

D1BCH2504

Name:

Reg. No.:

FIRST SEMESTER FYUGP EXAMINATION NOVEMBER 2025**(Regular/Improvement/Supplementary)****MINOR****CHE1MN101: BASIC INORGANIC AND NANO CHEMISTRY****Time: 2 Hrs.****Maximum Marks: 70**

M – Mark BL - Bloom's Taxonomy Level (1 to 6) CO - Course Outcome

Section A: Answer all questions. Each carries 3 marks.**Ceiling: 24 Marks**

No.	Question	M	BL	CO
1.	Explain the reasons for the stability of half-filled and fully filled orbitals.	3	3	CO1
2.	Distinguish between the terms HOMO and LUMO of molecules.	3	2	CO2
3.	Calculate the bond order of O ₂ molecule on the basis of its MO configuration.	3	3	CO2
4.	Calculate the mass of potassium permanganate (KMnO ₄) required to make 500 mL of 0.05 N aqueous solution. Equivalent mass of potassium permanganate is 31.6 g/eq.	3	3	CO4
5.	Why phenolphthalein show pink colour in basic solution?	3	2	CO4
6.	200 ml of the solution contains 0.754 g of NaHCO ₃ , what is its normality?	3	3	CO4
7.	What do you mean by most probable value in analytical chemistry?	3	1	CO4
8.	Why is it necessary to add NH ₄ Cl prior to adding NH ₄ OH for precipitating III group cations as their hydroxides in qualitative analysis ?	3	3	CO4
9.	Explain the term nanolithography.	3	1	CO5
10.	What are 0D and 1D-nanomaterials?	3	2	CO5

Section B: Answer all questions. Each carries 6 marks.**Ceiling: 36 Marks**

No.	Question	M	BL	CO
11.	Name a phosphorous fluoride which has trigonal bipyramidal geometry. Explain the geometry on the basis of VSEPR theory.	6	3	CO2
12.	Represent the shapes of NH ₃ and SF ₆ molecules.	6	4	CO2
13.	Give the MO energy diagram of B ₂ and comment on: (i) the stability (ii) magnetic behaviour of the molecule	6	3	CO2
14.	Discuss the variation of covalent radius along a period and down a group.	6	1	CO3
15.	Distinguish between the terms electronegativity and electron affinity. Explain the variation of electronegativity along a period and down a group.	6	2	CO3
(PTO)				

16.	Giving examples, explain primary and secondary standards in volumetric analysis.	6	2	CO4
17.	A solution contains Cu^{2+} and Zn^{2+} ions. How would you separate the ions and identify them.	6	3	CO4
18.	Write an account of electrical properties of nanomaterials.	6	2	CO5

Section C: Answer any one question. Each carries 10 marks. (1 x 10 = 10 Marks)

No.	Question	M	BL	CO
19.	What are quantum numbers? Discuss the significance of each quantum number.	10	1	CO1
20.	(a) Distinguish between the terms molarity, normality and molality. (b) Calculate the mass in g required to prepare 250 ml of 0.05 M solution of sodium carbonate (molar mass of sodium carbonate is 106 gmol^{-1}). (c) 0.22 g of silver nitrate (AgNO_3) is dissolved in 400 g of acetonitrile. Calculate the molality of the solution.	10	3	CO4