TANTA UNIVERSITY
Faculty of Science
Department of Physics

Examination of Nuclear(Detectors & Accelerators) Physics

For (4 states) Biophysics group

(First term January)

Date: Wensday 22 / 1 / 2014 نظام الساعات المعتره Time: Two hours only

Regular Students Total 100 mark Course No. : PH 4163

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1) Write in of sentence of the following :-

* Compare between Alpha - and Beta – Spectra, Cite with example for each.
* Explain the cross section or linear absorption of detector medium, Cite with example for modifying.
* What is the versatility of a detector ? (20 mark)

2) a) what are the quenching techniques when interact with a detector medium ?

b) Describe theory and discuss its recent development in the technology of the cyclotron, in short account. (20 mark)

3) a) What is the principle of operation of the Sloan resonance linear accelerator (lineac) ?

b) Explain (in brief) each of the following :-

* The drawback of the ionization chambers.
* Working voltage of a Geiger Miiler counter. (20 mark)

4) * Motivate (in brief) of the following :-

Neutron reaction with light helium ^{3}He nucleus is not so widely used, in spite of it has best detection for thermal neutrons.

* What is the unit of biological effectiveness or equivalent to man ?
* Draw Schematic for nuclear electronic detection system. (20 mark)

5) a) Draw sketch for energy levels of donner and acceptor of semiconductor bands, explain.

b) What is the operation theory of a magnetic spectrometer to measure an Alpha – or Beta – spectrum ? (20 mark)

Best Wishes for Successful „

Examiner: Prof. Dr. Mohsen El-Khosht

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY		
	INCOMPLETE EXAMINATION FOR CRDIT HOUR STUDENTS		
	COURSE TITLE: LASER CHEMISTRY		COURSE CODE: CH4113
DATE:23 JANUARY, 2014	TERM: FIRST	TOTAL ASSESSMENT MARKS: 50	TIME:2 HOURS

Answer the following questions (5 marks per point):

1- Using suitable diagrams and illustrations, describe each of the following laser systems:

i – Carbon dioxide laser

ii - Excimer laser

iii- Proton transfer dye laser

iv- Bonding in molecular oxygen O_2 and its first two excited states according to molecular orbital theory.

v- Construct the energy level diagram of species in a typical triplet sensitization experiment in which a mixture of naphthalene and benzophenone was irradiated through a 315 nm cut – in filter given the following absorption data:

For naphthalene $S_o \longrightarrow S_1$ at 385 nm and $S_o \longrightarrow T_1$ at 465 nm.

For penzophenone $S_o \longrightarrow S_1$ at 385 nm and $S_o \longrightarrow T_1$ at 413 nm.

The cut-in filter that absorbs below 315 nm. [Hint: The energy in k cal mol^{-1} is obtained as $28500 / \lambda$ (nm)]

2- The synthesis of vinyl chloride from 1,2-dichloroethane is an important multibillion industrial process demonstrating the advantages of laser applications. Write the reaction scheme and mention the advantages of laser application in comparison with thermal applications.

3- The technique of thermal lensing is an important application on laser collimation. Draw a time- resolved thermal lensing experimental setup and trace upon using the technique to study singlet oxygen sensitization kinetics.

4 - Discuss each of the following:

(a) The technique of Raman spectroscopy showing energy level diagram, the spectral output and band assignment.

(b) The principal of MUCAP reagent operation

(c) Oxygen sensors based on fluorescence quenching

(d) Photodynamic therapy (PDT)

5 - Explain the reason for each of the following:

(a) Carbonyl compounds are common triplet sensitizers

(b) R6G-I^- solutions are strongly fluorescent in ethanol but non-fluorescent in chloroform.

EXAMINER: PROF. DR. EL-ZEINY MOUSA EBEID

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION OF (FOURTH YEAR) BIOPHYSICS STUDENTS			
1969	COURSE TITLE:	**Astrobiology**		COURSE CODE: 4103
DATE:	20/1/2014	TERM: FIRST	TOTAL ASSESSMENT MARKS:50	TIME ALLOWED: 2HOURS

Answer the following questions.

First question:- (15 Marks)

a. Discuss the concept of evolution and three mechanisms for evolution.
b. Give short note on the definition of life based on the six characteristics of life.

Second question: - (15 Marks)

a. Discuss with equation how the Drake equation define the number of civilizations in our Galaxy.
b. What are the most important considerations for habitability?

Third question:- (10 Marks)

a. Why must a habitable planet have plate tectonics?
b. How do scientists determine the size of the habitable zone?
c. What happens as planets get closer to their suns?
d. How does mutation change and affect animal survival?
e. What evidence that supports evolution?

Fourth question:- (10 Marks)

Match the correct answers.

1.	The possibility of life once existing on Mars was supported by the discovery of	a-	terrestrial planets could have liquid water on their surfaces
2.	The "water hole" is a region	b-	in radio light where natural emissions from our Galaxy are minimal.
3.	Which star is the best candidate for seeking extraterrestrial life?	c-	communicate over interstellar distances.
4.	In the Drake equation, a technical civilization is defined as one that is able to	d-	61 Cygni, a K-type main-sequence star
5.	The habitable zone is the area where	e-	mud flows and bodies of liquid water existing in the past.

EXAMINERS	***Dr. Yasser Abdou***

☺ أطيب التمنيات بالتوفيق ☺

	TANTA UNIVERSITY- Faculty of Science -Department of physics			
	EXAMINATION FOR SENIORS STUDENTS OF BIOPHYSICS			
	COURSE TITLE:	**Materials Science I**		COURSE CODE: **PH4191**
DATE:	JANUARY 2014	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

ANSWER THE FOLLOWING QUESTIONS:

(1) A- Choose the right statement from between brackets: **(10 Marks)**

1. Early civilizations have been designated by the level of their (**technology – materials**) development.
2. (**Electropositive – electronegative**) elements are capable of giving up their few valence electrons.
3. Considering how two isolated atoms brought from infinity to be close to each other, the minimum in the net energy curve corresponds to the **(maximum – equilibrium**) spacing, r_0. where the bonding energy for these two atoms, E_0, corresponds to the energy at this (**minimum – maximum**) point; it represents the energy that would be required to separate these two atoms to an(**finite- infinite**) separation.
4. Impurities in solids may also be considered as (**boundaries – point**) defects.
5. The greater the modulus of elasticity, the (**softer – stiffer**) is the material, or the smaller the elastic strain that results from the application of a given stress.
6. It is often the case, especially in solid systems, that a state of equilibrium is never completely achieved because the rate of approach to equilibrium is extremely slow; such a system is said to be in a (**stable – metastable**) state.
7. Stable ceramic crystal structures form when those anions surrounding a cation (**are – are not**) all in contact with that cation.
8. Silicates are materials composed primarily of silicon and **(carbon – oxygen).**

B- Write very short notes about : Ceramics and the types of bonds that may exist in ceramics – Coordination number – AX type crystal structures. **(15 Marks)**

(2) 1. The relationships between processing, structure, properties and performance are very important. Give an example of a material that simply illustrates this sentence. **(10 Marks)**

2. why are the published atomic weights are not integers (5 Marks)
3. Define phase equilibrium giving an example to illustrate your definition. **(10 Marks)**

(3) 1.State the types of bonding. Then define only the covalent bonding giving one example of it with a simple illustrative drawing. **(15 Marks)**

2. Defects in solids may be useful in practical applications . Give an example for that from our daily life usages. **(10 Marks)**

(4) 1. Several features of the solute and solvent atoms determine the degree to which the former dissolves in the latter. Write down these features and give an example of two elements which can considered as excellent candidates for make a homogeneous solid solution. **(10 Marks)**

2. Define : engineering stress and strain and Hooke's law with equations. **(6 Marks)**
3. Define ductility and hardness and state three reasons for which sometimes measuring hardness for materials are preferred. **(9 Marks)**

EXAMINER	PROF. DR. S. A. SAAFAN

☺BEST WISHES☺

TANTA UNIVERSITY
FACULTY OF SCIENCE
PHYSICS DEPARTMENT

EXAMINATION FOR FRESHMEN (FOURTH LEVEL)

COURSE TITLE: PHYSICAL ELECTRONICS (BIOPHYSICS) COURSE CODE:PH4113

DATE: 6- 1- 2014 TERM: FIRST TOTAL MARKS: 100 ASSESSMENT TIME ALLOWED: 2 HOURS

Answer all the following four questions:

1-(a) Write the different types of diodes and discuss the operation of only two types (15 Degrees)

(b) Draw a complete Full wave Rectifier circuit with filter and discuss its operation (10 Degrees)

2- (a) Explain how the rectifier diode can be used in only one of the following applications:

- Voltage Limiters
- Voltage Doublers

(15 Degrees)

(b) Write the different methods of transistor biasing and discuss only one method (10 Degrees)

3- (a)Discuss the construction of Field Effect Transistor and write its equation for both I_D and g_m (15 Degrees)

(b) Show how the field Effect Transistor can be used as Analogue Multiplexer (10 Degrees)

4-(a) Compare between Thyristors and Silicon Controlled Rectifier (SCR) (15 Degrees)

(b) Discuss how can the SCR be used for Phase Control applications (Power control) (10 Degrees)

Examiner	Dr. Mahmoud Kamel

Best Wishes

	Tanta University **Faculty of Science** **Physics Department**			
	Examination for Biophysics Students			
	COURSE TITLE:	**Radiology**	**COURSE CODE:**	**BP 4180**
	January 1st, 2014	**TERM: FIRST**	**TOTAL ASSESSMENT MARKS:50**	**TIME ALLOWED: 2 HOURS**

QUESTION	*ANSWER THE FOLLOWING QUESTIONS:*	*Marks*
1.	a- Discuss the effect of radiation on DNA. b- Define each of the following: The physical half life, Biological half life, collective dose, and equivalent dose.	
2.	a- Write short notes about the cell cycle and radiation damage to cell. b- Explain in details the applications of radiation in industry.	
3.	a- Mention the different methods to increase the radio sensitivity of hypoxic cells in the radiation treatment. b- Unstable intermediates formed in hormones is analyzed by electron paramagnetic resonance (EPR), explain in details this technique.	
4.	a- Discuss the physical advantage of using heavy charged particles in cancer and other diseases treatment. b- Explain in details the repair process of the damage in DNA.	
EXAMINER	Dr. Hassan El Gohary	

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION FOR JUNIORS (FORTH YEAR) STUDENTS OF BIOPHYSICS			
	COURSE TITLE:	**BIOMATERIALS**		COURSE CODE: BP4174
DATE:	30 DECEMBER2013	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions

First question **(25 marks)**

A- Complete (10 marks)

1- The two distinct modes of degradation of polymers are ..... and ..... .
2- The types of silicate ceramics are ..... and .....
3- Any fracture processes involves two steps which are ..... and ..... .
4- The predominant cell types are present in the inflammatory response are ..... and ..... .
5- The immune system is consist of two major components: ..... and ..... .

B- Compare between the 3 types of polymers (plastics, elastomers, fibers). (10 marks)

C- Show how the grain size can effect on the mechanical properties of (Al_2O_3) ceramic. (5 marks)

.....

Second question **(25 marks)**

A- Write short notes about the applications of: collagen-polyethylene-polylactic acid. (12.5 marks)

B- Compare between thermosetting and thermoplastic polymers. (12.5 marks)

.....

Third question **(25 marks)**

A-What are the advantages and disadvantages of Ti and Ti alloys? Give some medical applications. (10 marks)

B- Draw the schematic diagram of isotactic, syndiotactic and atactic polymers. (5 marks)

C-How can the polymer degradation rate be controlled? (5 marks)

D-What is the composition of bioactive glass? (5 marks)

.....

Forth question **(25 marks)**

A-What is the effect of infection caused by implanted device? (7.5 marks)

B-Write briefly the structure of stainless steel (7.5 marks)

C-Define: **1-**exudation **2-** wear **3-** acute inflammation. (10 marks)

Examiners	Dr. Enas Hassan El-Ghazzawy

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	TANTA UNIVERSITY- Faculty of Science -Department of physics			
	ResitEXAMINATION FOR SENIORS STUDENTS OF BIOPHYSICS (4TH LEVEL)			
	COURSE TITLE:	Radiation Treatment Planning		COURSE CODE:BP4171
DATE:	28 DESEBER 2013	TERM: FIRST	TOTAL ASSESSMENT MARKS:54	TIME ALLOWED: 2HOURS

ANSWER THE FOLLOWING QUESTIONS:

1- Discuss how you can determine a mass tumor using two (at least) of the following machines:- (25 Deg.)

(a) CT

(b) PET/CT

(c) SONAR

2- Explain the Physical basis of MRI Scanner. (25 Deg.)

3- Show how you can make a treatment plan. (25 Deg.)

4- Write a short note for some of methods to calculate the treatment DOSE. (25 Deg.)

EXAMINERS	PROF. DR. T. ELNEMR	DR. G. Z. FARAG

Tanta University-Faculty of science

PH4206 Biophysics II-4th year-June 2015-06 time: 2 hour

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I-Choose the correct answer: (72 marks)

(1) •Which of the following is pyrimidine:

a-cytosine b-ysteine

c-Lysine d-leucine

(2) • Which of the following is purine :

a-glycine b-glutamine

c-arginine d-guanine

(3) • Which of the following is considered as a one operation of space group

a-translation b- reflection

c-inversion d-all the above

(4) •The spacing between unit cells in various direction are called

a-crystal lattice b-lattice directions

c-lattice parameters d-None of above

(5) •In methyl spectrum the peak is split into three peaks because there are .....possible spin combination of the two protons of methylene.

a-one b- two

c-three d-four

(6) •The chief differences between biological substances and other important materials are:

a-repeating units are groups of molecules

b-boding force are weak

c-organic molecules, and very small crystals

d-all of the above

(7) •The OH group and P group in the nucleotide are called

a-3'-NH and 5'-P b- 3'-H and 5'-OH

c-3'-OH and 5'-P d- 3'P and 5'-NH

(8) • Families of crystallographic of planes are indicated by

a-(hkl) b-[hkl]

c-< hkl > d-{ hkl }

(9) • To grow crystals of any compound from solution the molecules have to brought to:

a- amorphous state b- superposition states

b- saturated states d- supersaturated states

(10) • Dialysis can be used to obtain crystals for

a-Biological macromolecules b- biological molecules

c-inorganic molecules d-None of above

(11) • Miller indices help in identifying the plane from which the

a-deflection take place b-diffusion take place

c-Reflection take place d-absorption take place

12 •The principle difference between x rays and Y rays is their

a-Energy b-mass

c-velocity d-origin

13 • In x- ray analysis of the structure of biomolecules that makes up the crystals, we are used:

a-The amplitudes of each reflected wave.

b-The velocity of each reflected wave.

c-The frequency of the reflected wave.

d-None of the above.

14 •If the crystal lattice has two equal axes, and one angle as 120^0, the other two as right angles it is called

a-A tetragonal b- A monoclinic

c- A triclinic d- A hexagonal

15 •If the crystal lattice has three unequal axes, two of the angles as right angles, and no limitation on the third one it is called

a-A monoclinic b-A triclinic

c-A tetragonal d-A hexagonal

16 •In DNA the .....group is attached to the carbon (C) at 3' position

a-NH b- P

c-OH d-O

17 •DNA is formed by linking the.....of one nucleotide to the 3'-OH of neighboring nucleotide.

a-3'-NH b-5'-P

c-3'-P d-5'-OH

18 •In α -helix the high amount of .....bonds within the helix stabilizes the structure so that it forms a very strong rod like structure.

a- OH b- Carbon

b- Hydrogen d- Phosphate

19 •In RNA the suger is

a-deoxyribose b- ribose

c- non of the above

20 •The bases in RNA are

a-A, T ,G and C b-A ,T ,P and C

c-A ,V ,G and C d- A ,U ,G and C

21 •The bases in DNA are

a-A, T ,G and C b-A ,T ,P and C

c-A ,V ,G and C d- A ,U ,G and C

22 •If a nucleus is placed in a strong external magnetic field it will be

a-rotates b-spins

c-transits d-precesses

23 • Nuclei such as C^{12} ,O^{16} have spin quantum number equal to

a-integral value b- zero value

d- half integral value d-non of the above

24 •In the spectrum of the acetaldehyde (CH_3CHO) in which the CH_3 signal is split into a..... due to spin-spin coupling of protons with the neighboring CHO proton.

فبراير حمون

بسم الله الرحمن الرحيم

	Tanta UNIVERSITY- Faculty of Science -Department of physics			
	ResitEXAMINATION for Seniorsstudents OF BIOPHYSICS (4TH LEVEL)			
	COURSE TITLE:	MEDICAL MEASUREMENTS AND BIOLOGY		COURSE CODE:BP4282
DATE:	3 JUN 2015	TERM: 2 ND	TOTAL ASSESSMENT MARKS 100	TIME ALLOWED: 2 HOURS

Answer the following Questions:

1-Explain: (25 M.)

(a) The component of MRI.

(b) The different CT-Scanners generations.

2- Discuss: (25 M.)

(a) The X-RAY use in diagnostic tools.

(b) Activity, Dose, Effective dose, and Quality factor.

3- Compare between PET/CT and MRI scanners. (25 M.)

4-Discuss: (25 M.)

(a) The methods of radiation protection.

(b) Radioactive decay and lethal Dose.

EXAM. PROF. DR. G. FARAG & DR. A. AMMAR

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