A. G. High School and G. & D. Parikh Higher Secondary School

Navrangpura, Ahmedabad - 380 009.

Third Semester Examination : 2014

Date : 11-09-2014	Std. : 12	Marks	: 100
Day : Thursday	Subject : Chemistry	Time	: 2:30 Hrs.

Instruction :

1. **In this question paper there are 64 questions. All are compulsory.**
2. **In this question paper therer are total A, B, C, D (4 Sections.)**
3. **Section : A : Question No. 1 to 40 contains 40 multiple choice objetive questions, 1 marks each.**
4. **Section : B : Question No. 41 to 55 contains very short questions 2 marks each.**
5. **Section : C : Question No. 56 to 61 contains short questions. 3 marks each.**
6. **Section : D : Question No.62 to 64 contains essay type questions 4 marks each.**
7. **Select the option for correct answers.**
8. **Maximum marks of the question paper are 100 and time is 2:30 Hrs.**

Section - A

Question nos. 1 to 40 are multiple choice type questions. **(40)**
Each question carries 1 mark. Select the correct answer from the following :

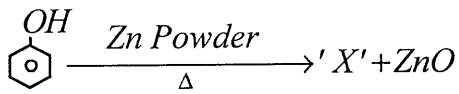
1. Which device transforms chemical energy into electrical energy ?
   (A) Electrochemical cell (B) Storage cell
   (C) Fuel cell (D) Leclanche cell
2. What is 'A' in the following reaction ?

   $$R-OH+H-X \xrightarrow[\Delta]{A} R-X+H_2O$$

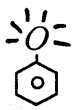
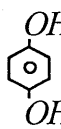
   (A) H_2SO_4 (B) Anhydrous $AlCl_3$
   (C) Anhydrous $ZnCl_2$ (D) Red Phosphorous
3. Which substance is added in chloroform when it is used as an anesthetic ?
   (A) Alcohol (B) Ethyl Acetate
   (C) Acetic Acid (D) Acetone
4. Which principle is involved in chromotographic separation ?
   (A) Precipitation (B) Hydration
   (C) Decomposition (D) Adsorption
5. In alcohol what is the hybridisation of 'C' and 'O' respectively ?
   (A) sp^3 and sp^3 (B) sp^3 and sp^2
   (C) sp^2 and sp^3 (D) sp^2 and sp^2
6. In HCl what are the types of attraction forces ?
   (A) Dispersion forces (B) Dipole Diple interaction
   (C) Hydrogen bond (D) Coulombic forces
7. Which of the following oxide is basic ?
   (A) N_2O_3 (B) P_4O_{10}
   (C) N_2O_5 (D) Bi_2O_3

8. Which element forms only one oxo acid ?
(A) F (B) Cl
(C) Br (D) I

9. In which of the following compounds schottky defect is present ?
(A) $NaCl$ (B) ZnS
(C) SiO_2 (D) $SrCl_2$

10. 

What is 'X' in the above reaction ?

(A) C_6H_6 (B) 
(C)  (D) None of them

11. Which unit of concentration changes with change in temperature ?
(A) Normality (B) Molarity
(C) %v/v (D) All of these

12. What type of solution is zinc amalgam ?
(A) Liquid - Liquid (B) Solid - Solid
(C) Liquid - Solid (D) Solid - Liquid

13. Which discharging reaction takes place at cathode in a lead storage cell ?

(A) $Pb_{(S)} + SO_4^{2-}{}_{(aq)} \longrightarrow PbSO_{4(S)} + 2\bar{e}$

(B) $PbSO_{4(S)} + 2\bar{e} \longrightarrow Pb_{(S)} + SO_4^{2-}{}_{(aq)}$

(C) $PbSO_{4(S)} + 2H_2O_{(\ell)} \longrightarrow PbO_{2(S)} + 4H^+_{(aq)} + SO^{2-}_{4(aq)} + 2\bar{e}$

(D) $PbO_{2(S)} + 4H^+(aq) + SO_4^{2-}{}_{(aq)} + 2\bar{e} \longrightarrow PbSO_{4(S)} + 2H_2O_{(\ell)}$

14. Which substance is mixed with Al_2O_3 to obtain pure aluminium by electrolycis ?
(A) $Na\left[Al(OH)_4\right]$ (B) Na_3AlF_6
(C) Na_2CO_3 (D) $NaOH$

15. Calculate % v/v of a solution containing 500 ml methanol in 5 litres aqueous methanol solution.
(A) 5% (B) 10%
(C) 1% (D) 2%

16. Why type of solid is H_2O(ice) ?
(A) Ionic solid (B) Metallic solid
(C) Net work solid (D) Molecular solid

17. Which is Swartz reaction from the following ?

(A) $CH_3 - Br + AgF \rightarrow CH_3 - F + AgBr$

(B) $CH_3 - Cl + NaI \xrightarrow{Acetone} CH_3 - I + NaCl$

(C) $2CH_3Cl + Na \xrightarrow{dry\ ether} CH_3 - CH_3 + 2NaCl$

(D) $CH_3Cl + Cl_2 \xrightarrow{hv} CH_2Cl_2 + HCl$

18. Which compound is produced by the oxidation of 2° alcohols with H_2CrO_4 ?

(A) Aldehyde (B) Ketone

(C) Carboxylic acid (D) Ester

19. What is the correct order of basicity of hydrides of elements of 15th group.

(A) $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$

(B) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

(C) $BiH_3 < SbH_3 < AsH_3 < PH_3 < NH_3$

(D) Both (A) & (C)

20. In which reaction 'temperature range' plays an important role ?

(A) Blast Furnace reactions (B) Zone refining

(C) Liquation (D) Electrolysis

21. Which reaction takes place when standard hydrogen electrode acts as anode ?

(A) $H^+_{(aq)(1M)} + \bar{e} \rightleftharpoons \frac{1}{2} H_{2(g)}(1bar)$ (B) $\frac{1}{2} H_{2(g)}(1bar) \rightleftharpoons H^+_{(aq)(1M)} + \bar{e}$

(C) $H_{2(g)}(1bar) \rightleftharpoons 2H^+_{(aq)(1M)} + \bar{e}$ (D) Both (B) and (C)

22. Which is an intrinsic semi-conductor ?

(A) *Ga* (B) *Ti*

(C) *Si* (D) *As*

23. For which solution the value of Vant Hoff factor is not one ?

(A) Acetic acid (B) Glucose

(C) *NaCl* (D) K_2SO_4

24. From the following alcohols, whose solubility in water is the maximum ?

(A) Glycerol (B) Ethylene glycol

(C) Benzyl Alcohol (D) Butyl Alcohol

25. Which is a secondary cell from the following ?

(A) Leclanche cell (B) Mercury cell

(C) Ni-Cd cell (D) Fuel cell

26. Oxide of which element is amphoteric ?

(A) N (B) P

(C) As (D) Bi

27. Which trihydride is poisonous ?

(A) NH_3 (B) PH_3

(C) AsH_3 (D) Both (B) and (C)

28. Which is a non-ideal solution from the following ?

(A) Mixture of Phenol and Aniline (B) Mixture of H_2SO_4 and H_2O

(C) Mixture of acetone and chloroform (D) All of these

29. How many total number of atoms are there in a body centered cube ?
(A) 1 (B) 2
(C) 8 (D) 4

30. What are 'x' and 'y' respectively in the following reaction ?

$$3Fe_{2(S)}O_3 + CO_{(g)} \longrightarrow 'X'_{(S)} + 'Y'_{(g)}$$

(A) $2Fe_{3(S)}O_4 + CO_{2(g)}$ (B) $2Fe_{3(g)}O_4 + CO_{(g)}$
(C) $2Fe_{(S)^2}O + CO_{2(g)}$ (D) $6Fe_{(S)}O + CO_{(g)}$

31. Tear gas is prepared from which gas ?
(A) SO_2 (B) Cl_2
(G) F_2 (D) C_3H_8

32. Colligative properties of a solution depends on _____
(A) Number of particles of (B) Number of particles of the solvent
(C) Nature of the solute (D) Nature of the solvent

33. What is the unit of molar conductivity ?
(A) $mhocm^2mol^{-1}$ (B) $ohm^{-1}cm^2mol^{-1}$
(C) $\mho cm^2mol^{-1}$ (D) All of these

34. Which are the anhydrides of HNO_2 and HNO_3 respectively ?
(A) N_2O_3 and N_2O_5 (B) N_2O_5 and N_2O_3
(C) NO_2 and N_2O_3 (D) NO_2 and N_2O_5

35. By which method Nickel is obtained in the form of a complex from impure Nickel ?
(A) Van Arkel (B) Hall Herault
(C) Mond Carbonyl (D) Heitler - London

36. $CuSO_4$ solution is not stored in an Aluminium vessel becuase.
(A) Reduction of Cu takes place (B) Oxidation of Cu takes place
(C) Reduction of Aluminium takes place (D) Both (B) and (C)

37. On electrolysing distilled water containing few drops of dilute H_2SO_4 between Pt electrodes, which gas is obtained at anode ?
(A) SO_2 (B) O_2
(C) Cl_2 (D) H_2

38. During electrolysis of dilute and aqueous $CuSO_4$ which metals are obtained in the anode mud ?
(A) *Fe, Al, Zn* (B) *Cu, Al, Zn*
(C) *Ag, Au, Pt* (D) *Ni, Zn, Cu*

39. Which reaction is occuring in the Bessemer converter ?

(A) $2Cu_{2(S)}S + 3O_{2(g)} \rightarrow 2Cu_{2(S)}O + 2SO_{2(g)}$

(B) $2Al_{2(S)}O_3 + 3C_{(S)} \rightarrow 4Al_{(S)} + 3CO_{2(g)}$

(C) $Fe_{(S)}O + C_{(S)} \rightarrow Fe_{(S)} + CO_{(g)}$

(D) $ZnCO_{3(S)} \xrightarrow{\Delta} ZnO_{(S)} + CO_{(g)}$

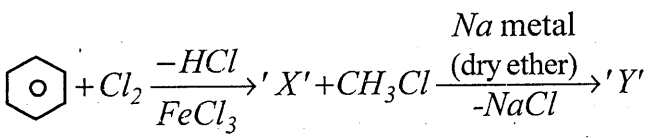
40. What is the formula of hypochlorous acid ?
(A) $HOCl_3$ (B) $HOCl$
(C) $HOCl_2$ (D) H_2OCl

Section - B : 2 Marks Each (Q.No.41 to 55)

41. At 25°C temperature for the given cell,
$^{\ominus}Cr / Cr^{3+}_{(aq)(0.1\,M)} // Fe^{2+}_{(aq)0.01\,M} / Fe^{\oplus}_{(S)}$
Calculate the cell potential. Given $E^oCr^{3+} / Cr = -0.72V$, $E^oFe^{2+} / Fe = -0.44V$
(A) 0.399V (B) 0.22 V
(C) -0.399 V (D) -0.26 V

42. At 27°C temperature if 0.6 gm substance is dissolved in 0.1 litre solution to prepare a solution whose osmotic pressure is 1.23 bar, calculate the molecular weight of the substance.
(A) 121.66 gm/mole (B) 12.66 gm/mole
(C) 430 gm/mole (D) 43.0 gm/mole

43. On heating ZnO it becomes yellow because which reaction takes place ?
(A) $ZnO \xrightarrow{\Delta} Zn^{2+} + O_2 + 2\bar{e}$ (B) $ZnO \xrightarrow{\Delta} Zn^{2+} + \frac{1}{2}O_2 + 2\bar{e}$
(C) $ZnO \xrightarrow{\Delta} Zn^{+} + \frac{1}{2}O_2 + \bar{e}$ (D) $ZnO \xrightarrow{\Delta} Zn^{2+} + O^{2-}$

44. 
In the above reaction what are 'X' and 'Y' respectively ?
(A) X = Chlorobenzen, Y = Methyl benzene
(B) X = Benzyl Chloride, Y = Tolune
(C) X = Chlorobenzene, Y = Ethyl benzene
(D) X = Benzyl Chloride, Y = Ethyl benzene

45. Which is a vicinal dihalide from the following ?
(A) 2, 2, dichloro butane (B) 2, 3 dischloorbutane
(C) 1, 4, dichlorobutane (D) 1, 3, dichlorobutane

46. Which of the following are not the uses of Zinc metal ?
(A) Galvanising iron
(B) Preparaing alloys like brass, german silver with Cu.
(C) Preparing agricultural tools
(D) Preparing electrical cells

47. For the following statement write 'T' for true and 'F' for false and find correct option.
1. Pentahalides are more covalent than trihalides
2. All the trihalides except Nitrogen are stable.
3. All the trihalides of 15th group form cavalent compounds.
4. NF_3 is unstable
(A) TTFF (B) TTFT
(C) FTTT (D) TTTF

48. What are 'X' and 'Y' in the following reaction ?

$$'X' \xrightarrow[H_2SO_4]{[O]/Na_2Cr_2O_7} CH_3CH_2-CH_2CHO \xrightarrow[H_2SO_4]{[O]/Na_2Cr_2O_7} 'Y'$$

(A) $X = CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2OH$, $Y = CH_3CH_2CH_2COOH$

(B) $X = CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2OH$, $Y = CH_3-\underset{\underset{CH_3}{|}}{CH}-COOH$

(C) $X = CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2OH$, $Y = CH_3-\underset{\underset{O}{||}}{C}-CH_2-CH_3$

(D) $X = CH_3-\underset{\underset{OH}{|}}{CH}-CH_2CH_3$, $Y = CH_3-\underset{\underset{O}{||}}{C}-CH_2-CH_3$

49. For the following oxides which is not correct ?

(A) TiO, CrO_2, ReO_3 behave as metals.

(B) ReO_3 possesses conductance and appearance like metallic copper.

(C) VO, VO_2, VO_3 and TiO_2 do not show metallic properties.

(D) Fe_3O_4, $MgFe_2O_4$, $ZnFezO_4$ show ferrimagnetism.

50. How mnay grams of urea should be added to 6 kg. of water to increase the boiling point from 373 K to 374 K ? Molal elevation constant for the solvent is 3.0K kgmol^{-1}. (At Wts = $H=1\ gmmol^{-1}$, $N=14\ gmmol^{-1}$, $O=16\ gmmol^{-1}$)

(A) 2.0 gms (B) 200 gms

(C) 20 gms (D) 0.2 gms

51. What is the symbolic representation of a standard cell made up of Ni and Cu electrodes.

$E^oNi^{2+}/Ni = -0.25V$, $E^oCu/Cu^{2+} = -0.34V$

(A) $^{\ominus}Ni_{(S)} / Ni^{2+}_{(aq)(1M)} // Cu^{2+}_{(aq)(1M)} / Cu^{\oplus}_{(S)}$

(B) $^{\ominus}Cu_{(S)} / Cu^{2+}_{(aq)(1M)} // Ni^{2+}_{(aq)(1M)} / Ni^{\oplus}_{(S)}$

(C) $^{\ominus}Ni^{2+}_{(aq)(1M)} / Ni_{(S)} // Cu_{(S)} / Cu^{2+\oplus}_{(aq)(1M)}$

(D) $^{\ominus}Cu^{2+}_{(aq)(1M)} / Cu_{(S)} // Ni_{(S)} / Ni^{2+\oplus}_{(aq)(1M)}$

52. From column 'A' find out the method of extraction and match with metals given in column 'B'. For this which is the correct pair ?

Column 'A'	**Column 'B'**
1. Mond Carbonyl	(x) Al
2. Van Arkel	(y) Ti
3. Hall Heraoult	(z) Ni

(A) (1-z), (2-x), (3-y) (B) (1-z), (2-y), (3-x)

(C) (1-x), (2-z), (3-y) (D) (1-y), (2-x), (3-z)

53. From which of the following reaction 1° alcohol is not formed ?

(A) $CH_3CH_2CHO \xrightarrow[H_2O]{NaBH_4}$ (B) $CH_3-CO-CH_3 \xrightarrow[H_2O]{NaBH_4}$

(C) $CH_3CH_2COOH \xrightarrow[H_2O]{LiAlH_4}$ (D) $CH_3COOCH_2CH_3 \xrightarrow[H_2O]{LiAlH_4}$

54. When 1.25 gm a non-volatile substance is dissolved in 20 gms water, the solution formed freezes at 271.94 K. What is the molecular weight of the substance ? ($Kf=1.86\ K\ Kg\ mol^{-1}$)

(A) $109.6\ gm\ mol^{-1}$ (B) $1.8gm\ mol^{-1}$

(C) $120.5\ gm\ mol^{-1}$ (D) $10.5gm\ mol^{-1}$

55. In the following reactions what are 'X' and 'Y' respectively ?

(i) $2P_{(S)} + 3H_{2(\ell)}O + 5O_{3(g)} \rightarrow 'X' + 5O_{2(g)}$

(ii) $2As_{(S)} + 3H_{2(\ell)}O + 5O_{3(g)} \rightarrow 'Y' + 5O_{2(g)}$

(A) $X=H_3PO_3,\ Y=H_3AsO_3$ (B) $X=H_3PO_2,\ Y=H_3AsO_4$

(C) $X=H_3PO_2,\ Y=H_3AsO_4$ (D) $X=H_3PO_4,\ Y=H_3AsO_3$

Section - C : 3 Marks Each. Q.No. 56 to 61

56. For the following statements write 'T' for true and 'F' for false and find the correct option.

(1) Stoichiometic defect is called intrinise or thermodynamic defect.
(2) In Schottky defect density of the substance does not decrease
(3) Frenkel defect does not change the density.
(4) In *AgCl*, *AgBr* and *AgI* Schottky defect is observed.

(A) TTFF (B) TFTF

(C) FTFT (D) TFFT

57. Phenol associates in water to form a dimer. When 0.6677 grams of phenol is dissolved in 35.5 grams of water, it depresses the freezing point by 0.215°K calculate the degree of association of phenol, if *Kf* of water is $1.85\ K\ Kgmol^{-1}$.

(A) *0.838* (B) *0.580*

(C) *8.38* (D) *0.930* .

58. If 0.835 gram *Ag* is deposited on cathode on pasisng 6 amperes current for 180 seconds in an aqueous solution of $AgNO_3$, what is the efficiency of the cell ? ($Ag=108\ gmmol^{-1}$)

(A) 64.51% (B) 60.98%

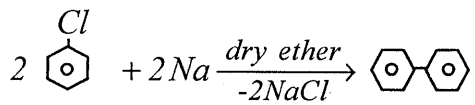
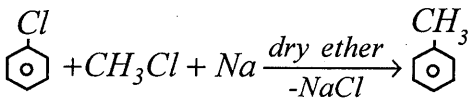
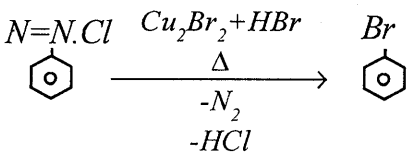
(C) 64.98% (D) 59.82%

59. Match the following pairs and findout the correct options.

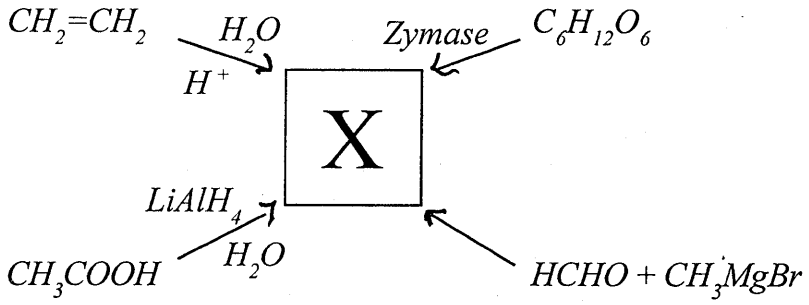
	Compound		**Uses**
1.	2nd element of 17th group	(p)	charring of sugar
2.	Phosphine	(q)	to sterilise drinking water
3.	H_2SO_4	(r)	Holme's signals
4.	Ozone	(s)	To prepare mustard gas

(A) (1-r), (2-p), (3-s), (4-q) (B) (1-s), (2-r), (3-p), (4-q)
(C) (1-p), (2-s), (3-q), (4-r) (D) (1-q), (2-p), (3-s), (4-r)

60. Match the following and findout correct options.

Reaction	**Final Product**
1. 	(p) Sand Meyer
2. 	(q) Grignard
3. 	(r) Wartz Fitting
4. $CH_3-I+Mg \xrightarrow[dry\ ether]{} CH_3-Mg-I \xrightarrow[aq.\ acid]{Hydrolysis\ H_2O} CH_4+Mg(OH)I$	(s) Fitting

(A) (1-r), (2-s), (3-p), (4-p) (B) (1-p), (2-r), (3-q), (4-s)
(C) (1-s), (2-r), (3-q), (4-p) (D) (1-s), (2-r), (3-p), (4-q)

61. 

What is 'X' in the above reaction ?

(A) CH_3COCH_3 (B) $HCOOCH_3$
(C) CH_3CH_2OH (D) CH_3CHO

Section - D : 4 Marks Each - Q.No. 62 to 64

62. At 300 k temperature and 1 bar pressure a current of 5.0 amperes is passed in an aqueous solution of K_2SO_4 for 30 minutes using Platinum electrodes, what is the volume of O_2 and H_2 gases liberated at the electrodes ? ($R=0.08314$ *lit atm* $k^{-1}mol^{-1}$)

(A) O_2 gas = 0.5736 liters, H_2 gas = 1.1472 liters

(B) O_2 gas = 1.1472 liters, H_2 gas = 0.5736 liters

(C) O_2 gas = 0.0233 liters, H_2 gas = 0.01165 liters

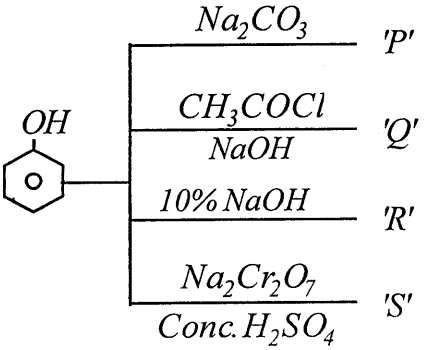
(D) O_2 gas = 0.01165 liters, H_2 gas = 0.0233 liters

63. Match the following and select the correct option.

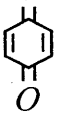
'A'	'B'
1. $H_2C=CH-CH_2-Cl$	(p) Used as antiseptic
2. Ethylene di chloride	(q) forms 2-enantiomers
3. Iodoform	(r) Allyl Chloride
4. 2-bromobutane	(s) geminal dihalide

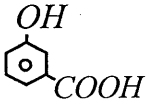
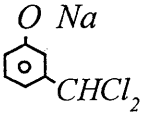
(A) (1-s), (2-q), (3-r), (4-p) (B) (1-s), (2-q), (3-p), (4-r)

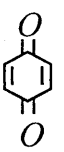
(C) (1-r), (2-s), (3-p), (4-q) (D) (1-p), (2-r), (3-q), (4-s)

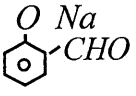
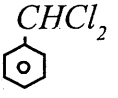
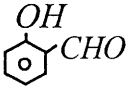
64. 

What are P, Q, R, S in the above reactions ?

(A) $P=$  $Q=$  $R=$  $S=$ 

(B) $P=$  $Q=$  $R=$  $S=$ No reaction

(C) P = No reaction $Q=$  $R=$  $S=$ 

(D) $P=$  $Q=$  $R=$  $S=$ 

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