

1B1N25156

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Reg. No:.....

Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree Examination, November 2025

CHE1CJ101 – Inorganic Chemistry - 1

(FYUGP 2024 Admission onwards)

Time: 2 hours

Max. Marks : 70

PART – A

All questions can be attended.
Each question carries Three mark.
Ceiling -24 Marks

		COs	Knowledge Level(KL)	Marks
1	Write down the expressions for standard deviation of sample and population. Explain the term.	CO1	C	3
2	Explain Q test.	CO1	C	3
3	Which is larger Cl or Cl^{2-} . Justify your answer.	CO2	P	3
4	Which has higher ionization energy : Mg or Al ? Why?	CO2	P	3
5	Discuss the shape of nitrate ion on the basis of hybridization.	CO2	P	3
6	Why do nanoparticles have different colour from that of the corresponding bulk form of the metal?	CO3	C	3
7	Briefly write on the structural aspects of fullerenes	CO3	C	3
8	Explain the term MSDS. Mention its importance	CO4	M	3
9	How does N-phenyl anthranilic acid function as an indicator in the titration of ferrous ion against dichromate?	CO4	M	3
10	Calculate the number of molecules in 6g of CO.	CO4	M	3

PART – B

All questions can be attended.
Each question carries six marks.

Ceiling -36 Marks

		COs	Knowledge Level(KL)	Marks
11	Explain the difference between accuracy and precision in analytical chemistry. Provide examples to illustrate each concept.	CO1	C	6
12	Explain Fajan's rules. How do they help to predict covalent character in an ionic bond? Illustrate with suitable examples.	CO2	P	6
13	Define dipole moment. Discuss its applications.	CO2	P	6
14	Molecular nitrogen is diamagnetic while molecular oxygen is paramagnetic. Explain this on the basis of MOT	CO2	P	6
15	Differentiate between constant and proportional errors.	CO1	C	6
16	Discuss the catalytic properties of nanomaterials.	CO3	C	6
17	Discuss the use of sol-gel synthesis in the preparation of metal oxide nanoparticles.	CO3	C	6
18	List out the advantages of double burette method over the single burette method in titrimetry.	CO4	M	6

PART - C

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

		COs	Knowledge Level(KL)	Marks
19	Explain Born-Haber cycle with an example.	CO2	P	10
20	Write a note on metal ion indicators. Explain the action of metal ion indicators with suitable examples.	CO4	M	10

1X10=10 Marks

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree Examination, November 2025

CHE1MN101 – Basic Inorganic and Nano Chemistry

(FYUGP 2024 Admission onwards)

Time: 2 hours

Max. Marks : 70

Course Outcome Mapping Scheme

1	2	3	4	5	6	7	8	9	10
CO 2	CO 1	CO 2	CO 3	CO 3	CO 4	CO 4	CO 4	CO 5	CO 5
11	12	13	14	15	16	17	18	19	20
CO 2	CO 2	CO 3	CO 4	CO 5	CO 4	CO 4	CO 5	CO 1	CO 4

PART-A

All questions can be attended.
Each question carries Three mark.
Ceiling -24 Marks

1. Give the shapes of the following molecules
(i) XeF_2 (i) PCl_5 (iii) SF_6
2. Write Schrodinger wave equation and mention the terms in it.
3. Differentiate coordinate bond and covalent bond.
4. Explain why nitrogen has higher ionization energy than oxygen.
5. State modern periodic law. List out the different blocks which constitute the periodic table.
6. Is methyl orange a suitable indicator for weak acid strong base titration? Justify your answer.
7. What mass of sodium hydroxide will be present in 250 mL of its 0.5 N solution?
8. Give the advantages of microanalysis.
9. What is fullerene ? How does its structure differ from that of graphene?
10. Explain the chemical vapour deposition technique for the synthesis of nanomaterials.

PART- B

**All questions can be attended.
Each question carries six marks.
Ceiling -36 Marks**

11. Draw MO diagram of C_2 molecule and explain the bond order and magnetic behavior.
12. Discuss valence bond theory with suitable examples
13. Define ionization energy. Explain the factors that govern the ionization energy of an element?
14. One litre of Mohr's salt solution was prepared by dissolving 400 g of it in water. 100 mL of this solution was pipetted and diluted to get a final volume of 250 mL. Calculate the normality of the new solution.
15. Differentiate the top-down and bottom-up approaches in nanomaterial synthesis. List out the advantages and disadvantages of each.
16. Explain the double burette method of titration. Give the advantages of this method.
17. Write a short note on redox titrations.
18. What are carbon nanotubes? Explain the structural difference between single walled and multiwalled carbon nanotubes

PART - C

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

19. Define quantum numbers. Write a note on different types of quantum numbers, their values and significance.
20. Describe the principles involved in the separation of cations during qualitative analysis.

1 x 10 = 10 Marks

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree Examination, November 2025

CHE1MN102 – Basic Inorganic and Bio Inorganic Chemistry

(FYUGP 2024 Admission onwards)

Time: 2 hours

Max. Marks : 70

PART – A

All questions can be attended.
Each question carries **Three** mark.
Ceiling -24 Marks

		COs	Knowledge Level(KL)	Marks
1	Cu(I) is diamagnetic whereas Cu (II) is paramagnetic. Why?	CO1	4	3
2	What is a redox indicator? Give two examples.	CO4	1	3
3	Name one anticancer drug and draw its structure.	CO5	2	3
4	Distinguish between the terms orbit and orbital.	CO2	2	3
5	Explain the toxicity caused by mercury.	CO5	5	3
6	Give the structural formula of EDTA. What is its important use?	CO4	2	3
7	Explain the variation of ionic radius down a group. Justify the answer.	CO3	4	3
8	What is a heme protein? Name two.	CO5	1	3
9	Distinguish between acidimetry and alkalimetry.	CO4	2	3
10	State and explain the <i>Hund's rule of maximum multiplicity</i> .	CO1	2	3

PART – B

All questions can be attended.
Each question carries six marks.

Ceiling -36 Marks

		COs	Knowledge Level (KL)	Marks
11	Write on the role of Zinc in living beings.	CO5	4	6
12	What is a primary standard in volumetry? What are the characteristics that a primary standard should possess?	CO4	2	6
13	State the <i>Heisenberg uncertainty principle</i> and discuss its significance.	CO1	2	6
14	Discuss the factors that influence the electron affinity of elements.	CO3	4	6
15	Explain the biochemical functions of haemoglobin and myoglobin.	CO5	4	6
16	180 g of oxalic acid is dissolved in water to prepare 2L of stock solution. 30 ml of the above solution is transferred into a 500 ml standard flask, diluted with water, and made up to the mark. Calculate the normality of the new solution obtained.	CO4	3	6
17	Explain Common ion effect is applied in qualitative inorganic analysis.	CO4	3	6
18	Predict the shapes of the following molecules on the basis of the VSEPR theory (i) BeCl_2 (ii) BF_3	CO2	3	6

PART - C

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

		COs	Knowledge Level(KL)	Marks
19	a) Explain the merits and demerits of the Bohr atom model. b) How is the hydrogen spectrum explained on the basis of Bohr's theory?	CO1	2	10
20	Discuss the salient features of the long form of periodic table.	CO3	2	10

1 x 10 = 10 Marks

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Reg. No:.....

Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree Examination, November 2025

CHE1MN103 – Basic Inorganic and Green Chemistry

(FYUGP 2024 Admission onwards)

Time: 2 hours

Max. Marks : 70

PART – A

All questions can be attended.
Each question carries Three marks.

Ceiling -24 Marks

		COs	Knowledge Level(KL)	Marks
1	State Heisenberg's Uncertainty Principle	CO1	Understand	3
2	A baseball of mass 0.15 kg is thrown at a speed of 40 m/s. Calculate its de Broglie wavelength.	CO1	Application	3
3	Define ionization enthalpy. How does it vary across a period?	CO3	Analyze	3
4	Define the inert pair effect with an example.	CO3	Understand	3
5	Compare Mendeleev's and Modern periodic laws.	CO3	Remember	3
6	Differentiate between accuracy and precision of a measurement.	CO4	Create	3
7	Calculate the number of hydrogen atoms present in 10 grams of glucose (C ₆ H ₁₂ O ₆). Molecular mass of glucose is 180 g/mol.	CO4	Application	3
8	Define green chemistry. Why is it important in today's context?	CO5	Understand	3
9	Give any two examples in which modern techniques help in minimizing toxic chemical waste.	CO5	Application	3
10	Explain the use of microwave energy in green synthesis	CO5	Analyze	3

PART – B

All questions can be attended.
Each question carries six marks.
Ceiling -36 Marks

		Cos	Knowledge Level(KL)	Marks
11	Use VSEPR theory to predict the molecular geometry of CH ₄ , NH ₃ , and H ₂ O.	CO2	Evaluate	6
12	Apply Molecular Orbital Theory to predict bond order in O ₂ and CO. Comment on their magnetic behavior.	CO2	Understand	6
13	Explain different quantum numbers with their significance.	CO1	Remember	6
14	What are complexometric titrations? Describe the principle and indicators used.	CO4	Understand	6
15	Describe the common ion effect and the solubility product. Give one application of each.	CO4	Analyze	6
16	Determine the mole fractions of urea and water in a solution prepared by dissolving 9 g of urea (Molar mass = 60 g/mol) in 90 g of water.	CO4	Application	6
17	List out and explain any six principles of green chemistry with suitable examples.	CO5	Remember	6
18	Explain unnecessary derivatization. Why is it avoided in green chemistry?	CO5	Create	6

PART - C

Answer any *one* question.
Each question carries **Ten** marks.

		Cos	Knowledge Level(KL)	Marks
19	Explain the Bohr model of the atom and discuss its merits and demerits.	CO1	Understand And Analyze	10
20	A) Explain the principle behind the separation of cations in qualitative analysis. B) Explain the theory and principles of acid-base titration.	CO4	Evaluate Understand	10

1 x 10 = 10 Marks

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Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree Examination, November 2025

CHE1FM105 – Environmental Chemistry

(FYUGP 2024 Admission onwards)

Time: 1 ½ hours

Max. Marks : 50

PART – A

All questions can be attended.
Each question carries Two mark.
Ceiling -16 Marks

No	Question	COs	Knowledge Level(KL)	Marks
1	List any two human activities that disturb the balance of the biosphere.	CO1	Understand	2
2	Differentiate between biotic and abiotic components of the environment.	CO1	Understand	2
3	Discuss how do wetlands act as natural sinks for pollutants?	CO2	Understand	2
4	Write any two harmful effects of hydrocarbons present in the atmosphere.	CO3	Remember	2
5	Explain Eutrophication.	CO3	Remember	2
6	Define biomagnification with one example.	CO4	Remember	2
7	Give four examples of biodegradable wastes.	CO3	Remember	2
8	Give two harmful effects of thermal pollution on aquatic life.	CO3	Understand	2
9	What is open dumping? Mention two disadvantages.	CO5	Understand	2
10	Write two examples of reuse of waste materials.	CO5	Understand	2

PART – B
All questions can be attended.
Each question carries six
marks.
Ceiling -24 Marks

		COs	Knowledge Level(KL)	Marks
11	Explain the composition of air, water, and soil, and discuss their interdependence in maintaining ecological balance.	CO1	Understand	6
12	Describe the process of global warming and mention its consequences on the environment.	CO3	Understand	6
13	Classify pollutants based on their persistence and geographical impact: global, regional and local.	CO2 , CO3	Understand	6
14	Explain physical, chemical, and biological agents causing water pollution.	CO5	Understand	6
15	Discuss the harmful effects of radioactive pollution.	CO4	Understand	6

PART - C
Answer any *one* questions.
Each question carries Ten marks.

		COs	Knowledge Level(KL)	Marks
16	a) Explain the water pollution caused by agricultural discharge. b) Discuss different water quality parameters represented by DO, BOD and COD	CO3	Understand	10
17	Discuss the following a) Acid rain b) Greenhouse effect c) Global warming	CO3	Understand	10

[1 x 10 = 10 Marks]