Mansoura University
Faculty of Science
Zoology Department
Subject: Zoology
Course: Cell communication (Z- 223)

2nd level Biophysics
Date: 3/6/2012
Time Allowed: 2 hrs
Full Mark: (80 marks)

I) Write (√) or (×): (20 marks, 2 marks each)

1) phospholipids are one of the main components of the extracellular matrix (   )

2) The Cell receptor of GPCR lack kinase domain so it works by activation of downstream targets such as protein kinases (   )

3) The ion channels of the cell membrane is consists mainly of cholesterol (   )

4) The permeability of gap junctions can be regulated by cell Ca^{+2} concentration, PH level and by a neurotransmitter such as dopamine (   ).

5) The main function of Na^+/K^+ pump is to maintain the cell steady state (   )

6) $G\alpha$ is the main active subunit of GPCR responsible for its signaling (   )

7) cAMP is considered as one of the cell signaling 2_{nd} messengers (   )

8) Binding of the acetylcholine to the Na^+ channels is an example of Voltage gated ion channels (   )

9) Absorption of amino acids is improved by alteration of gap junctions (   )

10) Nitric oxide signaling will lead to smooth muscle relaxation of blood vessels (   )

II) Choose the Right answer (10 marks, 2 marks each)

1) The function of …………… Protein is to connecting cells at cell-cell junctions

a) Cadherin   b) Integrins   c) Hemidesmosomes   d) P21

2) Sound waves will induce hearing by activating …………….. gated ion channel

a) Voltage   b) Ligand   c) Mechanical   d) Phosphorylation

4) The main function of ……………… junction is to seal cell-cell membrane barrier

a) Tight   b) Gap   c) Adheren   d) Communicating

5) Contact dependant signaling is greatly important for ………………

a) Cell cycle   b) muscle contraction   c) Immunoresponse   d) Hormonal secretion

مايو 2012		المستوى : الثانى
الزمن: ساعتين		الشعبة: (فيزياء – فيزياء حيوى)
التاريخ:6/ 6/2012	كلية العلوم – قسم الرياضيات	المادة: معادلات تفاضلية

أجب عن الأسئلة الآتية :

الدرجة الكلية : 80 درجة

السؤال الاول: i) أوجد حل المعادلة التفاضلية الاتية:

$$2x(y+1)dx - ydy = 0$$

ii) أوجد قيمة الثابت k التى تجعل المعادلة المعطاه معادلة تفاضلية تمامه:

$$(y^3 + kxy^4 - 2x)dx + (3xy^2 + 20x^2y^3)dy = 0$$

السؤال الثانى: i) أوجد حل المعادلة التفاضلية الاتية :

$$(x^2 + y^2)dx - xydy = 0 \quad .$$

ii) أوجد مجموعة المسارات المتعامدة مع المجموعة المعطاه الاتية:

$$y = c\cos x$$

السؤال الثالث: i) أوجد عامل المكامله للمعادلة التفاضلية الاتية:

$$(yx + y^2)dx + (x + 2y - 1)dy = 0$$

ii) حل المعادلة التفاضلية الخطية الاتية:

$$\frac{dy}{dx} + \left(\frac{1}{x}\right) y = \frac{\sin x}{x}$$

السؤال الرابع: i) أوجد حل المعادلة المتجانسة الاتية:

$$y'' - 4y' + 4y = 0$$

ii) أوجد الحل الخاص (العملى) للمعادلة الاتية:

$$(D^2 - D - 2)y = 8e^{3x}$$

مع أطيب التمنيات بالتوفيق

د. مرفت الشرباصى

(ccv6) فيزياء الموائع - نظرية - المستوى الثاني فيزياء

Second Semester May 2012

Educational Year: Second Level   Program: Physics & Biophysics
Time: 2 Hours   Subject: Physics
Date: 20 June 2012   Course (s) code: Phys. 227 [Fluid Mechanics]
    Full Mark: 80

Answer the following Questions

[1] The average density of Saturn is just 0.685 times that of water. Suppose a cube with sides 2 m in length could be cut out of Saturn and delivered to Earth. Also, suppose the cube is allowed to float in fresh water, Which has density of 1.0×10^3 Kg/m^3. What is the buoyant force acting on the cube ? How much of the cube's volume is not submerged solution. [20] mark

[2] The widest road tunnel in the world is located in California. The tunnel has a cross-sectional area of about 5×10^2 m^2. On the other hand, The three rivers water tunnel has a cross – sectional area of only 8.0 m^2. Imagine connecting together two tunnels with areas equals to these along a flat region and setting fresh water to flow at 9 m/s in the narrower tunnel. If the pressure in the wider tunnel is 1.6×10^5 pa, What is the pressure in the narrower tunnel ? [20] Mark

[3-a] Determine the velocity and mobility of aerosol particles undergoing gravitational settling in still air. [8] Mark

[3-b] A key to the understanding of the aerodynamic properties of aerosols is Reynolds number that characterizes fluid flow through a pipe or around an obstacle such as aerosol particle, State the properties of Reynolds number and then deduce it. [12] Mark

[4] Deduce Continuity and Bernoulli's equations to an ideal fluid. [20] Mark

With my best wishes
Prof. Dr. A. Elgarayhi

Examiners: 1- Prof. Dr. Goma Al-Damarawy   2- Prof. Dr. A. Elgarayhi

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Mansoura University   2nd Level Exam.
Faculty of Science   May 2012
Physics Department   Time allowed : 2 hrs

Atomic Physics   ف 222

Answer the following questions.

1-a) Characteristic X-rays contain several series, K series, L series, M series,… Study.
   K series is the most probable series. Comment.   [15 Marks]

 b) Discuss briefly the main assumptions of the vector atom model.
   The orbital angular momentum vector of an atom **L** = 2, and the spin angular
   momentum vector **S** = 1.   Estimate the total angular momentum vector **J** of
   the atom.   [13 Marks]

28

2-a) Starting with the mass relativistic effect and the general equation of total energy
   show how elliptical orbits could explain the fine structure.   [15 Marks]

 b) Discuss the main parts of mass spectrograph. How to operate. Study the function
   of the velocity selector.   [11 Marks]

26

3-a) Study the spectral series of H atom. Compare with the spectral series of Na atom.
   Draw the energy level diagram of the above two cases. Comment.   [15 Marks]

 b) Calculate the minimum wavelength λ_{min} of the X-ray produced if the potential
   difference across the tube is 30 kV.   Comment on the effect of the potential
   difference.   [11 Marks]

26

80

(c=3×10^{10} cm/s   h=6.625×10^{-34} J.s   R=1.097×10^{7} m^{-1} 1eV=1.6×10^{-19} J)
(e=1.6×10^{-19} C   m$_e$=9.11×10^{-28} g)

Best Wishes

Prof.   A. El-Khodary

مع كل التمنى / مع قرب التسليم

جامعة المنصورة
المنصورة - مصر
Mansoura University English

Answer the **three** questions

Question 1

A- **Identify** photosystem and compare between photosystem I and photosystem II.

B- **What** is meant by CAM plants?. Give two examples and describe the dark and light reactions in this type of plants.

C- **Answer** with **Yes** or **No** for each of the following statement:

1- The full range of radiation is called the red electromagnetic spectrum. (   )

2- C_4 plants form malic acid in light reactions. (   )

3- Plastids form small colorless bodies called proplastids. (   )

4- Plastocyanin contains on atom of copper, one atom of nitrogen and 2 atoms of sodium. (   )

5- There are no chloroplasts in cyanophyceae. (   )

Question 2

Outline each of the following:

A- The production of NADPH and ATP in light reactions of photosynthesis.

B- Conversion of ribulose-1,5-bisphosphate to ribulose-5-phosphate in Calvin cycle.

C- Compare between aerobic respiration and photosynthesis.

Question 3

A- **Identify**: C_3 plants -- C_4 plants. Give two examples for each group.

B- **Outline**: C_4 pathway for CO_2 fixation.

C- **Complete:**

1- Chloroplasts contain membranous sacs known as………………

2- …………are tiny pores on the undersurface of leaves.

3- light reactions convert solar energy to………

4- …………protect chlorophyll from photo-oxidation.

5- …………is a type of plastids occurs in plant cells not exposed to light and they are centre of starch grain formation.

………………………………………………………………………………………

Best wishes

Prof. Hamed M. El-Shora   Prof. Mahmoud E. Younis

Mansoura University
Faculty of Science
Physics Department

Course code: Biophys 221

Second semester 2011-2012
Date: 13/6/2012

2th level Biophysics Students
Full Mark: 80
Allowed time: 2 hours
Course title: Environmental Biophysics

Answer all the following questions: Marks

1- a- The body possesses a number of mechanisms that balance heat   **20**
        production with heat dissipation. Discuss this title.

   b-   A sample of radioactive material of activity 9.00×10^{12} Bq. The   **10**
        material's half-life time is 80.0 sec. How long will it take for the
        activity to fall to 2.00×10^{12} Bq.

2- a- Write shortly on the following: **20**

        Thermoregulation – Rem – Half life ($t_{\frac{1}{2}}$)- Rad –Radioactive series –
        Rontgen.

   b-   Compare between the Uranium dating and Carbon -14 dating.   **10**

3- a- Define Pollutant and write about Pollutants produced by human   **10**
        activity.

   b-   Discuss in detail the absorption of γ-rays.   **10**

Best wishes:

Examiners:

د. شلبية بدر *   أ.د/ إيمان صيصه

	بسم الله الرحمن الرحيم Final Exam in Physics (May. –2012) Second level Biophysics	Time Allowed :2 hours Subject : PHYSICS 220 (Thermodynamics) Full Mark 80 Marks
Mansoura University Faculty of Science Physics Department		

<u>Answer the following questions</u>

1-a) : state and prove the Claussius inequality

   b Drive the efficiency of a Carnot engine directly from a T- S digram.

   c) A Carnot engine is operated between two heat reservoirs at temperature of 0 C and 100 C , if the resultant work produced per cycle 1.5×10^9 erg , find the quantity of heat absorbed from the hot source

[30]

2)-a- prove that $\left(\dfrac{\partial u}{\partial v}\right)_T = \dfrac{\beta T}{K} - P$

b) Find $\left(\dfrac{\partial u}{\partial v}\right)_T$ for 1) an ideal gas   2) Van der Waal gas

Find the internal energy for each case and commrnt on the results.

[25]

3-a- For an ideal gas with constant heat capacities, show that the entropy is given by

   $S = C_v \ln P + C_p \ln V + \text{constant}$

   b- One gram of an ideal gas $C_v = 3.15$ J/gm.k at temperature 27 ^{0}C and pressure 1 atmosphere. The gas compressed under a constant volume until temperature becomes 727 ^{0}C, then the gas expands adiabatically until 27 ^{0}C and finally the gas compressed isothermally back to its initial volume.

   1) draw this cycle on P-V curve and on T-S curve

   2) Calculate

1- The increase in internal energy and the change of the entropy during the first process

2- The work done during adiabatic and isothermal processes

3- The efficiency of the cycle

[25]

Mansoura University		**Second Term**
Faculty of Science		**Final Exam**
Chemistry Department		**Second Level (Biophysics)**
Subject: Biochem. 271		**Date: 30th May 2012**
Course(s): Chemistry of		**Time Allowed: Two hours**
Biomolecules (Chemistry		**Full Mark: 80 Marks**
of Carbohydrates)		

Answer **ALL** the Following Questions

[1] A- Draw the structural formula of each of the following compounds:

i- α-D-Galactose (Haworth formula). ii- D-Fructosazone.

iii- Maltose. iv- Raffinose.

v- Chitin. **[10] Marks**

B- The straight-chain structure formula can account for some of the properties of glucose, but a cyclic structure is favoured on thermodynamic grounds and accounts for the remainder of its chemical properties. **Comment!** **[15] Marks**

[2] A- Complete the following equations:

i- Glucose + CH_3I + Ag_2O $\longrightarrow$ ....+..............

ii- .... + $Cu(OH)_2$ $\xrightarrow{\triangle}$

$$\begin{array}{c} O \\ \| \\ C-OH \\ H-\!\!\!-OH \\ HO-\!\!\!-H \\ HO-\!\!\!-H \\ H-\!\!\!-OH \\ CH_2OH \end{array}$$ + ...+ H_2O

iii- Fructose + Conc.HNO_3 $\longrightarrow$ ....+................

iv- Pentose + Conc. H_2SO_4 $\longrightarrow$ ....+...............

[16] Marks

B- State whether each of the following statements is True or False and correct the false one(s):

i- D-Glucose and D-Mannose are epimers.

ii- Sucrose is a reducing sugar which yields fructose and glucose on hydrolysis.

iii- The two chief constituents of starch are amylase and amylopectin.

iv- Inulin is a polymer of D-galactopyranose.

v- Cellulose is a heteropolysaccharide composed of α-D-glucopyranose and β-D-fructofuranose units.

[14] Marks

[3] Sketch each of the following pathways:

A- Glycogen $\longrightarrow$ Glyceraldehyde-3-phosphate **[13] Marks**

B- Glucose $\longrightarrow$ Ribulose-5-phophate **[12] Marks**

Examiner: Dr. Ahmed EL-Sokkary

-Good Luck-