Mansoura University
Faculty of Science
Zoology Department
Date: 14 /6/2012
Time: 2 hr

Program: Biophyscics
Subject: Nervous system
Full Mark: 80 Marks

Answer **All** the following questions:

1. Choose the correct answer for 10 questions only: **[20 Marks]**

1- Cerebrospinal fluid (CSF) is secreted by :-
    1-brain vessels   **2-choroid plexus**   **3-motor cells**

2- Parasympathetic nerves have opposite effects to:-
    1-somatic nerves   **2-sympathetic nerves**   **3-sensory nerves**

3- Reflexes are functionally divided into :-
    1-somatic&autonomic reflexes.   **2-somatic&cranial reflexes**
                            3- somatic& spinal reflexes

4- Norepinephrine is neurotransmitter released by :-
    1-peripheral nervous system **2- sympathetic nervous system**   **3-CNS**

5- Vasomotor centers are important for controlling :-
     1-blood pressure   **2-heart contraction**   **3-respiration**

6-Temporal lobes receives signals from :-
    1-auditory nerves   **2-optic nerves**   **3-facial nerves**

7-Microglia originate in:-
    1-brain   **2-liver**   **3-bone marrow**

8-For afferent neurons, cell bodies &long processes are :-
    1-outside CNS   **2- inside CNS**   **3- inside peripheral nervous system**

9-Deeper part of cerebral hemispheres contain groups of cells called :-
    1-basal ganglia   **2- motor cells**   **3- glial cell**

10-Initiation of voluntary movement is controlled by :-
    1-optic lobe   **2-sensory lobe**   **3-motor lobe**

11-endocrine functions are controlled by :-
    1-thalamus   **2- hypothalamus**   **3-cerebrum**

II.Compelete 5 only of the following: **[15 Marks]**

1-The end of axon makes junction with…………or…………or……………

2-In CNS, myelin sheath is formed by………………..,while in peripheral nervous

system is formed by………………………

3-Motor & interneuros are………………….,while sensory   neurons are unipolar.

4-Reflex action is carried out through a pathway called…………………

5-All cranial nerves control…………………………,while vagus nerve control…………….

6-Meninges consist of……………,…………………….,…………………..

III. Put (√) or (X) on the following statments &give the correct answer for the wrong ones: [15 Marks]
  1- Cervical region of spinal cord consists of 10 segments ,while lumber region of 5 segments (   )
  2- Cranial nerves are sensory or mixed ,while spinal nerves are mixed only(   ).
  3- Sympathetic nervous system is called thoraco-lumber because its sensory nerves arise from thoracic & lumber regions of spinal cord.
  4- Neurotransmitters released in parasympathetic nervous system are epinephrine & acetylcholine (   )
  5- Vital centers of the medulla are cardiac ,respiratoty &gastric centers(   ).

VI. Compare between each of the following: [30 Marks]
  1- Cerebrum& cerebellum
  2- Sympathetic & parasympathetic nervous system.
  3-Somatic motor neurons & autonomic motor neurons.
  4-Chemical synapse& electrical synapse.
  5-Parietal&temporal lobes.
  6-Astrogia& microglia

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Best Whishes

Dr. Azza M. El-Wakf

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Mansoura University
Faculty of Science
Physics Department

Second semester
Date:18-6-2012

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

Answer the following questions:

Marks

1-		Find the Fourier series of the function defined by: $$f(x) = -\frac{\pi}{2} - \frac{1}{2}x \qquad -\pi \leq x \triangleleft 0$$ $$f(x) = \frac{\pi}{2} - \frac{1}{2}x \qquad 0 \leq x \leq \pi$$	5
2-	a-	Find Laplace transform of the following function: $$\text{i) } f(t) = kt\cos kt + \sin kt \qquad \text{ii) } f(t) = te^{-\lambda t} - \frac{\lambda}{2}t^2 e^{-\lambda t}$$	10
	b-	Using Laplace transform to solve the differential equation $$y'' + 4y' + 6y = 1 + e^{-t}, \qquad y(0) = y'(0) = 0$$	10
3-		Find Laurent series about the indicated singularity in each case and give the region of convergence i. $(z-3)\sin\dfrac{1}{z+2} \qquad z=-2$ ii. $\dfrac{z}{(z+1)(z+2)} \qquad z=-2$ iii. $\dfrac{1}{z^2(z-3)^2} \qquad z=3$	25
4-	a-	Integrate i) $f(z) = \left[(z^2-1)\right]^{-1}\tan z \qquad$ ii) $f(z) = e^z/\left[(2z-1)\right]^2$ around the circle c: $|z| = \dfrac{3}{2}(counter \ clockwise)$	15
	b-	Discuss in details the transformations i) $\quad w = z_0 z \qquad$ ii) $w = \dfrac{1}{z} \qquad$ iii) $w = z^2$	15

Examiners:

Mansoura University Faculty of Science Physics Department		Second Term May 2012 Third Level Date : 25/6/2011 Program : Biophysics Course Code : Phys312 Time allowed : 2 hours
Course Title : Physics of Reactors and Neutrons		Total Full Mark:: 80 Marks

<u>Answer **THREE** Questions Only:</u>   السؤال الأول أجبارى

[1a] - Write on the different types of slow neutron reactions with short notes about each one. **[10 Marks]**

[1b] - Derive the law of attenuation of neutrons through matter and find the relation between the macroscopic cross section and mean free path. **[10 Marks]**

[1c] – A thin sheet of Co^{59} , 0. 25 mm thick , is irradiated with a neutron beam of flux density 10^{12} neutrons per cm^2 sec for a period of 2.5 hr . If the cross section for neutron capture by Co^{59} is 30 barns, how many nuclei of the isotope Co^{60} will have been produced at the end of the irradiation period per cm^2 .The density of Co^{59} is 8.9 grams per cm^2 , and Avogaro's number = 6.03×10^{23} gram mole $^{-1}$. **[10 Marks]**

[2a] - Study the energy dependence of neutron cross section for epithermal neutrons. **[13 Marks]**

[2b] - Write about the breeding reactions with examples. **[12 Marks]**

[3a] - Calculate the average number of fission neutrons per neutron absorbed (regeneration factor η) in uranium mixture which contains the U(235) and U(238) isotopes in a 1:10 ratio. Given $\sigma_a(235)$ = 683 barns , $\sigma_a(238)$ = 2.73 barns **[13 Marks]**

[3b] – If the spontaneous breakup of nuclei above A = 85 is energetically possible, why does it not always take place ? **[12 Marks]**

[4a] - Plot and discuss the hypothetical neutron flux distribution in thermal reactor. How themal neutrons are produced. **[13Marks]**

[4b] – Calculate and compare between the energy E_p that correspond to most probable velocity and the most probable energy E_0 . **[12 Marks]**

لجنة التصحيح :   أ.د/ على الفراش   أ.د.م/ أحمد أبوالعلا

MansouraUniversity
Faculty of Science
Chemistry Department
Code: Chem.341
Date : June 2012
Subject :
  Electrochemistry

Second Term
Third Level
Program : Chem/Botany, Chem/Zoology&Biophy.

Time Allowed : 2 hours
Full Mark : 60 Marks

Answer All Questions   الأسئلة على الوجهين

First Question :   (15 Mark)

(1) Given the cell : $Pt, H_{2(g)}$ *(1atm)* $/ HCl$ *(* a_1 *)* $/ HCl$ *(* a_2 *)* $/$ *(1atm)* $H_{2(g)}$ *, Pt*

    (i) Complete : The type of the cell is ....
        because..   (3 Mark)
    (ii) Deduce in detail the cell emf   (7 Mark)

(2) The following values of the emf of the cell: $Ag|AgBr_{(s)}, KBr, Hg_2Br_2|Hg$

at various temperatures is given as follows:

$t^{o}C$	20	25	30
E, V	0.06630	0.06839	0.07048

write the electrode reactions, cell reaction and calculate at $25^{o}C$:

    (i) E   (ii) ΔG (iii) ΔH (iv) ΔS (5 Mark)

Second Question :   (15 Mark)

Write on :

      (i) Liquid junction potential   (E_j)
      (ii) Gas electrodes .   (iii) Exchange current (i_o)
      (iv) Metal- insoluble metal oxide electrode

Third Question :   (15 Mark)

Give reason :

   (i) Chemical cells with transference are not suitable for exact thermodynamic calculations.
   (ii) Presence of MnO_2 in Le Clanche' cell.
   (iii) During discharging of lead-acid cell , H_2SO_4 is diluted.
   (iv) Saturated KCl solution is preferred in salt bridge.
   (v) Glass electrode is the most convenient one for measurement of pH.
   (vi) The potential of calomel electrode depends on the activity of chloride ion.

Fourth Question :   (15 Mark)

Complete :

(1) For the $H^+/H_{2(g)}$ reaction at Pt electrode the value of the exchange current is…………….. and the process is…………………….. while at Hg is…………….. and the process is…………………….. while at Hg electrode the value of the exchange current is…………and the process is……………

(2) In lead-acid cell, …………………is the anode, while…………….is the cathode.

(3) In Le Clanche' dry cell,……………….. is the anode and its reaction is…………………………………………………………………………………….. while…………….is the cathode and its reaction is……………………….

(4) Concentration overpotential is due to……………………………………

(5) Maxwell distribution law is given by the expression : …………………..

(6) When the electrode is polarized,the overpotential plays two roles:
   (i)…………………………………………………………………………………
   (ii)…………………………………………………………………………………

(7) The overpotential necessary for elecctrolysis of water is……………

(8) Electrical work = --

(9) Equation : -------- = --------------------- represents the bridge between thermodynamics and electrochemistry.

(10) An inert metal immersed in a solution containing two oxidation states of the same metal is called ------------------

(11) The transport number of the anion or cation is ------------------------------

(12) As an example of amalgam electrode concentration cell----------------

(13) As an example of electrolyte concentration cell without transference--------

(14) In Cd-Weston cell………………is the –ve electrode and ……………….. is the + electrode.

(15) Nernst equation relates ……………………with……………………..

Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Analytical Chemistry** **Course(s): 316- Chem.** **Biophysics Students**		**Second Term** **Third Year Students** **Time Allowed: 2 hours** **Full Mark: 80 Marks** **Date: 11ᵗʰ June 2012** **1ˢᵗ Period**

Answer the following questions

1- A- Polarography is used for both quantitative and qualitative analysis of analytes, explain this sentences with reference to Ilkovic' equation and equation of the polarographic wave (draw the corresponding curve in each case). **(10 Marks)**

1-B- A 495.5 mg sample of an iron ore is dissolved in acid and reduced in Jones redactor to give Fe^{2+} ion and diluted to 1 liter. A 10 ml aliquots is electrolyzed at a controlled potential of 1.007 volt vs NHE. The current as a function of time is plotted as in as described in classical figures, with 1 cm^2 of graph paper = 95 mA. sec (mC) . If the total no. of squares (square millimeters) is 6475, calculate the percentage of Fe in the ore. At.Wt. Fe = 55.85. **(10 Marks)**

2-A- Write an account about the coulometric determination of AsO_3^{3-} ion in insecticide by coulometric titration with reference to the electrolysis cell, mechanism of reaction, calculations and the conditions which should be satisfied for successful coulometric titrations . **(10 Marks)**

2-B- Calculate the solubility product constant , K_{AgBr} and the solubility, X, in molar and in ppm for the sparingly soluble AgBr salt present in the cathode chamber at 25°C for the following cell:

   (+) Pt / H$_2$ (0.5 atm) / H$^+$ (0.1M) // KBr (0.005 M) / AgBr$_s$ / Ag (-)

Knowing that:

$E^o_{Ag+/Ag^o} = 0.80$ volt, $E^o_{2H^+/H_2} = 0.0$ volt, $E_{cell} = 0.2527$ volt and
   At.Wts. : Ag = 108 , Br = 79.9. **(10 Marks)**

3-A- Write the different types of detectors used in gas chromatography and explain only one **(7 Marks)**
   B- Explain the different types of ion exchangers with examples. **(7 Marks)**
   C- A chromatographic column of length **5 cm** was used to separate **3** components. The three components were separated at **0.5, 1 , 1.5 minutes**. The base line width was **5, 15, 25 sec** respectively. Calculate the different parameters :
i- Number of plates (n)   ii- Height equivalent to theoretical plates (H)   iv- Resolution (R) **(7 Marks)**

4- A- Draw the figure of HPLC and discuss it shortly. **(12 Marks)**

   B- For a column of height of 5 cm and cross sectional of 1 cm^2 and void volume is 40 % , find V$_{max}$, if K$_d$ = 25 . **(7 Marks)**

Good Luck   *Prof. M.A. Hafez and Dr. Yasmin Gaber*

Mansoura University
Faculty of Science
Physics Department

Course code: Biophys 322

Second semester 2011-2012
Date: 4/6/2012

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

Answer all the following questions: Marks

1-	a-	Define the following state functions: Free energy, Enthalpy, Entropy and Biological Standard State.	10
	b-	Write short notes on action spectrum and accessory pigments.	10

2-	a-	What do we mean by photosystem, write the importance of each part of this system?	10
	b-	Classify the photosynthesis according to its dependence on light reactions?	10

3-	a-	Show the difference between the Biosphere state and synthetic phase? Explain the difference by some examples?	10
	b-	Compare between DNA and RNA.	10

4-	a-	Discuss the mechanism of ATP Production inside the chloroplast?	8
	b-	Calculate the value of $\Delta G^{o'}$ and ΔG for the following reactions 3-phosphoglycerate (3-PG) <==> 2-phosphoglycerate (2-PG) Given K_{eq}= - 0.178 at 37°C and 3-PG = 62.1 x 10^{-6} M and 2-PG = 4.3 x 10^{-6} M	6
	c-	Discuss in details the two electron pathways operate in the thylakoid membrane inside the chloroplast.	6

Best wishes:

Examiners:
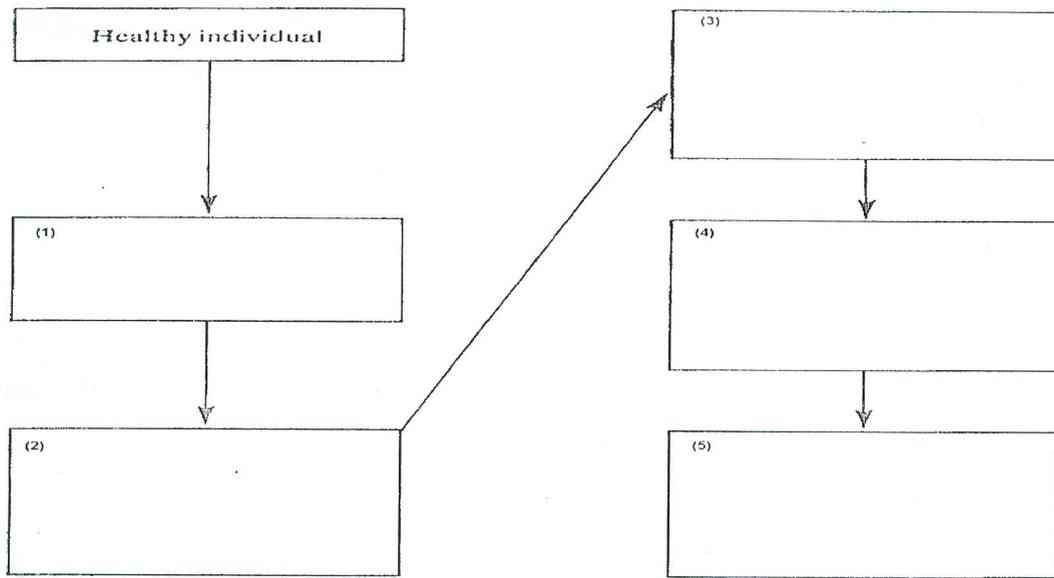
* د. هانى كمال   أ.د/ كرمال الفرحاتى

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

Second Term
Final Exam
Third Level (Biophysics)
Date: 11ᵗʰ June 2012
Time Allowed: Two hours
Full Mark: 80 Marks

Answer <u>ALL</u> the Following Questions

[1] A- Fill in the blank boxes in the following diagram showing the progressive development of a disease process:

```
┌─────────────────────┐              ┌─────────────────────┐
│  Healthy individual │              │ (3)                 │
└─────────────────────┘              │                     │
          │                          │                     │
          ▼                          └─────────────────────┘
┌─────────────────────┐                        │
│ (1)                 │                         ▼
│                     │              ┌─────────────────────┐
└─────────────────────┘              │ (4)                 │
          │                          │                     │
          ▼                          └─────────────────────┘
┌─────────────────────┐                        │
│ (2)                 │ ──────────►            ▼
│                     │              ┌─────────────────────┐
└─────────────────────┘              │ (5)                 │
                                     │                     │
                                     └─────────────────────┘
```

[15] Marks

B- Discuss the factors affecting the individual that need to be considered in establishing reference values. **[14] Marks**

[2] A- Because of some difficulties in practice, all chemical methods of testing for faecal occult blood give rise to both false and positive results. **Comment!**

[6] Marks

B- Mention the causes of water depletion and provide some examples for each cause.

[7] Marks

C- Explain the mechanisms and causes of metabolic acidosis. **[10] Marks**

[3] A- Enumerate the factors known to cause a shift of HbO_2 dissociation curve to the right.

[6] Marks

جامعة المنصورة
كلية العلوم
قسم الفيزياء
المنصورة – مصر

Mansoura University
Faculty of Science
Physics Department
Mansoura – Egypt

May Examination 2012

Subject: Physics 321		Level Three
Health Physics		Time: 2 hours
Full Mark: 80		Date: 7-6-2012

Answer the following question:

			Marks
1	a	*What is meant by;* • Internal dosimetry. • Energy Imparted. • Relative Biological effectiveness. • Energy fluence and particle fluence. • Absorbed dose.	10
	b	*Complete the following* • Aerodynamic diameter model based on .... • Microwave frequency range between .... while their wavelength varies between .... • There are three main factors that you must consider in minimizing exposure to radioactive sources other than natural radiation the first is ....., second .... and third .... • Rods are sensitive to .... and do not respond to .... while cones are sensitive to	10
	C	Write on details the useful and harmful effects of UV radiation in human body.	10
			(30)

Answer only two questions from the following

2	a	Arrange the following spectral region according to their energy in descending order; Gamma ray, X-ray, UV, Infrared, Microwave and radiowave..	10
	b	Discuss with aided figure the working of He-Ne Laser.	10
	c	Write on the uses of BOMAB phantom.	5
			(25)
3	a	What is the routs of intake methods, Discuss one of them	10
	b	How foods get cooked through microwave ovens.	10
	c	If a person has an unaided near point of 0.60m they need a convex lens in their glasses to make them able to see clearly an object that is only 25 cm from their eyes. What would be the power of this lens?	5
			(25)

4	a	Discuss the type of defects that person suffer and how you can correct this defects	10

<table>
<tr><th colspan="3">R</th><th colspan="3">L</th></tr>
<tr><th>Sph.</th><th>Cyl.</th><th>Axis</th><th>Sph.</th><th>Cyl.</th><th>Axis</th></tr>
<tr><td>+ 2.5</td><td>+ 0.5</td><td>120</td><td>+ 2.5</td><td>+ 1.5</td><td>70</td></tr>
<tr><td>+ 1.5</td><td>+ 0.5</td><td>100</td><td>+ 1.5</td><td>+ 1.5</td><td>90</td></tr>
</table>

IPD: 60

	b	The linear absorption coefficient of body tissue for 1MeV γ-ray is 7 m^{-1}. Calculate the thickness of tissue which reduces the incident intensity by a factor of 2.	10
	c	HPA stand for …………………………………………………………… DECT stand for ………………………………………………………..... WiFi stand for ………………………………………………………… WLAN's stands for …………………………………………………… ICRU stands for ………………………………………………………	5

(25)

With our best wishes:

Dr. Amr Mohamed Abdelghany

B- A young man was trapped underneath a car in a road traffic accident, and suffered multiple fractures. Despite adequate fluid intake over the next 36 h, at the time he was noted to be oliguric. The following results were obtained:

	Plasma analyses	Reference range
[Urea] (mmol/L)	22.1	2.5-6.6
[Na^+] (mmol/L)	133	132-144
[K^+] (mmol/L)	6.1	3.3-4.7
[Creatinine] (μmol/L)	214	55-120

Why is the potassium high?   **[10] Marks**

C- How can chemical investigation of patients with renal stones be helpful in reaching a diagnosis?

[12] Marks

Examiner: Dr. Ahmed EL-Sokkary

-Good Luck-