المستوى الثالث - برامج الفيزياء الحيوية - ر ٢٠١٢ لا حصاء الحيوى

Mansoura University
Faculty of Science
Math. Dept.
BIOSTATISTICS (ر ٢٠١)

Exam : Jan. 2012
Time : 2 hours
3th-year *
Date: 27 / 12 / 2012

Answer the following questions: (Total: 80 Marks)

[1] a-The following table is a random sample of weights of 80 students in kg

Weights	20-	30-	40-	50-	60-	70-
No. of Students	**20**	**15**	**20**	**12**	**8**	**5**

Find: i) median. ii) mode. iii) standard deviation. (21 Marks)

b- Find the coefficient of variation (C. V.) for the following data:
-2, -8, -6, 0, 4, 6, 10, 14, 12, 20. (9 Marks)

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[2] a- A random sample of 100 students shows that 20 of them are smoking regularly. Find 99% confidence interval for the proportion of the smoker students. (10 Marks)

b- Suppose that 4% of the glasses made by a certain machine will be defective in some way. If 10 glasses made by this machine are selected randomly, find

i) The probability that none of them is defective, and how many would we expect to be defective?

ii) The probability that at least 2 will be defective. (10 Marks)

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[3] a- A sample of size 16 is drawn from a normal population with mean $\mu = 200$ and variance 36. Find the probability that the sample mean will be less than 199. (10 Marks)

b- The contents of 10 similar containers of sulfuric acid are 6, 8, 9, 10.2, 10.4, 9.5, 10, 10.5, 5 and 9.2 liters. Find 95% confidence interval for the mean of all such containers, assuming an approximate normal distribution. (10 Marks)

c- If X is a random variable which has the probability distribution

x	1	2	3	4
P(x)	*a*	0.2	0.3	0.1

Find i) the constant a. ii) E(3X+1). iii) Var (X). (10 Marks)

$(z_{0.005} = 2.58, z_{0.01} = 3.32, t_{9,0.025} = 2.262, t_{10,0.025} = 2.228, \phi(0.67) = 0.75, \phi(1.67) = 0.98,$
$P(0 \le z \le 0.67) = 0.32, P(0 \le z \le 0.89) = 0.45).$

* برامج - شعب (فيزياء حيوي ، علوم بيئة ، كيمياء ونبات . كيمياء وحيوان ، ميكروبيولوجى)

تمنياتنا بالتوفيق.

د. بيه الدسوقى- د. عديلة عثمان - د. محمد جاد- د. فاتن شيحة

المستوى الثالث فيزياء حيوية - أطياف جزيئية (ف ٣٢٩)

Mansoura University
Faculty of Science
Physics Department

3rd Level Exam.
January 2012
Time allowed : 2 hrs

Molecular Spectroscopy 329 ف

Answer the following questions.

1- Derive and draw the allowed rotational energy levels and their corresponding transitions of a rigid diatomic molecule. (20 marks)

2- a- Discuss the microwave activity of the following molecules
HBr – CCl_4 – $^{13}C^{16}O$ – OCS (10 marks)
b- The diatomic molecule can execute rotations and vibrations quite independently "Born-Oppenheimer approximation". Explain in detail. (10 marks)

3- The vibration spectrum of carbon monoxide shows a band centre at 2143.26, first overtone at 4260.04, $P_{(1)} = 2139.43$ and $R_{(0)} = 2147.08$ cm^{-1}. Calculate
a- the rotational constant B. (5 marks)
b- the moment of inertia I. (5 marks)
c- the equilibrium frequency of oscillation $\overline{\omega}_e$ (5 marks)
d- the anharmonicity constant χ_e (5 marks)

4- a- Explain the IR activity of CO_2 molecule for the following modes of vibration. {symmetric stretching, bending, antisymmentric stretching} (10 marks)
b- Study the effect of isotopic substitution on the rotational energy levels. (10 marks)

($c=3x10^{10}$ cm/s $h=6.625x10^{-34}$ J.s $1eV=1.6x10^{-19}$ J $m=9.11x10^{-28}$ g)

Best Wishes

Prof. A. El-Khodary

Mansoura University Faculty of Science Physics Department		First Term Exam. Jan 3rd year BioPhys.&Physics Date: Jan. 2012 Time : 2 hours
Quantum Mechanics (I)		Full Mark : 80 Marks

Answer the following Questions:

1- In a one-dimensional infinite square potential well, find the following

(i) The eigenfunctions, and eigenvalues,

(ii) Show the energy levels are non degenerate

(iii)Verify the uncertainty relation .

[20] Mark

2-a) Calculate the harmonic oscillator wave function and probability density function for the first four states.

b) Show that the probability of finding a particle in ground state of a harmonic potential beyond the classical limits is nearly 0.16 .

[20] Mark

3-a) Give in details an outline of the formal structure of quantum mechanics.

b) Prove that the momentum operator is hermitian and its eigenvalue is real. [20] Mark

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4- a) Solve the Schrodinger equation to determine the energy eigenvalues and the corresponding eigenfunctions of a particle moving freely in a cubic box.

b) Discuss the degeneracy of these energy levels. [20] Mark

With Best wishes

Prof. Dr. A.El hanbaly.

Prof. Dr.E Sesa.

فيزياء + فيزياء صوبة

فيزياء الجوامد (ف ٣١١)

Mansoura University Faculty of Science Department of Physics Course Code: Phys. 311 Title: Solid State Physics		First Semester (Jan. 2012) Exam Type (Final): 3rd Year (Physics, Biophysics) Time: Two Hours Full Mark: 80 Mark

Answer **the first one and any other two questions** from the following

1- a: Find the Brillouin zones of the face centered cubic lattice. [13 Mark]

b: Aluminum has fcc structure. Calculate the nearest distance and the packing density. (atomic weight = 27 g/mol, density = 2.7 g/cm^3, $N_A = 6.22\times10^{23}$). [13 Mark]

2- Explain why diffraction of x-rays can not be observed from certain planes in specific crystalline types. [27 Mark]

3- a: Proof that Laue equations are consistent with Brag condition for diffraction. [14 Mark]

b: Illustrate with drawings the planes in a tetragonal crystal whose Miller indices are (110), (111), $(0\bar{1}2)$. [13 Mark]

4- a: Discuss the type of binding in NaCl crystal. [14 Mark]

b: Derive a relation for the spacing between planes in a crystalline structure. [13 Mark]

مع التمنيات بالتوفيق: أ.د. حمدى دويدار

المستوى الثالث - فيزياء حيوية - التحليل الحجمي والوزني (٣١٥ ك)

Mansoura University **Faculty of Science** **Chemistry Department** **Subject : Analytical Chemistry** **Course(s):** Chem. (315) Volumetric and gravimetric analysis	كلية العلوم جامعة المنصورة	**First Term** **Third level Biophysics Students.** **Date : 2,1. 2012** **Time Allowed: 2 hours** **Full Mark: 60 Marks**

Answer The Following Questions

1. **a)** Derive a curve for the titration of 50.0ml of 0.1M HCl with 0.1M NaOH, Calculate the pH of the solution after the addition 0.0, 10.0, 49.0, 50.0 and 60 ml of base, prepare a titration curve from the data. **[12 Marks]**

   b) Metion the use of adsorption indicators (the Fajons method) **[6 Marks]**

2. **a)** Explain in details hydrogen electrode. **[6 Marks]**

   b) Mention the behaviour of acid – base indicator and its pH range. **[10 Marks]**

   c) Define the following (mention the law and example if present).
   1) Pricipitation titration. 2) Buffer capacity.
   3) Inert electrode. 4) Pricision. **[8 Marks]**

3. **a)** Derive a curve for the titration of 50.0 ml of 0.1 M Fe^{2+} with 0.1M Ce^{4+}, calculate E of the solution after the addition of 0.0, 10.0, 49.0, 50.0 and 60.0 ml of Ce^{4+}, prepare a titration curve from the data ($E_{oFe}^{2+} = 0.68$ and $E_{oCe}^{4+} = 1.44$). **[12 Marks]**

   b) Mention brifly the steps in chemical analysis. **[6 Marks]**

With Best Wishes

Dr. W. Abo El- Maty

المستوى الثالث
فيزياحيوية فيزياء البوليمرات فص ٢٧٧

Mansoura University
Faculty of Science
Physics Department
Subject: BioPhy. 327
Physics: Polymer Physics

Academic Level: 3rd Level
Program: Biophysics
First Term Exam:25/12/2011
Time Allow: 2 hours
Full Mark: 80 Marks

Answer (ALL) Questions:

1) A- Describe one method use to study the thermal Analysis of polymer. [10 Mark]

B- What are the difference between the physical state of polymer and the Phase. [10 Mark]

2) Compare between: [20 Mark]

a- Anionic and Cationic polymerization.
b- Thermoplastic and Thermosets polymer.
c- Cis- and trans- isomerism.
d- Branched and Crosslinked polymer.
e- Atactic and Isotactic polymer.

3) Write briefly on: [20 Mark]

a- Ceiling temperature.
b- Electron microscope technique to study polymer structure.
c- Electrical conductivity of polymer.
d- Effect of temperature on polymerization rate.

4) A- Explain the physical meaning of glass-transition temperature. How can determine Tg by specific volume and modulus of elasticity [10 Mark]

B- Mention <u>three</u> factors affecting on the glass-transition temperature. [10 Mark]

"With Good Luck"

Examiners:

1- Dr. Maysa Ismail. *2- Prof.Dr. M. Abd el-Razik*

المستوى الثالث - فيزياء حيوية (ف ٢ ٢١) فيزياء حيوية جزيئية

Mansoura University Faculty of Science Physics Department		First Term Third Year Biophysics January 2012
Molecular biophysics Exam. Phy 311	Allowed time: 2hours	Full Mark: 80 Marks

Answer the following questions:

Q1: The plasma membrane is a complex assembly of macromolecules are called proteins enmeshed in a fluid array of phospholipid molecules. Though, cells interact with their environment through their plasma membranes proteins in many ways. **Discuss the types of proteins macromolecules in cell membranes with drawing**?	20 Marks
Q2: Cells contain two kinds of nucleic acids: deoxyribonucleic acid (DNA), which is the genetic material, and ribonucleic acid (RNA), which functions in protein synthesis. **Compare between the two nucleic acids and how is protein synthesis with Drawing**?	20 Marks
Q3: **Electrophoresis** is defined as the movement of charged particles when placed into an electrical field of varying electrical potential and another **Spectrophotometry** is the mainstay of the automated clinical chemistry laboratory and, the two equipment can measure the amount of macromolecules. **Discuss the two methods?**	20 Marks
Q4: Summarize the basic important features of Carbohydrates and lipids?	20 Marks

Best Wishes

Examiner: Dr. Attalla F. El-kott

المستوى الثالث فيزياء حيوية - فيزياء حيوية اشعاعية (ف ٤٠٢١)

فيزياء حيوية

Mansoura University
Faculty of Science
Physics Department
Course code: Bio-Phys 310

First semester 2011-2012
Date: .9..-1-2012

3rd Level Biophysics students
Full Mark: 80
Allowed time: 2 hours
Course title: Biophysical Radiation

Answer all the following questions: **Marks**

1- a- Discuss the Mechanisms of Radiation Damage to DNA. 7

b- Show the Difference between particulate and electromagnetic radiation? 7

c- Calculate the minimum wavelength and maximum frequency of X-ray tube operating at a voltage of 40 KV. 6

2- a- Mention the different types of Photon Interactions in Matter? Write short notes on each type? 7

b- Give short account on the mechanism of internal conversion and Auger electron. 7

c- Calculate the energy and frequency of a photon with a wavelength 5000 Å? (Plank's constant = 6.26×10^{-34} J.S and C=3×10^{8} m/s) 6

3- a- Give the meaning of linear energy transfer (L.E.T) and the range. 7

b- Define the following:- Radiation Absorbed Dose, Dose equivalent, tenth-Value Layer and mass decrement. 7

c- Define the following: 6

i- Radiosenstizers ii- Radioprotectors.

4- a- Discuss the basic principle of magnetic resonance imaging (MRI). 7

b- Define the following:- isotones, curie (Ci), activity, half life time and chain decay. 7

c- Calculate the mass defect and mass decrement for ^{4}He, where m_p=1.007, m_n=1.008 , m_e= 0.0005 a.m.u , isotopic mass (M) = 4.00260 and atomic weight (A) =4.0000 6

Best wishes:

Examiners: د.بكر طه * د. هانى كمال أ.د/ طه سكر