

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Chemistry Degree Examination, November 2024

CHE1CJ101 – Inorganic Chemistry – I

(FYUGP 2024 Admission)

Time: 2 hours

Max. Marks : 70

Course Outcome Mapping Scheme

1	2	3	4	5	6	7	8	9	10
CO1	CO1	CO2	CO2	CO2	CO3	CO3	CO4	CO4	CO4
11	12	13	14	15	16	17	18	19	20
CO1	CO1	CO2	CO2	CO3	CO3	CO4	CO4	CO2	CO4

PART – A

All questions can be attended.

Each question carries Three mark.

Ceiling -24 Marks

1. Distinguish between the terms systematic errors and random errors
2. Write the number of significant digits in each of the following reported values:
(i) 0.0847mL; (ii) 3.0000 g ; (iii) 3.0003 J
3. Arrange the following atoms in the increasing order of electron affinity: N,O, F, Cl.
4. Identify the larger one among : Mg & Mg^{2+} . Justify your answer.
5. Explain the shape and hybridization of XeF_4 molecules.
6. Discuss the classification of nanomaterials based on dimensionality with suitable example.
7. Explain graphene. Give any two methods of preparation.
8. Give the suitable indicator that can be used for each of the following titrations
i) Weak base vs strong acid;
ii) Strong base vs weak acid;
iii) Strong base vs strong acid.
9. Calculate the molality of a solution containing 0.3 mole of the solute in 2 Kg of the solvent?
10. Explain the term MSDS. Mention its importance.

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

11. Calculate the (i) mean, (ii) standard deviation and (iii) variance in respect of the following measurements for the concentration of lead in ppm found in replicate analysis of a sample of blood

2.751	2.752	2.752	2.756	2.760
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12. Write a paragraph on the involvement of chemistry in daily life.
13. Draw MO diagram of B_2 and C_2 molecules.
14. Discuss the factors influencing the electronegativity of elements.
15. Write a note on various top-down methods adopted in nanomaterials preparation.
16. Discuss briefly on electronic application of nanomaterials
17. Write a note on metal ion indicators? Explain their function with a suitable example.
18. Calculate the mass of CO having the same number of O atoms as in 88g of CO_2 .

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

19. (a) Discuss Born- Haber cycle with respect to NaCl.
(b) State and explain Fajans rules.
20. (a) Discuss the safe laboratory practices.
(b) Explain the simple first-aid procedures that have to be administered to victims if they suffer burns from heat, acids, alkalis, phenol and bromine.

1 x 10 = 10 Marks

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree (Honours) Examination, November 2024

CHE1FM105 – Environmental Chemistry

(FYUGP 2024 Admission)

Time: 1.5 hours

Max. Marks : 50

Course Outcome Mapping Scheme

1	2	3	4	5	6	7	8	9	10
CO1	CO2	CO2	CO4	CO3	CO5	CO4	CO4	CO3	CO6
11	12	13	14	15	16	17			
CO2	CO4	CO2	CO2	CO5	CO2	CO2			

PART – A

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

1. Name the four segments of the environment.
2. Explain cooling pond method.
3. Define greenhouse effect. Name two greenhouse gases
4. Identify the phenomenon global warming. What is it due to?
5. Define CFCs. How do CFCs cause ozone depletion?
6. Discuss the term alternative refrigerants. Name two alternative refrigerants which have very low GWP and ODP.
7. Write a note on the pesticide pollution of water.
8. Mention the adverse effects of acid rain.
9. Discuss the dire consequences of the stratospheric ozone depletion.
10. Discuss the cause and consequences of the Bhopal gas tragedy.

PART – B

**All questions can be attended.
Each question carries six marks.
Ceiling -24 Marks**

11. Differentiate photochemical smog and London smog.
12. Explain the cause and consequences of Minamata disease.
13. Define thermal pollution. Explain the most important sources of thermal pollution.
14. Write a note on eutrophication and its adverse effects on the environment.
15. Explain the method of landfilling in solid waste management?

PART - C

**Answer *anyone* question.
Each question carries 10 marks.**

16. (a) Discuss the pollution of air by oxides of C, S and N.
(b) How can we reduce ozone depletion and protect ozone layer?
17. Explain the water quality parameters represented by DO, BOD and COD.
(b) Write a short note on the Chernobyl disaster.

1B1N24097

(Pages : 2)

Reg. No:.....

Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree Examination, November 2024

CHE1MN101 – Basic Inorganic and Nano Chemistry

(FYUGP 2024 Admission)

Time: 2 hours

Max. Marks : 70

Course Outcome Mapping Scheme

1	2	3	4	5	6	7	8	9	10
CO1	CO1	CO2	CO3	CO3	CO4	CO4	CO4	CO5	CO5
11	12	13	14	15	16	17	18	19	20
CO1	CO2	CO3	CO4	CO4	CO4	CO4	CO5	CO2	CO5

PART – A

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

- Identify the type of hybridization in
(i) CH_4 (ii) PCl_5 (iii) SF_6
- Write the electronic configurations of elements with atomic numbers 20 and 25.
- Name the two types of hydrogen bonds and differentiate between them.
- Arrange the following atoms in the increasing order the first ionization enthalpy: Li, Be, and B. Explain the rationale for your arrangement.
- Explain the basis for the classification of elements in the modern periodic table?
- Calculate the normality of a solution containing 20g of NaOH in 2L.
- Differentiate between Accuracy & Precision.
- Mention two advantages of microanalysis.
- Compare Fullerenes and graphene.
- Outline the role of nanomaterials in drug delivery system.

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

11. Discuss how Bohr theory explains the formation of the line spectrum of hydrogen atom.
12. Mention the important postulates of VSEPR theory?
13. Explain the variation of atomic radius *along a period* and *down a group*.
14. Calculate the mole fractions of each component in a solution containing 25% water, 25% ethanol, and 50% acetic acid by mass
15. Write a note on different types of carbon nanotubes.
16. Explain solubility product and its applications in qualitative analysis
17. Give a brief account of complexometric titrations.
18. Discuss the classification of nanomaterials based on nanoscale dimensionality.

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

19. Describe different Quantum number with their significance.
20. Describe the various applications of nanomaterials across different fields, including medicine, electronics, energy, and environmental science.

1 x 10 = 10 Marks

1B1N24098

(Pages : 2)

Reg. No:.....

Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

First Semester B.Sc Degree Examination, November 2024

CHE1MN102 – Basic Inorganic and Bio Inorganic Chemistry

(FYUGP 2024 Admission)

Time: 2 hours

Max. Marks : 70

Course Outcome Mapping Scheme

1	2	3	4	5	6	7	8	9	10
CO1	CO1	CO2	CO3	CO3	CO4	CO4	CO4	CO5	CO5
11	12	13	14	15	16	17	18	19	20
CO2	CO1	CO3	CO3	CO4	CO4	CO5	CO5	CO1	CO1

PART – A

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

1. Identify designations of sublevels having (i) $n=2$; $l=1$ (ii) $n=4$; $l=3$ (iii) $n=3$; $l=2$?
2. State and explain the Pauli exclusion principle.
3. Write MO configurations of B_2 and C_2 molecules.
4. How does ionization enthalpy vary along a period? Explain.
5. Which is larger; Cl or Cl^- ? Justify your answer.
6. Define redox indicators? Give example.
7. Mention the advantages of micro analysis.
8. Copper(II) is precipitated as CuS in dilute acid medium while Cobalt (II) is precipitated as CoS in ammoniacal medium. Explain.
9. Name one anticancer drug and write its structure.
10. Define metalloenzymes? Give two examples.

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

11. Explain how VSEPR theory predicts the geometries of IF_3 and IF_7 molecules.
12. Explain the phenomenon justifying dual nature of electron.
13. Discuss the significance of Mosely's X-ray studies on developing the periodic classification of elements.
14. Discuss the factors that influence the electronegativity of elements.
15. Write a note on metal ion indicators. Explain their function with suitable example.
16. Calculate the number of moles of atoms present in
(a) 28 g of nitrogen; (b) 0.0115g of sodium; (c) 3.2×10^{-4} g of oxygen.
17. Explain 'sodium-potassium pump'.
18. Write on roles of Zinc in living beings.

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

19. Explain different quantum numbers. Discuss the significance of each quantum number.
20. Discuss the principles underlying the separation of cations into groups in qualitative analysis.

1 x 10 = 10 Marks

1B1N24099

(Pages : 2)

Reg. No:.....

Name:

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
First Semester B.Sc Degree Examination, November 2024
CHE1MN103 – Basic Inorganic and Green Chemistry
 (FYUGP 2024 Admission)

Time: 2 hours

Max. Marks : 70

Course Outcome Mapping Scheme

1	2	3	4	5	6	7	8	9	10
CO1	CO1	CO3	CO3	CO3	CO3	CO4	CO4	CO5	CO5
11	12	13	14	15	16	17	18	19	20
CO2	CO4	CO4	CO4	CO3	CO3	CO5	CO5	CO1	CO5

PART – A

All questions can be answered.
 Each question carries Three Mark.
 Ceiling -24 Marks

- Using quantum numbers, explain how the electron configuration of Chromium ($Z=24$) violates Aufbau's principle.
- Calculate the wavelength of an electron moving at $1/10$ th the speed of light. What is the significance of de Broglie's matter wave concept?
- Explain why fluorine has a lower electron affinity than chlorine.
- Compare and contrast Mendeleev's periodic law with the modern periodic law.
- Define the inert pair effect. Discuss its significance in the p-block elements.
- Explain why atomic radius generally decreases across a period but increases down a group.
- Explain why we add NH_4Cl before NH_4OH in Group 3 analysis.
- Describe the principles of acid-base titration.
- Explain the significance of catalysis in green chemistry.
- Define ionic liquids and explain how their properties contribute to green chemistry principles.

PART – B

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

11. Describe the VSEPR theory and predict molecular shapes for BF_3 and NH_4^+ .
12. Compare the advantages and limitations of
 - a) Double burette method vs single burette
 - b) Micro analysis vs macro analysis
13. Write balanced equations and calculate the equivalent weights for:
 - a) H_2SO_4 in acid-base titration with NaOH ,
 - b) Na_2CO_3 in acid-base titration with HCl
 - c) KMnO_4 in redox titration with FeSO_4 .

(Molecular Mass of $\text{H}_2\text{SO}_4 = 98$, Molecular Mass of $\text{Na}_2\text{CO}_3 = 106$, Molecular Mass of $\text{KMnO}_4 = 158$)
14. Explain the theories of indicator.
15. Evaluate the factors influencing metallic and non-metallic character in elements.
16. Compare and contrast ionization enthalpy, electron affinity, and electronegativity as properties that influence the chemical behaviour of elements. Discuss how these properties vary across the periodic table and justify your answer.
17. Explain the concept of unnecessary derivatization in chemical processes. Discuss why it may be considered inefficient or undesirable.
18. Discuss the advantages and limitations of using water as a solvent

PART - C

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

19. Explain different quantum numbers and their significance.
20. Describe the principles of green chemistry.

1 x 10 = 10 Marks