) Ionic composite (c) Transition co 4 The glass used in an (a) Safety glass. (b) Crooke's glass 5 Si is a	1. Answer all questions: 1. The name of the complex Na ₂ [SiF6 (a) Sodium tetrafluorosilicate (I (b) Sodium hexafluorosilicate (II (c) Sodium difluorosilicate (VI). (d) None of the above. 2. Which of the following is an example (a) [Fe(H ₂ O) ₆] ³⁺ . (c) [Co(NH ₃) ₆] ³⁺ . 3. Cs ⁺ CH is an example for: (a) Ionic compound. (c) Transition compound. 4. The glass used in automobiles and a (a) Safety glass. (b) Crooke's glass. 5. Si is a nutrient in biologicate of the football shaped cage like structurum of the properties of the propertie	1. Answer all questions: 1. The name of the complex Na ₂ [SiF6] is: (a) Sodium tetrafluorosilicate (IV). (b) Sodium hexafluorosilicate (IV). (c) Sodium difluorosilicate (VI). (d) None of the above. 2. Which of the following is an example for him (a) [Fe(H ₂ O) ₆] ³⁺ . (b) (c) [Co(NH ₃) ₆] ³⁺ . (d) 3. Cs+CH is an example for: (a) Ionic compound. (b) (c) Transition compound. (d) 4. The glass used in automobiles and aeroplant (a) Safety glass. (b) (c) Crooke's glass. (d) 5. Si is a —————————————————————————————————	1 The name of the complex Na ₂ [SiF6] is: (a) Sodium tetrafluorosilicate (IV). (b) Sodium hexafluorosilicate (IV). (c) Sodium difluorosilicate (VI). (d) None of the above. 2 Which of the following is an example for high spin Octahed (a) [Fe(H ₂ O) ₆] ³⁺ . (b) [Fe(CN) ₆] ⁴⁻ . (c) [Co(NH ₃) ₆] ³⁺ . (d) [Fe(CN) ₆] ⁴⁻ . 3 Cs ⁺ CH is an example for: (a) Ionic compound. (b) Ionic organo m (c) Transition compound. (d) Ylides. 4 The glass used in automobiles and aeroplanes is: (a) Safety glass. (b) Ground glass. (c) Crooke's glass. (d) Crown glass. 5 Si is a —————————————————————————————————	1. Answer all questions: 1. The name of the complex Na ₂ [SiF6] is: (a) Sodium tetrafluorosilicate (IV). (b) Sodium hexafluorosilicate (IV). (c) Sodium difluorosilicate (VI). (d) None of the above. 2. Which of the following is an example for high spin Octahedral compound. (a) [Fe(H ₂ O) ₆] ³⁺ . (b) [Fe(CN) ₆] ⁴⁻ . (c) [Co(NH ₃) ₆] ³⁺ . (d) [Fe(CN) ₆] ⁴⁻ . 3. Cs ⁺ CH is an example for: (a) Ionic compound. (b) Ionic organo metallic compound. (c) Transition compound. (d) Ylides. 4. The glass used in automobiles and aeroplanes is: (a) Safety glass. (b) Ground glass. (c) Crooke's glass. (d) Crown glass. 5. Si is a —————————————————————————————————	I. Answer all questions: 1. The name of the complex Na ₂ [SiF6] is: (a) Sodium tetrafluorosilicate (IV). (b) Sodium hexafluorosilicate (IV). (c) Sodium difluorosilicate (VI). (d) None of the above. 2. Which of the following is an example for high spin Octahedral complex? (a) [Fe(H ₂ O) ₆] ³⁺ . (b) [Fe(CN) ₆] ⁴⁻ . (c) [Co(NH ₃) ₆] ³⁺ . (d) [Fe(CN) ₆] ⁴⁻ . 3. Cs ⁺ CH is an example for: (a) Ionic compound. (b) Ionic organo metallic compound. (c) Transition compound. (d) Ylides. 4. The glass used in automobiles and aeroplanes is: (a) Safety glass. (b) Ground glass. (c) Crooke's glass. (d) Crown glass. 5. Si is a —————————————————————————————————

- 11 Give one application of Zeigler-Natta catalyst.
- 12 Name one biologically important cobalt containing compound.

 $(12 \times \frac{1}{4} = 3 \text{ weightage})$

Section B

- II. Short Answer type questions. Answer all nine questions:
 - 13 What is a Chelate?
 - 14 Why does NH₃ readily form complexes while NH₄+ does not?
 - Write down the structure of Co₂(CO)₈.
 - 16 What is meant by Bohr's effect?
 - 17 Name any two scanning probe instruments.
 - 18 Give any two examples for orthosilicates.
 - 19 What are ceramics? Give one use.
 - 20 What is Carborandum? What is its use?
 - 21 Give equation for Vilsmeir reaction.

 $(9 \times 1 = 9 \text{ weightage})$

Section C

- III. Short paragraph questions. Answer any five questions:
 - 22 Give the postulates of Werner's co-ordination theory.
 - 23 How is CFT useful in explaining the colour of transition metal complex?
 - 24 Explain the application of Wilkinson catalyst.
 - 25 Give short note on the biochemistry of Mg.
 - 26 Briefly explain the application of nanotechnology in biology.
 - 27 Write short note on zeolites.
 - 28 Explain the role of selenium in xerography.

 $(5 \times 2 = 10 \text{ weightage})$

Section D

- IV. Essay questions. Answer any two questions:
 - 29 Describe method for the manufacture of glass. What is annealing?
 - 30 Explain qualitatively the bonding in ferrocenes. What are its properties?
 - 31 Explain the different kinds of structural isomerism possible in complexes.

 $(2 \times 4 = 8 \text{ weightage})$

~	C	nn	63
U	O	υU	OO

Name	P
1441114	D

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2019

(CUCBCSS)

B.Sc. Chemistry

CHE 6B 09-INORGANIC CHEMISTRY-IV

Time: Three Hours

Maximum: 80 Marks

Part A

Answer all in one word/sentence.

- 1. Mention any three uses of Gunmetal.
- 2. What is Zeise's salt?
- 3. What is 18 electron rule?
- 4. Draw the structure of Cis-Platin.
- 5. Draw the structure of Haemoglobin.
- 6. What are the valuable numerals present in Neendakara beach sands.
- 7. What is the difference between calcination and roasting?
- 8. Mention any two uses of K₂Cr₂O₇.
- 9. Give the composition of Bronze and Brass.
- Define Legand.

 $(10 \times 1 = 10 \text{ marks})$

Part B

Questions 11—22. Answer any ten. Each question carries 2 marks.

- 11. What are the factors affecting stability of complexes?
- 12. Discuss briefly uses of alloy steels.
- 13. What is Hydrometallurgy?
- 14. Write short note on spectrochemical series.
- 15. Explain the anti-tumour drug activity of cis-platin.

- 16. Compare the oxygen binding capacities of haemoglobin and myoglobin.
- 17. Write short note on Ziegler-Natta catalyst.
- 18. Discuss bonding in Ferrocene.
- 19. Briefly outline the role of chlorophyll in photo synthesis.
- 20. Write short note on zone refining.
- 21. Write the IUPAC name of K2[Pt (IV) C16].
- 22. Write the structure of the complex Dibromo-tetra amine platinum (IV) bromide.

Part C

Questions 23—30. Answer any five. Each question carries 6 marks.

- 23. Write short note on Ellingham diagram.
- 24. Discuss sodium-potassium pump.
- 25. What are the merits and demerits of crystal field theory?
- 26. Discuss the applications of complexes in qualitative and quantitative analysis.
- 27. Write short note on EAN rule.
- 28. Write short note on Lanthanide contraction.
- 29. Discuss the preparation and properties of KMnO₄.
- 30. What are the limitations of VBT of co-ordination compounds?

 $(5 \times 6 = 30 \text{ marks})$

Part D

Questions 31—34. Answer any two. Each question carries 10 marks.

- 31. Discuss the Extraction of Titanium and Aluminium from their ores.
- 32. Briefly discuss the general characteristics of transition metals.
- 33. Discuss Stereo Isomerism in co-ordination compounds.
- 34. (a) Write short note on types of ligands.
 - (b) What are the factors which affecting crystal field splitting.

C	60	0	64
\mathbf{c}	UU	U	OH

Name			•••••	•••••	••••		•••
Name	······	••••••	•••••	•••••	••••	•••	•••

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2019

(CUCBCSS)

B.Sc. Chemistry

CHE 6B 10-ORGANIC CHEMISTRY-III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Each question carries 1 mark.

- 1. Mention any two uses of wax.
- 2. Give the structures of Vitamin A and C.
- 3. Give the structure of riboflavin. What is it commonly called?
- 4. What is Vulcanization?
- 5. What are nucleosides and nucleotides?
- 6. Name a steroid hormone.
- 7. What are the different types of RNA?
- 8. Sketch the NMR spectrum of ethyl alcohol.
- 9. What is Tollen's reagent?
- 10. What is meant by Isoelectric point?

 $(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions. Each question carries 2 marks.

- 11. Discuss the Biological functions of lipids.
- 12. Write short note on saponification number and Iodine number?
- 13. What is meant by inversion of cane sugar?
- 14. Write short note on mutarotation.
- 15. Give the structure of Methandrostenolone.
- Write short note on Phospholipids.

- 17. What is DNA finger printing?
- 18. What are Hormones? Why are they called chemical messengers?
- 19. Discuss briefly Diel's Alder reaction.
- 20. Write short note on chemical shift.
- 21. What are the uses of Sandalwood oil?
- 22. Give the structure of quinine and nicotine?

Section C

Answer any **five** questions. Each question carries 6 marks.

- 23. Explain sigmatropic rearrangement with examples.
- 24. Write short note on types of pericyclic reactions.
- 25. Differentiate between RNA and DNA.
- 26. Discuss briefly HDL and LDL.
- 27. Write short note on classification of amino acids.
- 28. Write short note on Kiliani-Fischer synthesis.
- 29. Discuss briefly the tests for urine sugar and blood sugar.
- 30. Write short note on epimers and anomers.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any two questions. Each question carries 10 marks.

- 31. Explain primary, secondary and tertiary structure of proteins. What is meant by denaturation of proteins?
- 32. Discuss briefly reducing and non-reducing sugars. Also discuss applications of carbohydrates.
- 33. Discuss few colour tests for proteins.
- 34. Write short note on natural rubber and advantages of vulvanization of rubber.

\mathbf{C}	60	0	65
•	U		JU

(Pages: 3)

Nar	ae	•
Dog	No	

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2019

(CUCBCSS)

Chemistry

CHE 6B 11—PHYSICAL CHEMISTRY - III

Time: Three Hours

Maximum: 80 Marks

Section A

Answer all questions.

Answer in one word or sentence.

1.	pH is defined as ———.
2.	Two examples of buffer solutions are ———.
3.	Example of a sparingly soluble salt is ———.
4.	Calculate the cell constant of M/10 solution of KCl at 291 K whose specific conductance is 0.0112 S cm ⁻¹ and resistance when contained in conductivity cell is 55 Ohms.
5.	Example of a salt of weak acid and weak base is ————.
6.	Example of a galvanic cell is ———.
7.	The distance ratio d_{100} : d_{110} : d_{111} planes in case of simple cubic lattice is ————.
8.	An example each of (a) tetragonal; and (b) triclinic systems are ————.
9.	A crystal planes makes intercepts $\frac{1}{2}a$, $\frac{1}{2}b$ and $\frac{3}{2}c$. What are the miller indices of the plane?
١٥.	The hydronium concentration of a solution having pH = 4.6990 is ————.
	$(10 \times 1 = 10 \text{ marks})$

Section B

Answer any ten questions. Each carries 2 marks.

- 11. Sketch the Calomel electrode and give the electrode reaction.
- 12. The solubility product of AgCl at 298 K is 1.7×10^{-10} mol² dm⁻⁶. Calculate the solubility of AgCl.
- 13. What is meant by specific conductance? How does it vary with dilution?
- 14. Derive Henderson equation for Basic Buffer.
- 15. Discuss briefly Hydrogen-Oxygen fuel cell.

- 16. Write S.N. on concentration cell without transference.
- 17. Discuss briefly Schottky defect.
- 18. Name one example each of acidic and basic buffer.
- 19. What is meant by ionic product of water? What is its value at 303 K?
- 20. Explain the term Wien effect.
- 21. Calculate the degree of hydrolysis of 0.05 M Potassium acetate in a 0.05 M ageous solution of it at 298 K (K_a of acetic acid = 1.8×10^{-5} K, $v = 1 \times 10^{-14}$).
- 22. Calculate the e.m.f. at 25°C of the cell $\operatorname{Zn}(s) \left| \operatorname{Zn^{+2}} \left(0.1 \, \mathrm{M} \right) \right| \left| \operatorname{Ag^+} \left(0.1 \, \mathrm{M} \right) \right| \operatorname{Ag}(s)$.

Given : $E^{0}Zn^{+2}$ | Zn = -0.76V; $E^{0}Ag^{+}$ | Ag = 0.80V.

 $(10 \times 2 = 20 \text{ marks})$

Section C

Answer any **five** questions. Each carries 6 marks.

- 23. Define molal depression constant. Calculate the freezing point of a solution prepared by dissolving 3.42 g of Sucrose, (molar mass = 342) in 50 g of water ($K_f = 1.86 \text{ K Kg mol}^{-1}$).
- 24. Explain the utility of the values of standard electrode potentials.
- 25. Write S.N. on Bravis lattices.
- 26. Discuss briefly intrinsic and extrinsic semi conductors with an example each.
- 27. How are liquid crystals classified?
- 28. State and explain Faraday's laws.
- 29. Discuss briefly Electrochemical theory of corrosion of metals.
- 30. State and explain Kohlrausch's law and explain one of its applications.

 $(5 \times 6 = 30 \text{ marks})$

Section D

Answer any two questions. Each carries 10 marks.

- 31. (a) Define solubility product. How is solubility and solubility product of a sparingly soluble salt determined?
 - (b) Write S.N. as liquid junction potential.

- 32. (a) State Henry's law. What are its applications?
 - (b) Discuss briefly conductometric titration of a weak acid against strong base and strong acid against weak base. What are the advantages of conductometric titrations?
- 33. (a) State and explain law of rational indices. Explain miller indices of a plane and how are miller indices obtained.
 - (b) Write S.W. on powder diffraction method.
- 34. (a) Write S.N. on Calomel electrode and quinhydrone electrode.
 - (b) Explain Debye-Hückel Onsager equation for strong electrolytes.

-			1 14		
C	0	100		TO A	-
	9		34	36	A
		图 등		A .	-
	Accord	- 10			

N	Jam	le	 	 	

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2017

(CUCBCSS-UG)

Polymer Chemistry

PC 6B 01—POLYMER CHEMISTRY—I

Time: Three Hours

Maximum: 80 Marks

Part A

Answer all questions.

Each carries 1 mark.

- 1. What is gel point?
- 2. Who invented PF?
- 3. Give an example for copolymer.
- 4. Give structure of Polybutadiene.
- 5. What is nylon 6?
- 6. Give an example for a synthetic rubber?
- 7. What is neoprene?
- 8. Name a plasticizer.
- 9. Suggest a method to determine weight average molecular weight.
- 10. What is number average molecular weight?

 $(10 \times 1 = 10 \text{ marks})$

Part B

Answer any ten questions.

Each carries 2 marks.

- 11. What is ring opening polymerisation?
- 12. What is nitrile rubber, give the uses.
- 13. Give Mark-Houwink equation.
- 14. What are heat resistant polymers?
- 15. Distinguish between Tg and Tm?
- 16. Write on natural polymers.
- 17. What is tacticity?

- 18. Explain ring opening polymerisation.
- 19. Distinguish between thermoplastics and thermosettings.
- 20. What is emulsion polymerisation?
- 21. What is meant by crosslinking?
- 22. Give the synthetic applications of phenolic resins.

Part C

Answer any five questions. Each carries 6 marks.

- 23. Explain compression moulding with diagram.
- 24. Discuss effect of co-polymerization on mechanical properties.
- 25. How will you distinguish between plastics, fibres and elastomers?
- 26. Differentiate between tear, wear and abrasion resistance.
- 27. Distinguish between inhibitor and retarder.
- 28. What is kinetic chain length?
- 29. Give expression for free energy of polymerization.
- 30. Write a short note on anionic polymerization.

 $(5 \times 6 = 30 \text{ marks})$

Part D

Answer any two questions. Each carries 10 marks.

- 31. Discuss kinetics of vinyl radical polymerisation.
- 32. Explain different polymerisation techniques.
- 33. Give the preparation, properties and uses of PP.
- 34. What are sedimentation and viscosity average molecular weights?

	60	$\mathbf{\Omega}$	5
U	Oυ	UI	IJ

Name

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2019

(CUCBCSS)

Polymer Chemistry

PC 6B 01—POLYMER CHEMISTRY—I

Time: Three Hours

Maximum: 80 Marks

Part A

Answer all questions.

Each question carries 1 mark.

- 1. Give the structure of PVC.
- 2. Name one plasticizer for PVC.
- 3. What is natural rubber.
- 4. Give structure of PS.
- 5. What is photodegradation?
- 6. What is Kevlar?
- 7. What is ABS resin, give its properties.
- 8. What are the monomers of an epoxy resin?
- 9. What is gelation?
- 10. What is nylon 6, 6?

 $(10 \times 1 = 10 \text{ marks})$

Part B

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

- 11. What is BUNA?
- 12. Give the applications of carbon fibres.
- 13. How are silicones prepared?
- 14. What is meant by compounding?
- 15. What are fillers, give examples?
- 16. Write note on inorganic polymers.

- 17. What are high temperature polymers?
- 18. What is fatigue?
- 19. Distinguish between thermoplastics and thermosettings.
- 20. What are engineering plastics.
- 21. What is meant by recycling of plastics?
- 22. Which polymer is used in making bullet proofs? Why?

Part C

Answer any **five** questions. Each question carries 6 marks.

- 23. Explain blow moulding with diagram.
- 24. Discuss effect of co-polymerization on mechanical properties
- 25. How will you distinguish between plastics, fibres and elastomers?
- 26. Differentiate between tear, wear and abrasion resistance.
- 27. Write short note on emulsion polymerization.
- 28. Discuss cryoscopic method for molecular weight determination.
- 29. How will you use TGA to study polymer degradation.
- 30. Give the important uses of polymers in medical field.

 $(5 \times 6 = 30 \text{ marks})$

Part D

Answer any **two** questions. Each question carries 10 marks.

- 31. Explain GPC technique in polymer characterization.
- 32. Explain light scattering.
- 33. Give the preparation, properties and uses of Phenolic resins
- 34. Derive expression for kinetics of stepwise polymerisation.

C 21100

(Pages: 2)

Name	**************	

Reg. No.....

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH 2017

(CUCBCSS-UG)

Polymer Chemistry

PC 6B 02 (E1)—POLYMER PROCESSING AND TECHNOLOGY

Time: Three Hours

Maximum: 80 Marks

Part A

Answer all questions.

Each carries 1 mark.

- 1. What is natural rubber.
- 2. Who invented nylon?
- 3. Give an example for natural polymer.
- 4. Give structure of Polybutadiene
- 5. What is a polyamide.
- 6. Which is the first synthetic polymer?
- 7. What is meant by liquid resin.
- 8. Name two biodegradable polymers.
- 9. Give one example for thermosetting polymer.
- 10. What is crosslinking?

 $(10 \times 1 = 10 \text{ marks})$

Part B

Answer any ten questions. Each carries 2 marks.

- 11. What is meant by creep?
- 12. What is nitrile rubber, give the uses.
- 13. What is meant by melt flow index?
- 14. What are heat resistant polymers?
- 15. Distinguish between Tg and Tm?
- 16. Write on tensile strength.
- 17. What is mastication?
- 18. Explain fatigue.

- 19. Distinguish between thermoplastics and thermosettings.
- 20. What is milling?.
- 21. How will you prepare ribbed smoked sheets?
- 22. What is meant by latex compounding?

Part C

Answer any five questions. Each carries 6 marks.

- 23. Explain blow moulding with diagram.
- 24. Discuss effect of co-polymerization on mechanical properties.
- 25. How will you test elastic properties?
- 26. Differentiate between tear, wear and abrasion resistance.
- 27. Distinguish between tensile strength, modulus and elongation at break.
- 28. Write short notes on antioxidants and accelerators.
- 29. Explain thermoforming.
- 30. Explain calendering with diagram.

 $(5 \times 6 = 30 \text{ marks})$

Part D

Answer any two questions. Each carries 10 marks.

- 31. Discuss rubber processing.
- 32. Explain how tensile properties are measured for thermoplastics and thermosets.
- 33. Compare and contrast compression moulding, injection moulding and transfer moulding.
- 34. Write short notes on cellulose derivatives.