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| **PB/CHAK/1220 11/01/2021** | | | | |
| **PREBOARD EXAMINATION- (2020-2021)** | | | | |
| **SUBJECT: CHEMISTRY (ANSWER KEY)**  **GRADE: XII** | | MAX. MARKS: 70TIME: 3 HRS | | |
| **General Instructions.**   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 (OBJECTIVE TYPE)** | |  |
| 1. |  | |  |
| (i) | (c) | |  |
| (ii) | **(b)** C4H10O : (*i*) C2H5OC2H5 (*ii*) CH3OC3H7 (iii) CH3OCH(CH3)2 | |  |
| (iii). | (d) | |  |
| (iv). | (a) | |  |
| 2. |  | |  |
| (i) | (ii) | |  |
| (ii) | (iii) | |  |
| (iii). | (ii) | |  |
| (iv). | (v) or (i) | |  |
| 3. | (b) | |  |
| 4. | (d) or (a) | |  |
| 5. | b) | |  |
| 6. | b) or b) | |  |
| 7. | (d) or (b) | |  |
| 8. | (c) or (d) | |  |
| 9. | (a) | |  |
| 10. | (b) or (a) | |  |
| 11. | (d) | |  |
| 12. | (iii) | |  |
| 13. | (iii) | |  |
| 14. | (i) or (ii) | |  |
| 15. | (iii) | |  |
| 16. | (i) | |  |
|  | **Section-B**  **The following questions, Q. No 17 – 25 are short answer type and carry 2 marks each.** | |  |
| 17. | (a)    (b) the reactivity of alkyl halide is more than vinyl and aryl halides because the halogen atom in alkyl halide is connected to the sp3 carbon. Whereas in vinyl or aryl the halogen atom is connected to the sp2 carbon.  Or  (a) alpha halogenation  (b) R−Cl+KOH(aq)→R−OH+KCl  The ionization of aqueous KOH produces hydroxide ions which are strong nucleophiles. Hence, alkyl chlorides undergo substitution to form alcohol.  R−CH2​−CH2​−Cl+KOH(alc)→R−CH=CH2​+KCl+H2​O  Alcoholic KOH solution gives alkoxide ion which is a strong base. It abstracts β hydrogen atom of alkyl chloride. A molecule of HCl is eliminated and an alkene is formed. | | 2 |
| 18. |  | | 2 |
| 19. | **(i) [CoCl2​(en)2​]Cl**  **(ii)**    **Or**   1. **Co(NH3​)4​(H2​O)Cl]Cl2**   **(ii)** | | 2 |
| **20.** | **OR**  The rate of reaction when molar concentration of reactants is unity.  The value depends on temperature but independent of concentration of reactants.  First order k = time-1, Second order k = mol-1 L time-1. | | 2 |
| **21.** |  | | 2 |
| **22.** | Alcohols undergo intermolecular hydrogen bonding. So, the molecules of alcohols are held together by strong intermolecular forces of attraction. But in ethers no hydrogen atom is bonded to oxygen. Therefore, ethers are held together by weak dipole-dipole forces, not by strong hydrogen bond. Since, lesser amount of energy is required than to break weak dipole-dipole forces in ethers than to break strong hydrogen bonds in alcohol. | | 2 |
| **23.** |  | | 2 |
| 24. | (i) because other products are escapable gases.  (ii) Since H2SO4 is an oxidizing agent, it oxidizes HI (produced in the reaction to I2). As a result, the reaction between alcohol and HI to produce alkyl iodide cannot occur. Therefore, sulphuric acid is not used during the reaction of alcohols with KI. | | 2 |
| 25. |  | | 2 |
|  | **SECTION-C**  **Q.No 26 -30 are Short Answer Type II carrying 3 mark each.** | |  |
| 26. | (i) The irregular variations of ionization enthalpies can be attributed to the extra stability of configurations such as d0, d5, d10. Since these states are exceptionally stable, their ionization enthalpies are very high. In case of first ionization energy, Cr has low ionization energy.  (ii) IE3IE3 for Cu, Ni and Zn is generally very high due to stability. That is why it does not show oxidation state of +3 .   1. Due to fully filled d-subshell in Zn2+.   Or   1. 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. (i) Cr3+   (ii) Mn3+ | | 3 |
| 27. | |  |  | | --- | --- | | 1. Aniline, *N*-ethylethanamine Etanamine 2. Butanamine < N-Ethylethanamine < N,N-Dimethyl ethanamine,  |  | | --- | | 1. N, N dimethylmethanamine, methanamine, N-methylmethanamine | | | Or   1. N-methyletahnamine is a secondary amine. When it reacts with benzenesulphonyl chloride, it forms N- Ethyl -N methyl sulphonamide while and N,N-dimethyl etahnanmine is a tertiary amine it does not react with benzenesulphonyl chloride. 2. Reaction(1mark)   Aromatic primary amines cannot be prepared by this method ***because aryl halides do not undergo nucleophilic substitution*** with the anion formed by phthalimide. | | | 3 |
| **28.** |  | | 3 |
| **29.** |  | | 3 |
| **30.** | An amorphous solid “A” burns in air to form a gas “B” which turns lime water milky. The gas is also produced as a by-product during roasting of sulphide ore. This gas decolourises acidified aqueous KMnO4 solution and reduces Fe3+ to Fe2+. Identify the solid “A” and the gas “B” and write the reactions involved. | | 3 |
|  | **Section-D** | |  |
| 31. | 1. The bleaching action of Chlorine is permanent because it involves the process of oxidation. Chlorine reacts with water to produce nascent oxygen. This oxygen combines with the colours material and makes it colourless. It a powerful oxidising agent. Hence bleaching action of Chlorine is permanent   The bleaching action of Chlorine is permanent because it involves the process of oxidation. Chlorine reacts with water to produce nascent oxygen. This oxygen combines with the colours material and makes it colourless. It a powerful oxidising agent. Hence bleaching action of Chlorine is permanent     In F2 molecule F-F bond energy is lower than Cl-F bond in ClF3. Thus fluorine is more reactive than ClF3. In ClF3 the Cl-F bond is weaker than Cl-Cl in Cl2. Thus ClF3 is more reactive than Cl2.     (1+1+1+2 marks)  **OR** Ozone is thermodynamically unstable since it spontaneously decomposes to oxygen due to - ve ΔH and + ve ΔS. These two effects reinforce each other resulting in large negative Gibbs energy change ΔG for conversion into oxygen.SF6 is an inert gas. Its inertness is due to the presence of sterically protected sulphur atom by six F atoms which does not permit the reactions like hydrolysis to take place  1. H2S is less acidic than H2Te because on moving down the group the size of the atom increases and ionization enthalpy decreases. This helps to dissociate the bond easily. | | 5 |
| 32. | (i) Etard reaction  (ii)(a) HCOOH > Cl-CH2-COOH > C6H5-COOH  (b) *p*-Nitrobenzaldehyde > Benzaldehyde > *p*-Tolualdehyde > Acetophenone  (iii) hydration with H+/ Hg2+ then tautomerism  b) Etard reaction followed by nitration  or  (i)   1. Tollen test 2. Iodoform test   (ii) | | 5 |
| 33. | **OR** | | 5 |

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