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DUMKAL COLLEGE

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(Govt. Aided, Affiliated to the: University of Kalyani Included under section 2(f) & 12 (B) of UGC Act.)

Notice

27.11.2025

All the Students of Semester III and V of Department of Chemistry are asked to submit the assignment given below on or before **09/12/2025**.

SEM III (CCF-NEP)

Major MAT-3 (Inorganic and Physical)

10

1. Write a short note on the HSAB principle and its application.
2. Write a short note on solubility product principles.
3. The Latimer and frost diagram of the $\text{KMnO}_4/\text{Mn}^{+2}$ system.
4. A solution of potassium ferricyanide cannot oxidize iodide to iodine but it can do so in presence of Zn^{+2} ion - explain.
5. Justify that alkali metals do not survive in aqueous solution but in liquid NH_3 .
6. Define order of a reaction.
7. Half-life period of any 1st order reaction is constant-Comment on it.
8. First order reaction cannot be completed in finite time-explain.
9. Distinguish between order and molecularity.

SEC-3

5

1. What is complexone? Discuss the characteristics of a complexone.
2. Why basic buffer is used during the estimation of hardness of water by standard $\text{Na}_2\text{H}_2\text{EDTA}$ solution? Write down the structure of EBT indicator.
3. Write down the structure of $\text{Ca}(\text{EDTA})$ complex.

Minor MIT-3

5

1. Write down the hybridization and structure of ClF_3 .
2. Construct Born Haber cycle of NaCl and calculate the lattice energy using the following ΔH data (KJ/mol). $\Delta H_D(\text{Cl}_2) = 225.9$, $\Delta H_{EA}(\text{F}) = -351.4$, $\Delta H_{IE}(\text{Na}) = +489.5$, $\Delta H_{\text{sub}}(\text{Na}) = 108.7$, $\Delta H_f^\circ(\text{NaCl}) = -414.2$
3. Define lattice energy.
4. Derive the formula $\Delta_{\text{tet}} = 4/9 \Delta_{\text{oct}}$.
5. Draw a qualitative MO diagram for O_2 molecule. Explain the bond dissociation energy of O_2 is less than that of O_2^+ ion.

MDC 1. What is a liquid soap?

2. Give an example of enzyme based detergent.
3. Give the common name of Gamma-hexane.
4. How does soap remove grease?
5. Which element is used in colored glass?

SEM V (CCF-NEP)

Major MAT-6 (Inorganic)

Write a short note on Born-Haber Cycle and its application.

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Major MAT-7 (Physical)

10

1. What are the essential requirements for the construction of a cell without transference? How the E°

value of Ag(s) / AgCl(s) electrode can be determined very accurately? What is the method of determining mean activity coefficients of HCl of any desired concentration? 2+2+1

2. Deduce an expression for the lowering of freezing point of a solvent by the dissolution of a non-volatile solute. Hence show that it is a colligative property. 5

Minor

5

1. Derive the expression for w , q , E and H for isothermal reversible expansion of ideal gas. 5

2. Write a note on each of the following topic

a) Reformatsky Reaction, b) Umpolung and c) Grignard Reaction


Head of the Department
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