Final Examination in **CHEMISTRY – Std. 11** M. Marks : 70
22-2-2016 Time : 3 hrs.

Total printed pages :	03
Total printed questions :	26

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General instructions:

i) Question numbers 1 to 5 carry 1 mark each.
ii) Question numbers 6 to 10 carry 2 marks each.
iii) Question numbers 11 to 22 carry 3 marks each.
iv) Question number 23 carry 4 marks
v) Question numbers 24 to 26 carry 5 marks each.
vi) Use log table if necessary.

1. What are sigma bonds? Why sigma bonds are stronger than pi bonds? 1

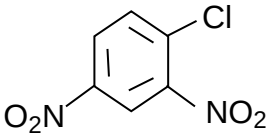
2. Magnesium does not impart colour to the flame. Why? 1

3. Define molality. Why is it preferred over molarity? 1

4. Arrange the following compounds in the increasing order of reactivity towards electrophilic substitution reactions:
Benzene, toluene, nitro benzene 1

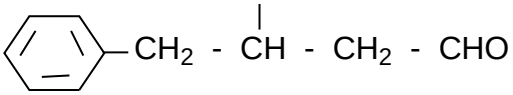
5. How to convert benzene to p-nitro bromobenzene. Give chemical equations only. 1

6. Give IUPAC names for the following: 2

i) 

ii) $CH \equiv C - CH_2 - CH_2 - CH = CH_2$

iii) $CH_3 - \underset{\underset{O}{\|}}{C} - \underset{\underset{OH}{|}}{CH} - CH_2 - CH_2 - COOH$

iv) 

7. Balance the following redox reaction:
$Zn + NO_3^- \rightarrow Zn^{2+} + N_2O + H_2O$ (acidic medium) 2

8. Can we use a copper vessel to store 1M $AgNO_3$ solution?
Given that $E^0\ Cu^{2+}/Cu = 0.34V$, $E^0\ Ag^{+}/Ag = 0.80\ V$. 2

9. a) Why does aluminium chloride behave as a Lewis acid? 2
b) What is the oxidation state of Na in NaO_2?
c) What is meant by inert pair effect?
d) Which group of elements are called alkaline earth metals?

10. a) Name the crystalline allotropes of carbon. 2
b) What is water gas? How is it prepared?

11. Two moles of PCl_5 were heated to 327^0C in a closed two litre vessel and when equilibrium was achieved PCl_5 was found to be 40% dissociated into PCl_3 and Cl_2. Calculate Kc. 3

12. a) Differentiate between homogenous and heterogeneous equilibrium. 3
b) What is the effect of temperature on the ionic product of water?
c) 0.049g of H_2SO_4 is dissolved per litre of the given solution.
Calculate pH of the solution. (Molecular mass $H_2SO_4 = 98g\ mol^{-1}$)

13. a) Write solubility product expression for a saturated solution of CaF_2 in terms of solubility, S. 3
b) The value of Kc for the reaction $2HI(g) \rightarrow H_2(g) + I_2(g)$ is $1x10^{-4}$.
At a given time the composition of the reaction mixture is
$[HI] = 2x10^{-5}$ mol/L, $[H_2] = 1x10^{-5}$mol/L, $[I_2] = 1x10^{-5}$mol/L
In which direction the reaction will proceed to attain equilibrium?

14. For the cell $Cr|Cr^{3+}||Sn^{4+}|Sn^{2+}$, give 3
i) half reactions
ii) overall reaction
iii) name the positive electrode
iv) mention the direction of flow of electric current.

15. a) Define resonance effect. 3
b) Give an example for nucleophilic addition reaction.
c) Suggest a method to separate a mixture of water and aniline.

16. a) Explain Wurtz reaction by giving reaction only. Mention a drawback of the reaction.
b) The reductive ozonolysis ofan alkene gave butanone and ethanal.
Give the structure and IUPAC name of the alkene. 3

(OR)

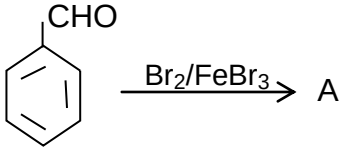
a) Complete the following reaction :

i)  + CH_3COCl $\xrightarrow{\text{Anhy } AlCl_3}$

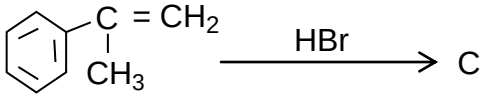
ii) $CH_3COONa + NaOH \xrightarrow{CaO,\ \Delta}$

b) Explain peroxide effect with the help of an example.

17. Find A, B and C in the following reactions: 3

i) 

ii) $CH_3 - CH_2 - \underset{\displaystyle Cl}{CH} - CH_3 \xrightarrow{\text{alc KOH}} B$

iii) 

18. Account for the following: 3

a) CO_2 is a gas while SiO_2 is a solid.

b) Atomic radius of $_{31}Ga$ is less than that of $_{13}Al$.

c) PbX_2 is more stable than PbX_4.

19. a) What will be the mass of one ^{12}C atom in g? (Atomic mass, C = 12 g). 3

b) Calculate the number of moles present in 0.28g of nitrogen gas (atomic massN=14)

c) The empirical formula and molecular mass of a compound are CH_2O and 180 respectively. What will be the molecular formula of the compound? (Atomic mass, C = 12, H = 1, O = 16)

20. a) How many moles and how many grams of sodium chloride are present in $250cm^3$ of a 0.5M NaCl solution? Molar mass NaCl=58.5g mol^{-1}. 3

b) Chlorine is prepared in the laboratory by treating manganese dioxide with aquous hydrochloric acid according to the equation

$4HCl + MnO_2 \rightarrow 2H_2O + MnCl_2 + Cl_2$

How many grams of HCl react with 5.0g of MnO_2?
(Atomic mass,H=1,Cl=35.5,Mn=55,O=16)

21. a) What are isoelectronic species? 3
b) Name a transition element.
c) Define the term electronegativity.
d) What are S-block elements?
e) Why does second ionisation enthalpy always greater than the first?
f) Write the atomic number of the element present in the third period and seventeenth group of periodic table.

22. Explain the following: 3
a) Halogens have high electron gain enthalpy.
b) Electronegativity values of inert gases are zero.
c) Metallic character of elements decreases on moving from left to right in a period.

23. Sodium is a silvery white metal. it is highly reactive. It catches fire when comes in contact with water. 4
a) How metallic sodium is stored?
b) Which block and period in the periodic table sodium belongs to? (at. No. Na = 11)
c) Comment on the metallic character of sodium giving reasons.
d) Complete the reaction $NaNO_3 \xrightarrow{heat}$

24. a) Write chemical equations involved in the detection of sulphur in organic compounds. 5
b) 0.3780g of an organic compound gave 0.5740g of silver chloride in carius estimation. Calculate the percentage of chlorine present in the compound. Atomic mass, Cl=35.5,Ag=108.
c) i) What are free radicals?
ii) Identify the type of organic reaction
$CH_3CH_2OH \xrightarrow{con\ H_2SO_4} CH_2= CH_2$
d) Discuss the stability of carbocations on the basis of inductive effect.

(OR)

a) Explain Lassaigns test for the detection of chlorine with the help of chemical equations.
b) In Dumas method for estimation of nitrogen,0.30g of an organic compound gave 50mL of nitrogen collected at 300K and 715 mm pressure. Calculate the percentage composition of nitrogen in the compound. (aquous tension at 300K is 15mm). Atomic mass nitrogen=14g.

aq. NaOH

c) Identify the type of chemical reaction:

$CH_3CH_2Br \longrightarrow CH_3CH_2OH$

d) Discuss the stability of carbocations on the basis of inductive effect.

25. a) Explain the mechanism for nitration of benzene. 5

b) –OH group attached to benzene ring is o, p-directing. Explain giving resonance structures.

c) Giving chemical test to distinguish between

i) ethane and ethene ii) but-1-ene and but-2-ene

(OR)

a) Explain the mechanism for chlorination of methane.

b) –OH group attached to the benzene ring is o,p-directing. Explain giving resonance structures.

c) How to convert

i) ethyne to but-1-yne? ii) phenol to benzene?

26. a) Explain the formation and geometry of SF_6 on the basis of hybridization. 5
(Atomic no: S = 16, F = 9)

b) Write molecular orbital configuration,calculate bond order and compare stability
of O_2^+ and O_2^-. (Atomic no: O = 8)

c) Draw potential energy diagram for the formation of H_2.

(OR)

a) What is meant by dipole moment?

b) Explain sp^3d hybridisation with the help of an example.

c) NH_3 is pyramidal in shape but BF_3 is triangular planar.
Explain on the basis of VSEPR theory.

-x-x-x-x-x-x-