पुथना International School

Shree Swaminarayan Gurukul, Zundal

PRE-BOARD [2020 – 21]					
Student Name				Grade	XII
Date				Subject	CHEMISTRY
		Time	3Hr	Total Marks	70

General Instructions:

Read the following instructions carefully.

a) There are 33 questions in this question paper. All questions are compulsory.

b) Section A: Q. No. 1 to 16 are objective type questions. carry 1 marks each.

c) Section B: Q. No. 17 to 25 are short answer questions and carry 2 marks each.

d) Section C: Q. No. 26 to 30 are short answer questions and carry 3 marks each.

e) Section D: Q. No. 31 to 33 are long answer questions carrying 5 marks each.

f) There is no overall choice. However, internal choices have been provided.

g) Use of calculators and log tables is not permitted.

[SECTION A] (OBJECTIVE TYPE)

Q. No. 1 to 16 are objective type questions. carry 1 marks each.

1. What are the axial angles and edge length in a cubic crystal system?
2. What does the positive value of standard electrode potential indicate?
3. Explain the terms – Adsorbate and Adsorbent with examples.
4. Curdling of milk is an example of:

a) breaking of peptide linkage

b) hydrolysis of lactose

c) breaking of protein into amino acids

d) denauration of proetin

OR

Dissachrides that are reducing in nature are:

a) sucrose and lactose

b) sucrose and maltose

c) lactose and maltose

d) sucrose, lactose and maltose

5.When 1 mole of benzene is mixed with 1 mole of toluene The vapour will contain: (Given : vapour of benzene = 12.8kPa and vapour pressure of toluene = 3.85 kPa).

a) equal amount of benzene and toluene as it forms an ideal solution

b) unequal amount of benzene and toluene as it forms a non ideal solution

c) higher percentage of benzene

d) higher percentage of toluene

6.Which of the following is the reason for Zinc not exhibiting variable oxidation state

a) inert pair effect

b) completely filled 3d subshell

c) completely filled 4s subshell

d) common ion effect

7. Propanamide on reaction with bromine in aqueous NaOH gives:

a) Propanamine

b) Ethanamine

c) N-Methyl ethanamine

d) Propanenitrile

8.Ambidentate ligands like NO2-and SCN- are :

a) unidentate

b) didentate

c) polydentate

d) has variable denticity

OR

The formula of the coordination compound Tetraammineaquachloridocobalt(III) chloride is

a) [Co(NH3)4(H2O)Cl]Cl2

b) [Co(NH3)4(H2O)Cl]Cl3

c) [Co(NH3)2(H2O)Cl]Cl2

d) [Co(NH3)4(H2O)Cl]Cl

9.Which set of ions exhibit specific colours? (Atomic number of Sc = 21, Ti = 22, V=23, Mn = 25, Fe = 26, Ni = 28 Cu = 29 and Zn =30)

a) Sc3+, Ti4+, Mn3+

b) Sc3+, Zn2+, Ni2+

c) V3+, V2+, Fe3+

d) Ti3+, Ti4+, Ni2+

10.Give one example of Hoffmann – Bromamide reaction.

11. Write two main functions of carbohydrates in plants.

In the following questions (Q. No. 12 - 16) a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

d) Assertion is wrong statement but reason is correct statement.

12.Assertion: The two strands of DNA are complementary to each other

Reason: The hydrogen bonds are formed between specific pairs of bases.

13.Assertion: Ozone is thermodynamically stable with respect to oxygen.

Reason:Decomposition of ozone into oxygen results in the liberation of heat

14.Assertion: Aquatic species are more comfortable in cold waters rather than in warm waters.

Reason:Different gases have different KH values at the same temperature

OR

Assertion: Nitric acid and water form maximum boiling azeotrope.

Reason: Azeotropes are binary mixtures having the same composition in liquid and vapour phase.

15. Assertion: Carboxylic acids are more acidic than phenols.

Reason: Phenols are ortho and para directing.

16.Assertion: Methoxy ethane reacts with HI to give ethanol and iodomethane

Reason: Reaction of ether with HI follows SN2 mechanism

[SECTION **B]**

The following questions, Q.No 17 – 25 are short answer type and carry 2 marks each.

17. With the help of resonating structures explain the effect of presence of nitro group at ortho position in chlorobenzene.

OR

Carry out the following conversions in not more than 2 steps:

(i)Aniline to chlorobenzene

(ii)2-bromopropane to 1- bromopropane

18. A glucose solution which boils at 101.04oC at 1 atm. What will be relative lowering of vapour pressure of an aqueous solution of urea which is equimolal to given glucose solution? (Given: Kb for water is 0.52 K kg mol-1)

19. (i) Using crystal field theory, write the electronic configuration of iron ion in the following complex ion. Also predict its magnetic behaviour : [Fe(H2O)6]2+

(ii)Write the IUPAC name of the coordination complex: [CoCl2(en)2]NO3

OR

(i)Predict the geometry of [Ni(CN)4]2-

(ii)Calculate the spin only magnetic moment of [Cu(NH3)4]2+ ion.

20. For a reaction the rate law expression is represented as follows: Rate = k [A][B]1/2

i. Interpret whether the reaction is elementary or complex. Give reason to support your answer.

ii. Write the units of rate constant for this reaction if concentration of A and B is expressed in moles/L.

21. The C-14 content of an ancient piece of wood was found to have three tenths of that in living trees. How old is that piece of wood? (log 3= 0.4771, log 7 = 0.8540 , Half-life of C-14 = 5730 years)

22. When 3-methylbutan-2-ol is treated with HBr, the following reaction takes place:Give a mechanism for this reaction.

23. Give the formula and describe the structure of a noble gas species whichis isostructural with IF6-.

24. The following haloalkanes are hydrolysed in presence of aq KOH.

(i) 2- Chlorobutane (ii) 2-chloro-2-methylpropane

Which of the above is most likely to give a racemic mixture? Justify your answer.

25.Atoms of element P form ccp lattice and those of the element Q occupy 1/3rd of tetrahedral voids and all octahedral voids. What is the formula of the compound formed by the elements P and Q?

[SECTION C]

Q.No 26 -30 are Short Answer Type II carrying 3 mark each.

26. Give reasons for the following:

i. Transition elements act as catalysts

ii. It is difficult to obtain oxidation state greater than two for Copper.

iii. $Cr_2O_7^{2-}$ is a strong oxidising agent in acidic medium whereas WO_3 and MoO_3 are not.

27. Arrange the following in increasing order of property specified:

i. Aniline, ethanamine, 2-ethylethanamine (solubility in water)

ii. Ethanoic acid, ethanamine, ethanol (boiling point)

iii. Methanamine, N, N- dimethylmethanamine and N- methylmethanamine (basic strength in aqueous phase)

OR

i. Give a chemical test to distinguish between N-methylethanamine and N,N-dimethyl ethanamine.

ii. Write the reaction for catalytic reduction of nitrobenzene followed by reaction of product so formed with bromine water.

iii. Out of butan-1-ol and butan-1-amine, which will be more soluble in water and why?

28. A metal crystallizes into two cubic system-face centred cubic (fcc) and body centred cubic (bcc) whose unit cell lengths are 3.5 and 3.0Å respectively. Calculate the ratio of densities of fcc and bcc.

29. Three amino acids are given below:Alanine $CH_3CH(COOH)(NH_2)$ Aspartic acid $HOOC-CH_2CH(COOH)(NH_2)$ and Lysine $H_2N-(CH_2)_4-CH(COOH)(NH_2)$

i. Make two tripeptides using these amino acids and mark the peptide linkage in both cases.

ii. Represent Alanine in the zwitter ionic form.

30. i. Arrange the following in decreasing order of bond dissociation enthalpy

F_2 , Cl_2 , Br_2 , I_2

ii. Bi does not form pπ-pπ bonds. Give reason for the observation.

iii.Electron gain enthalpy of oxygen is less negative than sulphur. Justify

[SECTION **D]**

Q.No 31 to 33 are long answer type carrying 5 marks each.

31. (i) Answer the following questions: (2+3)

a) Write the balanced chemical reaction for reaction of Cu with dilute HNO_3.

b) Draw the shape of ClF_3

(ii)'X' has a boiling point of 4.2K, lowest for any known substance. It is used as a diluent for oxygen in modern diving apparatus. Identify the gas 'X'. Which property of this gas makes it usable as diluent? Why is the boiling point of the gas 'X' so low?

32. An organic compound 'A' C_8H_6 on treatment with dilute H_2SO_4 containing mercuric sulphate gives compound 'B'. This compound 'B' can also be obtained from a reaction of benzene with acetyl chloride in presence of anhy $AlCl_3$. 'B' on treatment with I_2 in aq. KOH gives 'C' and a yellow compound 'D'. Identify A, B, C and D. Give the chemical reactions involved. (5)

OR

(i) Write the reaction for cross aldol condensation of acetone and ethanal.

(ii) How will you carry out the following conversions:

a) Benzyl alcohol to phenyl ethanoic acid

b) Propanone to propene

c) Benzene to m-Nitroacetophenone

33. (i) State Kohlrausch law. (1+4)

(ii) Calculate the emf of the following cell at 298 K:

$Al(s)/Al^{3+}(0.15M)//Cu^{2+}(0.025M)/Cu(s)$(Given $E^o(Al^{3+}/Al) = -1.66$ V, $E^o(Cu^{2+}/Cu) = 0.34$V, log 0.15 = -0.8239, log 0.025 = -1.6020)


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