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Grade : XII	**Subject : Chemistry**	**Marks: 70**
Date : 16/09/2019	**Empower-1 Worksheet**	**Ch-2,3,4,5,10,11,12,13**

General Instructions:

(i)   All questions are compulsory.

(ii) This question paper has four sections: Section A, Section B, Section C and Section D.

(iii) Section A contains questions of **one** mark each, section B contains questions of **two** marks each, section C contains questions of **three** marks each, and section D contains **three** of **five** marks each.

SECTION – A

1. CO (g) and H2 (g) react to give different products in the presence of different catalysts. The ability of the catalyst shown by these reactions is _____.

2. Out of chlorobenzene and benzyl chloride, which one gets easily hydrolysed by aqueous NaOH and why?

3. The IUPAC name of the following is _____.

$$CH_3 - \underset{\underset{C_2H_5}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{OH}{|}}{CH} - CH_3$$
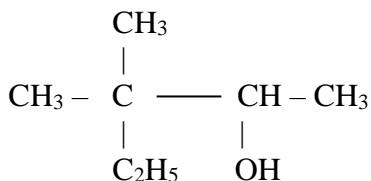
4. Which one of the following statement is incorrect about enzyme catalysis?
   a) Enzymes are denatured by ultraviolet rays and at high temperature
   b) Enzymes are least reactive at optimum temperature
   c) Enzymes are mostly proteinous in nature
   d) Enzyme action is specific

5. Which one of the following is an example for homogenous catalysis?
   a) Hydrogenation of oil
   b) Manufacture of ammonia by Haber's process
   c) Manufacture of sulphuric acid by Contact process
   d) Hydrolysis of sucrose in presence of dilute hydrochloric acid

6. Acid catalysed hydration of alkenes except ethene leads to the formation of
    a) mixture of secondary and tertiary alcohols
    b) mixture of primary and secondary alcohols
    c) secondary or tertiary alcohol
    d) primary alcohol

7. Among the alkenes which one produces tertiary butyl alcohol on acid hydration?
    a) $(CH_3)_2C = CH_2$ b) $CH_3 – CH = CH – CH_3$
    c) $CH_3 – CH_2 – CH = CH_2$ d) $CH3 – CH = CH_2$

8. A solution of acetone in ethanol
   a) shows a positive deviation from Raoult's law
   b) behaves like a near ideal solution
   c) obeys Raoult's law
   d) shows negative deviation from Raoult's law

9. Equimolar solution in the same solvent have
   a) same boiling point but different freezing point
   b) same freezing point but different boiling point
   c) same boiling point and same freezing point
   d) different boiling point and different freezing point

10. The highest electrical conductivity of the following aqueous solutions is of
    a) 0.1 M acetic acid
    b) 0.1 M chloroacetic acid
    c) 0.1 M fluoroacetic acid
    d) 0.1 M difluoroacetic acid
11. Saturated solution of KNO3 is used to make 'salt bridge' because
    a) velocity of K+ is greater than that of NO3-
    b) velocity of NO3- is greater than that of K+
    c) velocity of both K+ and NO3- are nearly the same
    d) KNO3 is highly soluble in water
12. Molarity of 0.2 N H2SO4 is
    a) 0.2   b) 0.4   c) 0.6   d) 0.1
13. Carbon tetrachloride has no net dipole moment because of:
    a) Its planar structure   b) Similar electron affinities
    c) Different electron affinities of C and Cl atoms   d) Its regular tetrahedral structure.
14. Only two isomeric monochloro derivatives are possible for:
    a) n-Butane   b) 2,4 Dimethlypentane   c) Benzene   d) 2 Methylpentane
15. The alkyl halide that can be made by free radical halogenation of alkanes
    a) RCl and RBr not RF or RI   b) RF, RCl and RBr not RI
    c) RF, RCl RBr and RI   d) RF, RCl and RI but not RBr.
16. The protecting power of lyophilic colloidal sol is expressed in terms of [CBSE AIPMT 2012]
    a) Critical miscelle concentration   b) Oxidation number
    c) Coagulation value   d) Gold number
17. Which one of the following is an example for homogenous catalysis?
    a) Hydrogenation of oil
    b) Manufacture of ammonia by Haber's process
    c) Manufacture of sulphuric acid by Contact process
    d) Hydrolysis of sucrose in presence of dilute hydrochloric acid
18. R— OH + HX ⟶ RX + H_2O
    In the above reaction, the reactivity of alcohols is
    a) Tertiary > secondary > primary   b) Tertiary < secondary < primary
    c) Tertiary > primary > secondary   d) Secondary > primary > tertiary
19. Ethyl alcohol on oxidation with $K_2Cr_2O_7$ gives
    a) Acetic acid   b) Acetaldehyde   c) Formaldehyde   d) Formic acid
20. In a zero-order reaction for every 10° rise of temperature, the rate is doubled. If the temperature is increased from 10°C to 100°C, the rate of the reaction will become
    a) 64 times   b) 128 times   c) 256 times   d) 512 times
21. For a first order reaction (A) → products the concentration of A changes from 0.1M to 0.025 M in 40minutes.
The rate of reaction when the concentration of A is 0.01 M is:
    a) 1.73×10^{-5} M/min   b) 3.47×10^{-4} M/min   c) 3.47×10^{-5} M/min   d) 1.73×10^{-4} M/min
22. An organic compound 'X' on treatment with Pyridium chlorochromate in dichloromethane gives compound 'Y'
    a) C_2H_5OH b) CH_3CHO c) CH_3COCH_3 d) CH_3COOH
23. E1, E2 and E3 are the emf values of the three galvanic cells respectively.
    (a) $Zn \mid Zn^{+2}_{1M} \parallel Cu^{+2}_{0.1M} \mid Cu$
    (b) $Zn \mid Zn^{+2}_{1M} \parallel Cu^{+2}_{1M} \mid Cu$
    (c) $Zn \mid Zn^{+2}_{0.1M} \parallel Cu^{+2}_{1M} \mid Cu$
    Which one of the following is true?
    a) E2 > E3 > E1   b) E3 > E2 > E1   c) E1 > E2 > E3   d) E1 > E3 > E2

24. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to
    a) Increase in both i.e. number of ions and ionic mobility of ions.
    b) increase in number of ions
    c) increase in ionic mobility of ions
    d) 100% ionization of electrolyte at normal dilution

25. The highest electrical conductivity of the following aqueous solutions is of
    a) 0.1 M acetic acid   b) 0.1 M chloroacetic acid
    c) 0.1 M fluoroacetic acid   d) 0.1 M difluoroacetic acid

26. In Freundlich Adsorption isotherm, the value of 1/n is
    a) 1 in case of physical adsorption   b) 1 in case of chemisorption
    c) Between 0 and 1 in all cases   d) between 2 and 4 in all cases

27. Diazo coupling is useful to prepare
    a) Pesticides   b) Dyes   c) Proteins   d)Vitamins

28. In a reaction, A + B → Product, rate is doubled when the concentration of B is doubled, and rate increases by a factor of 8 when the concentrations of both the reactants (Aand B) are doubled, rate law for the reaction can be written as
    a) Rate = k[A] [B]   b) Rate = k$[A]^2$[B]
    b) Rate = k[A]$[B]^2$ d) Rate = k$[A]^2[B]^2$

29. The time required for 100% completion of a zero order reaction is
    a) $\dfrac{a}{2k}$ b) ak   c) $\dfrac{2K}{a}$ d) $\dfrac{a}{k}$

30. In the hydrolysis of an organic chloride in presence of large excess of water,
    RCl + H_2O → ROH + HCl
    a) Molecularity and order of reaction both are 2
    b) Molecularity is 2 but order of reaction is 1
    c) Molecularity is 1 but order of reaction is 2
    d) Molecularity is 1 and order of reaction is also 1

31. The correct decreasing order of basic strength of gaseous NH_3, RNH_2, R_2NH, R_3N is
    a) $R_3N > R_2NH > RNH_2 > NH_3$ b) $NH_3 > RNH_2 > R_2NH > R_3N$
    c) $R_2NH > RNH_2 > R_3N > NH_3$ d) $RNH_2 > R_2NH > R_3N > NH_3$

SECTION-B

32. Explain why
    (i) the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride?
    (ii) alkyl halides, though polar, are immiscible with water?

33. How are the following conversions carried out?
    (i) Propene to propan-2-ol
    (ii) Benzyl chloride to Benzyl alcohol

34. Write the structure of the products when butan-2-ol reacts with the following:
    (a) CrO_3 (b) $SOCl_2$

35. Calculate the molarity of 9.8% (w/W) solution of H_2SO_4 if the density of the solution is 1.02 gmL^{-1}.
    (Molar mass of H_2SO_4 = 98g mol^{-1})

36. Calculate the degree of dissociation (α) of acetic acid if its molar conductivity (Λ_m) is 39.05 S cm^{2}mol^{-1}.
    (Given $\lambda^0(H^+)$=349.68 S cm^{2}mol^{-1} and $\lambda^0(CH_3COO^-)$=40.9 S cm^{2}mol^{-1})

37. Define half-life of a reaction. Write the expression of half-life for
    (i) zero order reaction and (ii) first order reaction.

38. Define the following terms:
    (i) Lyophilic colloid   (ii) Zeta potential   (iii) Associated colloids

39. Calculate the freezing point of a solution containing 60 g of glucose (Molar mass = 180 g mol^{-1}) in 250 g of water. (Kf of water = 1·86 K kg mol^{-1})

40. For the reaction

$2N_2O_5 (g) \longrightarrow 4NO_2 (g) + O_2 (g),$

The rate of formation of NO_2 (g) is 2·8 x 10^{-3} Ms^{-1}. Calculate the rate of disappearance of N_2O_5 (g).

41. How do you convert the following?
    (a) Ethanal to Propanone
    (b) Toluene to Benzoic acid

SECTION-C

42. A first order reaction is 50% completed in 40 minutes at 300 K and in 20 minutes at 320 K. Calculate the activation energy of the reaction. (Given: log 2 = 0·3010, log 4 = 0·6021, R = 8·314 JK^{-1} mol^{-1})

43. What happens when
    (a) A freshly prepared precipitate of Fe(OH)$_3$ is shaken with a small amount of FeCl$_3$ solution ?
    (b) Persistent dialysis of a colloidal solution is carried out?
    (c) An emulsion is centrifuged?

44. Give reasons:
(i) Acetylation of aniline reduces its activation effect.
(ii) CH_3NH_2 is more basic than $C_6H_5NH_2$.
(iii)Although –NH$_2$ is o/p directing group, yet aniline on nitration gives a significant amount of m-nitroaniline.

45. Write the chemical equations to illustrate the following name reactions:
(i) Wolf-Kishner reduction   (ii) Aldol condensation   (iii) Cannizzaro reaction.

46. An aromatic compound 'A' on treatment with aqueous ammonia and heating forms compound 'B' which on heating with Br$_2$ and KOH forms a compound 'C' of molecular formula C_6H_7N. Write the structurers and IUPAC names of compounds A, B and C.

47. Write the chemical reactions involved in the process of extraction of Gold. Explain the role of dilute NaCN and Zn in this process.

48. Differentiate between chemisorption and physisorption. (atleast 3 points each)

49. Classify the following as primary, secondary and tertiary alcohols:
    (i) CH_3-C$(CH_3)_2$CH$_2$OH   (ii) CH$_2$=CH-CH$_2$OH   (iii) CH$_3$-CH$_2$-CH$_2$OH

50. Answer the following questions:
     (i) What is meant by chirality of a compound? Give an example.
     (ii) Which one of the following compounds is more easily hydrolysed by KOH and why?
    (iii)Which one undergoes SN^2 substitution reaction faster and why? C_3H_7I or C_3H_7Cl.

51. An organic compound with molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On vigorous oxidation it gives 1,2 benzenedicarboxylic acid. Identify the compound.

52. Carry out the following conversions in not more than two steps:
     (i) Phenyl magnesium bromide to benzoic acid.
     (ii) Acetaldehyde to But-2-enal.
    (iii) Benzene to m-Nitroacetophenone.

SECTION-D

53. (a)Explain why the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride.
     (b) An optically active compound having molecular formula $C_7H_{15}Br$ reacts with aqueous KOH to give a racemic mixture of products. Write the mechanism involved in this reaction.

(c) Why phenol is more acidic than ethanol?

54. In a pseudo first order hydrolysis of ester in water the following results were obtained:

t/s	0	30	60	90
[Ester]/molL^{-1}	0.55	0.31	0.17	0.085

    (i)   Calculate the average rate of reaction between the time interval 30 to 60 seconds.

    (ii)   Calculate the pseudo first order rate constant for the hydrolysis of ester.

55. Calculate the standard electrode potential of Ni^{2+}/Ni electrode if emf of the cell is 0.059 V.

        $Ni_{(s)} | Ni^{2+} (0.01M) || Cu^{2+}(0.1 M) | Cu_{(s)}$ [Given $E^0 Cu^{2+}/Cu = +0.34$ V]

56. a) Write the rate law for a first order reaction. Justify the statement that half life for a first order reaction is independent of the initial concentration of the reactant.

   b) For a first order reaction, show that the time required for 99% completion of a first order reaction is twice the time required for the completion of 90%.

57. (a) Give reasons for the following:

    (i) Measurement of osmotic pressure method is preferred for the determination of molar masses of macromolecules such as proteins and polymers.

    (ii)Elevation of boiling point of 1M KCl solution is nearly double than that of 1 M sugar solution.

    (b) Calculate the freezing point of the solution when 31g of ethylene glycol is dissolved in 500g of water.   (K_f for water = 1.86 K kg mol^{-1})