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

Notice

08.01.2024

All the Students of Semester III and I of Department of Chemistry are asked to submit the assignment given below on or before **14/01/2025.**

SEM III (CCF-NEP)

Major MAT-3 (Inorganic and Physical) **10**

1. Calculate the emf and ΔG^o for the cell reaction at 25 °C:

Zn (s) | Zn^{+2} aq(0.01 M) | Cd^{+2} aq(0.01 M) | Cd (s)

Given $E^o Zn^{+2}/Zn$ = - | 0.763 V and $E^o Cd^{+2}/Cd$ = - 0.403 V.

2. What is liquid junction potential and how is it eliminated?

3. Draw the neutralization curve when a weak acid is titrated with a weak base.

4. Write short note on hard and Soft acid base (HSAB) principle.

5. Compare the basicity of trimethylammonium hydroxide and tetramethyl ammonium hydroxide in water with explanation.

2. Details Study of Chemical kinetics mentioning rate of reaction, order, molecularity and integrated rate laws (zero, 1st order, 2nd order) with their different characteristics.

SEC-3 **5**

1. How will you Estimate of Calcium and Magnesium ions in a mixture by complexometric titration?

2. How will you analyze Al, Zn and Boric acid in talc powder.

3. What is chromatography? Explain different types of chromatography.

Minor MIT-3 **5**

1.Write down the basic postulates of VSEPR Theory with examples.

SEM I (CCF-NEP)

Major MAT-1 (Inorganic and Physical) **10**

1. If the ionization energy of H atom is "x" then what will be the value of ionization energy of Li^{+2} ion?

2. On the basis of exchange energy explain why $3d^5 4s^1$ electronic configuration is more stable than $3d^4 4s^2$ electronic configuration.

3. Calculate the uncertainty in position of an electron whose velocity is 3.0×10^4 cm^{-1} accurate up to 0.001%. Mass of an electron is 9.1×10^{-28} g.

4. Calculate the Pauling electronegativity of chlorine from the following data:

HoD
Chemistry

Bond energies for H_2, Cl_2 and HCl are respectively 104, 57 and 102 k cal/mole; Pauling electronegativity of hydrogen is 2.1.

5. The energy of an excited H-atom is -3.4 eV. Calculate the angular momentum of the electron according to Bohr's theory [Given: $m_e = 9.1 \times 10^{-31}$ Kg, $R_H = 1.09 \times 10^{7}\ m^{-1}$, $h = 6.626 \times 10^{-34}$ Js,

$c = 3 \times 10^{8}\ ms^{-1}$]

6. a) Write down the equation of Maxwell's velocity distribution explaining all the terms. Explain graphically how the velocity changes with temperature.

b) Derive relationship between, Most probable velocity, Average velocity and Root mean square velocity.

SEC-1 **5**

1. Write short notes on preparation, structure and application of following antibiotic: i) penicillin, ii) Cloramphenicol.

2. Write the name of an antiepileptic drug and also its method of preparation.

3. What is fermentation? How cane prepare antibiotics and vitamins using fermentation using this process?

Minor MIT-1 **5**

1. Write down a short note on HSAB Principle and its application with example.

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