DELHI PUBLIC SCHOOL, JAMMU

Pre-Board II Assignment

Session (2019-20)

Class: 12th
Subject: Chemistry

General Instructions:
(i) All questions are compulsory.
*(ii) **Section-A:** Questions **1** to **20** arevery short answer questions (objective type) and carry**one mark each**.*
*(iii)**Section-B:** Questions **21** to **27** are short answer questions and carry **two marks each**.*
*(iv)**Section-C:** Questions **28** to **34** carry **three marks each**.*
*(v)**Section-D:** Questions **35** to**37** are long answer questions and carry **five marks each**.*
(vi) Use log tables is necessary. Use of calculators is not allowed.

SECTION-A

Questions 1 to 5 are passage questions:
Read the given passage and answer the questions (a) to (e) that follows:

All the noble gases have a stable configuration of ns^2np^6 except Helium which has $1s^2$ configuration. Thus, these elements have no tendency either to lose, gain or share electrons with the atoms of other elements, i.e. their combining capacity or valency is zero. Thus they have a very high ionisation enthalpy and large positive value of electron gain enthalpy.

Q1.   Why do noble gases have very low boiling points?
Q2.   Why do noble gases have comparatively large atomic sizas?
Q3.   Why are the elements of group 18 known as noble gases?
Q4.   Which noble gas is used in filling balloons for meterological observations?
Q5.   Explain why no chemical compound of helium is known.

Questions 6 to 10 are one word answers:

Q6.   Name the method used for refining of Zirconium metal?
Q7.   Why do amines behave as nucleophiles?
Q8.   Name the element which can exhibit the highest oxidation state in 3d-series.
Q9.   What kind of drug is phenacitin?
Q10.   Name the chemical reaction for converting benzene directly to benzaldehyde

Questions 11 to 15 are multiple choice questions:

Q11. Which of the following is lyophilic in nature?

    (1) Gum   (2) Sulphur   (3)Arsenic   (4)Iron

Q12. How many Faradays of electricity is required for the conversion of 1 mol Al_2O_3 to Al:

    (1) 2F   (2) 3F   (3) 6F   (4) 5F

Q13. The IUPAC name of $[Ni(CN)_4]^{2-}$ is:
    (1) Tetracyanonickel(II)ion   (2) Tetracyanonickelate(II)ion
    (3) Tetracyanonickel(0) ion   (4) Tetracyanonickelate(0)ion

Q14. The van't Hoff factor of benzoic acid solution in benzene is 0.5. In this solution benzoic acid is:

    (1) Dissociated   (3) forms dimer
    (2) Remains as such   (4) forms trimer

Q15. $C_6H_5CH_3 \xrightarrow{Br_2/FeBr_3}$, the reaction is called:

    (1) Nucleophilic substitution   (2) Free radical addition
    (3) Electrophilic substitution   (4) Free radical substitution

Questions 16 to 20 are assertionand reason based:

(A)   Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
(B)   Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
(C)   Assertion is correct, but reason is wrong statement.
(D)   Assertion is wrong, but reason is correct statement.

Q16. **Assertion:** In physisorption, adsorption decreases with the increase in temperature
    Reason: Physisorption is exothermic in nature.

Q17. **Assertion:** Nylon 6,6 is a thermoplastic polymer.
    Reason: It is prepared by the condensation polymerisation of hexamethylene diamine and adipic acid

Q18. **Assertion:** Analgesics bring down the body temperature during fever.
    Reason: Penicillin is a tranquilizer.

Q19. **Assertion:** The highest oxidation state of osmium is +8
    Reason: Osmium is a 5d-block element.

Q20. **Assertion:** Cu^{2+} iodide is not known
    Reason: Cu^{2+} oxidises I^- to iodine.

SECTION: B

Q21.   State Raoult's law for a solution containing non volatile solute. What type of deviation from Raoult's law is shown by a solution of chloroform amd acetone?

Q22.   Depict the galvanic cell in which the reaction: $Zn(s) + 2\ Ag^+\ (aq) \longrightarrow Zn^{2+}\ (aq) + 2Ag(s)$ takes place. Futher, show which of the electrodes is (−)vely charged?

Q23.   Give reason why benzyl chloride undergoes SN1 reaction faster than cyclohexyl methyl chloride?

Q24.   Give reason for the following:
(i)Red phosphorous is less reactive than white phosphorous.
(ii)Electron gain enthalpies of halogens are largely −ve?

Q25.   Give a chemical reaction for preparation of phenol from cummene.

Q26.   Write the difference in each of the following:
(i)Coagulation and peptization
(ii)Homogeneous catalysis and heterogeneous catalysis?

Q27.   Draw the structures of the following:
(i)XeF_2 (ii) XeO_3

SECTION: C

Q28.   (i) Arrange: the following in decreasing order of their basic strength:
$C_6H_5NH_2$, $C_2H_5NH_2$, $(C_2H_5)_2NH$, NH_3.

(ii) Why cannot aromatic primary amines be prepared by Gabriel Phthalimide Synthesis?

Q29.   Write the names and structures of the monomers of the following polymers:
(i)Terylene   (ii)Teflon   (iii)Nylon-6,6

Q30.   (a)A reaction is second order in A and first order in B.
(i) Write the differential rate equation.
(ii) How is the rate affected on increasing the concentration of A 3times?
(iii)How is the rate affected when concentration of both A and B are doubled?

Q31.   (a) Give chemical tests to distinguish between isopropyl alcohol and phenol.
(b) Give the product obtained in following reactions:
(i) HI with ethyl methyl ether.
(ii) Oxidation of propanol with alkaline $KMnO_4$.

Q32.   Bring out the following conversions:
a)Acetaldehyde to but-2-enal
b)Benzoic acid to benzaldehyde
c)Propanone to propene.

Q33. i) Draw the pyranose structure of glucose.
   ii) What type of linkage is present in proteins?

Q34. i) What is an adsorption isotherm?
   ii) Why does bleeding stop by rubbing moist alum.
   iii) Give one main difference between lyophilic and lyophobic colloids.

SECTION: D

Q35. a) Calculate E^0_{cell} for the following reaction at 298 K:
   $2Al\ (s)\ +\ 3\ Cu^{2+}\ (0.01M) \rightarrow 2Al^{3+}\ (0.01M) + 3Cu\ (s)$
   Given: $E_{cell} = 1.98$ V
   b) Using E^0 values of A and B, predict which is better for coating the surface of iron
   $[E^0\ (Fe^{2+}/Fe) = -0.44V]$ to prevent corrosion and Why?
   Given: $E^0(A^{2+}/A) = -2.37V$: $E^0\ (B^{2+}/B) = -0.14V$

Q36. (i)State the relationship amongst cell constant of a cell, resistance of the solution in the cell and conductivity of the solution. How is molar conductivity of a solution related to conductivity of its solution?

   (ii) A voltaic cell is set up at 25° C with the following half cell;
   Al/Al^{3+} (0.001M) and Ni/Ni^{2+} (0.50M)
   Calculate the cell voltage. $[E^°_{Ni^{2+}/Ni} = -0.25V, E^°_{Al3+/Al} = -1.66V]$

Q37. Give plausible reason for each of the following:
   a) Ortho-nitrophenol is more acidic that n-methoxyphenol.
   b) Alcohols are easily protonated in comparison to phenols
   c) The relative ease of dehydration of alcohols is $3^0 > 2^0 > 1^0$.
   d) How does phenol react with Br_2 in CS_2 and Bromine water?
   e) Propanol has higher b.p. than that of butane.

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