المستوى الثانى - مجموعة البيولوجيين حيوان وفطريات . ع ٢٠١٣

Mansoura University
Faculty of Science
Zoology Department

Academic year: 2nd Year
Program: All Programs
Code: 204 Z
Course: Chordates and Vertebrates

Marks: 60
Date: 26/1/2013
Time: 2 Hours
Number of papers: 2

Answer ALL the following questions:

Question One:

Choose the correct answer (ONLY one answer is correct): [20 Marks]

1) – Fertilization in Amphioxus is external and gives rise to ---------- which undergoes metamorphosis to adult stage.

(*a*) Tadpole larva (*b*) Ammocoet larva (*c*) Nauplius larva (*d*) Lancelet larva

2) – Hagfishes and lampreys are

(*a*) Bony fishes (*b*) Sharks (*c*) Jawless fishes (*d*) Gnathostomates

3) – The metamorphosis of ascidian larva to adult stage described as

(*a*) Retrogressive (*b*) Progressive (*c*) Partial (*d*) Incomplete

4) – All of the following items involved in buoyancy of dogfish except

(*a*) Large-sized liver (*b*) Squelence (*c*) Swim bladder (*d*) Heterocercal caudal fin

5) – All of the following are transitional ascidian larval organs except

(*a*) Notochord (*b*) Adhesive disk (*c*) Branchial basket (*d*) Dorsal tubular nerve cord

6) – The class mammals is divided into ---------- subclasses

(*a*) Three (*b*) Two (*c*) Four (*d*) Five

7) – The spiral valve is a characteristic feature of class

(*a*) Aves (*b*) Osteichthyes (*c*) Chondrichthyes (*d*) Reptilia

8) – The ---------- gland is the only gland of reptile's skin

(*a*) Oil gland (*b*) Sweat gland (*c*) Mammary gland (*d*) Scent gland

9) – Class Amphibia belongs to the subphylum

(*a*) Vertebrata (*b*) Cephalochordata (*c*) Urochordata (*d*) Hemichordata

10) – Reptiles, Aves and mammals are called

(*a*) Pisces (*b*) Amniotes (*c*) Semiterrestrial animals (*d*) Aquatic animals

انظر إلى بقية الأسئلة (السؤال الثانى و الثالث) فى الجزء الخلفى للورقة

Question Two: Write a brief notes on the following items: **[20 Marks]**

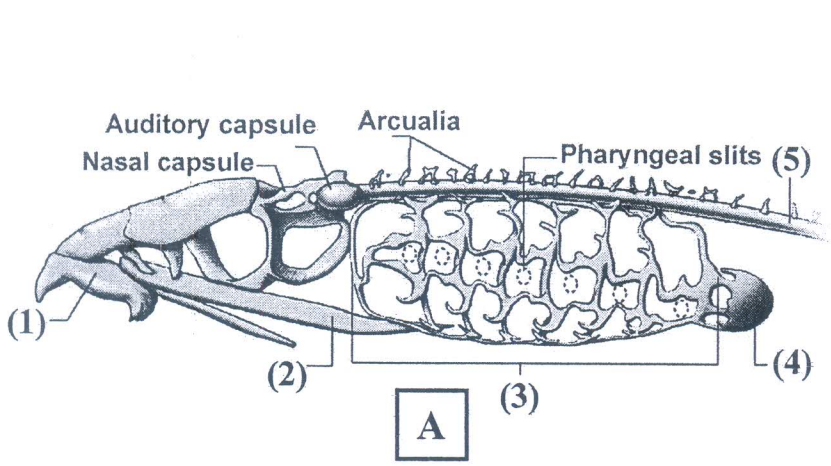
1) – The Circulatory system of ***Ascidia.*** (Draw) [4 Marks]

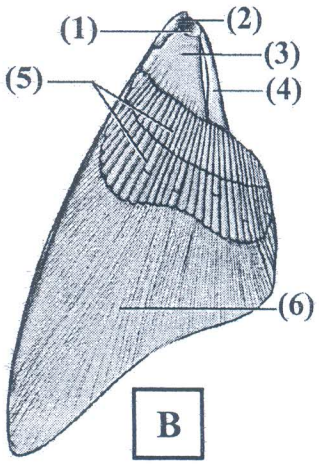
2) – Female urinogenital system of ***Scyliorhinus canicula.*** (Draw) [4 Marks]

3) – Mention the different sense organs of ***Petromyzon fluviatilis.*** [4 Marks]

4) – State ONLY (5) of main characters of **Cyclostomates.** [4 Marks]

5) – Answer the questions concerning the following two diagrams **[A]** and **[B]**: [4 Marks]





***i*- The diagram [A] represents ------.**
ii*- Define the structures from (1) to (5) and mention their functions in a *simple table.

***i*- The diagram [B] represents ------.**
***ii*- Define the structures from (1) to (6)**

Question Three: Answer the following items: **[20 Marks]**

1) – Mention the general characters of class **Mammals.** [5 Marks]

2) – Write on: Modifications of the digestive and urinogenital system of **Aves.** [5 Marks]

3) – Write the functions of the following: [5 Marks]

(*a*) Keratin

(*b*) Air sacs.

4) – Subclass **Prototheria** is considered as primitive mammals (Discuss and give examples) [5 Marks]

Good Luck

Examiners: *Dr.* Yosra Abdel Aziz Fouda

Dr. Ahmed Abdel Aziz Elmansi

مجموعة السوليهي - ضوء فيزياء ف ٢٢١

Mansoura University Faculty of Science Physics Department		**First Term Exam, 2013** **Second level** Date: **30-12-2012** Time allowed : **2 hours** Full Mark: **80 Mark**
Subject: **Physics**		Course: **Physical Optics 221 ف**

Answer the Following Questions

[1] **a**- Give a model to discuss Fraunhofer diffraction pattern when using a rectangular slit. Derive an expression for the intensity distribution of the observed diffraction pattern. **[18 Marks]**

b- When a thin sheet of transparent material of thickness 6.3×10^{-4} cm is introduced in the path of one of the interfering beams, the central fringe shifts to a position occupied by sixth bright fringe. If $\lambda = 5460\ A^{o}$, find the refractive index of the thin sheet . **[9 Marks]**

[2] **a**-Derive an expression for the intensity distribution in a Fabry-Perot system of interference fringes in transmission when the two coated plate are of same transmission coefficient T and reflectivity R. **[18 Marks]**

b-In a Jamin's refractometer, two evacuated tubes each of length 25 cm are placed in the two beams. A gas is slowly admitted and 125 fringes cross the centre of the field of view. Calculate the refractive index of the gas. ($\lambda = 5460\ A^{o}$). **[8 Marks]**

[3] **a**- If you have tourmaline crystal and unpolarized monochromatic light source. Construct an experiment to produce a beam of plane polarized light. **[10 Marks]**

b- Give the arrangement of Young's experiment to produce interference fringes. Derive expression for the conditions of the bright and dark fringes. Descrip these fringes. **[17 Marks]**

Good Luck

Examiners: Prof. Dr. Taha Sakkar, Prof. Dr. Eman Seisa , Prof. Dr. Mohamed Kabeel

مجموعة البيولوجي - مشتل السيد، التصنيف الأول م ٢٠١

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
First Term: Jan. 2013

Educational Year: Second Level   Program (Branch): Biology
Subject: Bot (201)   Course(s): Introduction to Plant Ecology & Taxonomy
Time: 2 hrs   Date: 2 /1/2013   Full mark: 60   Question mark: 20

Answer the following questions:

Q1:

[A] **Mark the following sentences by true (√) or false (×)** (10 marks)

1) **Climax stage is the final stage of the vegetation development.**
2) **Humid climate favors alkaline soils while, arid climate favors acidic soils.**
3) **Preferential halophytes are plants show optimum growth in saline habitats, despite their appearance in non-saline habitats.**
4) **Physical drought means that, the water is present in excess amount but it is not available to plants.**
5) **Clay particles are distinguished into mineral clay and colloidal clay.**
6) **Dunes are mainly formed of silt while, loses are mainly formed of sand.**
7) **Halophytes are plants growing in saline habitats, while hydrophytes growing in moist habitats.**
8) **Hygroscopic water is the soil water which is very important for plant life.**
9) **The phytoplankton stage is followed by submerged plant stage in hydrosere succession.**
10) **In ion exchange, the divalent ions have lower replacing power than monovalent ions.**

[B] Complete **the following sentences:** (10 marks)

1) **Xerophytes are classified into........... , ... and ....**
2) **Colluvial soil parent materials are transported by ...., while alluvial parent materials are transported by ....**
3) **According to salinity, soils may be ...., ... and ....**
4) **In xerosere succession, the first stage is called...........**

Q2:

[A] **Write on <u>two</u> only of the following:** (10 marks)

1) Evolution of vegetation.
2) The basic processes in soil development.
3) Different types of soil water.

[B] **Explain each of the following taxonomic terms and relate each to its family:** (10 marks)

1) Capitulum
2) Didynamous stamens
3) Epicalyx
4) Siliqua
5) Tetracyclic flower

باقي الاسئلة في الصفحة التالية ←

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
First Term: Jan. 2013

Q3:

[A] **Write shortly with help of drawing each of the following: (10 marks)**

1) Fleshy fruits
2) Imbricate aestivation
3) Insertion of floral parts
4) Tetradynamous stamens
5) Obdiplostemony

[B] **Tabulate the differences between each of the following: (10 marks)**

1) Subfamilies of leguminosae
2) Cyperaceae and graminae
3) Monocots and dicots flowers

Examiners:

Prof. Ibrahim Mashaly

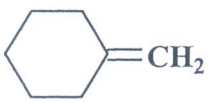
Dr. Ehsan El-Habashy

Mansoura University Faculty of Science Chemistry Department Subject : Chemistry Course: Organic Chemistry (235)		First term 2th level students Date: Jan. 2013 Time allowed: 2 hours Full mark: 60 marks

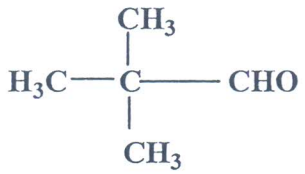
Answer the following questions:

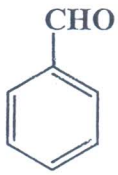
1- Complete the following equations: (20 marks)

i- $CH_3-CH=C(CH_3)-CH_3$ (with CH_3 on C) $\xrightarrow[H_2O_2]{HBr}$ .....

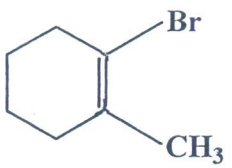
ii-  $\xrightarrow{O_3}$ .....

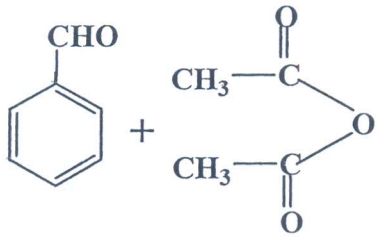
iii- $4\ CH_3-C\equiv N \xrightarrow{LiAlH_4}$ .....

iv-  $\xrightarrow[NaOH]{I_2}$ .....

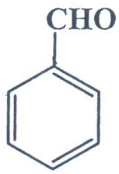
v- CH_3CHO +  $\xrightarrow{NaOH}$ .....

vi- $H_3C-C\equiv H \xrightarrow[2-\ CH_3-Cl]{1-\ Na}$ .....

vii-  $\xrightarrow{alc.KOH}$ .....

viii-  $\xrightarrow{sod.acetate}$ .....

ix- $H_3C-CH=CH_2 \xrightarrow{Cl_2/H_2O}$ .....

x- 2  $\xrightarrow{NaOH}$ .....

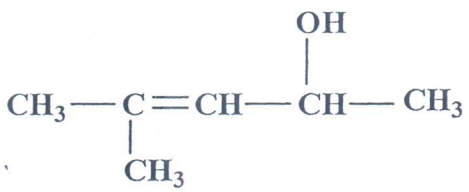
P.T.O

2- **a) Draw the chemical structure of the following compounds:** (5 marks)

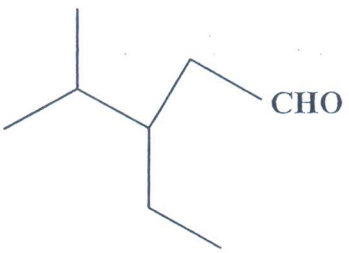
i- 2-chloro-5-ethyl-8,8-dimethylnonane.
ii- 5-methyl-4- hexene-2-one.

b) Give the IUPAC name of the following compounds: (5 marks)

i-



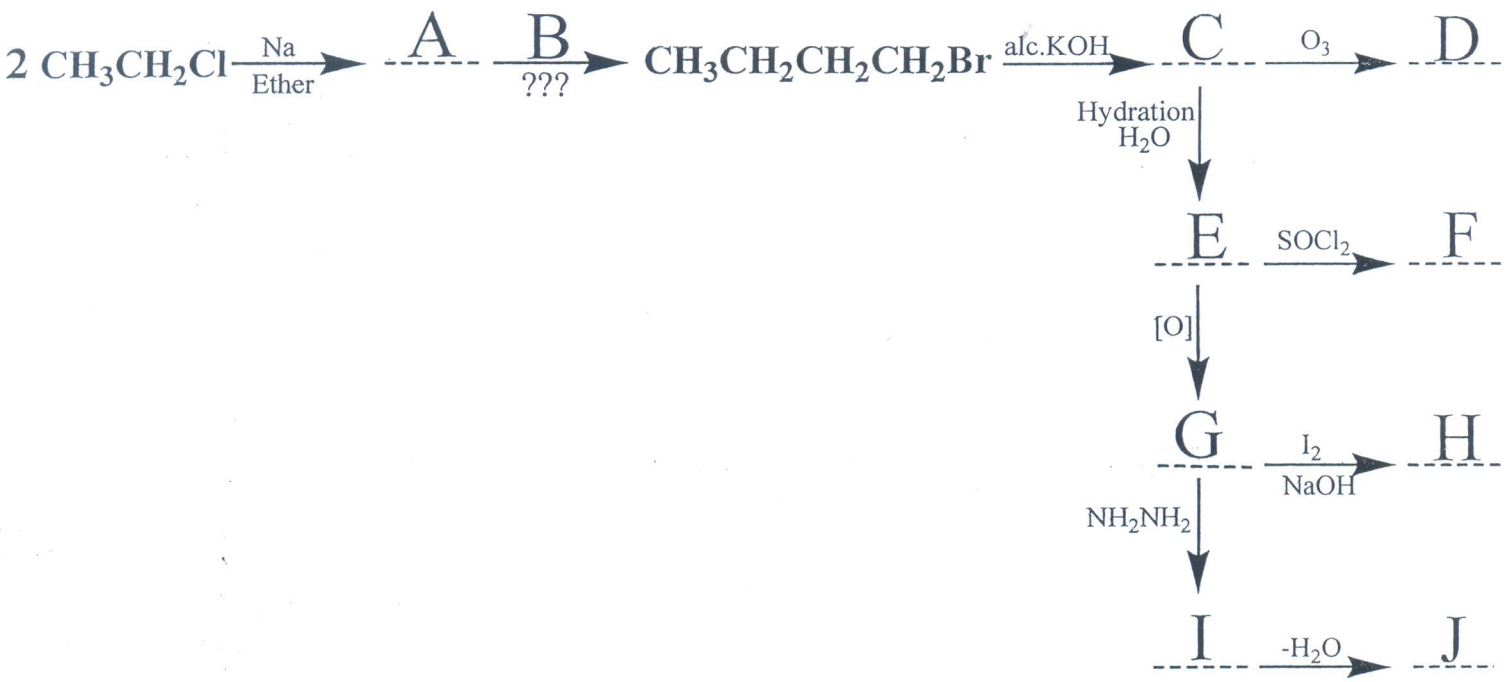
ii-



C) Show how you can do the following conversions: (10 marks)

i) Ethylene to Acetone.
ii) 1-propanol to 2-propanol.
iii) Ethane to Chloroform.
iv) Propyl chloride to propeneoxide.

3-Complete the following scheme: (20 marks)



With our best Wishes;

Prof. Dr. A.A. Fadda, Dr. D.M. Ayad, Dr. M. El Sayed, Dr. M. Monir.

Mansoura University
Faculty of Science
Zoology Department

First Term Exam, Jan. 2012

Education year: Second level | **Program: Biology**
Time: 2 hours | **Subject: Zoology**
Date: 23/ 1/ 2012 | **Course: Introduction to Embryology**
Code: Z 201 | **Full Mark: 60**

Answer all the following questions:

Q1) a- Choose the correct answer of the following: (10) Marks

1- In Human,..... cells exert microvilli to facilitate the blastocyst implantation.
a- trophoblaste b- hypoblaste c- epiblaste

2- The type of cleavage which occurs in Birds is called ..... cleavage.
a- discoidal meroblastic b- equal-holoblastic c- superficial

3- All the following sites of implantation form ectopic pregnancy except .....
a- tubal b- ovarian c- superior in uterus

4- ..... process occurs by removing Glycoprotein overlies the sperm.
a- cortical b- acrosomal c- capacitation

5- ..... stimulates the production of estrogen by the follicles cells.
a- LH b- FSH c- progesterone

6- If the embryo is female genetically, the cortex of the developing gonads become....
a-Thicker b- thinner c- no change

7- Shortly after ovulation, the wall of Graffian follicle wounds, folding and becomes....
a- mature ovum b- corpus luteum c- degenerating

8- Sperm secretes Hyaluronidase that helps to penetrate the .....
a- corona radiate b- zona pellucida c- plasma membrane

9- The trophoblast will form the ..... sac which represent the embryonic portion of the plasenta. a- amnionic b- chorionic c- yolk

10- At the end of spermatogenesis, each primary spermatocyte will give rise to ..... spermatozoa. a- one b- two c- four

Q1) b- Compare between <u>TWO</u> pairs only of the following: **(10) Marks**

1- Somatic cells and sex cells.
2- Golgi-phase and Maturation-phase.
3- Function of FSH and LH.

Q2) a- <u>Discuss the followings:</u> <u>(2o) marks</u>

1- Steps of fertilization.
2 -Compare between the blastula and gastrula of both toad &amphioxus embryos with labeled diagram .

<u>Q3)A-Write a short note on the following:</u> <u>(13 marks)</u>

1- Twins(definition & types showing fetal membranes)
2- Embryonic development of chick with labeled diagrams.

B-Complete the following sentences : (7 marks).

1-Process by which the single layered blastula is converted into three layers is……..
2-the first step in formation of gastrula in amphioxus is…….
3-…….is mitotic division of cells in the early embryo ,with no growth.
4-Types of cleavage are ……..,……..,……..
5-As gastrulation continues ,the three germ layers are
……..,……..……..,and…….
6-The inward movement of cells in gastrulation of toad is……..
……

With our best wishes …… Dr.Manal Ramadan ….Dr.Heba EL-Gaweed
Dr.Mohamed Ezat

Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Inorganic** **Course(s): Inorganic Chem. (121)**	كلية العلوم جامعة المنصورة	**First Term** **2d level (Geology, Microbiology,Botany,Environmental, Zoology/ Chem.)** **Time Allowed: 2 hours** **Full Mark: 80 Marks** **Date:** Jan, 2013

Answer The Following Questions

1. Comment on (10 only) of the following : (Each 3 Mark = 30 Marks)

1. Na^+ is smaller than Na but Cl^- is bigger than Cl.
2. Malathion has a great effect on insects rather than human.
3. White phosphorous should never be allowed to come in contact with the skin.
4. Cs^+ conducts electricity more than Li^+ in aqueous solution.
5. $CaCl_2$ added to molten NaCl in the extraction of Na.
6. Photochromic eye glass is made by adding a small amount of AgCl.
7. Aqueous solutions of Be(II) salts are acidic.
8. Oxy-hydrogen torch is used in cutting and welding metals.
9. Li shows considerable differences from the rest of group I
10. Thallous (+1) compounds are stable.
11. Lithium is similar to magnesium..
12. Addition of glycerol makes $B(OH)_3$ a strong monobasic acid.

2. Complete 10 only of the following equations : (Each 3 mark = 30 Mark)

1. $C_{(coke)} + H_2O_{(g)} \xrightarrow[1000°C]{Fe}$
2. $CH_4 + H_2O \xrightarrow[1000°C]{Ni} >$
3. $P_2O_5 + B_2O_3 \rightarrow$
4. $6HF + SiO_2 \rightarrow$
5. $4KO_2 + 2H_2O$
6. $CaCN_2 + 5H_2O \rightarrow$
7. $CuO + NaH \rightarrow$
8. $2NH_{3(aq)} + ClO^-_{(aq)} \xrightarrow{OH^-}$
9. $P_4O_{10} + 6H_2SO_4 Conc. \rightarrow$
10. $Ca(H_2PO_4)_2 + 2NaHCO_3 \xrightarrow{300°C}$
11. $2\ Ca_3(PO_4)_2 + 6SiO_2 + 10CO \rightarrow$
12. $NaCl_{(aq.)} + CO_{2(g)} + NH_{3(g)} \rightarrow$

3. Try on (4 only) of the following : (Each 5 mark = 20 Mark)

1. Isolation of silicon (Si) in pure form .
2. Ortho and para hydrogen.
3. Ostwald process for the production of HNO_3.
4. Allotropes of carbon.
5. Structure of B_2H_6.

Dr. Kamal Dr. Rany

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

جامعة المنصورة
كلية العلوم
قسم النبات
المنصورة - مصر

Final Examination in Botany
First Term: Jan. 2013
Educational Year: Second Level **Program (Branch):** Biology (chemistry & botany / Microbiology / Chemistry & zoology / Environmental sciences)

Subject: B(202) **Courses: Plant Metabolism**
Time: 2 hrs **Date: 20 /1 /2013** **Full mark:** 60 **Question mark: 20**

Answer the following questions:

Q1: Answer all the following questions: (20 marks)

a- Write an account on C_4 photosynthetic pathway.
b- Point out the difference between photosystem I and photosystem II.
c-Write an account on sucrose biosynthesis.
d- How pyruvic acid synthesized in plants? Does this process require the expenditure of energy? Discuss.
e- Comment upon the electronic transport system in respiration.

Q2: Explain only four from the following: (20 marks)

a- Biosynthesis of fatty acids.
b- Translation of protein synthesis.
c- Triacylglycerol biosynthesis.
d- β-oxidation of fatty acids.
e- Synthesis of amino acids.

Q3: (20 marks)

A) Answer the following questions: (5 marks)

i) Which two of the following statements are incorrect? (2 marks)

1- Anaerobic respiration uses oxygen to release energy from food.
2- Aerobic respiration converts food to carbon dioxide and water.
3- Anaerobic respiration releases energy from food without using oxygen.
4- Aerobic respiration releases oxygen from food during oxidation.

ii) Which one of the following would be acceptable evidence that some form of respiration was taking place in a living tissue? (2 marks)

1- Oxygen being taken up.
2- Oxygen being given out.
3- water vapour being produced.
4- food being used up.

Why are the other unacceptable?

P. T. O.

B) Complete the following sentences: (10 marks)

i-The general formula of monosaccharides is ....., while the general formula of disaccharides is.....

ii- Glycolysis occurs within ....., while Krebs cycle occurs within .....

iii- Maltose consists of .....and.....

iv- There are two types of fermentation .....and.....

v- Starch is a mixture of .....and .....

vi- lipids play three different functions..... , ... and .....

vii- Proteins are polymers of .....which linked by ..... bonds.

viii- The complimentary sequence for DNA ATCG is.....

ix- Fatty acid with (18:3), 18 means that.....and 3 means that .....

x- Each amino acid has four different groups attached to α-carbon atom are 1....., 2....., 3..... And 4 .....

C) Put true (T) or false (F) and correct the underlined words if false: (5 marks)

i- The head of a fatty acid is a carboxyl group which is hydrophobic.

ii- Ribosome composed of 40% rRNA and 60% protein.

iii- The initial step in the conversion of lipids to sugars is the hydrolysis of triacyglycerol stored in the cytoplasm by lipase enzyme.

iv- Translation is the process of copying the sequence of one strand of DNA.

v- UGG is a stop codon on mRNA.

"Best of Luck"

Examiners:

Prof. Heshmat S Aldesuquy
Dr. Rasha M. Eid Gamel

Prof. Wafaa M. Shukry
Dr. Amany M Kazamel

الفرقة الثانية - تخصص البيولوجيا - مقدمة في الفيزياء الحيوية ف ع 211

Mansoura University
Faculty of Science
Physics Department
Course code: Bio-Phys 211
Course title: General biophysics

First term 2012-2013
Date: 16-1-2013

2nd Level students
Biophysics-Physics-Microbiology-Chemistry-Biochemistry-Chemistry Botany - Chemistry Zoology and Environmental Science
Full Mark: 80
Allowed time: 2 hours

Answer all the following questions:

1- A- Write true (√) or False (χ) [each item = 1.5 Mark]

i. The frequency range detected by the human ear is between 20 Hz-20000 KHz.

ii. Hypermetropia caused by irregularity shaped cornea results in light focusing in front of retina.

iii. There are three types of color sensitive cones in retina.

iv. The human eye is organ design to receive visible light having wavelengths between 380 and 760 μm.

v. Ionizing radiations are known to cause DNA damage, cancer, mutation and birth defects.

vi. The electric potential of the heart can be measured by electro-encephalogram EEG.

vii. There are negative charges on the outside of the cell membrane of neurons than the inside produces a resting potential of -70 mV.

viii. The conduction speed of unmyleinated axons is given by $u = 1.8\sqrt{a}$ (m/sec) where a is the radius of axon (μm).

ix. The efferent neurons are those axons travel from sensing areas to the spinal cord

x. The ear canal behaves like a pipe open from one end and the other end is closed by tympanic membrane.

B- Calculate the lowest frequency in which sound resonates in ear, knowing that the velocity of sound is C=350 m/sec and the ear canal length is L=2.5 cm (n=1 when $L=\lambda/4$). **[5 Marks]**

C- What is the total flow resistance of a two parallel arteries in a calf have radius 0.5 mm and length 100 mm? If the volume flow rate of blood through these arteries is 1.2×10^{-6} m^3/sec, what is the pressure drop across the arties knowing that $\eta_{blood}=3.5\times10^{-3}$ poise.

[5 Marks]

2- A- Complete the following sentences: (each item = 2 Mark)

- The P-Wave in ECG indicates .....(1).....of the right and left .....(2).....

الإمتحان مكتوب على وجهى الورقة

- The alpha waves of EEG have frequency range .....(3).....Hz in .....(4).....state.
- In .....(5).....effect, electron is ejected from the atom and is accompanied by scattered ...(6).....

B- Find an expression given for the half life time and decay constant of a radionuclide?

[8 Marks]

C- If you have 1gm of ^{226}Ra that emits $3.7x10^{10}$ photon/sec. What is the decay constant and half life time knowing that Avogadro's number=$6.02x10^{23}$. **[5 Marks]**

3- A- Choose the correct answer : **[each item = 1 Mark]**

i. The retina of the eye contains two types of photoreceptors cones and ..... (Spheres- triangles- rods-rectangles).

ii. The flow of ions causes an electric current in the ion chamber with intensity proportional to the .....of ions (volume- number-density –shape).

iii. The beta particles are a fast moving .....(protons-neutrons-electrons-photons).

iv. ..... provide the eye's color sensitivity (Rods –Cones- Corneas –Irises).

v. The percent of hydrogen atoms in human body is (53%-63%-73%-83%).

vi. About ..... of cones are green sensitive. (23%-42%-52%-62%).

vii. 1 gray equal (1 rad- 10 rad-100 rad-1000 rad).

viii. 1 rem equal (0.1 Sv-0.01 Sv-0.001 Sv-0.0001 Sv).

B- Define the following: **[each item = 2 Marks]**

a. Depolarization
b. Graded potential
c. Radiation flux
d. Decibel
e. Magnetic resonance imaging

C- Calculate the capacitance per unit length and area of an unmyleinated axon, if the material in the axon membrane has dielectric constant K=7 and $\varepsilon_o=8.85x10^{-12}$ S/ohm-m and the radius a= $3.5x10^{-6}$ m and thickness of membrane is b=$5x10^{-9}$ m. **[7 Marks]**

D- If a person has an unaided near point of 0.5 m, what would the power of a lens make him able to see an object at 25 cm? **[5 Marks]**

Best wishes:

Examiners: Dr. H. Kamal Dr. N. Kenawi Dr. M. Mansour

الإمتحان مكتوب على وجهى الورقة

بسم الله الرحمن الرحيم

Mansoura University **Faculty of Science** **Department of Chemistry** **January, 23, 2013**		**Second Level, Chemistry and Biochemistry students** **Final exam 211Chem** **Fundamentals of Analytical Chemistry** **Time allowed: 2 hours**

Answer the following questions:

1. *Define the following:* **(10 marks)**

a) Zimmermann Reinhard's reagent

b) Metallic indicators

c) Standard deviation

d) Buffer capacity

e) Precision and accuracy

f) Solubility product

g) Titration Error

h) Reducing agent

i) Absolute and effective stability constant for EDTA complexes

1.b) Calculate the actual potential (E) of 50ml o.1N Fe^{2+} solution on addition of the following amounts of 0.1N Ce^{4+} solution

a) 0ml b) 10ml c) 25ml d) 50ml e) 60ml

($E^{o}_{Fe3+/Fe2+}$ =0.77 V, $E^{o}_{Ce4+/Ce3+}$ =1.61 V) **(5marks)**

2.a) Give an account on the following: **(12marks)**

i) Types of titrations of EDTA
ii) Importance of using buffer solutions in complexometric titration
iii) Restrictions of usage of Mohr method
iv) Application of $KMnO_4$ for analysis of mixture of (Fe^{2+} +Fe^{3+})

2.b) The following set of chloride analysis were reported; 103, 106, 107, 114mg/l. Determine if any .a of these values could be excluded (tabulated value of Q is 0.829) **(3 marks)**

3.a) Calculate the pH of the following mixtures: **(9 marks)**

i) 50ml HCl 0.1N+30ml NH_4OH 0.1N +20ml H_2O

ii) 50ml HCl 0.1N+50ml NH_4OH 0.1N

iii) 50ml HCl 0.1N+60ml NH_4OH 0.1N (Kb_{NH4OH}= $1.8x10^{-5}$)

3.b) A sample of NaCl weights 0.5 gram. 50 mL of 0.21M $AgNO_3$ is added to precipitate AgCl . The excess silver nitrate is titrated with 0.28M potassium thiocyanate to give 25.5 mL at the end point. Find the percentage of NaCl in the sample. (Na=23, Cl= 35.5) **(6 marks)**

4.a) Find the confidence interval for the following titration volumes:

50.00, 51.00, 50.50, 49.80

(knowing that the standard deviation (s)= 0.02 and t=4.2 at 95% confidence) **(3 marks)**

4.b) Calculate the volume of concentrated HCl solution , *having density1.14g/ml and 36% w/w percentage concentration,* required to prepare 500.00mL of 0.20 N HCl solution. (H= 1.00, Cl=35.50.) **(3 marks)**

4.c) Calculate Ksp of Ag_2CrO_4 (M.wt.= 332) knowing that its solubility is 0.004g/100ml at 25°C. **(3 marks)**

4.d) 250ml aqueous solution containing 0.05mg of copper. Express the concentration of copper in ppm and ppb scale **(3 marks)**

4.e) Indicate 3 types of indicators used in oxidation reduction titrations **(3 marks)**

Best wishes

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