المستوى الثالث - فيزياء حيوية - طاقة حيوية (فاع ٣٢٢)

Mansoura University
Faculty of Science
Physics Department

Course code: Biophys 322

Second semester 2012-2013
Date: 27-5-2013

3rd level Biophysics Students
Full Mark: 80
Allowed time: 2 hours
Course title: Bioenergy

Answer the following questions:

Marks

1- a- Show the difference between the Biosphere state and synthetic phase? Explain the difference by some examples? 10

b- Write short notes on: 10

I. Action spectrum.

II. Accessory pigments

2- a- Free energy liberated during the degradation of foodstuffs is collected and stored in different forms. Write on these forms? 10

b- Write short notes on:

I. Nitrogen cycle 10

II. Acidic rain

3- a- Compare between Nucleoside and Nucleotide 10

b- Show the mechanism of Carbon Dioxide Fixation (Calvin cycle)? Clarify its importance? 10

4- a- Define the following state functions: 10

1- Free energy 2- Enthalpy

3- Entropy 4- Biological Standard State

b- Calculate the value of $\Delta G_o'$ and ΔG for the following reactions 10

3-phosphoglycerate (3-PG) <==> 2-phosphoglycerate (2-PG)

Given Keq= - 0.178 at 37oC and

3-PG = 62.1 x 10-6 M and 2-PG = 4.3 x 10-6 M

Best wishes:

Dr Hany Kamal

المستوى الثالث - فيزياء حيوية - فيزياء حيوية صحية فص ٢٠١٣

Mansoura University Faculty of Science Physics Department	Biophysics, 3rd Level	Final examination, 2012-2013 Second semester May, 2013 Time: 2 hrs

Health Physics (Bio-Phys 321)
80 Marks

Answer the following Questions:		**Marks**
1.a)	Study the effects of laser energy on the eye. What are the technical considerations for eye safety?	8
b)	Discuss the biological effect of radiation.	9
c)	Calculate the photon flux at 2 m from Cs ^{137} gamma source of activity 500 MBq.	9
2.a)	Define the following: i-the Becquerel. ii-Dose equivalent. iii-Absorbed Dose. vi-The Gray.	9
b)	Study in details the ion chamber and how it is used for the measurement of radiation intensity.	9
c)	Estimate how much energy deposition of photons per unit mass of dry air is equivalent to 1 R.	9
3.a)	Study in details what we mean by Kerma.	9
b)	Compute the air Kerma if the quality is given by 0.01 for an exposure to a source was found to be 29.3R.	9
c)	Study the method for accurate measurement of the ranges of alpha particles in air.	9

With our Best wishes,

Examiners:	*Prof. Dr.* Emad Kedr.	*Dr. Safaa Abdel-Maksoud*

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Electro-analytical & Chromatography Chemistry 316	كلية العلوم جامعة المنصورة	Second Term Third Level Biophysics. Time Allowed: 2 hours Full Mark: 80 Marks Date: June 3, 2013

Answer The Following Questions

1.a) Define the following. (8 marks)

i) Mercury cathode

ii) Ilkovic equation

iii) Residual current

iv) Enzyme electrode

1.b - Compare between: (12 marks)

a) Pulse polarography and differential Pulse polarography

b) Potentiometry, coulometry and voltammetry

c) Coulometric titrations and conventional titrations

d) Advantages and limitations of ion selective electrodes .

2.a)- Discuss briefly the following: (16 marks)

i) The effect of the presence of precipitating agent on the standard electrode potential

ii) Selected electro-generated intermediates for complexometric, precipitation and acid –base coulometric titrations

iii) The construction and theory of fluoride ion selective electrode

iv) The effect of dissolved oxygen on the polarographic measurements

2.b) Calculate the liquid junction potential across a membrane at 25□ C, in which electrolyte 1is 1M KCl and electrolyte 2 is 0.1M KCl, $t_{K^+} = 0.49$ and $t_{Cl^-} = 0.51$. Neglect activity coefficients (4marks)

3- a- Write the different types of detectors used in HPLC and explain only one. (5 marks)

b- write shortly on paper chromatography. (9 marks)

c- A chromatographic column of length 5cm was used to separate 3 components. The three components were separated at ½, 1, 1.5 minutes, The base line width was 5, 15, 25 sec respectively. Calculate the different parameters (number of plates (n), Height equivalent to theoretical plates (H), Resolution (R)]. (6 marks)

4- a- Draw the figure of gas chromatography and discuss it shortly. (6 marks)

b- Define each of the following: (9 marks)

i- retention time ii- retention volume iii- separation factor

c- For a column of hight of 5 cm and cross sectional area of $1cm^2$ and void volume is 40%, find V_{max} if K_d=25 (5 marks)

With best wishes

Prof. Dr Magdi Khalifa

Dr. Yasmeen Gaber

الفرقة الثالثة - فيزياء حيوية - كيمياء حيوية اكلينيكية (٣٧٨ ك)

Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochem. 378
Course(s): Clinical Biochemistry

Second Term
Final Exam
Third Level (Biophysics)
Date: 3rd June 2013
Time Allowed: Two hours
Full Mark: 80 Marks

Answer ALL the Following Questions

[1] A- Several changes may occur in blood sample following collection unless special precautions are observed.

i- Mention some examples of the commoner and more important changes that occur prior to the separation of plasma or serum from cells. **[10] Marks**

ii- What are these special precautions referred to above? **[3] Marks**

B- Draw the distribution pattern for each of the following in the healthy population:

i- Plasma [Sodium]. ii- Alkaline phosphatase activity. **[6] Marks**

C- Explain why the factors responsible for variation between groups of individuals have to be taken into account when establishing reference values. **[6] Marks**

[2] A- Give a brief classification of the main uses of the data contained in clinical chemistry reports. **[5] Marks**

B- Comment on:

i- Fresh specimens are required because of changes which occur in urine on standing. **[3] Marks**

ii- False positive and false negative results may be obtained, in practice, form all chemical methods of testing for faecal occult blood. **[5] Marks**

iii- Plasma [K^+] tends to fall as the diuretic phase continues in acute renal failure. **[2] Marks**

C- Discuss the physiological responses that occur when water intake is reduced and restoration of water balance is delayed. **[15]Marks**

[3] A- Describe the mechanisms and causes of metabolic acidosis. **[10] Marks**

B- A 71-year-old woman was found by a neighbour drowsy and unwell. She had had an upper respiratory tract infection several weeks previously, and had been very slow to recover from this. She had been increasingly thirsty over this period. The only past history was of diabetes mellitus, diagnosed about five years previously and controlled by diet. On examination, she was very dehydrated, but her breath did not smell of ketones. The following results were obtained:

P.T.O.

	Plasma analyses (mmol/L)	Reference range (mmol/L)
[Urea]	28.2	2.5-6.6
[Na^+]	156	132-144
[K^+]	4.4	3.3-4.7
[Total CO_2]	26	24-30
[Glucose]	38.2	3.6-5.8(fasting)

Why is her sodium so high? **[10] Marks**

C- What are the criteria that inulin fulfils to be used in physiologic investigation for the determination of the GFR?

[5] Marks

Examiner: Dr. Ahmed EL-Sokkary

-Good Luck-

المستوى الثالث. فيزياء حيوية - الفيزياء الرياضية لغير الفيزيائيين ف ٢٠١٣

Mansoura University
Faculty of Science
Physics Department

Second semester
Date:10-6-2013

3rd level Biophysics students
Full Mark: 80
Allowed time: 2 hours
Course title: Mathematical Physics for non physicists
Course code: Phys 330

Answer the following questions: Marks

1-		Verify that $y_1 = x^2$ is one solution of $$x^2 y'' + xy' - 4y = 0,$$ and find y_2 and the general solution.	15
2-	a-	Find Laplace transform of the following function: i) $f(t) = kt\cos kt + \sin kt$ ii) $f(t) = te^{-\lambda t} - \frac{\lambda}{2}t^2 e^{-\lambda t}$	10
	b-	Using Laplace transform to solve the differential equation $$y'' + 4y' + 6y = 1 + e^{-t}, \qquad y(0) = y'(0) = 0$$	10
3-		Determine a lower bound for the radius of convergence of power series of $(1+x^2)y'' + xy' + 2y = 0$ about the ordinary points (a) $x_0=0$ (b) $x_0=3$ (c) $x_0=4$	25
4-	a-	Prove that $u = e^{-x}(x \sin x - y \cos y)$ is harmonic.	10
	b-	Find v such that $f(z) = u + i v$ is analytic.	10

Examiners: * أ.د/ عطاالله الحنبلى

المستوى الثالث - فيزياء حيوية - فيزياء المفاعلات والنيوترونات (ف٣١٢)

Mansoura University Faculty of Science Physics Department	Year: 3th Level Specialization: Biophysics Program	Second Semester , 2012-2013 June , 2013 Time: 2 Hours

Subject: Physics of Reactors and Neutrons Monday : 16/6/201 9-11 AM

كود المادة : ف 312 / أسم المادة : فيزياء / أسم المقرر : فيزياء المفاعلات و النيوترونات

Answer (5) Questions Only	(Full Mark : 80)	Mark
1a-	Nuclear Reactors are classified by several methods; provide a brief outline of these classification methods.	8
1b-	Draw and explain the main components of a pressurized water reactor	8
2a-	Derive the relation between the macroscopic cross section and mean free path.	10
2b-	A 1 cm thick lead absorber attenuated an initial 10 MeV neutron beam to 84.5% of its value. What is the total cross-section, given that the atomic weight of Pb = 207.21 and its density is 11.3 gm/cm^3?	6
3a-	Give in table the Distribution of Energy Among Products Released by Fission of ^{235}U .	8
3b-	Discuss the most outstanding features of the yield curve and plot the yields and mass distribution of fission products in the case of U^{235} by thermal and fast neutrons.	8
4a-	Study the energy dependence of neutron cross section of epithermal neutrons.	10
4b-	The cross-section of for the $^{10}B(n, \alpha)^7Li$ reaction is 753 barns for thermal (0.025 eV) neutrons. What is the cross-section at 50 eV?	6
5a-	If the spontaneous break up of nuclei above A=85 is energetically possible, why does it not always take place?	10
5b-	Give the basic ideas and assumptions of Bohr –Wheeler theory about the behavior of a nuclear drop under small deformations.	6
6a-	Give and define each term in the Maxwell-Boltzmann distribution expressions in the velocity and energy form.	10
6b-	Calculate the most probable velocity and the most probable energy.	6
	With our Best Wishes	

Examiners : Prof. Dr. Ali H. El-Farrash Ass.Prof. Dr. Ahmed Abu El-Ela*

*Corresponding Examiner