للفاينال كيمياء (1)

Answer all questions .

Select the correct answer from the following :

1) **The normality of 0.5 M sulfuric acid (H_2SO_4) solution is :**
   a. 0.4 N
   b. 0.5 N
   c. 1.0 N
   d. 2.0 N

2) **The PH of a solution with (OH^-) = 10^{-5} M is :**
   a. 10^{-5}
   b. 10^{+5}
   c. 5.0
   d. 9.0

3) **To achieve octet rule, oxygen atom ($_8O$) needs :**
   a. 1 electron
   b. 2 electrons
   c. 3 electrons
   d. 5 electrons

4) **This reaction is a :**

$$2KI_{(aq)} + Pb(NO_3)_{2(aq)} \rightarrow 2KNO_{3(aq)} + PbI_{2(s)}$$

   a. Synthetic reaction
   b. Decomposition reaction
   c. Single displacement reaction
   d. Double displacement and precipitation reaction
   e. Neutralization reaction

5) **A one-liter vessel contains 1.80 moles NH_3 , 0.009 moles N_2 , AND 10.0 moles of H_2. Calculate equilibrium constant (K_c) of the following reaction ?**

$$N_2(g) + 3H_2(g) \leftrightarrow 2NH_3(g)$$

   a. $K_C = 0.460$
   b. $K_C = 1.360$
   c. $K_C = 3.600$
   d. $K_C = 0.036$
   e. $K_C = 0.360$
   f.

6) **In water (H_2O) molecule, the bonds are :**
   a. Ionic bonds
   b. H-bonds
   c. Coordinate bonds
   d. Covalent bonds
   e. Polar covalent bonds

7) **The general formula of cycloalkanes is :**
   a. $C_{2n}H_{2n+2}$
   b. C_nH_{2n}
   c. C_nH_{2n+2}
   d. C_nH_{2n-2}

8) **Calculate the molar concentration of a solution containing 2g NaOH in 250 mL of water ? (Na = 23, O = 16, H = 1)**
   a. 0.002 M
   b. 0.02 M
   c. 0.20 M
   d. 2.00 M
   e. 2.20 M

9) **Isotopes are atoms of the same element having the same numbers of :**
   a. Protons and different numbers of neutrons .
   b. Protons and different numbers of electrons .
   c. Neutrons and different numbers of electrons .
   d. Neutrons and different numbers of protons .
   e. Protons and different numbers of protons .

10) **10 g salt solution contains 2.5g of a given salt . The percent composition of the resultant solution is :**
   a. % = 4% (w/v)
   b. % = 0.25% (w/v)
   c. % = 0.25% (w/w)
   d. % = 25% (w/v)
   e. % = 25% (w/w)

11) **The ionic charge of an element containing 50 protons and 52 electrons is:**
   a. 2+
   b. 2-
   c. 4+
   d. 4-
   e. 3+

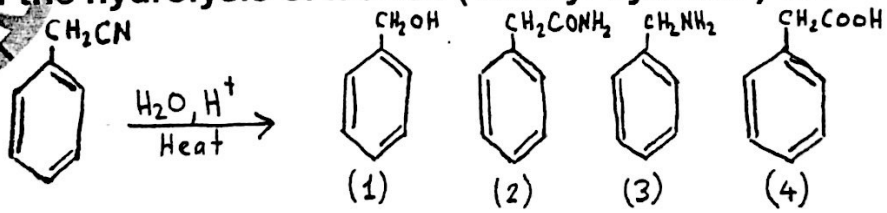
12) **..... is the number of moles of solute per kilogram of solvent .**
   a. Molality
   b. Molarity
   c. Percentage
   d. Normality

13) **The mass (weight) of 0.2 moles of fructose $C_6H_{12}O_6$ (C=12, O=16, H=1) is :**
   a. 0.2 g
   b. 2 g
   c. 18 g
   d. 36 g
   e. 180 g

14) **the solubility of gases :**
   a. increase with an increase in temperature
   b. decrease with an increase in temperature
   c. decrease with a decrease in temperature
   d. is not affected by temperature
   e. is slightly affected by temperature

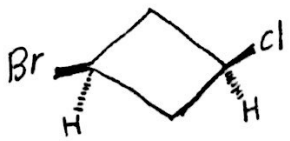
15) **which of the following is an example of an ionic bond :**
   a. H-Cl
   b. Cl-Cl
   c. NaCl
   d. CO_2
   e. CH_3CH_3

16) **The final product of the hydrolysis of nitriles (benzyl cyanide) is :**



   a. Compound 1
   b. Compound 2
   c. Compound 3
   d. Compound 4

17) **This structure stands for :**

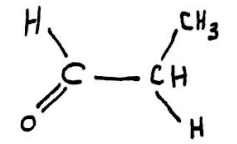


   a. Cis-1-bromo-3-chlorobutane
   b. Trans-1- bromo-3-chlorobutane
   c. Cis-1- bromo-3-chlorocyclobutane
   d. Trans-1- bromo-3-chlorocyclobutane

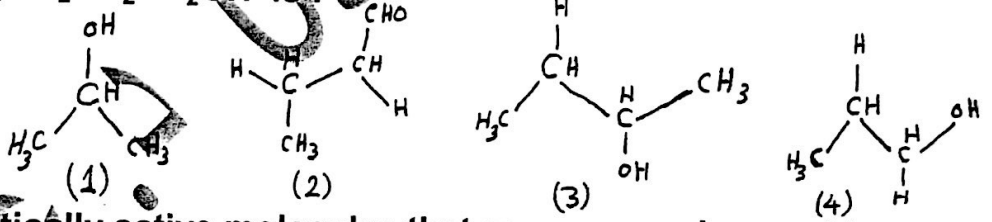
18) **Structural isomerism involves compounds with :**
   a. Different molecular formulae but with the same structural formulae
   b. Different molecular formulae but with the same special arrangement
   c. Different molecular formulae and different structural formulae
   d. The same molecular formulae but different structural formulae
   e. The same molecular formulae but different empirical formulae

19) **Stereoisomerism involves :**
   a. Optical and chain isomerism
   b. Geometrical and chain isomerism
   c. Geometrical and positional isomerism
   d. Geometrical and functional group isomerism
   e. Geometrical and optical isomerism

20) **The following pair of compounds exhibit :**
   a. Chain isomerism
   b. Functional group isomerism
   c. Positional isomerism
   d. Geometrical isomerism
   e. Optical isomerism

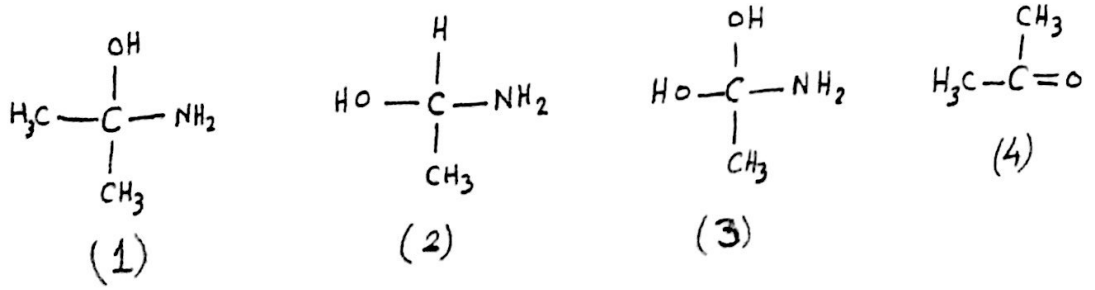


21) **The isomer of $CH_3CH_2CH_2CH_2OH$ is :**
   a. Compound 1
   b. Compound 2
   c. Compound 3
   d. Compound 4



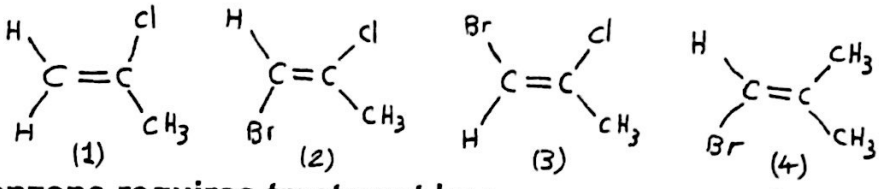
22) **.....are optically active molecules that are non-supeimposable Mirror image of each other .**
   a. enantiomers
   b. chain isomers
   c. geometrical isomers
   d. positional isomers

23) ..... is chiral compound
   a. Compound 1
   b. Compound 2
   c. Compound 3
   d. Compound 4



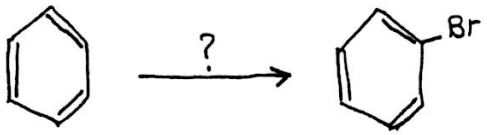
24) **Which of the following structures represents E configuration ?**

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



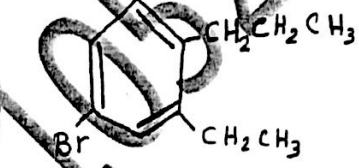
25) **Bromination of benzene requires treatment by :**

a. Br_2 / $FeBr_3$
b. KBr / $KBrO_3$
c. Br_2
d. $FeBr_3$
e. $KBrO_3$



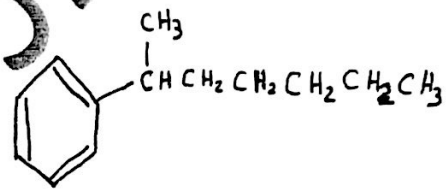
26) **This structure corresponds to :**

a. 1-propyl-2-ethyl-4-bromobenzene
b. 1-bromo-3-ethyl-4-bromobenzene
c. 5-bromo-1-ethyl-2-bromobenzene
d. 4-bromo-2-ethyl-1-propylbenzene



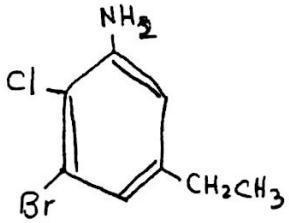
27) **This structure represents :**

a. 2-heptylbenzene
b. 6-heptylbenzene
c. 2-phenylheptane · 2-Phenylheptane
d. 6-phenylheptane · 6-Phenylheptane



28) **Which name matches the following structure ?**

a. 2-chloro-5-ethyl-3-bromoaniline
b. 5-ethyl-3-bromo-2-chloroaniline
c. 5-bromo-6-chloro-3-ethyl aniline
d. 3-bromo-2-chloro-5-ethylaniline

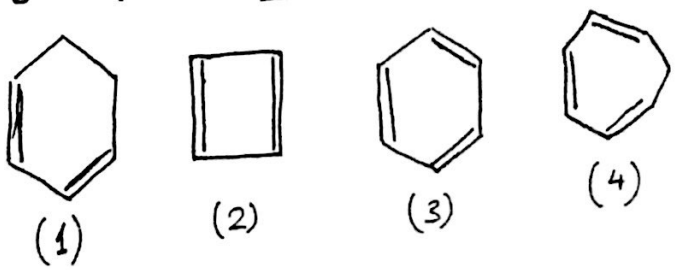


29) **Cyclobutadiene is antiaromatic because it is :**

a. Cyclic, planar, completely conjugated and have 4*n* π- electrons
b. Cyclic, planar, completely conjugated and have 4*n*+2 π-electrons
c. Noncyclic , planar, completely conjugated and have 4*n* π-electrons
d. cyclic , nonplanar, completely conjugated and have 4*n* π-electrons
e. cyclic , planar, unconjugated and have 4*n* π-electrons

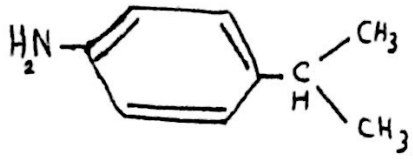
30) **Which of the following compounds satisfies Huckel's rule ?**

a. compound 1
b. compound 2
c. compound 3
d. compound 4



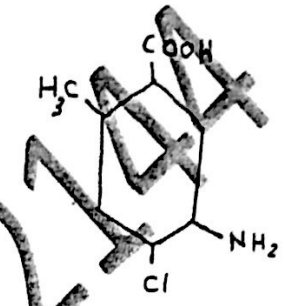
31) **This structure corresponds to :**

a. P-propylaniline
b. M-propylaniline
c. O-isopropylaniline
d. M-isopropylaniline
e. P-isopropylaniline



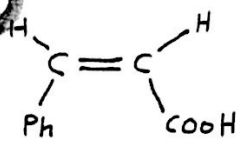
32) **The IUPAC nomenclature of this compound is :**

a. 4-chloro-5-amino-2-methylhexanoic acid
b. 5-amino-4-chloro-2-methylhexanoic acid
c. 2-methyl-4-chloro-5-aminocyclohexanecarboxylic acid
d. 5-amino-4-chloro-2-methyleyelohexanecarboxylic acid



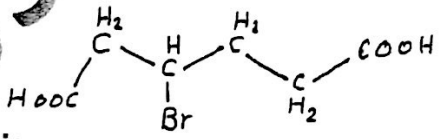
33) **This compound is :**

a. Trans-1-phenylprop-1-en-3-oic acid
b. Cis-1-phenylprop-1-en-3-oic acid
c. Cis-3-phenylprop-2-en-1-oic acid
d. Trans-3-phenyl-2-prop-2-en-1-oic acid



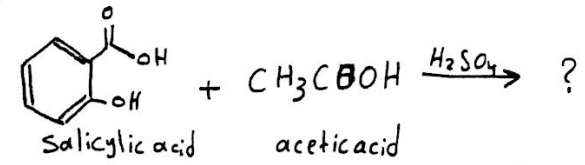
34) **The following dicarboxylic acid is named :**

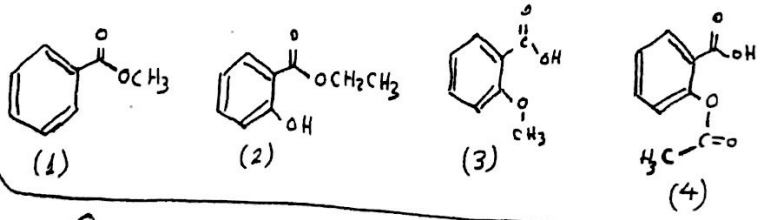
a. 3-bromohexanedioic acid
b. 4-bromohexanedioic acid
c. 3-bromo-5-carboxypentanoic acid
d. 4-bromo-5-carboxypentanoic acid



35) **The product of the following reaction is:**

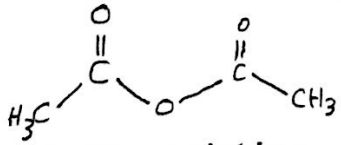
a. compound 1
b. compound 2
c. compound 3
d. compound 4





36) **This structure is named :**

a. Ethanoic anhydrides
b. Acyl halides
c. Acid amides
d. Diethyl ether
e. Esters

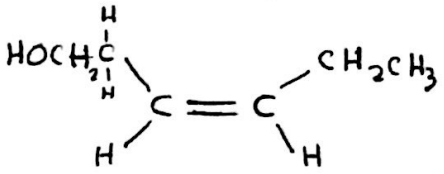


37) **The molecule with the highest boiling point is :**

a. 2-methoxy pentane
b. 2-pentanone
c. 2-pentanol
d. 2-pentane

38) **the IUPAC nomenclature for the following compound is :**

a. trans-hex-3-en1-ol
b. cis-hex-3-en-1-ol
c. trans-1-hydroxy-3-hexene
d. cis-1-hydroxy-3-hexene
e. cis-4-ethylbut-3-ene-1-ol



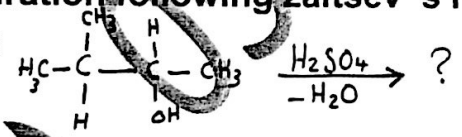
39) **glycols are compounds containing :**

a. two COOH groups on adjacent carbons
b. two OH groups on the same carbons
c. two OH groups on adjacent carbons
d. three OH groups on adjacent carbons

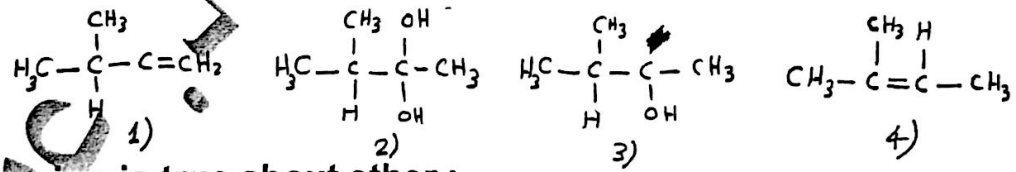
40) **which of the following is true about alcohol oxidation :**

a. primary alcohols are oxidized to ketones
b. secondary alcohols are oxidized to aldehydes
c. secondary alcohols resist oxidation
d. secondary alcohols are oxidized to ketones
e. tertiary alcohols are oxidized to carboxylic acids

41) **alcohols undergo dehydration following zaitsev 's rule to give the following major product :**



a. compound 1
b. compound 2
c. compound 3
d. compound 4



42) محذوف

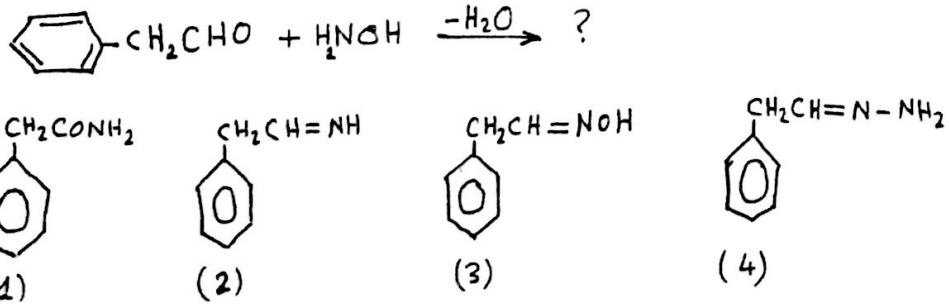
43) **Which of the following is true about ether :**

a. Ethers can form H-bonds with each other
b. Ethers are H-bond donors
c. Ethers are H-bond acceptors
d. Ether are both H-bond donors and acceptors
e. Ether are neither H-bond donors nor acceptors

44) محذوف

45) **Condensation of the following aldehyde with hydroxylamine gives :**

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4

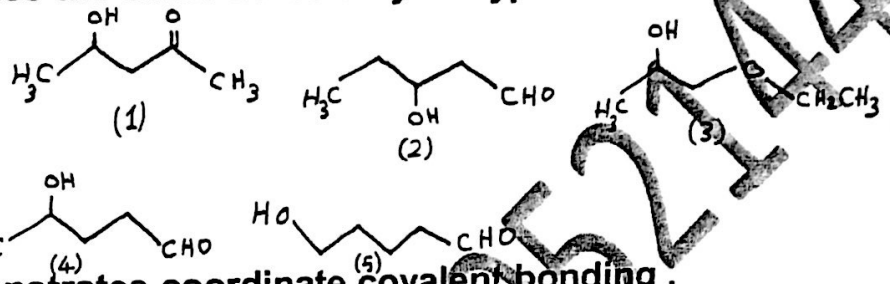


46) **The IUPAC nomenclature for $CH_3CH_2OCH_2CH_2CH_3$ is :**

a. Propyl ethyl ether
b. Ethyl propyl ether
c. 1-propoxyethane
d. 3-ethoxypropane
e. 1-ethoxypropane

47) **..... matches the same name 3-hydroxypentanal .**

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4
e. Compound 5



48) **..... demonstrates coordinate covalent bonding .**

a. NH_2-NH_2
b. NH_3-BF_4
c. NH_3-BF_3
d. NH_3-H_2O

49) **The triple bond consists of :**

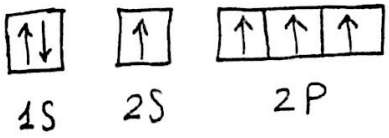
a. Three σ bonds
b. Three π bonds
c. One π and two σ bonds
d. Two π and one σ bonds

50) **In ethene (C_2H_4) the geometry around each carbon is :**

a. Linear planar
b. Trigonal planar
c. Trigonal nonplanar
d. Tetrahedral

51) **This electronic configuration represents :**

a. Carbon in a excited state
b. Carbon in a ground state
c. Nitrogen in a ground state
d. Nitrogen in a excited state
e. Oxygen in a ground state



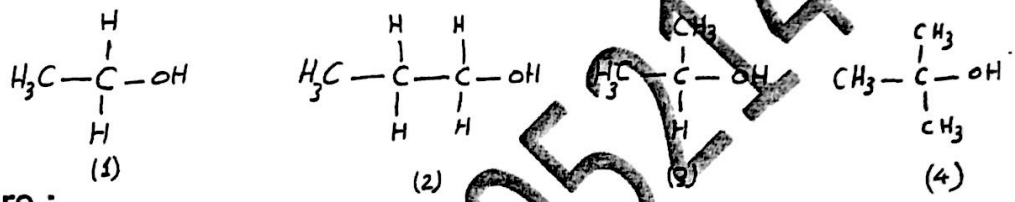
52) **Hybridization of the carbon atoms indicated by (*) in the following compounds is :**

a. Sp^3 , sp, sp^2
b. Sp^3 , sp^2 , sp
c. Sp^2 , sp , sp^3
d. Sp^2 , sp^3 , sp
e. Sp , sp^2 , sp^3

$CH_3\overset{*}{C}H_2CH_3$, $H_2\overset{*}{C}=CH_2$, $H_3C-\overset{*}{C}\equiv CH$

53) **..... is a secondary (2^o) alcohol**

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



54) **In ethyne ,there are :**

a. Two *sp* orbitals and one unhybridized *p* orbital
b. Two *sp* orbitals and one hybridized *p* orbital
c. one *sp* orbitals and two unhybridized *p* orbital
d. Two *sp* orbitals and two hybridized *p* orbital
e. Two *sp* orbitals and two unhybridized *p* orbital

55) **Aldol condensation reaction occurs in basic medium for any aldehyde containing α-hydrogen through**

a. Nucleophilic addition reaction
b. Electrophilic addition reaction
c. Nucleophilic substitution reaction
d. Elimination reaction
e. Hydrolytic reaction

56) **The missing (?) product in the following reaction is :**

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4

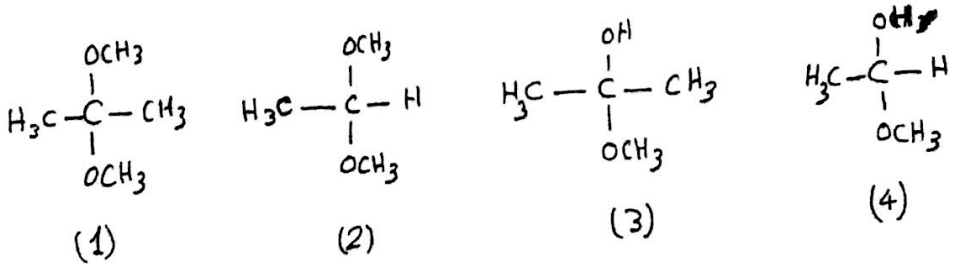
$CH_3CH_2CH_2\overset{O}{\overset{\|}{C}}CH_3 \xrightarrow{NaOH/I_2} ? + CHI_3$ (yellow ppt)

(1) $CH_3CH_2CH_2CH_2COOH$
(2) $CH_3CH_2CH_2COOH$
(3) $CH_3CH_2CH_2CH_2CH_3$
(4) $CH_3CH_2CH_2\overset{OH}{\overset{|}{C}}HCH_3$

57) **Addition of excess methanol to acetaldehyde under acidic condition gives the following acetal dervative of:**

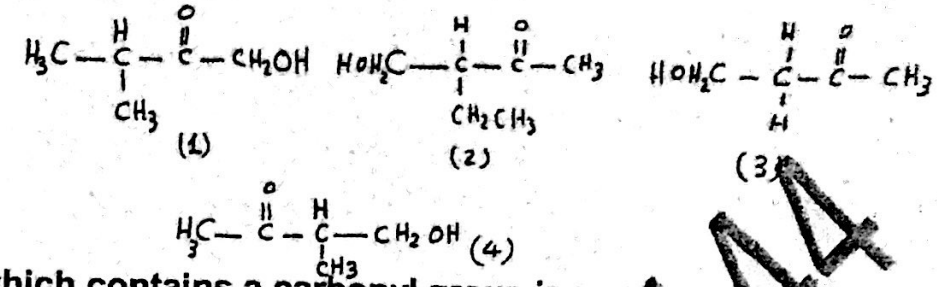
a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4

$CH_3CHO + 2CH_3OH \xrightarrow[-H_2O]{H^+} ?$



58) **Which of the following structures matches the name 4-hydroxy-3-methyl-2-butanone ?**

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



(1) (2) (3)

(4)

59) **The compound which contains a carbonyl group is :**

a. **Propanal**
b. **Porpanol**
c. **Propane**
d. **Dipropyl ether**

60) **Cannizzaro reaction occur between two molecule of :**

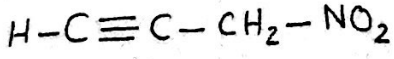
a. **Aldehyde containing α-hydrogen**
b. **Aldehyde containing no α-hydrogen**
c. **Acid containing α-hydrogen**
d. **Acid containing no α-hydrogen**
e. **Alcohol containing no α-hydrogen**

61) **What is the total number of sigma bonds in the following compound?**

a. 8
b. 10
c. 11
d. 15

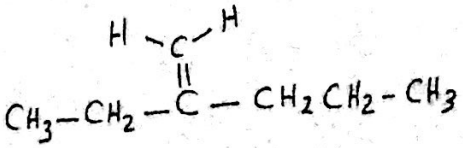
62) **What is the total number of π bonds in the following compound**

a. 1
b. 2
c. 3
d. 4

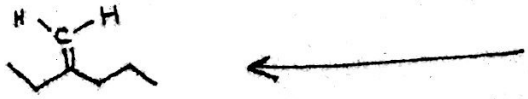


63) **What is the best name for the following compound ?**

a. Cis -2-methyl-1-pentene
b. Trans-4-ethyl-4-pentene
c. Cis-2-ethyl-1-pentene
d. 2-ethyl-1-pentene

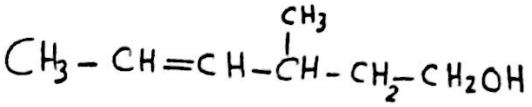


أو ممكن يجي بالشكل التالي :



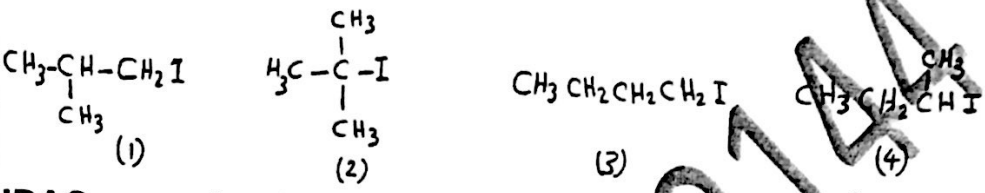
64) What is the IUPAC nomenclature for the following structure ?

a. 4-methyl-2-hexaneol
b. 4-methyl Hex-2-en-1-ol
c. 3-methyl Hex-4-en-1-ol
d. 3-methyl Hexanol



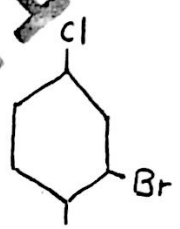
65) Which of the following matches tert-butyl iodide?

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



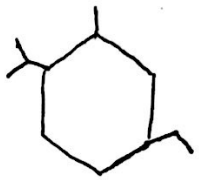
66) What is the IUPAC name for this compound?

a. 2-bromo-4-chloro cyclohexane
b. 3-bromo-1-chloro-4-methyl cyclohexane
c. 2-bromo-4-chloro-1-methyl cyclohexane
d. 2-bromo-4-chloro-1-methyl benzene



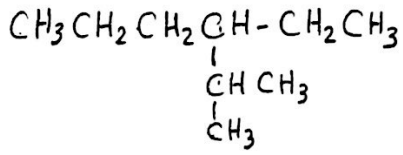
67) What is the IUPAC name for this compound?

a. 3-ethyl-2-isopropyl-1-methyl cyclohexane
b. 3-ethyl-6-isopropyl-1-methyl cyclohexane
c. 6-ethyl-1-isopropyl-2-methyl cyclohexane
d. 5-ethyl-2-isopropyltoluene



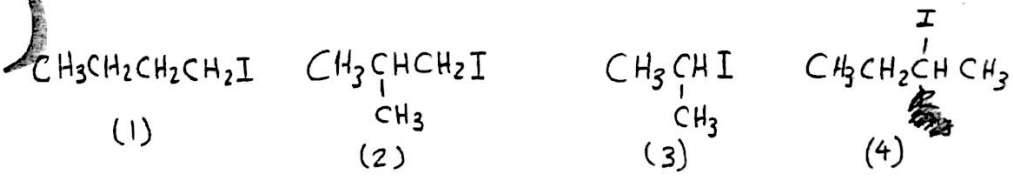
68) What is the IUPAC name for this compound?

a. 3-ethyl-2-methylhexane
b. 3-isopropylhexane
c. 2-methyl-3-ethylhexane
d. 3-propylhexane



69) Which of the following structures matches the name iso-butyl iodide?

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



70) All the following classified as dihydric alcohols <u>Except</u>

a. Ethylene glycol
b. Propylene glycol
c. Glycerol
d. 1,2-ethanediol

71) **The missing (?) product in the following reaction is:**

$CH_3CH_2OH \xrightarrow[180°C]{H_2SO_4} ? + H_2O$

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4

CH_3-CH_3 (1)

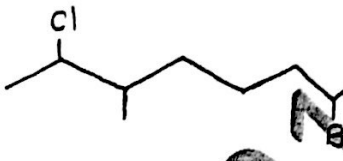
$CH\equiv CH$ (2)

$CH_2=CH_2$ (3)

CH_3-CHO (4)

72) **What is the IUPAC name for this compound?**

a. 7-bromo-2-chloro Octane
b. 7-bromo-2-chloro-3-methyloctane
c. 2-bromo-7-chloro-3-methyloctane
d. 7-bromo-2-chloro-3-methylheptane



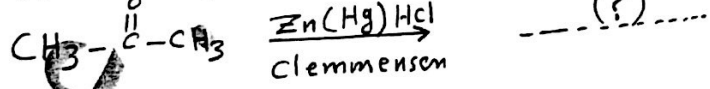
73) **Which of the following is a secondary alcohol?**

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4

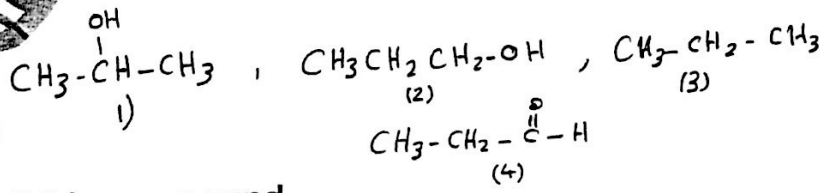
74) **What is the common name of $CH_3CH_2\underset{CH_3}{\underset{|}{C}}HOH$**

a. Isopropyl alcohol
b. 2-butanol
c. Sec-butyl alcohol
d. Iso-butyl alcohol

75) **The missing (?) product in the following reaction is:**

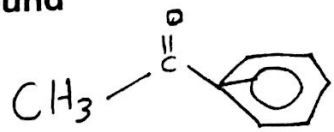


a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



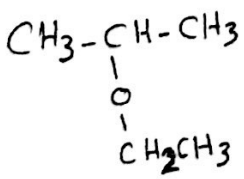
76) **What is the name of this compound**

a. Methyl cyclohexyl ketone
b. Benzo acetone
c. Benzene carbaldehyde
d. Acetophenone



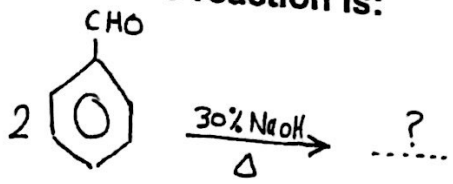
(learning Activity) نشاط تعلمي

ما اسم هذا المركب ؟ ←

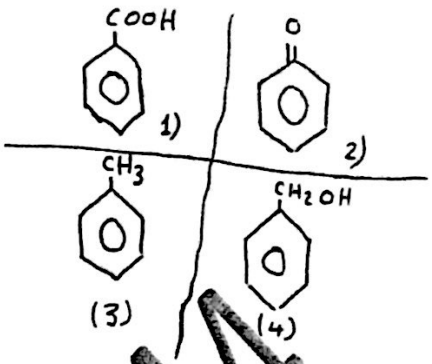


(2- ethoxy propane) or in common name: (ethyl isopropyl ether)

77) **The reduction product for this reaction is:**



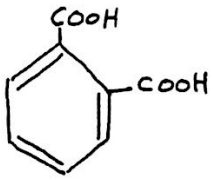
a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



78) **Aldehydes and ketones react with alcohols in presence of an acid to give:**
a. Hemiacetic acid or hemiketone
b. Carboxylic acid or ketone
c. Carbaldehyde or carboxylic acid
d. Hemiacetal or hemiketal

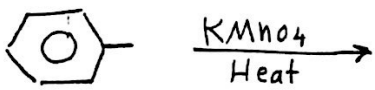
79) **about Tollen's test for aldehydes all of the following is true <u>Except:</u>**
a. the silver precipitate like silver mirror
b. butanal reduced for primary alcohol
c. butanal oxidized to give butanoic acid
d. Aldehyde react with (AgNO3 , NH4OH) to give corresponding carboxylic acid

80) **What is the IUPAC name of this compound ?**

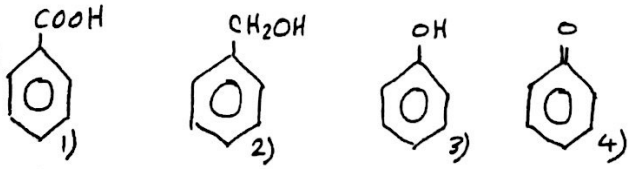


a. Benzene-1,2-dicarboxylic acid
b. Benzene dicarboxylic acid
c. Salicylic acid
d. Phthalic acid

81) **The final product for oxidation of arenes as the following reaction is:**



a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



82) **All of the following about acid chlorides is true <u>EXCEPT :</u>**
a. Acid chlorides react with alcohol to form corresponding esters
b. Preparation of acid chlorides came from reaction of carboxylic acid with thionyl chloride
c. Acid chlorides react with ammonia and amines to give pyridine
d. Acid chlorides react with ammonia and amines to give amides

83) What is the name of this compound ?

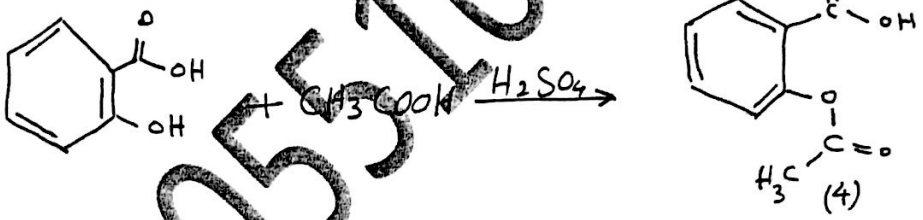
a. 2-methylbutanoyl chloride
b. 3-methylbutanoyl chloride
c. 2-methylbutanoic chloride
d. Isopropyl ethanoyl chloride

84) What is the IUPAC name of Aspirin?

a. Methyl salicylate
b. acetyl salicylic acid
c. ethyl salicylic acid
d. Acetyl benzoic acid

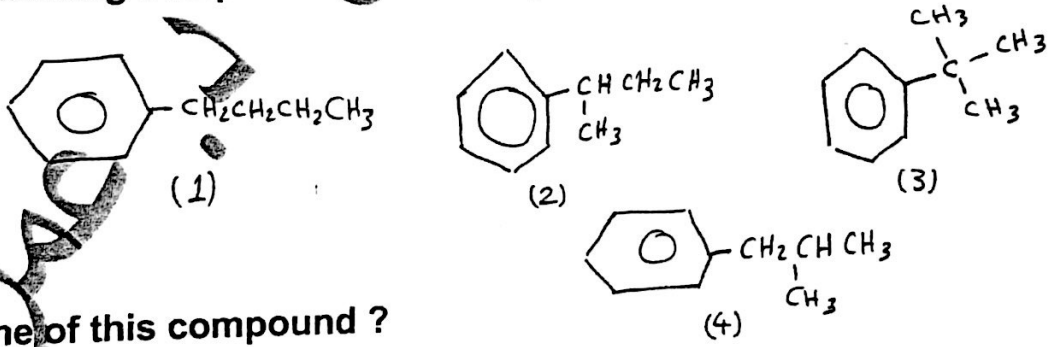
85) What is the missing (?) product of the following reaction ?

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4



86) Which of the following compounds is sec-butyl benzene ?

a. Compound 1
b. Compound 2
c. Compound 3
d. Compound 4

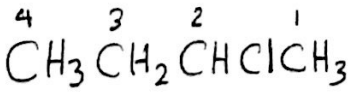


87) What is the name of this compound ?

a. Propyl toluene
b. M- propyl toluene
c. Isopropyl benzene
d. P-isopropyl toluene

88) Which carbon atom is a chiral center?

a. Carbon number 1
b. Carbon number 2
c. Carbon number 3
d. Carbon number 4



89) **All of the following is positional isomers EXCEPT:**

a. 1-chloropentane , 2-chlorobutane
b. 1-butanol , 2-butanol
c. 1-chloropentane , 2-chloropentane
d. Pent-1-ene , Pent-2-en

90) **2-bromo-2-methylbutane is an achiral molecule because it :**

a. Has 4 different groups
b. Has 2 similar groups
c. Non-superimposable and mirror image
d. Rotate the plane polarized light to the right

91) **For measured the rotation of light by optical isomers we used a :**

a. Voltmeter
b. Ammeter
c.Polarimeter
d. Lux meter

Q	A	Q	A	Q	A	Q	A	Q	A
1	c	20	b	39	c	58	d	77	d
2	d	21	c	40	d	59	a	78	d
3	b	22	a	41	d	60	b	79	b
4	d	23	b	42	x	61	c	80	a
5	e	24	c	43	c	62	b	81	a
6	e	25	d	44	x	63	d	82	c
7	b	26	d	45	c	64	c	83	b
8	c	27	c	46	e	65	b	84	b
9	a	28	d	47	b	66	c	85	d
10	e	29	a	48	c	67	c	86	b
11	b	30	c	49	d	68	a	87	d
12	a	31	e	50	b	69	b	88	b
13	d	32	d	51	a	70	c	89	a
14	b	33	c	52	b	71	c	90	b
15	c	34	a	53	c	72	d	91	c
16	d	35	d	54	e	73	a		
17	c	36	a	55	a	74	c		
18	d	37	c	56	b	75	c		
19	e	38	b	57	b	76	d		

1) **Organic chemistry is the chemistry of :**
   a. Halide compounds
   b. Metallic compounds
   c. Carbon compounds

2) **Compounds composed of only carbon and hydrogen are known as :**
   a. Carbon hydrides
   b. Hydrocarbons
   c. Hydrogen carbides

3) **Vital biological molecules in living systems are largely :**
   a. Metallic compounds
   b. Inert elements
   c. Organic compounds

4) **Which of atomic orbitals overlap to form the C-H bonds in ethane ?**
   a. a 1s atomic orbital of H and a $2sp^3$ atomic orbital of C
   b. a 1s atomic orbital of H and a $2sp$ atomic orbital of C
   c. a 1s atomic orbital of H and a 2s atomic orbital of C
   d. a 1s atomic orbital of H and a $2p$ atomic orbital of C

5) **What are the orbitals which overlap to form the carbon-carbon bond in ethane ?**
   a. Two carbon $2sp^2$ atomic orbitals
   b. Two $2sp^3$ atomic orbitals
   c. Two carbon two $2sp^3$ molecular orbitals
   d. Two $2p_x$ atomic orbitals

6) **What atomic orbitals of carbon are used for the formation of the sigma bond component of the C-C triple bond ?**
   a. $2p$ atomic orbitals
   b. $2sp^2$ atomic orbitals
   c. $2sp$ atomic orbitals
   d. $2sp^3$ atomic orbitals

7) **What are the relative lengths of the C-H bonds, in ethane, ethene, and ethyne ?**
   a. CH(ethane) = CH(ethene) > CH(ethyne)
   b. CH(ethane) < CH(ethene) = CH(ethyne)
   c. CH(ethane) = CH(ethene) = CH(ethyne)
   d. CH(ethane) > CH(ethene) > CH(ethyne)
   e. CH(ethane) < CH(ethene) < CH(ethyne)

8) **What would be the predicted shape for the carbon atoms in ethane, C_2H_4 ?**
   a. Linear
   b. Trigonal planar
   c. Tetrahedral
   d. Trigonal bipyramidal

9) **Based on your knowledge of cis- and trans-cycloalkanes, what would the alkene shown below be ?**
   a. Trans
   b. Cis
   c. This alkene is neither cis- or trans
   d. This molecule is not analkene

10) **What would be the predicted shape for the carbon atoms in ethyne, C_2H_2 ?**
   a. Linear
   b. Trigonal planar
   c. Tetrahedral
   d. Trigonal bipyramidal

11) **The bond angles in a saturated hydrocarbon of methane is typically :**
   a. 120°
   b. 90°
   c. 109.5°
   d. 180°

12) **What are the relationships between double and single bonds ?**
   a. Double bonds are longer, and therefore, stronger than single bonds
   b. Double bonds are longer, and therefore, weaker than single bonds
   c. Double bonds are shorter, and therefore stronger than single bonds
   d. Double bonds are shorter, and therefore, weaker than single bonds

13) **The compound $CH_3CH_2CH_2Br$ is known as 1-bromopropane or :**
   a. Propyl bromide
   b. 3-bromopropane
   c. Propyl bromine
   d. Butyl bromide

14) **Alcohols have higher boiling points than alkanes of comparable molecular weight because of :**

a. Hydrogen bonding
b. Diaxial interactions
c. Steric strain
d. Hyperconjugation

15) **Which of the following has the highest boiling point ?**

a. CH_3-O-CH_3
b. CH_3-CH_2-OH
c. CH_3-CH_2-CH_3

16) **The Williamson ether synthesis produces ethers by reacting an :**

a. Alcohol with a metal
b. Alkoxide with a metal
c. Alkoxide with an alkyl halide

17) **The alcohols that contains two alkyl groups attached to the carbon bonded to the -OH group i ,**

a. Primary alcohol
b. Secondary alcohol
c. Tertiary alcohol
d. Quaternary alcohol

18) **Provide the IUPAC name for $CH_3(CH_2)_3CH(OH)CH_2(OH)$**

a. 1-Hexanol
b. 2-Hexanol
c. 2-Hexanal
d. 1,2-Hexanediol
e. 5,6-Hexanediol

19) **Aldehydes can be formed from the respective alcohols by :**

a. Hydration
b. Dehydration
c. Hydrolysis
d. Oxidation
e. Reduction

20) **Aldehydes and ketones con be formed by the ..... of alcohols .**
a. Combustion
b. Oxidations
c. Reduction
d. Isomerization
e. All of the above

21) **The common name of ethanoic acid is :**
a. Propionic acid
b. Formic acid
c. Ethanic acid
d. Acetic acid

22) **The IUPAC name of the product from the reaction of ethanol and butyric acid is :**
a. Butyl ethanoate
b. Ethyl butanoate
c. Methy pentanoate
d. Ethyl butyrate

23) **Which of the following is correct order of oxidation for an alkane ?**
a. Alkane → alcohol → carboxylic acid → aldehyde
b. Alkane → aldehyde → alcohol → carboxylic acid
c. Alkane → carboxylic acid → aldehyde → alcohol
d. Alkane → alcohol → aldehyde → carboxylic acid
e. Alkane → aldehyde → carboxylic acid → alcohol

24) **What are the products of the reaction between methanol and ethanoic acid**
a. Ethyl methanoate and water
b. CH_3COOCH_3 and hydrogen
c. Methyl ethanoate and water
d. CH_3COOCH_3 and hydrogen

25) **Esterification is a .....**
a. Condensation reaction
b. Irreversible reaction
c. Addition reaction
d. Neutralization reaction

26. The general formula of alkanes is:

a. C_nH_{2n+2}
b. C_nH_{2n}
c. C_nH_{2n-2}
d. C_nH_{2n+1}

27. Which of the following is true about alcohol oxidation:

a. primary alcohols are oxidized to adehydes
b. secondary alcohols are oxidized to aldehydes
c. tertiary alcohols are oxidized to aldehydes
d. tertiary alcohols are oxidized to carboxylic acids

28. Combination of one s orbital and three p orbitals of carbon gives four equivalents :

a. SP^3, atomic orbitals
b. SP^2 atomic orbitals
c. SP, atomic orbitals
d. SP^4 atomic orbitals

29. The triple bond consists of:

a. three σ bonds
b. three π bonds
c. one π and two σ bonds
d. two π and one σ bonds

30. In ethene (C_2H_4), the geometry around each carbon is:

a. linear planar
b. trigonal planar
c. trigonal nonplanar
d. tetrahedral

31. The compound which contains a hydroxyl group is:

a. propanol
b. propane
c. propyne
d. propene

32. Glycols are compounds containing:

a. two COOH groups on the same carbon
b. two OH groups on the same carbon
c. two OH groups on adjacent carbons
d. two COOH groups on adjacent carbons

33. Cis-trans isomers are the result of

a. restricted rotation about double bonds
b. restricted rotation about triple bonds
c. free rotation about single bonds
d. no rotation about single bonds

34. CH_3CH_2F is called

a. ethyl fluoride
b. methyl fluoride
c. ethyl chloride
d. methyl chloride

35. Alkenols is

a. unsaturated alcohols
b. saturated alcohols
c. unsaturated acids
d. saturated acids

36. Ethers are

a. H-bond donors
b. H-bond acceptors
c. both H-bond donors and acceptors
d. neither H-bond donors nor acceptors

37. The IUPAC nomenclature for $CH_3OCH_2CH_2CH_3$ is:

a. propyl methyl ether
b. 1-propoxymethane
c. ethyl propyl ether
d. 1-methoxypropane

Q	A	Q	A	Q	A	Q	A
1	c	11	c	21	d	31	a
2	b	12	c	22	b	32	c
3	c	13	a	23	d	33	a
4	a	14	a	24	c	34	a
5	c	15	b	25	a	35	a
6	c	16	c	26	a	36	b
7	d	17	b	27	a	37	d
8	b	18	d	28	a		
9	b	19	d	29	d		
10	a	20	b	30	b		

1. **How many electron are in $_{26}Fe^{2+}$**

   a- 26 b- 28 c- 24 d- 23

2. **Au is the symbol of gold , Fe symbol of iron and pb the symbol of :**

   a- Bromine b- boron c – lead d- phosphorus

3. **The mass number is :**

   a) number of proton in nucleus

   b) number of electron in atom

   c) number of proton + number of neutrons

   d) number of neutrons only

4. **the electron arrangement X 2,8,4 refer to:**

   a- P atom b- Si atom c- C atom d- S atom

5. **$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$ this reaction is a double displacement and :**

   a- Neutralization b- precipitation c- combustion d- synthesis

6. **In periodic table From right to left across the period :**

   a- Atomic radius decrease b- electronegativity increase c- electropositivity increase

7. **Factors affecting in solubility are nature of solute/solvent and temperature and:**

   a- Density b- pressure c- molecular weight d-number of electrons

8. **An example for solid/solid solution is:**

   a- Soda water b- bronze c- dental filling d- air

9. **Isotopes are atoms of :**

   a- The same element with the same numbers of electrons.

   b- The different element with different numbers of neutrons

   c- The same element with the different numbers of neutrons.

   d- The same element with the same numbers of neutrons.

10. **In the periodic table , alkali metals and alkali earth metals are represented respectively in groups:**

    a- 1 and 2 b- 2 and 1 c- 1 and 17 d- 1 and 3

11. the number of electrons , protons and neutrons respectively in $_{34}{}^{78}Se^{2-}$

a- 34 , 34 , 44

b- 36 , 34 , 44

c- 36 , 34 , 78

d- 32 , 34 , 44

12. Across agiven period (from left to right) in the periodic table :

a) Electropositivity increase and electronegativity decrease

b) Electropositivity decrease and electronegativity increase

c) Both Electropositivity and electronegativity increase

d) Atomic radius increase

13. The molecular mass of a given molecule is 180 and the empirical formula of it CH_2O

محذوف **Calculate the molecular formula (atomic mass of C=12 H=1 O=16)**

a- $C_4H_8O_4$ b- $C_6H_{12}O_6$ c- $C_2H_4O_2$ d- $C_6H_{10}O_6$

14. The names of these compounds :K_2O , $FeCl_2$, NF_3 respectively are :

a- Potassium oxide , iron(II) chloride , nitrogen fluoride

b- Potassium oxide , lead(II) chloride , nitrogen tri-fluoride

c- Potassium oxide , iron(II) chloride , nitrogen tri-fluoride

d- Di-Potassium mono-oxide , iron (II)fluoride , nitro fluoride

15. If a neutral atom loses one or more electrons it becomes

a- Anion b- cation c- molecules d- compound

16. Substance that yields hydrogen ions when dissolved in water

a- Basic b- solvent c- acid d- element

17. To achieve octet rule, nitrogen atom ($_7N$) :

a- Gain 2 electrons

b- Gain 3 electrons

c- Lose 5 electrons

d- Share 7 electrons

18. Types of bonds in Na_2CO_3 are :

a- hydrogen bonds .

b- covalent bonds.

c- ionic and covalent bonds .

d- coordinate covalent bonds.

19. ..... Demonstrates coordinate covalent bonding:

a- NH_2- NH_2 b- NH_3- H_2O c- NH_3- BF_3

20. Covalent bond is characterized by the following <u>EXCEPT :</u>

a- It can be single, double or triple bonds

b- It is formed between nonmetals with a large difference in electronegativity

c- Bond is formed by sharing of electrons

d- They are not conductors

21. The bond between water molecules is :

a- Hydrogen bond b- covalent bond c- ionic bond d- electrostatic bond

22.The bond between NaCl molecules is :

a- Hydrogen bond b- covalent bond c- ionic bond d- electrostatic bond

23. The bond between ammonia and boron tri-fluoride is :

a- Van der waals b- coordinate covalent bond c- ionic bond d- H-bond

24. The type of bond between water atoms :

a- Ionic b- polar covalent c- Hydrogen bond d- electrostatic

25. An example of ionic bond :

a- $CaCl_2$ b- CO_2 c- F_2 d- $C_6H_{12}O_6$

26. Force of attraction and repulsion between molecules is :

a- Intermolecular interaction

b- Ionic attraction

c- Intramolecular interaction

d- Covalent bonding

27. The weakest intermolecular interactions caused by the formation of temporary dipoles

a- Van der waals b- covalent bond c- ionic bond d- hydrogen bond

28. Indicates the type and number of atoms in a molecule

a- Empirical formula b- molecular formula c- structural formula

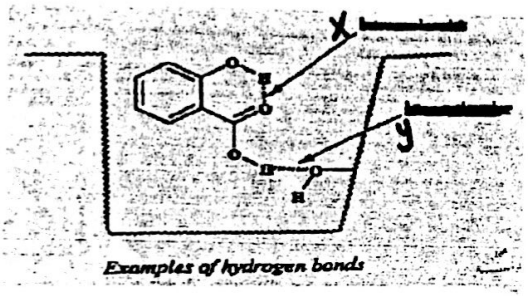
29. The maximum number of electrons in third energy level(n=3) :

a- 2 b- 8 c- 32 d- 18

30. The ionic charge of $_{12}$Mg atom is :

a- 2^- b- 2+ c- 3+ d- 1+

31. the bonds X and Y in these picture respectively is :



a- Intramolecular H-bond and intermolecular H-bond

b- Intermolecular H-bond and intramolecular H-bond

c- Ionic bond , covalent bond

d- Both are intermolecular H-bonds

32. Single – displacement reactions are :

a- Oxidation-reduction reactions and precipitation reaction

b- Precipitation and neutralization reactions

c- Oxidation- reduction reactions

d- Combustion reactions

33. The metals Ca and Ba can displace H_2 from

a- Water only

b- Acids only

c- Steam and acids and water

d- Can not displace H_2

34. One of the following choices are metals can displace H_2 from steam :

a- Aluminum and lead

b- Tin and nickel

c- Aluminum and zinc

d- Silver and gold

35. The least reactive metals such as silver and gold :

a- Displace H_2 from all sources

b- Displace H_2 from acids

c- Displace sodium atom from its compound in solution

d- Cannot displace H_2 from any sources

36. This reaction : $2AgNO_{3(aq)} + Cu_{(s)} \rightarrow Cu(NO_3)_{2(aq)} + 2Ag_{(s)}$ is single displacement and:

a- Synthetic reaction

b- Oxidation-reduction reaction

c- Acid base reaction

d- Decomposition reaction

37. The product of the following reaction $2Al + 3Cu(NO_3)_2 \rightarrow$ are :

a- $2Al(NO_3)_2 + 3Cu$

b- $2Al(NO_3)_3 + 2Cu$

c- $3Al(NO_3)_3 + 2Cu$

d- $2Al(NO_3)_3 + 3Cu$

38. In butane combustion reaction to balance O_2 we put front of it :

a- 3 b- 26 c- 13 d- 16

39. This reaction : $N_2O_4 \rightarrow 2NO_2$ is :

a- Oxidation /reduction

b- Decomposition

c- Neutralization

d- Precipitation

40. To complete this reaction $Li + H_2O \rightarrow$ ..... $+ H_2$ put in space :

a- Li_2O b- LiOH c- $Li(OH)_2$ d- $LiOH_2$

41. In this equation $ZnCl_2 + Cu \rightarrow CuCl_2 + Zn$ the(Zn) in reactant :

a- Reduced b- oxidized c- non metal d- reducing agent

42. What is the all balanced equation for this reaction : $KOH + H_2SO_4 \rightarrow$

a- $KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$

b- $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 3H_2O$

c- $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$

d- $3KOH + H_2SO_4 \rightarrow K_3SO_4 + 6H_2O$

43. A special type of double displacement reactions that involve acid and base:

a- Oxidation /reduction

b- Decomposition

c- Neutralization

d- Precipitation

44. When X loses electrons X is oxidized and so X is :

a- Oxidizing agent b- reducing agent c- X deceases in O.N d- acid

45. Aqueous reactions between soluble compounds to produces insoluble compound

a- Oxidation /reduction reaction

b- Decomposition reaction

c- Neutralization reaction

d- Precipitation reaction

46. The symbol (S) in reactions says the compound is solid and (aq) says

a- compound is liquid

b- compound in gaseous state

c- compound is taking place in water solution

d- compound is precipitate

47. $C_3H_8 + \ldots^{x} \ldots O_2 \rightarrow CO_2 + H_2O$ to balance this reaction displace x with :

a- 6 b- 8 c- 4 d- 5

48. All of the following are true about the activity series of the metals <u>EXCEPT</u>:

a- The four nonmetals below H_2 cannot displace it from any source .

b- Metals is arranged with strongest reducing agent at the top

c- Metals is arranged with the least active ones at the bottom

d- Metals is arranged with the most active metal at the top

49. Combustion reaction is characterized by the following <u>EXCEPT</u>

a- It is called burning reaction

b- Its products are always carbon dioxide and water

c- It is a reaction between carbohydrate and oxygen gas

d- It is used to heat homes and run automobiles

50. The sum of oxidation numbers (O.N) values for the atoms in a polyatomic ion equals :

a- Zero b- numbers of atoms c- +1 always d- ion charge

51. The oxidation number for oxygen equal -1 :

a- In all compounds

b- In peroxides

c- When it combination with sulfur

d- In combination with non metals

52. The oxidation number of Sulfur in sulfur trioxide is :

a- +6 b- +4 c- +2 d- +1

53. The O.N of nitrogen in nitric acid is :

a- +3 b- +5 c- +1 d- +6

54. The O.N of carbon in hydrogen carbonate ion (bicarbonate) equal :

a- +3 b- +5 c- +4 d- +6

55. Recognizing oxidizing and reducing agent in this reaction : $2H_2 + O_2 \rightarrow 2H_2O$

a- H_2 is oxidizing agent and O_2 reducing agent

b- Both H_2 and O_2 is reducing agent and the water is the oxidizing agent

c- H_2 is reducing agent and O_2 oxidizing agent

d- Water is oxidizing agent and O_2 the reducing agent

56. The reaction which involve loss of electrons is

a- Oxidation reaction

b- Decomposition reaction

c- Neutralization reaction

d- Precipitation reaction

57. The product of this reaction : $NaCl + Br_2 \rightarrow$?

a- $NaBr_2 + Cl_2$

b- $NaBr + Cl_2$

c- $NaBr_3 + Cl_2$

d- No reaction

58. All of the following are true about oxidation number <u>except</u> :

a- For group 1A (1) : O.N = +1 in all compounds

b- For hydrogen O.N = +1 in combination with metals

c- For an atom in its elemental form O.N = 0

d- The sum of O.N values for atoms in a compound equals zero

59. All of the following about solutions is true EXCEPT

a- In aqueous solution water is a solvent

b- A solution is a homogeneous mixture

c- Saturated solution contains less amount of solute than unsaturated solution

d- Solvent and solute making solution

60. Dental filling is an example of:

a- Solid / solid solution

b- Solid / liquid solution

c- Liquid / solid solution

d- Gas / gas solution

61. Factors affecting solubility are nature of solute / solvent and temperature and :

a- Number of atoms b- oxidation number c- pressure

62. The molecular mass of Fe_2O_3 (Awt of Fe=56 O=16) is

a- 160 g b- 152 g/mol c- 160 g/mol d- 72g/ mol

63. Calculate the mass of 100 moles of Al_2O_3 (Al= 27 O= 16)

a- 102 g b- 10200 g d- 1020 g d- 200 g

64. Calculate the molar concentration of a solution containing 10 g NaCl dissolved in 200 ml water ? (Na= 23 Cl=35.5)

a- 8.5 M b- 0.08 M c- 0.85 M d- 5.8 M

65. ..... is the number of moles of solute per liter of solution

a- Molality

b- Normality

c- Molarity

d- Percentage

66. The PH of a solution with $[OH^-] = 10^{-9}$ M

a- 9 b- 4 c- 10^{-5} d- 5

67. Acidic solution are those having :

a- PH = 7

b- PH > 7

c- PH< 7

d- PH ≤ 7

68. The oxidation number of sulfur and oxygen in SO_2

a- Sulfur is +4 and oxygen is -2

b- Sulfur is -4 and oxygen is -2

c- Sulfur is -4 and oxygen is +2

d- Sulfur is +2 and oxygen is -2

69. The POH of solution is :

a- The negative logarithm of the hydroxide ion concentration $[OH^-]$

b- The negative logarithm of the hydrogen ion concentration $[H^+]$

c- The positive logarithm of the hydroxide ion concentration $[OH^-]$

70. The molality of solution containing 20g of NaOH dissolved in 100 g in water

a- 0.5 m b- 5 m c- 0.05 m d- 2 M

71. The normality of 2 molar of H_3PO_4 ?

a- 8N b- 6 N c- 2 N d- 0.6 N

72. The normality of a solution containing 10 g NaOH dissolved in 150 ml solution

a- 2.66 N

b- 1.66 N

c- 0.66 N

d- 0.16 N

73. Solution have 0.5 M of Hcl in 500 ml of solution the mass of HCl is

a- 0.925

b- 91.5

c- 9.125

74. Determine the molarity of 2 N of H_2SO_4

a- 4 N b- 1M c- 2M d- 8M

75. The combustion reaction needs fuel , Oxygen and .....

a- Carbohydrate b- acid c- spark d- water

76. The mass of 0.1 mole glucose $C_6H_{12}O_6$ (C=12 , H=1 , O=16)

a- 81 g b- 18 g c- 180 g d- 1800 g

77. The maximum quantity of solute dissolved in certain quantity of solvent

a- Isotopes b – unsaturated solution c – solubility d- molarity

78. A solution is made by mixing 250 g of hexane and 50 g of octanol . what is the mass percent of the octanol ?

a- 83.3 % w/w

b- 16.7 % w/v

c- 16.7 % w/w

d- 20 % w/w

79. The number of moles of solute per kilogram of solvent is known as :

a- Molarity b- normality c- molality

80. What is the molarity of solution has 1.25 moles of KOH is dissolved in 500 ml of water

a- 0.44 M b- 2.5 M c- 1.25 M

81. In a 4.0 m aqueous solution . the number of moles of solute dissolved in 250 g of water:

a- 16 mole b- 1 mole c- 0.1 mole d- 2 mole

82. What is the molality of solution has 10 g of NaCl is dissolved in 500 g of water (NaCl=58.5 g/mole)

a- 0.90 m

b- 0.34 m

c- 0.089 m d- 0.34 M

83. What is the concentration of a solution containing 40 g of potassium nitrate In 0.2 L of solution

a- 20 % w/w

b- 24% w/v

c- 20 % w/v

d- 2 % w/v

84. Determine the percent by mass of a 20 g salt dissolved with 180 g water ?

a- 20 % w/w b- 11.1 % w/w c- 10 % w/w d- 12.5 % w/w

85. Most important buffer system in blood plasma is

a- Acetic acid / sodium acetate

b- Carbonic acid / hydrogen carbonate

c- Ammonia / ammonium chloride

86. The PH value of the blood

a- 8 b- 6.4 c- 7.4

87. an example for acidic buffer is:

a- Hydrochloric acid / sodium chloride

b- Carbonic acid

c- Ammonia / ammonium chloride

d- Acetic acid / potassium acetate

88. To increase the concentration of ammonium ions to making alkaline buffer we adding:

a- water

b- Sodium acetate

c- Ammonium chloride

d- Acetic acid

89. When we adding alkali to acidic buffer the OH^- ions react with

a- Acid salt

b- H^+ ions

c- NH_4^+ ions

90. Equilibrium can be disturbed by changing temperature , partial pressure and

a- Concentration b- number of moles c – PH value

91. Mixture that minimizes PH change on addition of small amounts of acid or base

a- Molality

b- Solute

c- Buffer solution

d- Saturated solution

92. A two litter vessel contains 1.6 moles NH_3 , 0.8 moles N_2 and 1.2 moles of H_2 what is the equilibrium constant for this reaction $N_2 + 3H_2 \rightarrow 2NH_3$

a- 1.851 b- 7.40 c- 10.36 d- 0.232

93. Calculate the PH buffer solution whose [HA] = 0.1 mol.dm^{-3} and [A^-] = 0.1 mol.dm^{-3} and the Ka = 2 x 10^{-4}

a- 6 b- 3.7 c – 5.6

94. At a chemical equilibrium :

a- The weight of the forward and reverse reactions are equal

b- The masses of the forward and reverse reactions are equal

c- The rate of the forward is higher than reverse

d- The rate of the forward and reverse reactions are equal

95. The equilibrium constant for the reaction :

$2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

a- $K = [SO_2]^2.[O_2] / [SO_3]^2$

b- $K = [SO_3] / [SO_2].[O_2]$

c- $K = [SO_3]^2 / [SO_2]^2 . [O_2]$

96. **All of the following is false about buffer solution <u>except:</u>**

a- It is mixture of strong acid and its salt or strong base with its salt

b- It is mixture of weak acid or weak base with its salts

c- It is mixture of strong acid and base only

d- It is mixture of strong acid and strong base

97. **Calculate the PH of solution containing 0.0500 mol.dm^{-3} methanoic acid and 0.100 mol.dm^{-3} sodium methanoate . Ka= 1.6 x 10^{-4}**

a- 6.30 b- 4.10 c- 3.25

حل اسئلة Mid ليبار 1 تحضيري

1- c
2- C
3- C
4- Si
5- b
6- c
7- b
8- b
9- C
10- a
11- b
12- b

13- b محذوف

ف $M_{wt\ ef} = 12+2+16$
$= 30\ g/mol$

$n = \frac{M_{wt}\ MF}{M_{wt}\ EF} = \frac{180}{30} = 6$

$6(CH_2O) = C_6H_{12}O_6$

14- C
15- b
16- C
17- b
18- C
19- C
20- b
21- a
22- d
23- b
24- b
25- a
26- a
27- a

28- b
29- d
30- b
31- a
32- c
33- c
34- C
35- d
36- b
37- d

38- C

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

39- b ($\underline{2}\ NO_2$) للناتج يعطي

40- b

41- a [صفر ← ناتج +2] كانت

42- C
43- C
44- b
45- d
46- C
47- d

48- a
49- C
50- d
51- b

52- a

SO_3: S → +6, O → −2

53- b

HNO_3: H → +1, N → +5, O → −2

54- C

HCO_3^-: H → +1, C → +4, O → −2

المجموع اللازم = −1

55- C
56- a

57- d
58- b
59- C
60- C
61- C
62- c
63- b

64- C

$M = \frac{mass}{M_{wt} \times V_L}$

$M = \frac{10}{58{,}5 \times 0{,}2}$

$= 0{,}85\ M$

65- a

66- d

$pOH = -\log(10^{-9})$
$= 9$

$pH = 14 - 9 = 5$

Answer All Questions

A] Encircle the best answer from the following in the provided answer sheet:

1- All of the following are true about solubility EXCEPT:

a. solubility of solids increases with temperature

b. solubility of liquids increase with pressure

c. solubility of gas decreases with temperature

d. solubility of gas increases with pressure

2-Dental filling is an example of:

a. liquid in gas solution

b. liquid in liquid solution

c. solid in liquid solution

d. liquid in solid solution

3-The mass (weight) of 0.2 moles of fructose $C_6H_{12}O_6$ (C = 12, O = 16, H = 1) is:

a. 0.2 g.

b. 2 g.

c. 36 g

d. 180 g.

4-A chemical equilibrium is attained when:

$$aA + bB \rightleftharpoons cC + dD$$

a. the rates of the forward and reverse reactions are equal

b. the rate of the forward reaction is higher than reverse reactions

c. the concentrations of reactants and products are constant.

d. both a and c

5- Determine isotopes from the following:

a. $^{15}_{7}X$ $^{15}_{8}X$

b. $^{14}_{6}X$ $^{12}_{6}X$

c. $^{14}_{7}X$ $^{13}_{6}X$

d. $^{14}_{6}X$ $^{15}_{7}X$

6-The pH of a solution with $[OH^-] = 10^{-5}$ M is:

a. 10^{-5}
b. 10^{+5}
c. 5.0
d. 9.0

7-All of the following are buffer systems <u>EXCEPT:</u>

a. acetic acid/sodium acetate
b. benzoic acid / sodium benzoate
c. hydrochloric acid / sodium chloride
d. ammonium hydroxide /ammonium chloride

8-The chemical formula for ammonium chloride, aluminium hydroxide and sodium sulfite are

a. NH_3Cl, $Al(OH)_3$ and Na_2SO_3
b. NH_4Cl, $Al(OH)_3$ and Na_2SO_3
c. NH_4Cl, $Al(OH)_2$ and Na_2SO_4
d. NH_4Cl, $Al(OH)_3$ and Na_2SO_4

9-All of the following are false about periodic table <u>EXCEPT</u>:

a. elements are arranged in groups according to mass number
b. elements are arranged in groups according to atomic number
c. elements are arranged in periods according to mass number
d. elements are arranged in periods according to atomic number

10-The percent composition of a solution which contains 20 g salt and 0.100 kg solvent is

a. 16.66 % w/v
b. 20 % w/w

c. 16.66 % w/w

d. 20 % w/v

11-All of the following are true about alkaline buffer <u>EXCEPT:</u>

a. it is composed of weak base and one of its salts

b. it is composed of ammonium hydroxide and ammonium chloride

c. the role of ammonium hydroxide to provide high concentration of NH_4^+.

d. it is used to minimize pH changes.

12-The electron arrangement X $_{2,8,5}$ refer to

a. P atom

b. S atom

c. Si atom

d. C atom

13-In halogen group, fluorine is more electronegative than chlorine due to

a. the largest distance between nucleus and outermost electrons

b. the smallest distance between nucleus and outermost electrons

c. the largest distance between nucleus and electrons of the first energy level

d. the smallest distance between nucleus and electrons of the first energy level

14-The chemical formula for sodium carbonate, potassium nitrate and potassium thiocyanate are

a. Na_2CO_3 , KNO_2 and KSCN

b. Na_2CO_3 , KNO_3 and KSCN

c. $NaHCO_3$, K_2NO_3 and KCN

d. Na_2CO_2 , KNO_3 and KCN

15- This redox reaction is characterized by the following <u>EXCEPT</u>:

$$\mathbf{Cu(s) + 2\ AgNO_3\ (aq) \Longrightarrow Cu(NO_3)_2\ (aq) + 2\ Ag(s)}$$

a. oxidation number of Cu increased

b. oxidation number of Ag decreased

c. Ag is reducing agent

d. Cu is oxidized

16-The products of the following reaction are

$$\mathbf{2KCl\ (aq)\ +\ Br_2\ (aq) \Longrightarrow}$$

a. 2KBr (aq) + Cl_2 (aq)

b. KBr (aq) + Cl_2 (aq)
c. 2KBr (aq) + 2 Cl_2 (aq)
d. no products

17-The following reaction represents

$$CaCO_3 \xrightarrow{heat} CaO + CO_2$$

a. decomposition reaction
b. double displacement and precipitation reaction
c. single displacement reaction
d. synthetic reaction

18- The formula weight of $C_6H_{12}O_6$ is:

a. 30
b. 180
c. 16
d. 96

19-All of the following are false about oxidation number (O.N.) <u>EXCEPT</u>:

a. for an atom in its elemental form, O.N.= +1
b. for group 7A(17):O.N. = -1 in combination with metals or nonmetals
c. for oxygen: O.N. = - 2 in peroxides
d. for hydrogen: O.N. = +1 in combination with metals

20-Combustion reaction is characterized by the following <u>EXCEPT</u>:

a. it is called burning reaction
b. it is used to heat homes and run automobiles
c. it is a reaction between hydrocarbon and oxygen gas.
d. its products are always SO_2 and H_2O

21-One of these metals cannot displace H_2 from any source.

a. Na
b. Mg
c. Hg
d. Al

22-In periodic table, the element which is located in period 3 and group 3A is

a. $_{15}P$
b. $_{11}Na$

c. $_{13}Al$

d. $_{5}B$

23-Energy levels have a maximum number of electrons equal to

a. n^2

b. $2n$

c. $2n^3$

d. $2n^2$

24 - To achieve Octet rule, magnesium atom ($_{12}Mg$):

a. gains 2 electron

b. loses 2 electron

c. gains 6 electrons

d. shares 2 electron

25-All of the following are true about ionic bond <u>EXCEPT</u>:

a. it is formed between atoms of nonmetals and metals with a large difference in electronegativity

b. it is formed by transfer of electrons

c. it is produced between charged ions.

d. it is good conductor and has low melting point.

26- The oxidation number (O.N.) of nitrogen in HNO_3 is

a. **+3**

b. -3

c. + 5

d. -5

27-What is the volume of 1.25 M NaOH solution which can be prepared using 60 g NaOH (Na = 23, O =16 , H =1).

a. V = 0.12 L

b. V = 1.2 L

c. V = 12 L

d. V = 0.2 L

28-Calculate the pH of a solution containing 0.0100 mol dm^{-3} benzoic acid and 0.0400 mol dm^{-3} sodium benzoate (Ka = 6.3 x 10^{-5} mol dm^{-3}).

a. pH = 8.4

b. pH = 8.0

c. pH = 4.8

d. pH = 9.2

29- At 25°C, Kw =

a. $[H_3O^{1+}]\ [OH^{1-}] = 1.0 \times 10^{+14}$

b. $[H_3O^{1+}]\ [OH^{1-}] = 1.0 \times 10^{-14}$

c. $[OH^{1-}]\ [OH^{1-}] = 1.0 \times 10^{-14}$

d. $[H^{1+}]\ [H^{1+}] = 1.0 \times 10^{+14}$

30-All of the following are true about solution <u>EXCEPT</u>:

a. solution can be classified as saturated or unsaturated.
b. solution is a homogeneous mixture of 2 or more substances .
c. an aqueous solution has water as a solvent
d. the solubility of a solution is the minimum quantity of solute that can be dissolved in a certain quantity of solvent

B] Answer the following questions

1) Find molality of 12g HCN in 250ml methanol (d= 0.792 g/ml)
(H = 1, C =12, N= 14)

<u>Answer:</u>

MWt of HCN = 27

n (moles) = mass/ MWt = 12/27 = **<u>0.444 moles</u>**

Molality (m) = moles of solute/ kilogram of solvent

d (density) = mass / volume

0.792 = mass/ 250 ml

Mass = 0.792 x 250 = **<u>198 g / 1000 = 0.198 kg</u>**

Molality (m) = 0.444/ 0.198 = 2.242 m

.....

2) Mention the equation which indicates role of carbonic acid/
hydrogencarbonate ion buffer in case of blood acidosis.

Any increases in $[H^+]$ ions in the blood are removed by the conjugate base. The equilibrium shifts left removing most of the H^+ ions.

$H_2CO_{3(aq)} \rightleftharpoons H^+_{(aq)} + HCO_3^-{}_{(aq)}$ (in the blood)

$\downarrow$

$H_2O + CO_2$ (By respiration expel more carbon dioxide)

.....

3) Write the reaction between calcium chloride and sodium phosphate indicating its type

$3CaCl_{2(aq)} + 2Na_3PO_{4(aq)} \rightarrow 6NaCl_{(aq} + Ca_3(PO_4)_2$

Type: double-displacement reaction

4) Compare between molecular and empirical formulae giving examples

<u>Molecular formula</u>: *it* shows the exact number of atoms of each element in the smallest unit of a substance e.g $C_6H_{12}O_6$

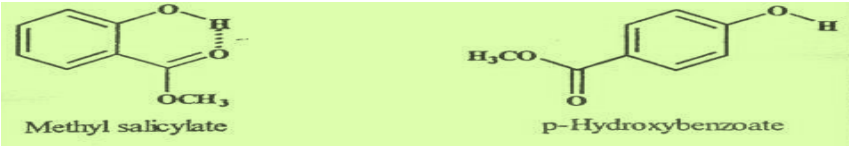
<u>Empirical formula</u>: *it* shows the simplest whole-number ratio of the atoms in a substance e.g CH_2O

.....

5) Define hydrogen bond giving an example for intramolecular type (draw the structure)

<u>Definition</u>: it is the attraction between H in a molecule to an unshared pair of **e-** of another molecule

example: methyl salicylate (muscle pain remedy) is a weak antibacterial agent due to the phenolic hydroxyl group of methyl is masked by intramolecular hydrogen bonding.



Best wishes

End of Exam

Answer sheet

Model - 2

Q	A	Q	A	Q	A
1	B	11	C	21	C
2	D	12	A	22	C
3	C	13	B	23	D
4	D	14	B	24	B

5	B	15	C	25	D
6	D	16	D	26	C
7	C	17	A	27	B
8	B	18	A	28	C
9	D	19	B	29	B
10	C	20	D	30	D