مدونة المناهج السعودية

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الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

Jeddah University

CHEMISTRY (110)

Test Bank (II)

Chapters 5-6

Assignments 1

1- The expression for the equilibrium constant (Kc) for the chemical equation:
$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

(a) K_c=[CaO][CaO] (b) K_c= [CO_2] (c) K_c=[CaO][CaO]/[$CaCO_3$] (d) K_C= [$CaCO_3$]

2- Consider the following reaction at equilibrium.
3- $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$

Adding additional CO_2 will shift the reaction mixture towards:

(a) The reactants (b) products (c) both reactants and products (d) non

3- Hydrofluoric acid is:

(a) Strong acid (b) strong base (c) weak acid (d) weak base

4- The [H_3O^+] in a solution is 1.8×10^{-4}, this solution is:

(a) Acidic (b) basic (c) neutral (d) amphoteric

5- When the following reaction reaches to equilibrium:

$A(g) + B(g) \rightleftharpoons 2C(g)$ $K_c=1.4 \times 10^{-5}$
The concentration of the products .....the concentration of reactants

(a) is greater than (b) is lower than (c) equal (d) non

6- Acetic acid is a weaker acid than sulphuric acid because:

(a) it has low molecular weight.
(b) sulphuric acid is weakly ionised.
(c) it does not dissociates completely.

7- Consider the reaction at equilibrium:
$2KClO_3(s) \rightleftharpoons 2\ KCl(s) + 3O_2(g)$
Addition of KCl to the reaction mixture will:

(a) shift the reaction left
(b) shift the reaction right
(c) remain the reaction unchanged

8- This reaction is endothermic

$C(s) + CO_2(g) \rightleftharpoons 2CO(g)$

Assignments 1

Increasing the reaction temperature will:

(a) shift the reaction left
(b) shift the reaction right
(c) remain the reaction unchanged

9-The pH of solution prepared from 4 g NaOH and water to make 1L of solution is:

(a) 5 (b) 8 (c) 9 (d) 13

10- For the reaction $Ni(s) + 4CO(g) \rightleftharpoons Ni(CO)_4$ $K_C = 5.0 \times 10^4$ at 25 °C

Kc for the reaction $Ni(CO)_4 \rightleftharpoons Ni(s) + 4CO(g)$ will be:

(a) 2.0×10^5 (b) 5.0×10^4 (c) 5.0×10^{-5} (d) 2.0×10^{-3}

11- If a balloon is inflated from a volume of 0.1 L to 1.85 L against an external pressure of 1.0 atm, the work done is:

(a) 1.75 L.atm (b) -1.75 L.atm (c) 1.75 J (d) –1.75 J

12- A bomb calotimeter is used to measure the changes in internal energy for

(a) Combustion reactions (b) neutralization reactions (c) redox reactions (d) precipitation reactions

13- The enthalpy (H) is defined as the sum of its internal energy and its.....

(a) Volume (b) Pressure (c) concentration (d) product of volume and pressure

14- The value of enthalpy change (ΔH) is positive for....

(a) Exothermic reaction (b) endothermic reaction (c) reversible reaction (d) Irreversible reaction

15- Constant pressure calorimeter measures

(a) enthalpy change (b) heat of combustion (c) internal energy (d) heat capacity

16- Thermodynamics is the general study of.....

(a) energy interconversions (b) reaction kinetics (c) chemical changes (d) physical changes

17- A system release 625 kJ of heat and dose 105 kJ of work on the surroundings, what is the change in the internal energy of the system?

(a) –730 kJ (b) 730 kJ (c) 520 kJ (d) – 520 kJ

Assignments 1

18- The total energy of the universe is……

(a) Increasing (b) decreasing (c) constant (d) changeable

19- The quantity of heat required to change the system's temperature by 1 °C is the…..

(a) molar heat capacity (b) heat capacity (c) internal energy (d) stranded enthalpy

20- The sum of the kinetic and potential energies of all particles that compose a system is known as….

(a) enthalpy (b) work (c) internal energy (d) stat function

22- The burning of natural gas on a stove is an …..

(a) exothermic process (b) endothermic process (d) chemical process (e) physical process

23- Water condensation from a steam is ……

(a) exothermic process (b) endothermic process (d) chemical process (e) physical process

① $CaCO_{3(s)} = CaO_{(s)} + CO_{2(g)}$

$K_c = [CO_2]$ (b) ←

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② $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$ ↑

(a) reactants (left)

زادت كمية CO_2 ← الاتجاه العكسي

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③ HF (hydrofloric acid).

(c) weak acid

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④ $pH = -\log[H_3O^+]$

$= -\log[1.8 \times 10^{-4}]$

$pH = 3.74$ ← acidic (① حامضي)

(a) ←

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⑤ $K_c = 1.4 \times 10^{-5}$ → (L)

$K_c << 1$ (is lower than)

* $k_c = 1$ [products] = [reactants]
* $k_c > 1$ [products] > [reactants]
* $k_c < 1$ [products] < [reactants]

---

(6) (c) CH_3COOH
does not dissociates completely
حمض أكل / لا يتفكك كلياً

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(7) $2\,KClO_{3(s)} = 2\,KCl_{(s)} + 3O_{2(g)}$

* $KCl_{(s)}$ مادة حفازة لا تؤثر

(c) remain the reaction unchanged

---

(8) حرارة $+ C_{(s)} + CO_{2(g)} \downarrow = 2\,CO_{(g)} \uparrow$

* (R) * k_c increase تزداد

(b) shift to Right

(a) $\text{moles} = \frac{\text{mass (g)}}{\text{molar mass}}$ NaOH

$= \frac{4}{23+16+1} = 0.1$ mole

$M = \frac{\text{moles}}{\text{Volume (L)}} = \frac{0.1}{1} = 0.1$ M

* NaOH strong base.

$pOH = -\log[OH^-]$

$pOH = -\log[0.1]$ $pOH = 1$

$pH = 14 - 1 = 13$ (d)

(c) المعادلة ② عكس اتجاه المعادلة ①

$K_2 = \frac{1}{K_1}$ $K_2 = \frac{1}{5 \times 10^4}$

$K_2 = 2 \times 10^{-5}$

(a)

(11) $\boxed{w = -P\Delta V}$

$w = -1 \times (1.85 - 0.1)$

$= -1.75$ L·atm (b) ✓

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(12) bomb calorimeter

@ Combustion reaction تفاعلات الاحتراق

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(13) enthalpy $= E + PV$

(d) product of volume and pressure

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(14) $\Delta H = +$ (positive)

(b) endothermic RX التفاعلات الماصة للحرارة

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(15) constant pressure calorimeter measures

(a) ✓

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(16) @ ✓

(17) $E = q + w$

$E = 625 + 105$

$E = 730$ kJ (b)

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(18) Total energy of universe is constant

(c)

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(19) (b) heat capacity

السعة الحرارية

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(20) * مجموع طاقتي الوضع والحركة

(c)

internal E = طاقة حركية + طاقة الوضع

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(22) burning ⟶ Exothermic Rx

(a)

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(23) (b) Endoth — condensation تكثف

Jeddah University

CHEMISTRY (110)

Test Bank

Chapters 5-6-7

Chem 110 Chapter 5 +6 +7 Exam

Choose the correct answer

[1] For the following equilibrium $2KClO_{3(s)} \rightleftharpoons 2KCl_{(s)} + 3O_{2(g)}$

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 $C_{(s)} \rightleftharpoons 2H_{2(g)} + CH_{4(g)}$

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 $C_{(s)} + CO_{2(g)} \rightleftharpoons 2CO_{(g)}$

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) $NH_{3(aq)} + H_2O_{(l)} \rightleftharpoons NH_4^+{}_{(aq)} + OH^-{}_{(aq)}$

(B) $HF_{(aq)} + H_2O_{(l)} \rightleftharpoons H_3O^+{}_{(aq)} + F^-{}_{(aq)}$

(C) $2KClO_{3(s)} \rightleftharpoons 2KCl_{(s)} + 3O_{2(g)}$

(D) $CO_3^{2-}{}_{(aq)} + H_2O_{(l)} \rightleftharpoons HCO_3^-{}_{(aq)} + OH^-{}_{(aq)}$

[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) $HC_2H_3O_2$ (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) $C_2H_3O_2^-$ (D) F^-

[10] Which of the following is a Lewis acid?

(A) HCl (B) NH_3 (C) HNO_3 (D) BF_3

[11] For the following equilibrium reaction $A \rightleftharpoons 3C$ K_1
The overall equilibrium constant K_1 in terms of the given two equilibria

$A \rightleftharpoons 2B$ K_2

$2B \rightleftharpoons 3C$ K_3

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

[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

$2KClO_{3(s)} \rightleftharpoons 2KCl_{(s)} + 3O_{2(g)}$ is given by

(A) $K = [KCl]^2 [O_2]^3 / [KClO_{3(s)}]^2$
(B) $K = [O_2]^3$
(C) $K = [KClO_{3(s)}]^2 / [KCl]^2 [O_2]^3$
(D) $K = 1 / [O_2]^3$

[14] The following reaction: $N_2O_4(g) \rightleftharpoons 2\ NO_2(g)$ **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) $\Delta H = 0$

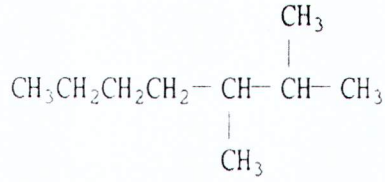
(C) $\Delta H > 0$ (D) None of them

[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) R—O—R B) R—CO—R C) R—CO—OH D) R—OH

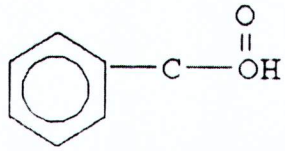
[25] Which one of the following is not an alcohol?

A) acetone B) methanol C) ethanol D) propanol

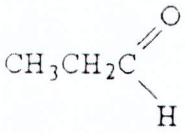
[26] Which of the following represents a ketone?

A)

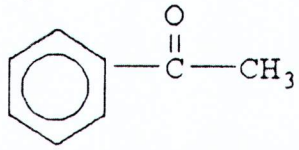
B)



C)



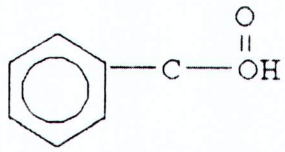
D)



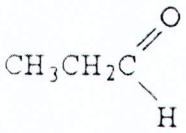
[27] Which of the following represents a carboxylic acid?

A)

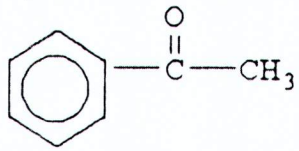
B)



C)



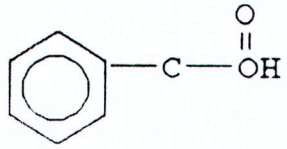
D)



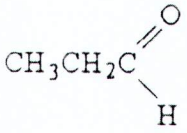
[28] Which of the following represents an amine?

A)

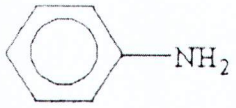
B)



C)



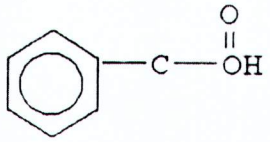
D)



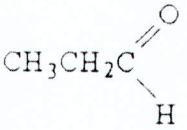
[29] Which of the following represents an aldehyde?

A)

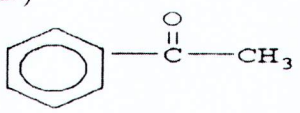
B)



C)

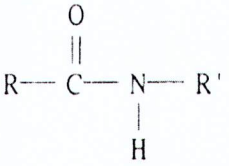


D)

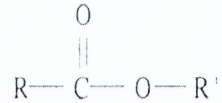


[30] Which of the following contains a peptide linkage?

A)



B)



C)

D)

[31] Hybridization of the carbon atom indicated by (*) in CH_3-*CH_2-CH_3, *CH_2=CH_2, and CH_3-*C≡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) C=C bond B) C≡C bond C) C—C bond D) C=H bond

[37] Alkenes always contain a _____.

A) C=C bond B) C≡C bond C) C-C bond D) C=H bond

[38] The general formula of alkenes is _____.

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

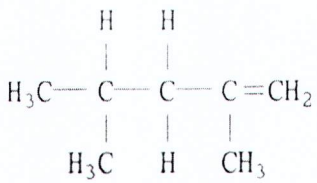
[39] The general formula of alkanes is _____.

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 _____.

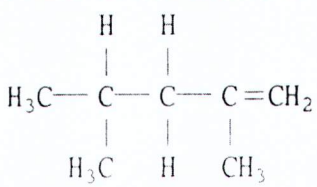
A) C_nH_{2n} B) C_nH_{2n-2} C) C_nH_{2n+2} D) C_nH_n

[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.

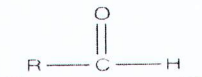
A) C_3H_8 B) C_3H_6 C) C_6H_6 D) $C_{17}H_{36}$

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

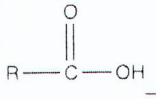
(A) 1-bromobutane B) 2-bromobutane C) 1,2-dibromobutane D) 2,3-dibromobutan

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

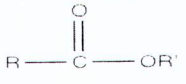
A) Ether B) ester C) ketone D) aldehyde

[47] The following structure represents  **.**

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

[48] The following structure represents  **.**

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

[49] The following structure represents  **.**

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

[50]  **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

chem-110 - 5-6-7

① $\uparrow 2KClO_{3(s)} \rightleftharpoons 2KCl_{(s)} + 3O_{2(g)}$

© remain unaffected لا يتأثر

$KClO_{3(s)}$ ← مادة صلبة لا تؤثر في حالة الاتزان

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② $C_{(s)} = 2H_{2(g)} + \underline{CH_4}_{(g)} \uparrow$

زيادة المادة ← يتجه التفاعل في الاتجاه العكس

(B) shift to left (L)

---

③ $C_{(s)} + CO_{2(g)} = 2CO_{(g)}$

الحرارة أحد التفاعلات — Endo ماص للحرارة

$C_{(s)} + CO_{2(g)} + \uparrow \underline{\text{حرارة}} = 2CO_{(g)}$

(a) shift to Right

(4) heterogenous equilibrium إتزان غير متجانس

(c) $2KClO_{3(s)} = 2KCl_{(s)} + 3O_{2(g)}$

أكثر من حالة واحدة من حالات المادة

* (aq) aqueous solution, and (L) liquid are the same state

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(5) (d) H_2SO_3 is weak acid

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(6) (b) NH_3 ammonia (weak base)

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(7) (d) ClO_4^- (weak base)

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(8) $[H_3O^+] = 10^{-pH}$

$[H_3O^+] = 10^{-7.8}$ $[H_3O^+] = 1.6 \times 10^{-8}$ M

(c)

(9) stronge acid $\xrightarrow{-H^+}$ neutral c-base

$HNO_3 \xrightarrow{-H^+} NO_3^-$

(B)

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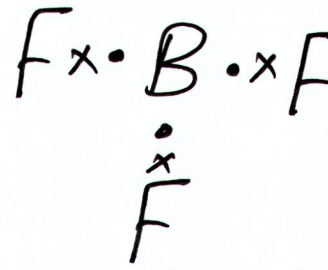
(10) lewis acid ⟶ pair electron acceptor

BF_3



تملك نقص من الالكترونات

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(11)

$A = 2B \quad k_2$

$2B = 3C \quad k_3$

$A = 3C$ بالجمع

التفاعل الأول حاصل جمع التفاعلين الثاني والثالث

$k_1 = k_2 \times k_3$ (B)

(12) ammonia $pH > 7$ (B)

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(13) $2KClO_{3(s)} = 2KCl_{(s)} + 3O_{2(g)}$

$K_c = [O_2]^3$ (b)

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(14) $N_2O_{4(g)} = 2NO_{2(g)}$

(b) reversible عكسية

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(15) $pH < 7$ pepsi

(b)

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(16) (b) The first law

- القانون الأول للديناميكا الحرارية

(17) (a) internal energy الطاقة الداخلية

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(18) (c) bomb calorimeter

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(19) (d) coffee-cup calorimeter

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(20)

$$w = -P\Delta V$$

$$w = -1.2(0.75 - 0.16)$$

$$w = -0.78 \text{ atm} \cdot L$$ (c)

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(21) Endothermic $\Delta H = +$

عاص الحرارة

(c) $\Delta H > 0$

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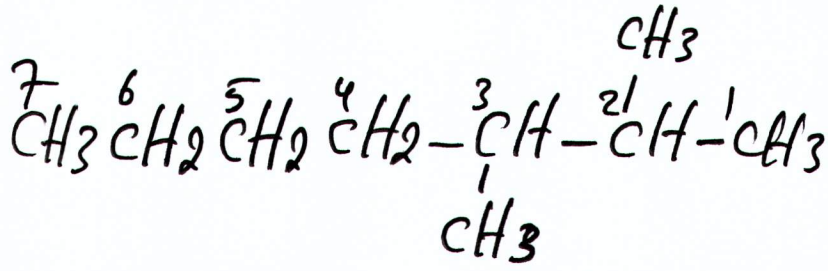
(22) (c) $H = E + PV$

(23)



2,3 dimethyl heptane

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(24) (d) alcohol R-OH

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(25) (a) acetone (مذيب)
(ketone)

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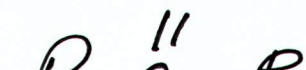
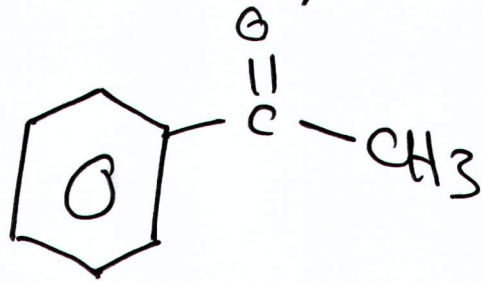
(26) ketone 

(d) 

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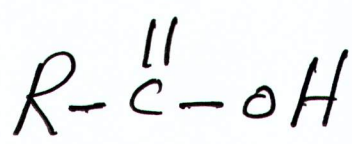
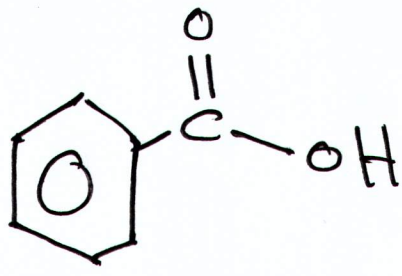
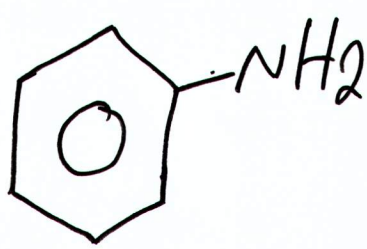
(27) carboxylic acid 



(B)

(28) amine RNH_2

(d) 

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(29) aldehyde $R-\overset{\overset{O}{\|}}{C}-H$

(c) $CH_3-CH_2-\overset{\overset{O}{\|}}{C}-H$ propanal

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(30) * peptide linkage الرابطة الببتيدية

(a) $R-\overset{\overset{O}{\|}}{C}-\underset{\underset{H}{|}}{N}-R'$

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(31) $-\overset{|}{\underset{|}{C}}-$ sp^3 رابطة أحادية

$CH_2=$ sp^2 رابطة ثنائية

$C\equiv CH$ sp رابطة ثلاثية (a)

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(32) (a) alkane (single bond)

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(33) (olefins)(alkenes)

(a)

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(34) alkyne (C_nH_{2n-2})

C_2H_2 (Ethyne)(acetylene)

(c) الأسيتيلين

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(35) (c) Alkyne (triple bond)

36 Alkynes $C\equiv C$ (b)

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37 Alkenes $C=C$ (a)

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38 alkene C_nH_{2n}

(a)

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39 alkanes C_nH_{2n+2}

(c)

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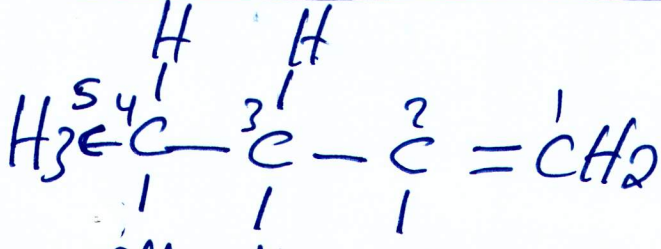
40 alkynes C_nH_{2n-2}

(b)

41



(d)

CH_3 H CH_3 2,4 dimethyl-1-pentene

(42) (=) (σ + π)

(a) one π bond.

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(43) (d) 3 π bond.

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(44) (b) C_3H_6 alkene C_nH_{2n}

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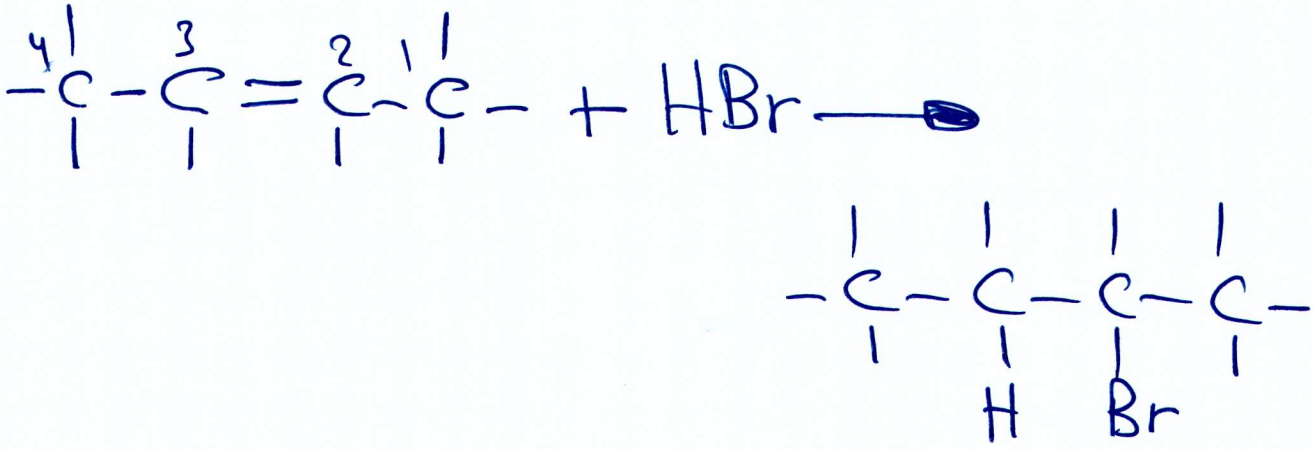
(45)



* 2-bromobutane

(b)

46 $R-O-R'$ ether

(a)

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47 $R-\overset{O}{\overset{\|}{C}}-H$ aldehyde

(d)

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48 $R-\overset{O}{\overset{\|}{C}}-OH$ @ carboxylic acid

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49 $R-\overset{O}{\overset{\|}{C}}-O-R'$ (b) ester

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50 $R-\overset{O}{\overset{\|}{C}}-NH_2$ (b) amide

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51 (b) glucose جلوكوز

(52) $CH_3-CH_3 \longrightarrow C_2H_6$ alkane

(53)

$CH_3-CH=CH_2 + H_2 \longrightarrow CH_3-CH_2-CH_3$

1-propene

propane

(a) ⌐

(54) monosaccharides (glycose, fructose)

(55) Polysaccharides (cellulose, starch)