

Gurudas College
Internal Assessment Examination, 2021-22
Subject-CEMA, SEM-I
Paper- CC-1-1

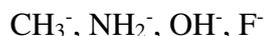
Time: 45 Minutes

Full Marks: 2× 10 = 20

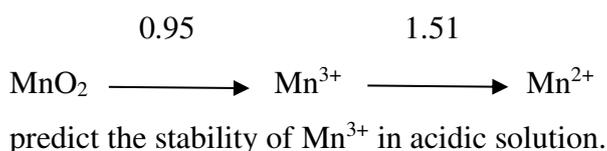
Group A

Answer any seven questions

1. Depict the comparative Radial Distribution Function curves for 1s, 2s and 3s orbitals and calculate their number of nodes.
2. Explain why stability of d^5 system is more compared to d^4 and d^6 systems in terms of exchange energy.
3. Calculate the ground state term symbol of V(III).
4. Write two limitations of Bohr's theory.
5. Find out and justify the order of Proton affinity among the following:



6. Acetic acid is weak acid in water but strong acid in liq. ammonia - explain.
7. From the Latimer diagram:



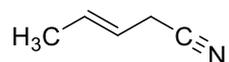
8. In qualitative inorganic analysis Group IIIA cations are precipitated by NH_4OH and NH_4Cl but not by NaOH and NaCl – justify.
9. Choose the order and explain:
 - i) Strength of Bronsted acids: SnH_4 , SbH_3 , TeH_2
 - ii) Strength of Lewis acids: SiF_4 , SiCl_4 , SiBr_4
10. You are supplied with 100ml 0.1N acetic acid to titrate with 0.1N NaOH . Calculate the pH at the equivalence point and name a suitable indicator for the titration.
11. Show the effect of addition of F^- on the reduction potential of $\text{Fe}^{3+}/\text{Fe}^{2+}$ couple.
12. Oxidising power of KMnO_4 is pH dependent – Justify.

Group B

Answer any three questions

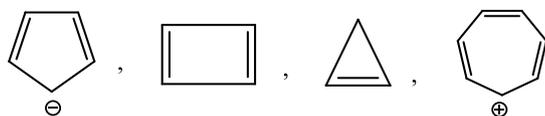
13. The dipole moment of cis-2-butene is more than that of its trans isomer. Explain with reason.

14. Draw the orbital picture of



15. The boiling point of carboxylic acids are higher than those of alcohols of comparable molecular weights. Explain.

16. Classify the following molecules as aromatic or antiaromatic:



17. Give one example of steric inhibition of resonance.

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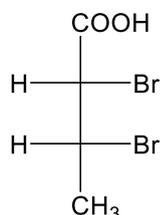
Paper- CC-1-2

Time: 30 Minutes

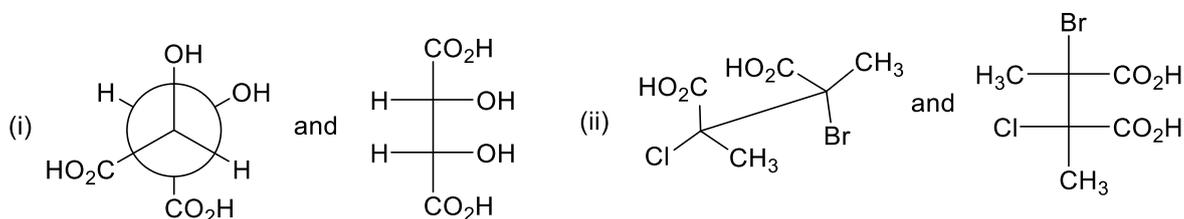
Full Marks: 2× 5 = 10

Answer any five questions

1. What is the dimension of mean square speed? Calculate it.
2. What are 'a' and 'b'? write down their units.
3. Write down the mathematical expression of mean free path in terms of molecular diameter (σ) and clearly mention the other terms involved in it.
4. Suggest and explain two ways for increase in reaction rate (unaltering initial reactant concentration).
5. Write down with proper equation, the temperature dependence of coefficient of viscosity for gas and liquid.
6. Draw the concentration vs. time and rate vs. time plots for a zero-order reaction.
7. Convert the given Fischer projection of the following molecule into staggered Newman and eclipsed Sawhorse projection formulae.



8. Identify whether the following pairs of molecules represents enantiomer, diastereomer or homomer.



9. Assign R/S descriptors to the following compounds mentioning priority of the ligands around the chiral centre:

