المستوى الثالث - كيمياء حيوى
كيمياء مياه
كيمياء بيئة
كيمياء عضوية - كيمياء عضوية ك ٣٤٦

Mansoura University
Faculty of Science
Chemistry Dept.
3rd Year Gen. Chem.

2d Semester 2014
Chem. ~~364~~ 346
Full Mark [80]
Time Allowed 2hr

Final Examination

Answer the Following Questions:

1. Write the correct answers of each of the followings: **[15]**

(A) The rate law for this reaction is $k[A][B]^2$. Doubling the concentration of A increases the rate of the reaction by a factor of **(a) 9** **(b) 4** **(c) 1** **(d) 2**

(B) The units of k for the third order reaction is
(a) s^{-1} (b) s^{-3} (c) $L\ mol^{-1}\ s^{-1}$; (d) $L^2\ mol^{-2}\ s^{-1}$; (e) $L^2\ s^2\ mol^{-2}$

(C) **The rate of a chemical reaction**
a) does not vary with temperature
b) depends on the slow step of the mechanism
c) depends on concentration of products
d) has an order which is related to the coefficients of the balanced equation

2. Answer the followings: **[25]**

(A) Explain the influence of reaction temperature on each of;
(a) Rate constant (b) Half-life time (c) Activation energy
(d)Reaction order (e) Molecularity of reaction

(B) For the following reaction mechanism:

$$NO + O_3 \rightarrow NO_2 + O \quad \textbf{(step 1)}$$
$$O_3 \rightarrow O_2 + O \quad \textbf{(step 2)}$$
$$NO_2 + O \rightarrow NO + O_2 \quad \textbf{(step 3)}$$

Give the (a) The overall reaction equation; (b) the expression for V_R; (c) The intermediate(s); (d) the rate If step 2 is the slowest.

(C) How the concentration-time data plotted in order to obtain a straight line for first, second ,thirdand zero order?

(D) Sketch the consequences of absorption of light in a system

اقلب الصفحة من فضلك

(E) Define the kinetic salt effect and prove that

$$\log \frac{k_2}{k_2^0} = 2AZ_A Z_B I^{1/2}$$

3. Solve the following problems: **[40]**

(A) For the reaction, **$2HI \rightarrow H_2 + I_2$**, k = 1.20×10^{-3} M^{-1} s^{-1} at 700 K.

A sample of 0.0172 mol L^{-1} HI is maintained at 700 K.
How long will it take to decompose 40% of the original HI?

(B) A certain system absorbs 3.0×10^{16} quanta of light per second. On irradiation for 10 minutes 0.002 mole of the reactant was found to have reacted. Calculate the quantum efficiency and comment.

(C) The rate constant for the decomposition of CH_3CHO is 0.0105 dm^3 mol^{-1} s^{-1} at 700 K. If the activation energy for this reaction is 188 kJ, find the rate constant at 800 K.

(D) The following initial rate data was collected for the reaction;

$\alpha A + \beta B \rightarrow \gamma C + \delta D$

Experiment	[A](M)	[B](M)	Rate M/s
1	0.422	1.52×10^{-2}	2.71×10^{-5}
2	0.638	1.21×10^{-2}	$4,93 \times 10^{-5}$
3	0.921	1.52×10^{-2}	1.29×10^{-5}

Calculate the order and rate constant of the reaction.

N.B. $N_A = 6.02 \times 10^{23}$ mol^{-1}, h = 6.626×10^{-34} Js, C = 3×10^8 ms^{-1}

GOOD LUCK

Prof. Shawky Hassan, Prof. Hamed Abo El Nadar and Prof Salem Samra

المستوى الثالث - كيمياء نبات - تاغ وتصنيف زهريات كاسيات (٣١٨ ن)

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
Second Term: Jun. 2014

Educational Year: Third Level **Program (Branch): Botany / Chemistry**
Subject: Bot (318) **Course(s): Climate-Plant Cover & Taxonomy**
Time: 2 hrs **Date: 4 / 6 /2014** **Full mark:** 60 **Question mark: 20**

Answer the following questions:

Q.1 A- Write on Two Only of the following: (20 marks)

1- External and internal features of xerophytes.
2- Liquid forms of precipitation
3- Classification of halophytes according to adaptability to salinity.

Q.2 A- Complete the following sentences: (10 marks)

1- The boundary between the troposphere and the stratosphere is called .....
2- Snow is ..... and hail is .....
3- Plants grow in low light intensity is called .....
4- Oligohalophytes are plants growing in ..... habitats, while ..... are resisting salts by desalinization of their tissues.
5- Evaporation can be measured by....., while.....is measured by anemometer.

B- Elucidate with draw only: Hygrometer and Standard Rain Gage

C- Mention the families which have the following characters: (10 marks)

1- Leaves opposite decussate.
2- Obdiplostemonous stamens.
3- Fruit sliqua or silicula.
4- Stamens with only one lobe anther.
5- Fleshy oblique placenta.
6- Leaves with transverse parallel venation.
7- With only half fertile stamen.
8- Fruits are aggregate of achenes.
9- Flowers are unisexual and dioecious.
10- A duck weed family.

Q3. A- Complete the following sentences: (10 marks)

1- Families .....and ..... with inferior ovary.
2- Inflorescence of Labiatae is .....and style is. .....
3- In family compositae disc floret characterized by ..... and. .....
4- The two most important families within order Rosales are ..... and. .....
5- In Callistemon, stamens are ..... with long filament form a. .....
6- Leaves of Gramineae with ..... and. .....
7- Some stamens are modified into petals in ..... and. .....
8- .....is a monocot plant but its leaves with pinnate venation.

A- Mark the following sentences by true (√) or false.(×)

9- Delphinum with only two petals inside the spure.
10- Family Compositae with caryopsis fruit.
11- In family Malvaceae anthers united to form a tube.
12- Replum is developed in the ovary of family Labiatae.
13- Family Liliaceae characterized by scaly perianth.

Examiners: **Dr. Ehsan El-Habashy** **Dr. Yasser El-Amier**

المستوى الثالث - كيمياء ونبات - مزارع غذائية وزراعة أنسجة (م ٣١٩)

Mansoura University
Faculty of Science
Botany Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
Second Term: June. 2014

Educational Year: Third Level **Program (Branch): Botany/Chemistry**
Subject: N(319) **Course(s): Plant nutrient and tissue cultures**
Time: 2 hrs **Date: 8 / 06 /2014** **Full mark:** 60 **Question mark: 20**

Answer the following questions:

Q1 Discuss briefly the techniques of hydroponics cultures with special reference to the basic six hydroponics systems. **(20 mark)**

Q2

A: Account on one only of the following: **(10 mark)**

i- Composition of plant nutrient cultures.

ii- Advantages and disadvantages of hydroponics cultures.

B: Describe the term subculture and explain the factors determining its frequency, why do researchers have to do it? How would you do it for callus, shoot, and cell suspension cultures? Does subculture has any hazards? **(10 mark)**.

Q3 **A : Define the following terms:** **(8 mark)**
Somaclonal variation, totipotency theory, explant, differentiation, embryogenesis, morphogenesis, rejuvenation, subculture, and hardening off.

B: Describe *ONLY* four the following: (12 mark, 3 mark each)

i- Initiation of anther culture and describe its biological significance.

ii- Protoplast fusion and its importance.

iii- Phytohormones and their role in plant tissue culture.

iv- Different types of calli.

v- Methods of initiation of a typical plant cell suspension culture.

Best wishes

Examiners: Prof. Mohamed A. Abbas Dr. Farag Ibraheem

Mansoura University **Faculty of Science** **Chemistry Department** **Code: Chem.341** **Subject : Electrochemistry**	كلية العلوم جامعة المنصورة	**Third Level - Second Term** **Program : Biophysics ;** **Chem./Botany; Chem./Zoology** **Date : June 2014** **Time Allowed : 2 hours** **Full Mark : 60 Marks**

Answer All Questions الأسئلة على الوجهين

First Question: **(20 Mark)**

[A] Write on Nernst theory of the origin of electrode potential and Nernst equation relating electrode potential and concentration. **(8 Mark)**

[B] Taking E^o $Zn^{2+}/Zn = -0.76$ V and E^o $Mg^{2+}/Mg = -2.37$ V , construct a cell of both electrodes.

Write electrode and cell reactions and calculate : E^o cell , ΔG^o and equilibrium constant K . **(6 Mark)**

[C] Write on cadmium-Weston standard cell. **(6 Mark)**

Second Question: **(20 Mark)**

[A] Discuss in detail activation overpotential for polarized electrode and the Tafel equation. Illustrate how,using this equation, the exchange current i_o can be calculated. **(8 Mark)**

[B] If the Tafel constants, a and b, have the values 1.54 v and 0.119 v respectively for the reduction of hydrogen ions at a lead cathode, calculate the values of transfer coefficient α and the exchange current density i_o .

(6 Mark)

[C] Write on cathodic evolution of hydrogen. **(6Mark)**

Third Question: **(20 Mark)**

[A] The following values of emf of the cell: Ag/ AgBr/ KBr (a=1) / Hg_2Br_2/Hg

at various temperatures are given as follows:

t^oC	20	25	30
E (V)	0.06630	0.06834	0.07048

Write the electrode reactions, cell reaction and calculate the enthalpy change of the cell reaction ΔH, free energy change ΔG , entropy change ΔS and equilibrium constant K at 25°C.

(8 Mark)

[B] Complete : (6 Mark)

(1) $Sb/Sb_2O_3/OH^-$ is called..... and can be used for measuring .....

(2) In chemical cell emf is due to ....., while in concentration cell it is due to.....

(3) Concentration overpotential is due to .....

(4) The potential of gas electrode depends on..... and.....

(5) Ohmic overpotential is due to .....

(6) The transport number of the anion or cation is .....

[C] Tick (√) for the correct answer : (6 Mark)

(1) Overpotential η is given by :

(i) $\eta = E_{irreversible} + E_{reversible}$ ( ) (ii) $\eta = E_{irreversible} - E_{reversible}$ ( ) (iii) $\eta = E_{reversible} - E_{irreversible}$ ( )

(2) For an electrode at equilibrium :

(i) Rate of oxidation = rate of reduction ( ) (ii) Rate of oxidation > rate of reduction ( )

(iii) Rate of oxidation < rate of reduction ( )

(3) For non spontaneous cell reaction :

(i) E has a +ve value while ΔG has a –ve value ( )

(ii) E has a -ve value while ΔG has a +ve value ( )

(iii) Both E and ΔG have zero value ( )

(4) Theoretically , liquid junction potential (E_j) equal zero when:

(i) $t_+ = t_-$ ( ) (ii) $t_+ > t_-$ ( ) (iii) $t_+ < t_-$ ( ) (iv) $t_+ + t_- = 0$ ( )

(5) The cell : $Pt, H_{2(g)} (P_1 \text{ atm}) \mid HCl (a) \mid (P_2 \text{ atm}) H_{2(g)}, Pt$

is an example of :

(i) Electrolyte concentration cell without transference ( )

(ii) Electrolyte concentration cell with transference ( )

(iii) Chemical cell without transference ( )

(iv) Electrode concentration cell without transference ( )

(6) Irreversible processes are characterized with:

(i) Very high i_o ( ) (ii) Very low i_o ( )

Good Luck

المستوى الثالث كيمياء حيوى
كيمياء نبات - كيمياء حيوية - كيمياء منتجات طبيعية ٣٣٥

Mansoura University
Faculty of Science
Dept. of Chemistry
Second Semester Exam (2013/14)

Chem 335
Natural Products' Chemistry
Time allowed: 2 hours
Full Mark: 60 Marks

ANSWER THE FOLLOWING QUESTIONS

I. In your answer notebook write the letter representing the right statement **for only 15 of the following** (30 marks,2 for each).

1- The best classification method for studying natural products is:
a) that based on taxonomy b) that based on carbon skeleton
c) that based on biogenesis d) that based on physiological activities

2- Classification of steroids as a class of natural products is based on:
a) biogenesis b) carbon skeleton c) physiological activity d) none of them

3- Aromatic compounds can be produced from:
a) Shikimic acid pathway b) Mevalonic acid pathway
c) Polyketide pathway d) All of them

4- Natural products are:
a) Primary metabolites b) Secondary metabolites c) Both of them d) None of them

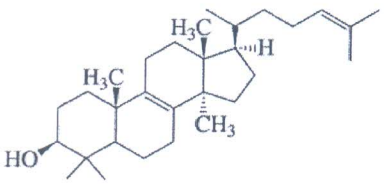
5- Mevalonic acid pathway produces:
a) carotenoids b) steroids c) terpenoids d) all of them

6- Shikimic acid pathway
a) starts with phosphoenolpyrovate and erythrose 4-phosphate
b) produces shikimic acid as a final product
c) produces terpenoids as final products
d) produces fatty acids as final products

7- Mevalonic acid pathway produces
a) coumarins b) monoterpenes c) acetogenins d) polyketides

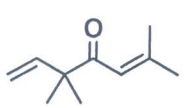
8- Squalene is the precursor of:
a) monoterpenes b) diterpenes c) triterpenes d) tetraterpenes

9- The precursor of sesquiterpenes is:
a) geraniol b) farnesol c) geranylgeraniol d) squalene



10- Steroids are formed from lanosterol by losing of:
a) 2 CH_3 at C4 and CH_3 at C14 b) the side chain at C17
c) angular methyl groups d) 3-hydroxyl group

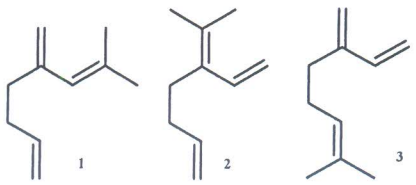
11- Lanosterol is:
a) a sterol b) a sex hormone c) a triterpene d) a sapogenin



12- Artemisia ketone is:
a) a regular monoterpenoid b) an irregular monoterpenoid c) a sesquiterpenoid
d) none of them

13- From essential oil production methods are:
a) expression b) steam distillation c) adsorption on fats d) all of them

14- A monoterpene gives by ozonolysis acetone, 2 moles of formaldehyde and

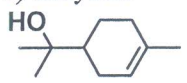


$OHC\text{-}CH_2CH_2\text{-}CO\text{-}CHO$, it may be:

a) 1 b) 2 c) 3 d) any of them

15- An aldehyde having molecular formula $C_{10}H_{20}O$ should be:

a) acyclic b) monocyclic c) bicyclic d) tricyclic



16- α-Terpineol reacts with bromine to give:

a) a deep blue nitrosyl compound.

b) a yellow oxime c) a dibromo compound d) none of them

17- Distillation of α-terpineol with selenium gives:

a) benzene b) toluene c) p-cymene d) Diel's hydrocarbon

18- Distillation of cholesterol with selenium gives:

b) benzene b) toluene c) p-cymene d) Diel's hydrocarbon

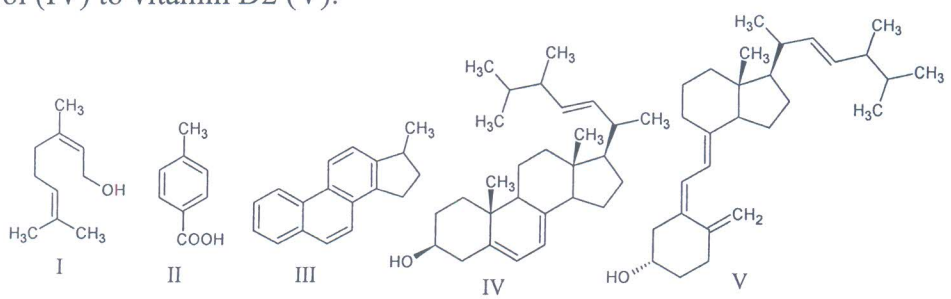
II. Illustrate by chemical equations **only three** of the following conversions (15 marks,5 for each):

1- nerol (I) into α-terpineol (p-menth-1-en-8-ol).

2- p-toluic acid (II) into α-terpineol.

3- 2(1-naphthyl)ethyl magnesium bromide into Diel's hydrocarbon (III).

4- Ergosterol (IV) to vitamin D2 (V).

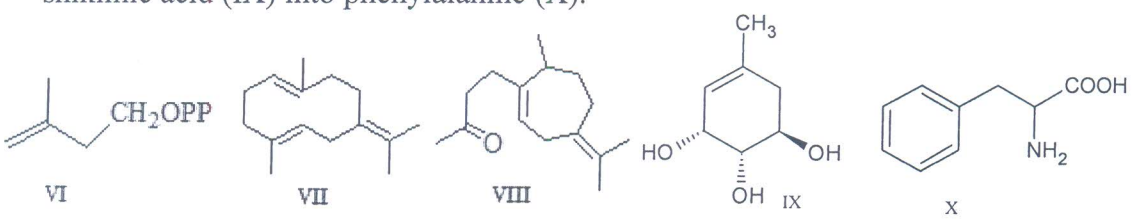


III. Illustrate by chemical equations the following biogenetic conversion (15 marks,5 for each):

i. acetyl co-enzyme A into isopentenyl pyrophosphate (VI).

ii. the germacrane (VII) into the seco-guaiane (xanthane) (VIII).

iii. shikimic acid (IX) into phenylalanine (X).



Best Wishes: Prof. Mamdouh Abdel-Mogib, Prof. Moged Berghot, Dr. Mona Elsayed & Dr. Saad Shaaban