MODEL EXAMINATION (DECEMBER – 2017)

CLASS: XII Div: A   **CHEMISTRY**   **Time: 3 hrs.**

Date…………….   **MAX. MARKS: 70**

Name…………………………………   **Roll No…….**

GENERAL INSTRUCTIONS:
(a) All questions are compulsory.
(b) Questions number 1 to 5 are very short –answer questions and carry 1 mark each.
(c) Questions number 6 to 10 are short answer questions and carry 2 marks each.
(d) Question number 11 to 22 are also short answer questions and carry 3 marks each.
(e) Question number 23 is a value based question and carry 4 marks.
(f) Question number 24 to 26 are long answer questions and carry 5 marks each.
(f) Use log tables, If necessary. Use of calculator is not allowed.

1. Out of $BaCl_2$ and KCl, which one is more effective in causing coagulation of a negatively charged colloidal sol? Give reason.   (1)
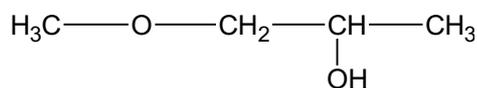
2. Why is zinc not regarded as a transition element?   (1)

3. Which would undergo $S_N{}^2$ reaction faster in the following pair: (1)

    H_3C——CH_2——Br and H_3C——$\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle Br}{|}}{C}}$——$CH_3$
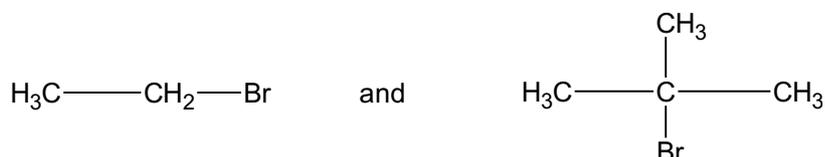
4. How much charge in Faradays is required for the reduction of 1 mole of Al^{3+} to Al?   (1)

5. Write the IUPAC name of the give compound.   (1)

    H_3C——O——CH_2——$\underset{\underset{\displaystyle OH}{|}}{CH}$——$CH_3$

6. Draw the structures of the following: (2)
    (a) XeF_2
    (b) XeO_3

7. Write down the IUPAC name of the following $[Co\,(NH_3)_5(CO_3)]Cl$. What type of isomerism is shown by this complex?   (2)

OR

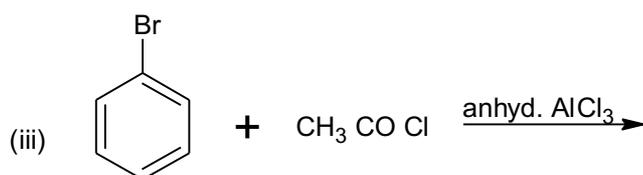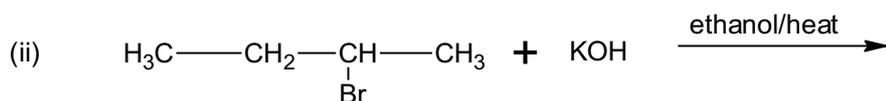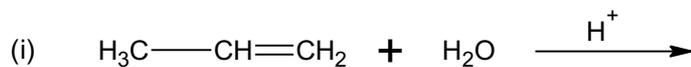Using IUPAC norms write the formulae for the following coordination compounds:

(a) Tetrachloridocuprate(II)

(b) Potassium tetrahydroxozincate(II)

8. Derive the relation between relative lowering of vapour pressure and molar mass of the solute. (2)

9. Arrange the following: (2)

(a) In increasing order of basic strength

$C_6H_5^-NH_2$, $CH_3-CH_2-NH_2$, $C_6H_5-NH-CH_3$

(b) In increasing order of boiling point

C_2H_5-OH , $CH_3-CH_2-NH_2$, $CH_3-NH-CH_3$

10. Define rate constant (k). Write the unit of rate constant for the following: (2)

(i) First order reaction

(ii) Second order reaction

11. Define the following terms: (3)

(i) F-Centre

(ii) p-type semiconductor

(iii) Ferromagnetism

12. The rate constant of a first order reaction increases from 2×10^{-2} to 8×10^{-2} when the temperature (3) changes from 300 K to 320 K. Calculate the energy of activation (E_a)

(log 2 = 0.301 , log 3 = 0.4771 , log 4 = 0.6021)

13. Define the following terms: (3)

(i) Homogeneous catalysis

(ii) Coagulation

(iii) Macromolecular colloids

14. (i) Mention the principle behind the zone refining of gold? (3)

(ii) What is the role of dilute NaCN in the extraction of gold?

(iii) Which form of iron is the purest form of commercial iron?

15. When 1.5 g of a non-volatile solute was dissolved in 90 g of benzene, the boiling point of benzene (3) raised from 353.23 K to 353.93 K. Calculate the molar mass of the solute

(K_b for benzene = 2.52 K kg mol^{-1})

16. Give reasons for the following: (3)

(i) Dinitrogen is a gas but phosphorus is a solid.

(ii) Bond angle decrease from H_2O to H_2Te

(iii) Halogens have the maximum negative electron gain enthalpy.

17. Write the structure of the major product in each of the following reactions: (3)

(i) H_3C——CH=CH_2 + H_2O $\xrightarrow{H^+}$

(ii) H_3C——CH_2——$\underset{\underset{Br}{|}}{CH}$——$CH_3$ + KOH $\xrightarrow{ethanol/heat}$

(iii) + $CH_3\,CO\,Cl$ $\xrightarrow{anhyd.\ AlCl_3}$

18. Give reasons for the following: (3)

(a) p-nitrophenol is more acidic than o-nitrophenol.

(b) Bond angle C –O –C in ethers is slightly higher than the tetrahedral angle ($109^o\ 28^|$)

(c) $(CH_3)_3C$ –Br on reaction with $NaOCH_3$ gives an alkene instead of an ether.

19. How do you convert the following: (3)

(i) Benzoic acid to Benzaldehyde

(ii) Ethyne to Ethanal

(iii) Acetic acid to Methane

OR

Write the chemical equations involved when $C_2H_5NH_2$ is treated with the following reagents:

(i) CH_3COCl/pyridine

(ii) $C_6H_5SO_2Cl$

(iii) $CHCl_3$ + KOH

20. Write the names and structures of the monomers of the following polymers: (3)

(i) Buna-N

(ii) Bakelite

(iii) Teflon

21. (i) Write the product obtained when D-glucose reacts with Br_2 water. (3)

(ii) What type of linkage is present in proteins?

(iii) Write one difference between DNA and RNA

22. (a) Write the hybridization and shape of the following complexes: (3)

(i) $[Co(NH_3)_6]^{3+}$

(ii) $[NiCl_4]^{2-}$

(Atomic number : Co =27, Ni =28)

(b) Out of NH_3 and 'en', which ligand forms more stable complex with metal and why?

23. Seeing the growing cases of diabetes and depression among young children, Mr Chopra, the (4) principal of one reputed school organized a seminar in which he invited parents and principals. They all resolved this issue by strictly banning junk food in schools and introducing healthy snacks and drinks like soup, lassi, milk, etc in school canteens. They also decided to make compulsory half an hour of daily physical activities for the students in the morning assembly. After six months, Mr. Chopra conducted the health survey in most of the schools and discovered a tremendous improvement in the health of the students.

After reading the above passage, answer the following questions:

(i) What are the values (at least two) displayed by Mr. Chopra?

(ii) As a student, how can you spread awareness about this issue?

(iii) Why should antidepressant drugs not be taken without consulting a doctor?

(iv) Give two examples of artificial sweetners.

24. Calculate e.m.f and ΔG for the following cell: (5)

Ni (s) | Ni^{2+} (0.01 M) || Ag^+ (0.001 M) | Ag (s)

Given E^o (Ni^{2+}/Ni) = -0.25 V, E^o (Ag^+ / Ag) = +0.80 V

OR

(a) The conductivity of 0.1 mole L^{-1} Solution of NaCl is 1.06×10^{-2} S cm^{-1}. Calculate its molar conductivity and degree of dissociation (α). Given λ^o (Na^+) = 50.1 Scm^2 mol^{-1} and λ^o (Cl^-) = 76.5 S cm^2 mol^{-1}.

(b) What is the difference between primary battery and secondary battery? Give one example of each type.

25. (a) Write the structure of A, B, C and D in the following reactions: (5)

$$C_6H_5COCl \xrightarrow{H_2/Pd - BaSO_4} A \xrightarrow{Conc. NaOH} B + C$$

A $\xrightarrow{CH_3MgBr/H_3O^+}$ D
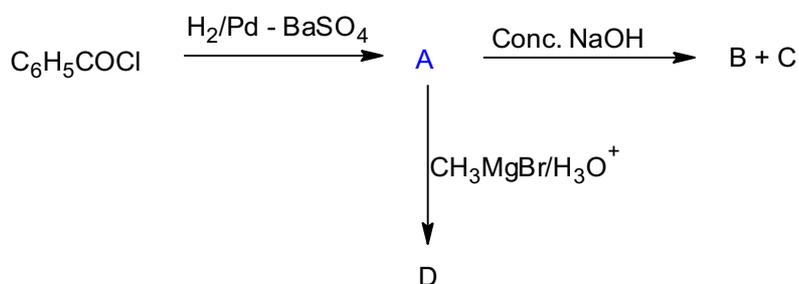
(b) Distinguish between the following:

(i) $C_6H_5 –COCH_3$ and $C_6H_5 –COCH_2CH_3$

(ii) Benzoic acid and Phenol

(c) Write the structure of 2-hydroxybenzaldehyde.

OR

(a) Write the structures of the main products when ethanal (CH_3 –CHO) reacts with the following reagents:

(i) HCN

(ii) H_2N –NH_2 /H^+

(iii) $LiAlH_4$

(b) Arrange the following in the increasing order of their reactivity towards nucleophilic addition reaction:

$C_6H_5COCH_3$, CH_3 –CHO , CH_3 –CO –CH_3

(c) Give a simple chemical test to distinguish between the following pair of compounds:

CH_3CH_2CHO and CH_3CHO

26. (a) Account for the following: (5)

(i) Ce^{4+} is a strong oxidizing agent in aqueous solution.

(ii) Transition metals have high enthalpy of atomization

(iii) Mn shows maximum number of oxidation states in 3d series.

(b) Complete the following:

(i) $2\ MnO_4^- + 6\ H^+ + 5NO_2^-$ $\rightarrow$

(ii) $Cr_2O_7^{2-} + 14\ H^+ + 6\ Fe^{2+}$ $\rightarrow$

OR

(a) Account for the following:

(i) Transition metals form coloured compounds.

(ii) Cr^{2+} is a strong reducing agent.

(iii) Actinoids show irregularities in their electronic configurations.

(b) Define lanthanoid contraction. Write the common oxidation state of lanthanoids.

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