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| **HY/CHAK/1220/A 21/11/2020** | | | |
| **HALF YEARLY EXAM- ANSWER KEY (2020-21)** | | | |
| **Subject: CHEMISTRY**  **Grade: XII** | | Max. Marks: 70Time: 3 Hrs | |
| **General Instructions. Read the following instructions carefully.**   1. There are 33 questions in this question paper. All questions are compulsory. 2. Section A: Q. No. 1 to 2 are case-based questions having four MCQs or Reason Assertion type based on given passage each carrying 1 mark. 3. Section A: Question 3 to 16 are MCQs and Reason Assertion type questions carrying 1 mark each 4. Section B: Q. No. 17 to 25 are short answer questions and carry 2 marks each. 5. Section C: Q. No. 26 to 30 are short answer questions and carry 3 marks each. 6. Section D: Q. No. 31 to 33 are long answer questions carrying 5 marks each. 7. There is no overall choice. However, internal choices have been provided. 8. Use of calculators and log tables is not permitted. | | | |
|  | **Section-A** | |  |
| 1. | (i) (b)  (ii) (a) or (a)  (iii) (a)  (iv) (c) | | 4 |
| 2. | (a) (i) (b) (iv) (c) (i) (d) (ii) or (i) | | 4 |
| 3. | (iii) | | 1 |
| 4. | (iii) or (iv) | | 1 |
| 5. | (i) | | 1 |
| 6. | (iii) | | 1 |
| 7. | (ii) or (iii) | | 1 |
| 8. | (iv) | | 1 |
| 9. | (i) | | 1 |
| 10. | (i) | | 1 |
| 11. | (iv) | | 1 |
| 12. | (i) | | 1 |
| 13. | (iii) | | 1 |
| 14. | (i) or (ii) | | 1 |
| 15. | (i) | | 1 |
| 16. | (i) | | 1 |
|  | **SECTION-B** | |  |
| 17. | **(i)Arrange the following in the increasing order of boiling point:**  1M glucose < 1M PbCl2 < 1M Al2(SO4)3  **(ii) Arrange the following in the increasing order of freezing point:**  1M glucose > 1M PbCl2 > 1M Al2(SO4)3  Or | | 2 |
| 18. | (a)Negative Eo values for Mn2+ and Zn2+ are related to stabilities of half-filled and fully filled configuration respectively. But for Ni2+, Eo value is related to the highest negative enthalpy of hydration.  (b) Enthalpy of atomization means the energy required to get free atoms from any element. Transition elements possess large number of unpaired electrons in their atoms, so they have stronger inter atomic –atomic interaction and hence stronger bonding between atoms resulting in higher enthalpies of atomization. | | 2 |
| 19. | **(i) Sulphur vapours are passed through cold water:** Sulphur molecules associate together to form multimolecular colloids.  **(ii) White of an egg is mixed with water:** Protein molecules present in the white of the egg are macromolecules colloids soluble in water  Or  (i) These sols are readily precipitated (or coagulated) on the addition of small amounts of electrolytes, by heating or by shaking and hence, are not stable. Further, once precipitated, they do not give back the colloidal sol by simple addition of the dispersion medium. Hence, these sols are also called irreversible sols  (ii) : Fe3+ ion has greater coagulating power than K+ ion. | | 2 |
| 20. | a)Nitration is carried out in an acidic medium. In an acidic medium, aniline is protonated to give anilinium ion (which is meta-directing).  b) any one test  Or  CH3COO-NH4+  CH3CONH2  CH3CN  CH3CH2NH2 | | 2 |
| 21. | (a) The abnormal low value of manganese is probably **due to stable electronic configuration**. As the **3d-electrons are more tightly held by the nucleus** the electrons are not available for bonding resulting weaker metallic bonding in Mn in comparison to Cr.  (b) In the p–block the lower oxidation states are stable for the heavier members, this is due to inert pair effect that is unavailability of s-electron to involve in bonding, the opposite is true in the groups of d-block. For example, in group 6, Mo(VI) and W(VI) are found to be more stable than Cr(VI) because the stability of high oxidation states increases down the group due to easier availability of both d and s electrons for ionization. This easier availability of d and s electron occurs as higher energy d and s orbital. | | 2 |
| 22. | Formula; ½  Values in formula: 1  Answer: ½ | | 2 |
| 23. | a) Electrolyte ‘B’ is strong as on dilution the number of ions remains the same, only interionic attraction decreases therefore increase in ∧m is small.  b) when an oppsoing potential of 1.1 V is applied to a galvanic cell having electrical potential of 1.1 V then cell reaction stops completely and no current will flow through the cell. | | 2 |
| 24. | (i) Because fluorine is more electronegative as compared to chlorine.  (ii) Due to small size of fluorine six F – ion can be accomodated around sulphur whereas chloride ion is comparatively larger in size, therefore, there will be interionic repulsion. | | 2 |
| 25. | Those reactions which are not truly of first order reaction but under some condition (when one of the reactant presents in excess) they behave like a first order reaction | | 2 |
|  | **Section-C** | |  |
| 26. | (a) (i) Tollen`s test or Iodoform test (any one)  (ii) Tollen`s or fehling test  (b) Br-CH2-COOH > HCOOH > Cl-CH2CH2COOH > C6H5-COOH  **Or**  A= Propan-2-ol, B = propanone , C = Iodoform | | 3 |
| 27. | (a) Smoke is lead into a chamber of the precipitator with plates charged opposite to the particles in smoke. The particles lose charge and get precipitated.  (b) The adsorption of positively charged Fe3+ ions by the sol of hydrated ferric oxide results in positively charged colloid.  c) Physisorption involves weak van der Waals forces which weaken with rise in temperature. The chemisorption involves formation of chemical bond involving activation energy and like any other chemical reaction is favoured by rise in temperature.  Or  a) The charged colloidal particles start moving towards oppositely charged electrodes.  b) Medicines are more effective in the colloidal form because of large surface area and are easily assimilated in this form.  c) Due to excessive dialysis, traces of electrolyte which stabilises the colloids is removed completely, making the colloid unstable. As a result coagulation takes place. | | 3 |
| 28. | b) | | 3 |
| 29. | (a)    (b)(i) HCℓ < HBr < HF < HI  (ii) H2S < H2Se < H2Te< H2O | | 3 |
| 30. | (i) Zero (ii) –*k* (iii) mol L–1 s–1 | | 3 |
|  | **Section-D** | |  |
| 31. | (a) How are the following conversions carried out?  (i)    (ii)    (b) Describe Hell–Volhard–Zelinsky reaction  write a note on hell volhard zelinsky reaction - Chemistry -  TopperLearning.com | rtc3ne9jj  c) Aldehydes and ketones react with hydrogen cyanide (HCN) to yield cyanohydrins. This reaction occurs very slowly with pure HCN. Therefore, it is catalysed by a base and the generated cyanide ion (CN-) being a stronger nucleophile readily adds to carbonyl compounds to yield corresponding cyanohydrin.  (d) Tollen test or Iodoform test    Or  (a) Explain the following name reaction:  (i) Etard reacton  CBSE Sample Papers for Class 12 Chemistry Paper 2 - CBSE Tuts  (ii) Rosenmund reduction:    (b) Give reason for the following  **(i)** Aldehydes are generally more reactive than ketones in nucleophilic addition reactions due to steric and electronic reasons.  Sterically, the presence of two relatively large substituents in ketones hinders the approach of nucleophile to carbonyl carbon than in aldehydes having only one such substituent.  Electronically, two alkyl groups reduce the electrophilicity of the carbonyl carbon more effectively in ketones than in aldehyde.  Hence Aldehydes are more reactive toward nucleophilic addition reactions than Ketones.  (ii)Dry hydrogen chloride protonates the oxygen of the carbonyl compounds and therefore, increases the electrophilicity of the carbonyl carbon facilitating the nucleophilic attack of alcohol.  (iii) Yes because it not carry any alpha hydrogen. | | 5 |
| 32. | (a) Explain why  (i) because HF does not react with wax but react with glass. It dissolved SiO2 present in glass forming hydrofluorosilicic acid  SiO2 + 6HF → H2SiF6 + 2H2O  (ii) Because fluorine is more electronegative as compared to chlorine.  (iii) SF6 is a non-toxic gas which is thermally stable and chemical inert. Due to its inertness and high tendency to suppress internal discharges,  (b) Complete the following (Reaction should be balanced):  (i) 4NaCℓ + MnO2 + 4H2SO4 →MnCℓ2 + 4NaHSO4 + 2H2O + Cℓ2  (ii) XeF6 + 2H2O → XeO2F2+ 4HF  Or  (a) Explain why  (i) Interhalogen compounds are more reactive than halogens (except fluorine). This is  because in interhalogen compounds (X–X`) different kind of atomic orbital combine  together which result in weak overlapping so bonding between two different halogen is  weak Whereas in molecular halogen bonding is strong due to overlapping in same kind of  orbitals.  (ii) Fluorine has higher reduction potential value due to its low bond dissociation energy and  high hydration energy with compare to chlorine.  (iii) because the first ionization enthalpy of molecular oxygen(1175 kJmol–1) was almost  identical with that of xenon (1170 kJ/mol]  (b) Complete the following (Reaction should be balanced):  (i) 2KI + H2O + O3 → 2KOH + I2 + O2  (ii) XeF6 + 3H2O → XeO3 + 6HF | | 5 |
| 33. | (a) Aniline undergoes resonance and as a result, the electrons on the N-atom are delocalized over the benzene ring. Therefore, the electrons on the N-atom are less available to donate.  Image result for resonance in aniline  On the other hand, in case of methylamine (due to the +I effect of methyl group), the electron density on the N-atom is increased. As a result, aniline is less basic than methylamine. Thus, *pKb* of aniline is more than that of methylamine.  (b) It is given that compound ‘C’ having the molecular formula, C6H7N is formed by heating compound ‘B’ with Br2 and KOH. This is a Hoffmann bromamide degradation reaction. Therefore, compound ‘B’ is an amide and compound ‘C’ is an amine. The only amine having the molecular formula, C6H7N is aniline, (C6H5NH2).(Reaction must)  Or  (a) Assign a reason for each of the following statements:  (i) because the basic **amine** would deprotonate the **carboxylic acid** to form a highly unreactive ammonium carboxylate salt.  (ii) Aniline does not undergo Friedel-Crafts reaction (alkylation and acetylation) due to salt formation with aluminium chloride, the Lewis acid, which is used as a catalyst. Due to this, nitrogen of aniline acquires positive charge and hence acts as a strong deactivating group for further reaction  (b) (i) **In increasing order of basic strength:**  C6H5NH2 < C6H5N(CH3)2 < NH3 < C6H5CH2NH2 < CH3NH2 < (C2H5)2NH  (ii) **In decreasing order of boiling point:**  C2H5OH > C2H5NH2 > (CH3)2NH  (c) Aromatic primary amines cannot be prepared by this method because aryl halides do not undergo nucleophilic substitution with the anion formed by phthalimide. | | 5 |

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