المستوى الثالث - فيزياء - فيزياء الكوانتم ف ٣١١
فيزياء صوص

Mansoura University Faculty of Science Department of Physics Course Code: Phys. 311 Title: Solid State Physics		First Semester (Jan. 2014) 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: Draw the planes (120), (201) and $(1\bar{1}1)$ in a cubic crystal. Calculate the interplaner distance in each case ($a = 3 \times 10^{-10}$ m) [13 Mark]

b: Explain why there is no diffraction patterns from the planes (111) in BCC crystals, whereas these planes form strong patterns in the FCC crystals. [13 Mark]

2-a: Is there a dependence of the bulk modulus of a solid on its volume? [14 Mark]

b: The molecular weight of NaCl is 58.5 g and its density is 2.17 g/cm^3. Calculate the Bragg angle for the maximum diffraction intensity at $\lambda = 1.2\times10^{-10}$ m. [13 Mark]

3-a: Show that the diffraction condition in a reciprocal lattice satisfies Bragg law. [14 Mark]

b: How many atoms per mm^2 are there in (*i*) (101) plane and (111) plane for iron which has BCC structure. (Atomic radius = 1.24×10^{-10} m). [13 Mark]

4-a: Find the shape and dimensions of the first Brillouin zone in a BCC lattice. [14 Mark]

b: Deduce a relation for the crystal interplaner distance in terms of Miller indices of the planes. [13 Mark]

($N_A = 6.022\times10^{23}$ mol^{-1})

مع التمنيات بالتوفيق: أ.د. حمدى دويدار

المستوى الثالث - فع ٣١٠
فيزياء حيوية - فيزياء حيوية إشعاعية

Mansoura University	First semester 2013-2014	3rd Level Biophysical students
Faculty of Science	Date 26/12/2013	Full Mark : 80 Marks
Physics Department		Allowed Time : 2 Hours

Course Code : Bio-Physics 310 — Course Title : Biophysical Radiation

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Answer all the following questions : — Marks

1a- Show the difference between particulate and electromagnetic radiation. 7

1b- What is the wavelength corresponding to photons emitted by hydrogen of energy 10.2 eV ? 7

1c- Define the following with examples :

Nuclide - Radionuclides - Isotopes - Isotones - Isotones - Isobars - Isomers 7

1d- Derive the law of radioactivity. 7

2a- What are the properties of alpha decay. 7

2b- Differentiate between negative and positive electron emission decay . 7

2c- Mention the different types of photon interaction in matter ? Write short notes on each type? 7

2d- Give the meaning of linear energy transfer LET and range.

Calculate the mean range R_m of 5-MeV alpha particles in air at NTP. 7

3a- What is the energy equivalent of the mass of the electron in joules and Mev?

(Given : the mass of the electron = 9.1×10^{-27} kg) 4

3b- Define the following: Radiation Absorbed Dose , Dose equivalent ,

Tenth Value Layer and mass decrement 7

3c- Discuss the Mechanism of Radiation Damage to DNA. 7

3d- Define the following:

Radiosesitizers --- Radioprotectors 6

Best wishes: Dr. Ahmed Abu El-Ela

المستوى الثالث - مجموعة البيولوجي - الإحصاء الحيوي ٣٠١ / + فيزياء حيوي

Mansoura University Faculty of Science Maths department Subject: Biostatistics (R301)		Exam: Jan 2014 Third Year Programs * Date : 23 – 1 - 2014 Time allowed :2 hours

*كيمياء و حيوان – فيزياء حيوية – ميكروبيولوجى – كيمياء و نبات – علوم بيئة.

Answer the following questions

1- a - The following table shows the age distribution of patients (21 Marks)

Age	22-24	25-27	28-30	31-33	34-36
No. of pat	3	8	12	5	2

Calculate: i- median ii- standard deviation iii- mode

b- If X has binomial distribution with mean 4/3 and standard deviation $2\sqrt{2}/3$ Find $P(X \geq 2)$. (5 Marks)

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[2]- a- A random sample with $\sum_{i=1}^{40} X_i = 280$ and $\sum_{i=1}^{40} X_i^2 = 2100$. Construct 98% confidence interval for the population mean. (10 Marks)

b- If X is a random variable has the density function (10 Marks)

$$f(x) = \begin{cases} 3x^a & 0 < x < 1 \\ 0 & otherwise \end{cases}$$

Find 1- Constant a. 2- Distribution function. 3- Variance.
4- $P(0 < X < 0.5)$, $P(0.6 < X < 4)$, $P(X = 0.3)$, $P(X > 0.1)$.

c- A sample of size 64 is drawn from a population with mean 3.2 and standard deviation 1.6 Find the probability that the sample mean will be
1- more than 3.5 2- less than 2.7 (10 Marks)

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[3] a- If $\overline{X} = 16$, $\sum_{i=1}^{n} X_i^2 = 6640$ and $S^2 = 10$, Find n. (4 Marks)

b- If X has Poisson distribution with $P(X = 0) = P(X = 1)$. Find
1- $P(X \geq 4)$. 2- $P(X < 1)$. 3- mean and variance. (10 Marks)

c- A random sample of size 16 has mean 32.8 and standard deviation 4.51, Construct 95% confidence interval for the population mean. (10 Marks)

$Z_{0.01} = 2.33$, $Z_{0.025} = 1.96$, $t_{16,0.025} = 2.145$, $t_{15,0.025} = 2.131$, $\phi(1) = 0.8413$, $\phi(1.5) = 0.933$, $\phi(2.5) = 0.9937$.

Best wishes *Dr. Noura Fakhry.* *Dr. Mohamed Abd El-Rahman.*

المستوى الثالث - فيزياء حيوية - فيزياء البلمرات ف ٣٢٧

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

Academic Level: 3rd Level
Program: Biophysics
1st Term Exam 30/12/2013
Time Allow: 2 hours
Full Mark: 80 Marks

Answer (ALL) Questions:

1) A- What are the physical states of polymer? Discuss in details the first order phase transitions in polymer. [11 Mark]

B- Compare between: [9 Mark]

a- Thermoplastic and Thermosets polymer.
b- Cis- and trans- isomerism.
c- Branched and Crosslinked polymer.

2) A- Write briefly on: [8 Mark]

- Ceiling temperature.
- Effect of temperature and pressure on polymerization.

B- Define the polymerization. Explain the Ionic polymerization. [12 Mark]

3) A-Explain the physical meaning of glass-transition temperature and Discuss two different methods used to determine Tg . [14 Mark]

B- Explain the three steps of chain polymerization. [6 Mark]

4) A- Describe Differential Scanning Calorimetry. [11 Mark]

B- Mention three factors affecting Tg. [9 Mark]

"With Good Luck"

Examiners:

1- Dr. Maysa Ismail. *2- Prof.Dr. M. el-Tonsy.*

المستوى الثالث - فيزياء عامة - أطياف جزيئية ف ٣٢٩

Mansoura University
Faculty of Science
Physics Department

3rd Level Exam.
January 2014
Time allowed : 2 hrs

Molecular Spectroscopy 329 ف

Answer the following questions.

1-a- The diatomic molecule can execute rotations and vibrations quite independently "Born-Oppenheimer approximation". Explain. (15 marks)

b- Discuss the different regions of the electromagnetic waves and the corresponding spectroscopic techniques. (15 marks)

2-The vibration spectrum of a certain diatomic molecule exhibits R and P branches. Knowing that $P_{(1)} = 2139.43$, $R_{(0)} = 2147.08\ cm^{-1}$ and the first overtone is centered at $4260.04\ cm^{-1}$. Evaluate

a- the equilibrium frequency of oscillation $\overline{\omega}_e$ (5 marks)

b- the anharmonicity constant χ_e (5 marks)

c- the rotational constant B. (5 marks)

d- the moment of inertia I. (5 marks)

3-a- State and then comment the microwave activity of the following molecules

Cl_2 – $^{13}C^{16}O$ – CH_4 – OCS (10 marks)

b- State and then discuss the Infra Red (IR) activity of CO_2 molecule for the following modes of vibration. {symmetric stretching, bending, asymmetric stretching} (10 marks)

c- Calculate the relative population N_2 / N_0 of a rigid diatomic molecule where the rotational constant $B=5cm^{-1}$ and $T=300\ K^o$. (10 marks)

($c=3x10^{10}$ cm/s $h=6.625x10^{-34}$ J.s $1eV=1.6x10^{-19}$ J $m=9.11x10^{-28}$ g $k=1.38x10^{-23}$ J/K^o)

Best Wishes

Prof. A. El-Khodary

المستوى الثالث - فيزياء حيوى - التحليل الحجمى والتحليل الوزنى ٢٠١٥

Mansoura University **Faculty of Science** **Chemistry Department** **Subject: Chemistry** **Course(s): Chem. (315) Volumetric and Gravimetric analysis**	كلية العلوم جامعة المنصورة	**First Term** **Third level Biophysics Students** **Date : Jan, 2014** **Time Allowed: 2 hours** **Full Mark: 60 Marks**

Answer The Following Questions

1. Drive a titration curve of the titration of 50ml of a solution of 0.01M Ca^{2+} buffered at pH 10.0 with 0.01 M EDTA (k_{abs} for CaY^{2-} is 5.0x1010,K_{eff} is 1.8x1010. Calculate PCa of the solution after the addition of 0.0,10.0,49.9,50,60 ml of EDTA. **[10 Marks]**

2. a) Metion the use of adsorption indicators (the Fajans method) and factors must be considered in choosing a proper adsorption indicators for a precipitation titration. **[8 Marks]**

   b) Explain with drawing the calomel electrode. **[8 Marks]**

3. a) Mention the behaviour of acid – base indicator and its pH range. **[8 Marks]**

   b) Define the following (mention the law and example if present. **[10 Marks]**

   1. Pricipitation titration
   2. Buffer capacity
   3. inert electrode.
   4. Pricision
   5. Solubility product

4. a) Mention the requirements shoud be met for successful gravimetric method. **[8 Marks]**

   b) Calculate the pH of the solution after the addition 0.0,10, 50.0 and 60 ml of 0.1 M NaOH to 50.0 ml of 0.1 M HCl **[8 Marks]**

With my Best Wishes,

Examiner : Dr. W. M. El-Matty

المستوى الثالث - فيزياء حيوية حزيرانية ٢٠١٤

Mansoura University
Faculty of Science
Zoology Department
Subject: 3rd Biophysics students
Courses: Molecular Biophysics
Academic Year: 2013-2014

First Term - Final Exam
Students
Date: 16-01-2014
Time Allowed: 2 hrs
Full Mark: 80

Answer All the Following Questions

Q. 1. Write details in the Following Statements: **(20 marks, 10 Marks each)**

1. A. The Central Dogma of Molecular Biology.

1. B. Nuclear magnetic resonance (NMR).

Q. 2. Compare between the Following Items in Tables: **(20 marks, 10 Marks each)**

2. A. DNA and RNA Molecules.

2. B. Hormonal, Structural, Storage and Transport Proteins.

Q. 3. Mention structure and functions of the Following items: **(20 marks, 10 Marks each)**

3. A.: Endoplasmic reticulum.

3. B.: Golgi apparatus.

Q. 4. Complete the following states: **(20 marks, 2 Marks each)**

1- Prokaryotic cell structure has, no nucleus, DNA is in a region called the nucleotid and DNA, is circular and has no .....

2- ..... cell structure is large, with a typical plasma membrane and its cellular organelles enclosed by double membranes.

3- Nucleus is surrounded by the nuclear envelope and a double nuclear membrane which has nuclear pores that .....

4- ..... consists of both DNA and protein. The most common proteins are histones. DNA is coiled around histones in a regular pattern that produces structures called .....

من فضلك ----- انظر فى الخلف ---------

5-Ribosomes contains two.....

and.....and its function is .....

6- ..... is, the largest organelle in the cell, most obvious membrane bound compartment, controls cell activities and contains the nucleolus.

7- ..... fuse with the Golgi, dump their contents into the Golgi apparatus, Golgi packages proteins in vesicles so that they may be excreted from the cell, or used within the cell. And ..... used for excretion -leave the Golgi and move to plasma membrane where they fuse and dump their contents outside.

8- ..... used for removing reactive compounds from the cytoplasm, which create H2O2 as a byproduct and degrade it with the enzyme catalase.

9- Mitochondria is a cellular powerhouses, the site of much of the energy harvest by cells and have double membrane structure, inner membrane folded into inward projections called ..... and two spaces within the mitochondrion one called the ..... and other called the .....

10- Cytoskeleton is scaffolding of proteins that transport materials, position and move organelles, maintain and change cell shape, and organize enzymes into functional association's three components:

1,.....2,.....**and**

,3,.....

With my best wishes,,,,,,,,,,,,,,,,,,,,

.....Dr. Sayed Kamel Areida.....

المستوى الثالث - فيزياء
ف ٣١٢ - ميكانيكا الكم ١ - فيزياء حيوى

Mansoura University Faculty of Science Physics Department	20 Jan. 2013	***Third Year Physics & Biophysics*** Time allowed: 2 hrs Full Mark: 80

Course: Quantum Mechanics I (314)

Answer the following questions:

1. a) Find the bound state energy levels and their corresponding eigenfunctions of a particle moving In a one-dimensional harmonic oscillator potential.
b) Discuss the Degeneracy of the lowest three energy states of a spherical harmonic oscillator. [25 Marks]

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2) A mono-energetic beam of particles of energy E strikes from left a one-dimensional potential step given by $V(x)=0$ for $x<0$ and $V(x)=V_0$ for $x>0$. Obtain the reflection and transmission coefficients in the case of $E>V_0$ and compare the quantum mechanical results with the classical one. [20 Marks]

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3) Using the perturbation theory for non-degenerate states to derive the first-order corrections on the energy eigenvalues and their eigenfunctions of a perturbed system. [20 Marks]

4-a) An infinite potential well of width L given by $V(x)=0$ for $0<x<L$ and oo elsewhere is perturbed in the region $0< x <L/2$ by a value V_0 , find the first order correction on its ground state energy.
4-b) Calculate $[\hat{E}, t]$ and $[\hat{p}_x, x^2]$ [15 Marks]

With Our Best Wishes

Prof. Dr. A.R. Degheidy

Prof. Dr. A..El-hanbaly

المستوى الثالث - مجموعة البيولوجي + الفيزيا الحيوي - الاحصاء الحيوي - ٢٠١٣

Mansoura University Faculty of Science Maths department Subject: Biostatistics (R301)		Exam: Jan 2014 Third Year Programs * Date : 23 – 1 - 2014 Time allowed :2 hours

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المستوى الثالث - مجموعة البيولوجي
+ الفيزياء الحيوي - / ٣.١ الاحصاء الحيوي

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