

Chem 110 Chapter 5 +6 +7 Exam

Choose the correct answer

- [1] For the following equilibrium $2\text{KClO}_{3(s)} \rightleftharpoons 2\text{KCl}_{(s)} + 3\text{O}_{2(g)}$
When KClO_3 is added to the reaction mixture, the reaction will
(A) Shift to right (B) Shift to left (C) remain unaffected (D) none
- [2] For the following equilibrium $\text{C}_{(s)} \rightleftharpoons 2\text{H}_{2(g)} + \text{CH}_{4(g)}$
When CH_4 is added to the reaction mixture, the reaction will
(A) Shift to right (B) Shift to left (C) remain unaffected (D) none
- [3] The following reaction is endothermic $\text{C}_{(s)} + \text{CO}_{2(g)} \rightleftharpoons 2\text{CO}_{(g)}$
When the reaction temperature is increased, the reaction will
(A) Shift to right (B) Shift to left (C) remain unaffected (D) none
- [4] Which of the following is a heterogeneous equilibrium?
(A) $\text{NH}_{3(aq)} + \text{H}_2\text{O}_{(l)} \rightleftharpoons \text{NH}_4^+_{(aq)} + \text{OH}^-_{(aq)}$
(B) $\text{HF}_{(aq)} + \text{H}_2\text{O}_{(l)} \rightleftharpoons \text{H}_3\text{O}^+_{(aq)} + \text{F}^-_{(aq)}$
(C) $2\text{KClO}_{3(s)} \rightleftharpoons 2\text{KCl}_{(s)} + 3\text{O}_{2(g)}$
(D) $\text{CO}_3^{2-}_{(aq)} + \text{H}_2\text{O}_{(l)} \rightleftharpoons \text{HCO}_3^-_{(aq)} + \text{OH}^-_{(aq)}$
- [5] Which of the following is a weak acid?
(A) HCl (B) HNO_3 (C) HBr (D) H_2SO_3
- [6] Which of the following is a weak base?
(A) NaOH (B) NH_3 (C) $\text{HC}_2\text{H}_3\text{O}_2$ (D) HN_3
- [7] Which of the following anions is a weak base?
(A) Cl^- (B) NH_3 (C) CHO_2^- (D) ClO_4^-
- [8] The hydronium ion concentration of a solution of pH 7.8 is
(A) 1.6×10^8 (B) 6.2 (C) 1.6×10^{-8} (D) 6.3×10^7
- [9] Which of the following anions has a neutral pH?
(A) CHO_2^- (B) NO_3^- (C) $\text{C}_2\text{H}_3\text{O}_2^-$ (D) F^-
- [10] Which of the following is a Lewis acid?

(A) HCl (B) NH₃ (C) HNO₃ (D) BF₃

[11] For the following equilibrium reaction $A \rightleftharpoons 3C$ K_1

The overall equilibrium constant K_1 in terms of the given two equilibria

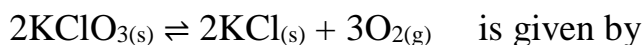


(A) $K_1 = K_2 + K_3$ (B) $K_1 = K_2 \cdot K_3$ (C) $K_1 = K_2 / K_3$ (D) $K_1 = K_3 / K_2$

[12] The household ammonia has a

(A) pH = 7 (B) pH < 7 (C) pH > 7 (D) pH ≤ 7

[13] The equilibrium constant K , for the reaction



(A) $K = [\text{KCl}]^2 [\text{O}_2]^3 / [\text{KClO}_{3(s)}]^2$

(B) $K = [\text{O}_2]^3$

(C) $K = [\text{KClO}_{3(s)}]^2 / [\text{KCl}]^2 [\text{O}_2]^3$

(D) $K = 1 / [\text{O}_2]^3$

[14] The following reaction: $\text{N}_2\text{O}_4(g) \rightleftharpoons 2\text{NO}_2(g)$ represents

(A) irreversible (B) reversible (C) acidic (D) neutral

[15] The soft drinks (e.g. Pepsi) has a

(A) pH = 7 (B) pH < 7 (C) pH > 7 (D) pH ≤ 7

[16] The statement “The total energy of the universe is constant” is related to

(A) Internal energy (B) The first law of thermodynamics
(C) Enthalpy (D) The heat capacity

[17] The statement “A state function that equals to the sum of kinetic and potential energies of all particles in the system” is related to

((A) Hess's law (B) The first law of thermodynamics
(C) bomb calorimeter (D) Coffee-cup calorimeter

[18] is used to measure the heat evolved from combustion reactions at constant volume.

(A) Coffee-cup calorimeter (B) The first law of thermodynamics

(C) bomb calorimeter

(D) Hess's law

[19] is used to measure the heat changes in different reactions at constant pressure.

(A) Hess's law

(B) The first law of thermodynamics

(C) bomb calorimeter

(D) Coffee-cup calorimeter

[20] What is the work exerted by a gas that expanded from 0.10 L to 0.75 L against a constant pressure of 1.2 atm?

(A) 0.78 L. atm

(B) -79.1 J

(C) - 0.78 L atm⁻¹

(D) 79.0 J

[21] The endothermic reaction is the one whose.....

(A) $\Delta H < 0$

(B) $\Delta H = 0$

(C) $\Delta H > 0$

(D) None of them

[22] The relation between the energy and enthalpy is

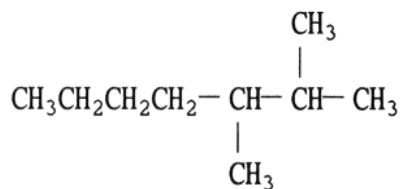
(A) $E = H + PV$

(B) $H = E - PV$

(C) $H = E + PV$

(D) none of them

[23] The correct name of the following structure



A) 2,3-dimethylheptane

B) 2-methylheptane

C) 2,3-dimethylhexane

D) 2,3-dimethylpentane

[24] is the general formula of an alcohol.

A) $\text{R}-\text{O}-\text{R}$

B) $\text{R}-\text{CO}-\text{R}$

C) $\text{R}-\text{CO}-\text{OH}$

D)

$\text{R}-\text{OH}$

[25] Which one of the following is not an alcohol?

A) acetone

B) methanol

C) ethanol

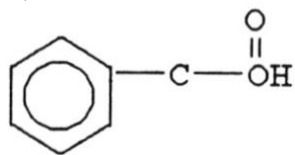
D) propanol

[26] Which of the following represents a ketone?

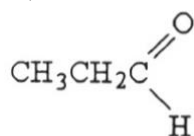
A)



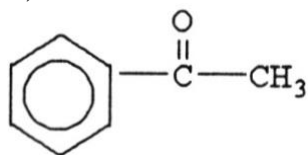
B)



C)



D)

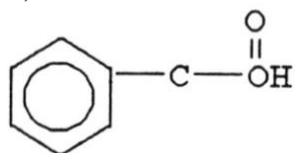


[27] Which of the following represents a carboxylic acid?

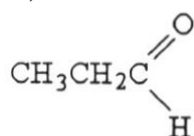
A)



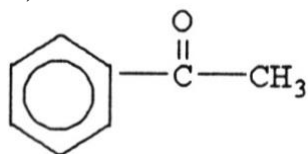
B)



C)



D)

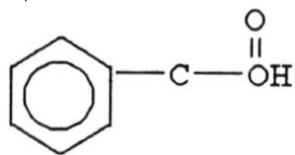


[28] Which of the following represents an amine?

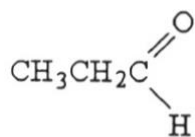
A)



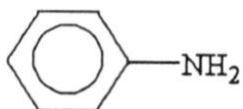
B)



C)



D)

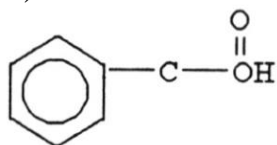


[29] Which of the following represents an aldehyde?

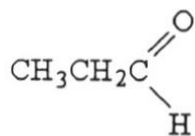
A)



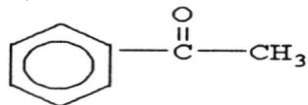
B)



C)

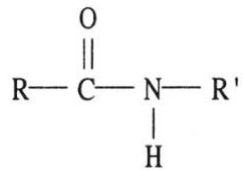


D)

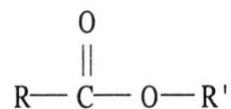


[30] Which of the following contains a peptide linkage?

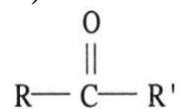
A)



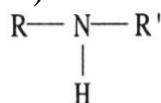
B)



C)



D)



[31] Hybridization of the carbon atom indicated by (*) in $\text{CH}_3\text{-*CH}_2\text{-CH}_3$, $\text{*CH}_2\text{=CH}_2$, and $\text{CH}_3\text{-*C}\equiv\text{CH}$ is _____, _____, and _____, respectively.

A) sp^3 , sp^2 , sp

B) sp^3 , sp , sp^2

C) sp , sp^2 , sp^3

D) sp , sp^3 , sp^2

[32] Hydrocarbons containing only single bonds between the carbon atoms are called

A) alkenes

B) alkynes

C) aromatics

D) alkanes

[33] Which of the following are known as olefins?

A) alkenes

B) alkynes

C) aromatics

D) alkanes

[34] The simplest alkyne is _____.

A) ethylene

B) ethane

C) acetylene

D) benzene

[35] Hydrocarbons containing carbon-carbon triple bonds are called.....

A) alkanes

B) aromatic hydrocarbons

C) alkynes

D) alkenes

[36] Alkynes always contain a _____.

A) $\text{C}=\text{C}$ bond

B) $\text{C}\equiv\text{C}$ bond

C) $\text{C}-\text{C}$ bond

D) $\text{C}=\text{H}$ bond

[37] Alkenes always contain a _____.

A) $\text{C}=\text{C}$ bond

B) $\text{C}\equiv\text{C}$ bond

C) $\text{C}-\text{C}$ bond

D) $\text{C}=\text{H}$ bond

[38] The general formula of alkenes is _____.

A) C_nH_{2n}

B) $\text{C}_n\text{H}_{2n-2}$

C) $\text{C}_n\text{H}_{2n+2}$

D) C_nH_n

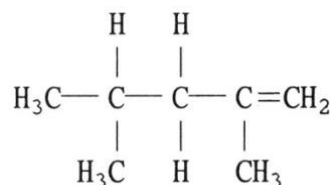
[39] The general formula of alkanes is _____.

- A) C_nH_{2n} B) C_nH_{2n-2} C) C_nH_{2n+2} D) C_nH_n

[40] The general formula of alkynes is _____.

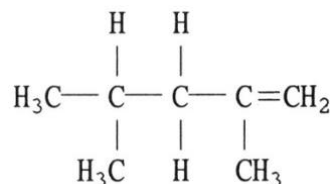
- A) C_nH_{2n} B) C_nH_{2n-2} C) C_nH_{2n+2} D) C_nH_n

[41] What is the name of the compound below?



- A) 2,4-methylbutene B) 2,5-dimethylpentane
C) 2,4-ethylbutene D) 2,4-dimethyl-1-pentene

[42] What is the number of π bond in the following compound?



- A) 1 B) 2 C) 4 D) 3

[43] The number of π bonds in $CH_3-CH=C=CH-CH-CH=CH-CH_3$ is

- A) 1 B) 2 C) 4 D) 3

[44] _____ could be alkene.

- A) C_3H_8 B) C_3H_6 C) C_6H_6 D) $C_{17}H_{36}$

[45] The addition of HBr to 2-butene produces _____.

- (A) 1-bromobutane B) 2-bromobutane C) 1,2-dibromobutane D) 2,3-dibromobutan

[46] The following structure $R-O-R'$ represents _____.

- A) Ether B) ester C) ketone D) aldehyde

[47] The following structure represents $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$ _____.

- A) Ether B) ester C) ketone D) aldehyde

[48] The following structure represents $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$ _____.

- A) carboxylic acid B) ester C) ketone D) aldehyde

[49] The following structure represents $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OR}'$ _____.

- A) carboxylic acid B) ester C) ketone D) aldehyde

[50] $\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$ is called _____.

- A) amine B) amide C) ketone D) aldehyde

[51] Starch, glycogen, and cellulose are made of repeating units of _____.

- (A) lactose B) glucose C) fructose D) sucrose

[52] The correct name of CH_3-CH_3 is _____.

- A) ethane B) propane C) ethyl D) propyne

[53] The product of the addition of H_2 to 1-propene in the presence of a nickel catalyst is _____.

- A) propane B) propyne C) propanol D) 2-butene

[54] _____ is a monosaccharide.

- (A) Fructose B) Lactose C) Guanine D) Glycogen

[55] _____ is a polysaccharide.

- A) Cellulose B) Galactose C) Ribose D) Sucrose