



TANTA UNIVERSITY- Faculty of Science -Department of Physics

EXAM FOR SENIORS STUDENTS OF PHYSICS

COURSE TITLE:

Solid State Physics II

COURSE CODE: PH4171

DATE: 23-12- 2017

TERM: FIRST

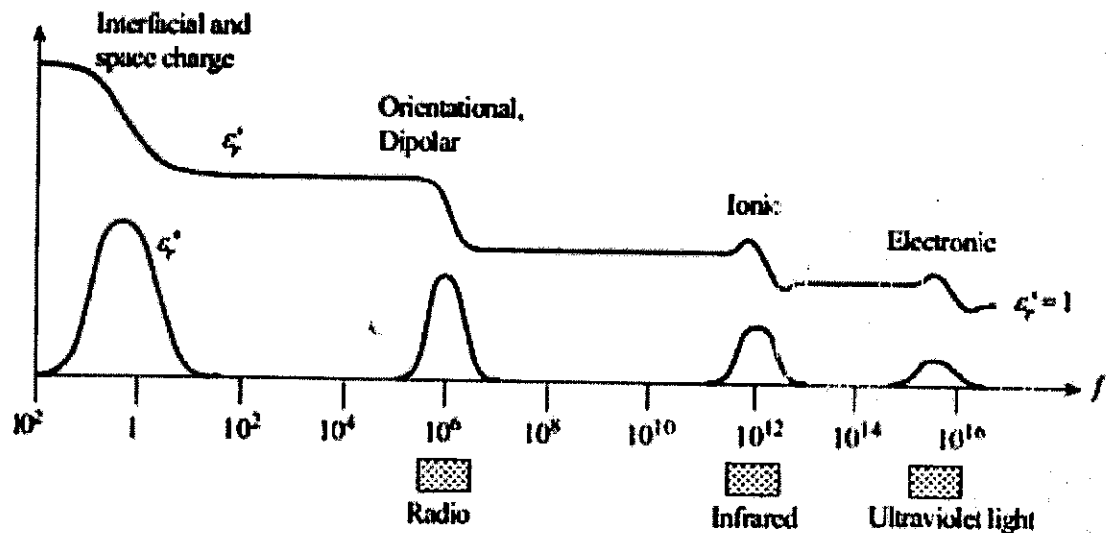
TOTAL ASSESSMENT MARKS: 100

TIME ALLOWED: 2 HOURS

Answer the following questions:

- 1- A-State Bloch's Theorem and **prove it** in 1-Dimension. (15 Marks)
- B- **Define** shortly Drude Model. (10Marks)
- 2- A-From the free electron Schrödinger equation in three dimensions **prove that** k_f depends on the particle concentration. (15 Marks)
- B- **Deduce** the electrical conductivity in a metal described by the free electron model. (10Marks)
- 3- **Explain physically** the origin of energy gaps in the simple problem of a linear solid of lattice constant a ; **clarify your answer by drawing** a schematic diagram of the probability density ρ in the lattice for $|\psi(-)|^2$, $|\psi(+)|^2$, and for a traveling wave. (25 Marks)
- 4- A- **Explain** the different mechanisms of polarization in dielectrics. (16 Marks)
- B- **Explain** briefly the figure by answering the following questions: **What are ϵ' and ϵ''** represented on the y-axis? **What is f** represented on the x-axis? **What happens for ϵ' (ϵ' only not ϵ'') in the four regions and why?**

(9Marks)



EXAMINER

PROF. DR. SAMIA AHMED SAAFAN

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وحدة ضمان الجودة
كلية العلوم - جامعة طنطا
QUALITY ASSURANCE UNIT
FACULTY OF SCIENCE - TU



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TANTA UNIVERSITY
FACULTY OF SCIENCE
PHYSICS DEPARTMENT

EXAMINATION FOR (FOURTH YEAR)

COURSE
TITLE:

DIGITAL ELECTRONICS

COURSE CODE: PH 4153

DATE :

27-12-2017

TERM: FIRST

TOTAL
MARKS:

100

ASSESSMENT

TIME ALLOWED: 2 HOURS

Answer all the following questions:

1- (a) Write the Truth table of one bit Multiplexer ,deduce and draw its simplified logic circuit , then redraw the circuit using only NAND gates (15 Marks)

(b) Write the Truth table of 1-bit comparator; deduce and draw its logic circuit using two different methods (10 Marks)

2-(a) Draw any circuit for 1-bit memory and discuss its truth table (10 Marks)

(b)Draw a block diagram for a 4 -Bits Ripple counter and show how it can be converted to count up to 9 (15 Marks)

3- (a)-Discuss the different methods of gate conversion using any two examples (15 Marks)

(b) Prove that the NOR gate is a universal gate (10Marks)

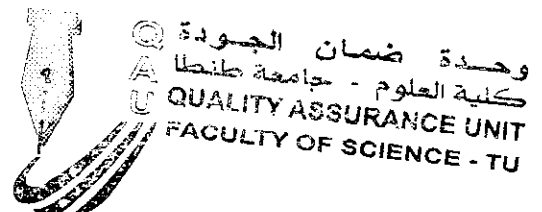
4- (a) Write the Truth Table of binary half Adder ,then deduce its logical circuit ,and show how it can be used for 1-Bit full Adder (15 Marks)

(b) Show how to convert 4-bits parallel adder to 4 bit subtractor in case of positive subtraction? (10Marks)


Examiner

Dr. Mahmoud Moustafa Kamel

Best Wishes



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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	EXAMINATION FOR JUNIORS (FORTH YEAR) STUDENTS OF BIOPHYSICS		
	COURSE TITLE:	BIOMATERIALS	COURSE CODE: BP4174
	DATE: 27 DECEMBER 2017	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100 TIME ALLOWED: 2 HOURS

Answer the following questions

First question (25 marks)

- A- Complete** (10 marks)
- 1- The ultimate stress is
 - 2- To overcome the problems of metallic implantation and processes are performed.
 - 3- The two main degradation processes in polymers are and
 - 4- The crystal structure is for diamond and for graphite.
 - 5- The problem of adding Cr to stainless steel alloys is
- B- What are the problems of nearly inert micro-porous ceramics?** (7.5 marks)
- C- How can alloying process problems be overcome?** (7.5 marks)

Second question (25 marks)

- A- Biodegradation of polymers is very important process. Explain.** (12.5 marks)
- B- What is the design and materials of hip joint?** (12.5 marks)

Third question (25 marks)

- A- What is the structure of bioactive glass?** (10 marks)
- B- Give the reason: 1-Ti is used in load bearing implant rather than stainless steel.** (10 marks)
- 2- Collagen can be used in drug delivery systems but polyester cannot.**
- C- What is the composition of Hydroxyapatite?** (5 marks)

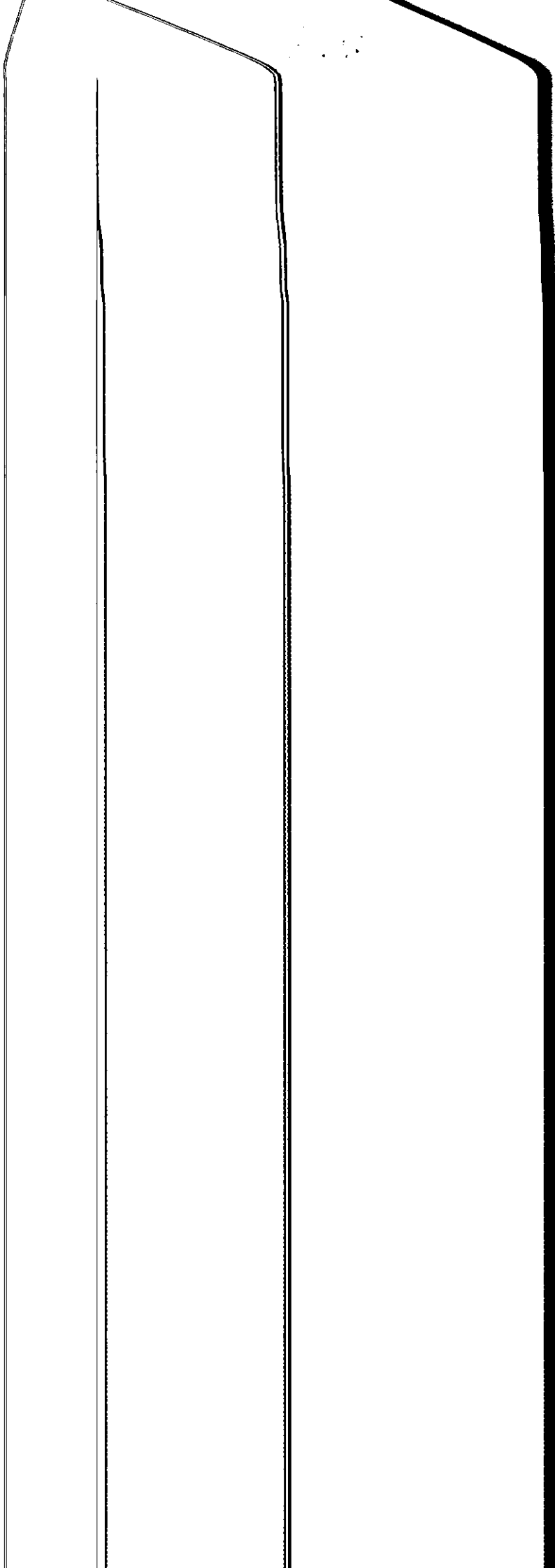
Forth question (25 marks)

- A- Explain pitting corrosion.** (10 marks)
- B- Show how the mechanical properties of biomaterials are important to know.** (15 marks)

Examiners	Dr. Enas Hassan El-Ghazzawy
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TANTA UNIVERSITY FACULTY OF SCIENCE _ PHYSICS DEPARTEMENT			
EXAM OF B. SC.			
COURSE TITLE :	BIOPHYSICS-I		COURSE CODE: PH4105
30/12/2017	TERM: 1 ST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

I-Complete the following : (30 marks)

1-When, the two phenomenon CD and ORD are related and together are called the.....

2-In Fluorescence microscopy , longer delays lead to the phenomenon of

3- Many biological molecules are optically active i.e they.....the plane of polarized light.

4- For wet specimens the process which has to be carried out gradually in order that the sudden loss of water does not distort the structure, this process is called.....

5-Virtual images are images thatbe captured on a screen.

6-.....compounds absorb blue light and emit.....light.

7-..... is a method used to prepare samples when only the surface features are of interest.

8-The two main methods of preserving the sample are byand by

9-The.....electron microscope is very useful in obtaining images of the surface of thick specimens.

10-When a beam of unpolarized light falls on a sheet of Polaroid , only lightin one direction passes through.

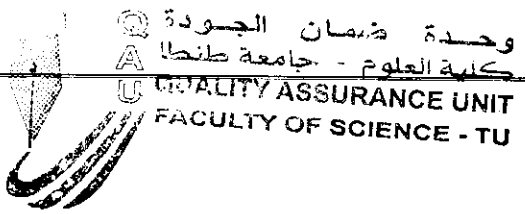
II-Choose the correct answer: (60 marks)

1-Which of the following orbital is nonbonding orbital :


- a- π orbital
- b- n orbital
- c- σ orbital
- d- all of the above

2-A plote of difference in refractive index i.e ($n_L - n_R$) versus the wavelength is called

- a- CD curve
- b- ORD curve
- c- CD and ORD curve
- d- cotton effect



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	TANTA UNIVERSITY- Faculty of Science -Department of Physics			
	EXAM FOR SENIORS STUDENTS OF BIOPHYSICS			
COURSE TITLE:	Physical Electronics		COURSE CODE: PH4113	
DATE:	3-1-2018	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions:

- 1- A- Write short notes about the Czochralski method and the liquid-encapsulated Czochralski (LEC) method too? (20 Marks)

- 2- Which statement is right and which one is wrong? If wrong how the right statement should be written? (20 Marks)
 - A- The two-element (*binary*) I-II compounds such as GaN, GaP, and GaAs are common in light-emitting diodes (LEDs). (I and II represent the first and second column in the periodic table.
 - B- One of the less important characteristics of a semiconductor, is its *energy band gap*.
 - C- For example, GaP has a band gap of about 2.3 eV, corresponding to wavelengths in the red portion of the spectrum.
 - D- The electronic and optical properties of semiconductor materials are strongly affected by impurities, which may be added in precisely controlled amounts. This process is called (sintering).
 - E- The periodicity in a crystal is defined in terms of a symmetric array of points in space called the (symmetry).
 - F- The basic crystal structure for many important semiconductors is the fcc lattice with a basis of three atoms, giving rise to the *diamond* structure, characteristic of Si, Ge, and C in the diamond form.
 - G- The diamond structure can be thought of as an fcc lattice with an extra atom placed at $a/4 + b/4 + c/4$ from each of the fcc atoms.
 - H- Si and GaAs have indirect and direct energy gaps but this does not affect their use in practical devices.
 - I- The four sp^3 "hybridized" orbitals, point symmetrically in space and lead to the diamond lattice in Si.
 - J- These "non-directed" chemical bonds are responsible for the tetragonal diamond or zinc blende lattice structure in most semiconductors.

- 3- A- In Czochralski crystal growth, the shape of the ingot is determined by a combination of two factors, what are these factors? (10 Marks)
B- What are the factors upon which the distribution coefficient does depend? (10 Marks)


- 4- Summarize the steps of manufacturing Si wafers. (20 Marks)

- 5- A - Write short notes about vapor phase epitaxy. (10 Marks)
B- Deduce the total current due to both drift and diffusion of n and p charge carriers in a semiconductor. (10 Marks)

EXAMINER	PROF. DR. SAMIA AHMED SAAFAN
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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	EXAMINATION OF 4 TH YEAR BIOPHYSICS STUDENTS		
COURSE TITLE:	Astrobiology I		COURSE CODE: PH4103
6/1/2018	TERM: FINAL	TOTAL ASSESSMENT MARKS:50	TIME ALLOWED: 2 HOURS

Answer the following questions:-

Question One: (10 MARKS)

1. Two Greek's schools of thought led to two fundamentally different conclusions about the possibility of extraterrestrial life. Explain the difference.
2. Explain how the green-house effect and Earth's magnetic field protect our life.

Question Two: (15 MARKS)

1. What is Miller-Urey experiment? Did it make life?
2. What are the physical conditions that make our planet habitable?


Question Three: (15 MARKS)

1. There are different scientific theories on the origins of life on Earth. Explain most accepted scenario from your point of view.
2. How CO₂ regulates Earth's climate?

Question Four: (10 MARKS)

1. Could extraterrestrial life exist? Explain your answer.
2. Explain why Earth is silicon rich, but life is carbon-based?

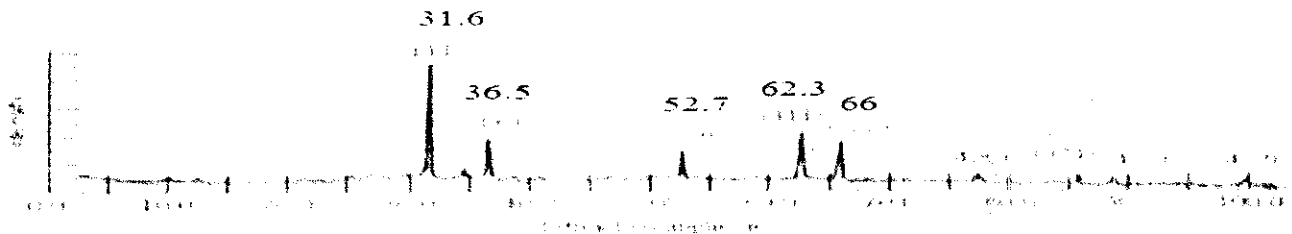
(Best wishes ----- Dr. Yasser Abdou)

	TANTA UNIVERSITY- Faculty of Science -Department of Physics			
	EXAM FOR SENIORS STUDENTS OF GENERAL PHYSICS			
COURSE TITLE	Materials Science		COURSE CODE: PH4193	
DATE:	- 1 - 2018	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

First Question:

- 1- Using a hard sphere model for both FCC and BCC unit cells, find
a) Lattice parameter b) Coordination number c) APF. [15Marks]

- 2- The figure shows FCC diffraction pattern for a powdered specimen of lead. Compute the average lattice parameter for lead if the wavelength of monochromatic radiation is 0.1790nm. (use 5 peaks only) [10Marks]



Second Question:

- 1- Briefly explain Vander Wall and metallic bonds. [10Marks]
- 2- Briefly describe periodic table of elements. [10Marks]

Third Question:


- 1- Name and define the dislocation types are found in solids. [10Marks]
- 2- Explain atomic vibration as a type of defect in solids. [10Marks]
- 3- Sketch/describe unit cells for zinc blende and fullerene. [10Marks]

Fourth Question:

- 1- List and define the Imperfections types in ceramics (with drawing as possible). [15Marks]
- 2- Cite the factors of the component ions in crystalline ceramic materials influence the crystal structure. [10Marks]

EXAMINER	DR. REDA EL-SHATER
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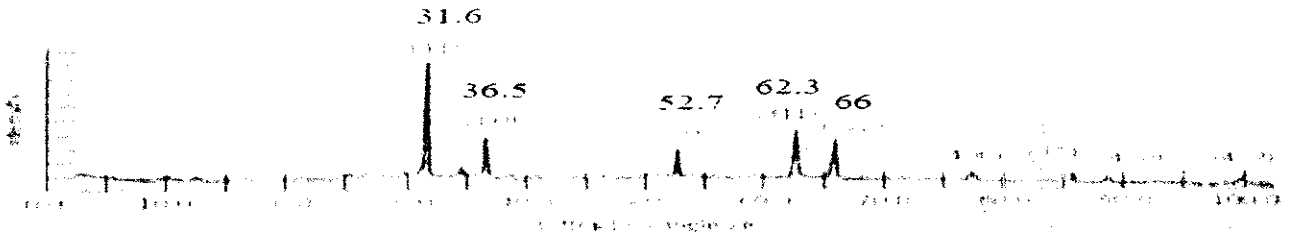
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	TANTA UNIVERSITY- Faculty of Science -Department of Physics			
	EXAM FOR SENIORS STUDENTS OF GENERAL PHYSICS			
	COURSE TITLE	Materials Science		COURSE CODE: PII4193
DATE:	- 1 - 2018	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

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EXAMINER	DR. REDA EL-SHATER
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	TANTA UNIVERSITY- Faculty of Science - Department of Physics			
	EXAM FOR 4 TH YEAR STUDENTS			
	COURSE TITLE:	Detectors and Accelerator Physics	COURSE CODE: PH4163	
DATE:	14 JAN 2017	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions

Question one (30 points)

A- If a proton has a total energy of 1 TeV, what is its value of β ?

(Hint: $m_p = 1.673 \times 10^{-30}$ g)

B- Put (✓) or (x) and then discuss why you choose your answer:

- 1- The detector efficiency can be classified into two types of efficiency
- 2- The advantage of ionization chamber detectors is their dead time
- 3- There are three possibilities for the wall effect in the BF_3 tube.
- 4- The overall gain of a PM depends on the secondary emission factor δ only
- 5- The linearity of a PM depends strongly on the type of dynode configuration and the current in the tube only.
- 6- A high capacitance and a high frequency reduce the current dependence in the Cockcroft-Walton generator
- 7- Cyclotron is reasonable for accelerating electrons to high energies
- 8- In Betatron, the maximum energy for electrons is 300 MeV
- 9- In synchrotrons, focusing magnets are used.
- 10- The advantage of SSB detectors is their sensitivity to light
- 11- The length of the tube is the same in Wideroe's tube

Please turn the page for the other questions