A

A10- Determine the value of K_c for the following reaction if the equilibrium concentrations are as follows: $[H_2] = 0.11$ M, $[I_2] = 0.11$ M, $[HI] = 0.78$ M

$$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$$

a- $K_c = 90.23$
b- $K_c = 10.11$
c- $K_c = 50.28$
d- $K_c = 88.15$

A11- Which of the following is a Brønsted-Lowry base?
a- HCl
b- NH_3
c- CH_4
d- Cl_2

A12- What is the conjugate acid of HCO_3^- ?
a- H_2CO_3
b- H_2O
c- OH^-
d- CO_3^{2-}

A13- The pH value of the neutral solution is ----------.
a- 7
b- > 7
c- < 7
d- zero

A14- Which of the following is a strong acid?
a- H_2O
b- HF
c- $HClO_4$
d- NH_4^+

A15- Calculate the concentration of H_3O^+ in a solution that contains 1.3×10^{-2} M OH^- at 25 °C.
a- 5.5×10^{-13} M
b- 8.0×10^{-11} M
c- 7.7×10^{-13} M
d- 5.0×10^{-12} M

A16- Consider the following reaction at equilibrium
$$A(g) + B(g) + heat \rightleftharpoons C(g) + D(g)$$
By adding heat, the reaction will go to the ----------.
a- right
b- left
c- up
d- down

A17- The total energy of the universe is ----------.
a- change
b- constant
c- unkown
d- zero

A18- ---------- measures the change in internal energy at constant volume.
a- thermometer
b- timer
c- bomb calorimeter
d- none

A19- The sum of kinetic and potential energies of all particles in the system is –
a- internal energy
b- electric energy
c- light
d- speed

A20- Alkenes always contain a _____.
a- C - C single bond
b- C≡C triple bond
c- C=C double bond
d- C-H bo

A21- A chemical reaction that gives heat to the surrounding is ----------
a- exothermic
b- acidic
c- basic
d- endothermic

A22- Butane has _____ carbon atoms.
a- 6
b- 1
c- 3
d- 4

A23- The general formula for an aldehyde is _____.

a- $R-O-R'$
b- $R-\overset{O}{\overset{\|}{C}}-OH$
c- $R-\overset{O}{\overset{\|}{C}}-H$
d- $R-OH$
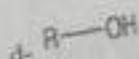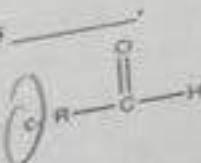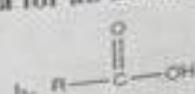
A24- What is the name of $CH_3CH_2CH_3$?

a- methane
b- propane
c- ethane
d- hexane

A25- What is the name of the compound below?

a- 2,4-dimethyl-1-pentene
b- dimethyl-2-butene
c- 2,4-hexene
d- 2,5-dimethylpentane
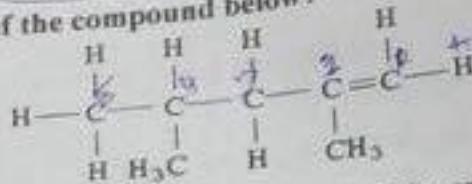
A26- The structure of benzene is _____.
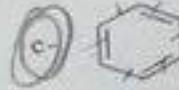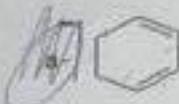
A27- Which of these compounds is an alcohol?

a- CH_3NH_2
b- CH_3OH
c- CH_3OCH_3
d- CH_3CONH_2

A28- The following reaction would produce _____.

$$CH_3CH_2OH + (O) \longrightarrow \underline{\quad} + H_2O$$

a- CH_3CH (with O)
b- CH_3OH
c- CH_3OCH_3
d- $CH_3\overset{O}{\overset{\|}{C}}CH_3$
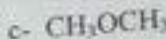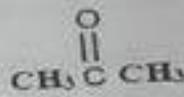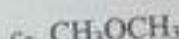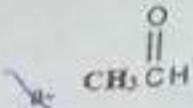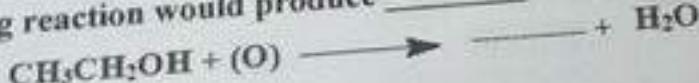
A29- The correct name for the following compound is _____.
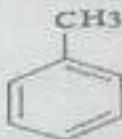

a- chlorobenzene
b- methylbenzene
c- ethanal
d- ethylbenzene

A30- Which of the following is an ester?

a- $CH_3-\overset{O}{\overset{\|}{C}}-OH$
b- CH_3OH
c- CH_3 (benzene ring)
$CH_3-\overset{O}{\overset{\|}{C}}-O-CH_3$
d- CH_3CH_3

A31- The following reaction would produce _____.

$$CH_2 = CH_2 + Br_2 \longrightarrow$$

a- CH_3CHOH b- $CH_3-\overset{O}{\overset{\|}{C}H}$ c- CH_3CHCl_2 d- $\underset{CH_2}{\overset{Br}{|}}-\underset{CH_2}{\overset{Br}{|}}$
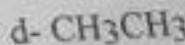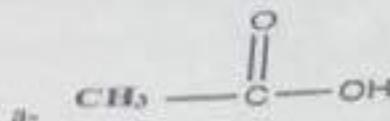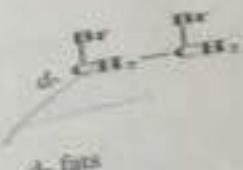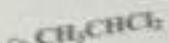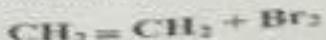
d- fats

A32- _____ is a polysaccharide.

a- starch   b- glucose   c- DNA

A33- Which of the following is a "cis" isomer?

a-   b-   c-   d-
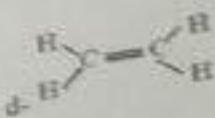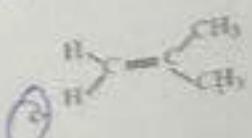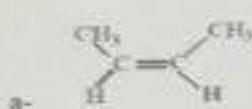
A34- Amino acids are linked together by a _____.

a- ketone group   b- double bonde   c- single bond   d- peptide bond

A35- Which of the following is a biopolymer?

a- nucleic acid   b- ketone   c- carboxylic acid   d- ester

A36- How many isomers are there for butene (C_4H_8)?

a- 0   b- 2   c- 3   d- 4

A37- Which of the following is a carbohydrate?

a- phospholipid   b- glucose   c- DNA   d- fats

A38- How many hydrogen atoms in the following structure?
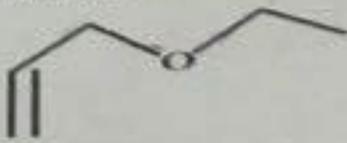
a- 10   b- 12   c- 15   d- 17

A39- What are the functional groups in amino acids?

a- (-CHO + -COOH)   b- (-NH₂ and -COOH)   c- (-OH + -CO)   d- (-CHO + -O-)

A40- Which of following is an organic compound?

a- HCl   b- NaOH   c- NaCl   d- CH₄

Good Luck

(Choose and mark the correct answer in the Answer Sheet)

A1- Express the equilibrium constant for the following reaction.

$$2 CH_3Cl(g) + Cl_2(g) \rightleftharpoons 2 CH_2Cl_2(g) + H_2(g)$$
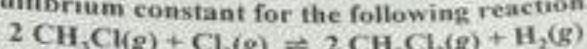
a- $K = \dfrac{[CH_2Cl_2][H_2]}{[CH_3Cl][Cl_2]}$ b- $K = \dfrac{[CH_2Cl_2]^2[H_2]}{[CH_3Cl]^2[Cl_2]}$ c- $K = \dfrac{[CH_3Cl]^2[Cl_2]}{[CH_2Cl_2]^2[H_2]}$ d- $K = \dfrac{[CH_3Cl][Cl_2]}{[CH_2Cl_2][H_2]}$

A2- Determine the missing equilibrium constant.

If $A + B \rightleftharpoons C$ has $K_{forward}$; Then $C \rightleftharpoons A + B$ has $K_{reverse} = ?$

a- $K_{reverse} = 1 / K_{forward}$ b- $K_{reverse} = K_{forward}$ c- $K_{reverse} = K_{forward} / 2$ d- $K_{reverse} = 0$

A3- Consider the following reaction at equilibrium

$$N_2O_4(g) \rightleftharpoons 2 NO_2(g)$$
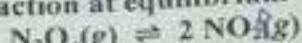
By increasing the concentration of NO_2, the reaction will go to the ----------- .

a- right   b- left   c- up   d- down

A4- What is the name of HNO_3?

a- nitric acid   b- sulfuric acid   c- hydrochloric acid   d- acetic acid

A5- Determine the value of the missing equilibrium constant.

$A_{(g)} \rightleftharpoons 2 B_{(g)}$ $K_1 = 0.24$

$2 B_{(g)} \rightleftharpoons 3 C_{(g)}$ $K_2 = 3.8$ 0.24×3.8
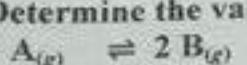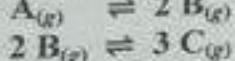
$A_{(g)} \rightleftharpoons 3 C_{(g)}$ $K_{overall} = ?$

a- 4.043   b- 0.912   c- 0.031   d- 6.335

A6- Which of the following is an Arrhenius acid?

a- H_2SO_4 b- NH_3 c- NaOH   d- CH_3CH_3

A7- Calculate the pH of a solution that contains 3.9×10^{-4} M H_3O^+ at 25 °C.

a- 4.31   b- 3.41   c- 6.07   d- 2.65

A8- Express the equilibrium constant for the following reaction.

$$KClO_3(s) \rightleftharpoons KClO(s) + O_2(g)$$
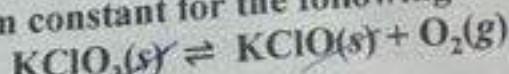
a- $K = [KClO]$ b- $K = \dfrac{[KClO][O_2]}{[KClO_3]}$ c- $K = \dfrac{[KClO_3]}{[KClO][O_2]}$ d- $K = [O_2]$

A9- What is the name of $NaHCO_3$?

a- sodium carbonate   b- sodium hydroxide   c- sodium bicarbonate   d- potassium hydroxi

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