

دكتور محمد علي



TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
General Physics & Material Science: (LEVELFOUR)			
COURSE TITLE:	Detectors & Accelerators		COURSE CODE: PH4163
TOTAL MARKS 100	SEMESTER: ONE	TIME ALLOWED: TWO HOURS	DATE: 27/12/2016

Q1: Put (√) or (X) then correct and rewrite the wrong sentences [15 Marks]

- a- Good spectrometer should has high resolution and transmission ()
- b- Geiger Muller counter operates at relatively high voltage ()
- c- Ge(Li) detectors are more suitable than silicon detector for the detection of electromagnetic radiation ()
- d- Pair production cross section is proportional to Z^4 of the absorber ()
- e- One advantage of linear accelerators is that they emit synchrotron radiation ()

Q2: [23 Marks]

A- Compare between transverse and longitudinal Beta-particles magnetic spectrometer, support your answer (with necessary figures and mathematical equations) **(16 Marks)**

B- 1 cm thick lead absorber attenuated an initial 10 MeV neutron beam to 84.5% of its value, what is total cross-section? given that the atomic weight of Pb = 207.21 and its density is 11.3 gm/cm³? **(7 Marks)**

Q3: Complete the following sentences [42 Marks, 1.5 mark for each space]

- 1- Slow neutrons are classified into:
 a- b- c- d- e-
- 2- The different methods used in neutron detections are:
 a- b- c- d-
- 3- Examples of solid state detectors are:
 a- b- c-
- 4- Examples of gas filled detectors are:
 a- b- c-
- 5- Application of linear accelerators are:
 a- b- c-
- 6- The advantages of circular accelerator over linear accelerator are:
 a- b-
- 7- A linear particle accelerator consists of the following elements:
 a- b- c-
 d- e- f-
- 8- The disadvantages of circular accelerator are:
 a- b-

Q4: [20 Marks]


A- Draw and explain the construction and basic principle of operation for diffused junction detector **(10 Marks)**

B- Explain the Recoil proton method "support your answer with necessary figures and equations" **(10 Marks)**

Examiner

Prof. Dr. Mohsen Elkhosht

Dr. Sherief Hamada.

 TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
EXAMINATION FOR SENIORS (FOURTH YEAR) STUDENTS OF MATERIAL SCIENCE			
COURSE TITLE:		ELECTRON MICROSCOPY	
DATE:	22/1/2017	TERM: FIRST	TOTAL ASSESSMENT MARKS:100
		COURSE CODE: MS4123	
		TIME ALLOWED: 2 HOURS	

ANSWER THE FOLLOWING QUESTIONS:

Q1 (25 Marks)

Write about:

- a) Advantages and disadvantages of the transmission electron microscope. (10 Marks)
- b) Two methods of specimen preparation in TEM. (10 Marks)
- c) Spherical aberration in electron microscopy. (5 Marks)

Q2 (25 Marks)

- a) Vacuum is nothing but everything in electron microscopy, Explain. (5 Marks)
- b) Summarize in a simple schematic the secondary effects that maybe detected when a primary electron beam interacts with a specimen. (10 Marks)
- c) Write about X-ray energy dispersive spectroscopy XEDS. (10 Marks)

Q3 (20 Marks)

- a) Write about specimen preparation in SEM and the problems associated with non-conducting materials. (10 Marks)
- b) What are the differences between light microscopy and electron microscopy? (10 Marks)

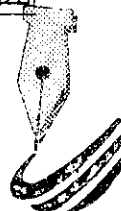
Q4- Choose the correct answer (30 Marks, 3 marks each)

- 1- In electron optics, the device that corrects for astigmatism is called:
 - A) A stigmator
 - B) An electrostatic lens
 - C) A condenser lens
 - D) An electron probe


- 2- All of the following are true about field emission except:
 - A) The emitted electrons have very well defined energies.
 - B) Thermal excitation is not required
 - C) Evaporation from the surface that takes place during operation shortens the tip's lifetime.
 - D) Field emission requires a very high vacuum to achieve a stable operation.



انظر باقى الأسئلة خلف الصفحة



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

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION FOR SENIORS (FORTH LEVEL) STUDENTS OF MATERIAL SCIENCE (SEMESTER 1)			
	COURSE TITLE:	INTRODUCTION TO NANO-TECHNOLOGY	COURSE CODE: MS4163	
DATE: 29	DECEMBER 2016	TERM: SUMMER	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer The Following:

First question: {25 Marks}

A) Define the following: (12 Marks)

1) Nanomaterials. 2- Bulk materials. 3- Grain size. 4- Crystallite size.

B) What are the advantages and the hazard of using (nanomaterials comparing to bulk materials) nanotechnology and microtechnology. (13 Marks)

Second question: {25 Marks}

A) Write short notes on the following: (10 Marks)

The unique size-dependent properties of nanomaterial "magnetic, electrical, physical, ..." (give examples).

B) Discuss the fabrication methods (top down-bottom up) of the nanomaterials; (give an example), declare your answer by drawing. (15 Marks)

Third question: {20 Marks}

A) Discuss briefly the methods for characterization of nanomaterials "XRD, SEM, TEM, ..." (10 Marks)

B) Discuss the application of nanomaterials in (Information and communications). (10 Marks)

Fourth question: {30 Marks}

Discuss and show the advantage of using nanotechnology of the following fields:

a) Diseases Diagnostic. (10 Marks)

b) Environment. (10 Marks)

c) REAEWEBLE ENERGY (10 Marks)

Examiners	Prof. Talaat M. Meaz	Prof. Samia A. Saafan
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فيزياء سنين 6 فبراير



TANTA UNIVERSITY- Faculty of Science -Department of Physics

EXAM FOR SENIORS STUDENTS OF BIOPHYSICS

COURSE TITLE:	Physical Electronics		COURSE CODE: PH4113
DATE:	1ST JANUARY- 2017	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100
			TIME ALLOWED: 2 HOURS

Answer the following questions:

- 1- Define shortly: (25 marks)
 - a- monocrystalline , amorphous and polycrystalline solids
 - b- fractional distillation technique
 - c- Czochralsky method
- 2- a- Summarize the steps of manufacturing Si wafers. (10 marks)
b- Draw a figure showing the coulombic potential wells of two atoms close to each other, along with the wave functions of two electrons centered on the two nuclei. And show how for such an interacting system two-electron wave functions are probable and what happens if many atoms that are brought together? (15 marks)
- 3- a-Si and GaAs have indirect and direct energy gaps and this is affecting their use in practical devices. Illustrate this statement clarifying your answer with simple drawings. (15 marks)
b- Define donor levels and acceptor levels in extrinsic semiconductors. (10 marks)
- 4- a- Deduce the total current due to both drift and diffusion of n and p charge carriers in a semiconductor. (15 marks)
b- Define "excess" carriers and how they can be created? (5 marks)
c- Define luminescence and its classification to three types depending on how the excess carriers are generated. (5 marks)

EXAMINER

PROF. DR. SAMIA AHMED SAAFAN

☺ BEST WISHES ☺



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TANTA UNIVERSITY- Faculty of Science -Department of Physics			
EXAM FOR SENIORS STUDENTS OF MATERIALS SCIENCE			
COURSE TITLE	Materials Design		COURSE CODE:MS4121
DATE:	5-1-2017	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100 TIME ALLOWED: 2 HOURS

First Question:

- i) Cite the criteria that are important in the **Selection consideration** of materials. [10Marks]
- ii) Using the selection consideration developed for minimum material mass and **minimum cost**, describe the acceptable candidates from the following Five Engineering Materials. [10Marks]

Material	ρ (Mg/m^3)	τ_f (MPa)	\bar{c} ($\$/\$$)
Carbon fiber-reinforced composite(CF-RC)	1.5	1140	80
Glass fiber-reinforced composite(GFRC)	2.0	1060	40
Aluminum alloy (2024-T6)(Al.A)	2.8	300	15
Titanium alloy (Ti-6Al-4V)(Ti-AL.A)	4.4	525	110
4340 Steel.	7.8	780	5

Density (ρ), Strength (τ_f), and Relative Cost(\bar{c}) for Five Engineering Materials.

Second Question:

- i) Find the **shear stress** of a helical spring has been constructed of wire having a circular cross section diameter (d), the coil center to center diameter (D), a compressive force (F) and force independent constant $k_w = 1 + \frac{1}{2C}$.
- ii) Prove that **the Stiffness of spring** is $\left(\frac{G \cdot d}{8n \cdot C^3}\right)$. Where (G) and (C) are the rigidity and spring constant of coil material. [20Marks]

Third Question:

- i) List and briefly explain the **biocompatibility** considerations relative to materials that are employed in artificial hip replacements. [15Marks]
- ii) Compare between the specific properties of the three materials are employed in the **femoral stem** of the artificial hip replacement. [15Marks]

Forth Question:

- i) Write the Required **mechanical properties** of the hip joint replaced components. [10Marks]
- ii) List the Requirements of the **Thermal Protection System Design** on the Space Shuttle Orbiter. [10Marks]
- iii) Write short notes about **reinforced carbon-carbon** used in the Design of Space Shuttle Orbiter. [10Marks]

EXAMINER	DR. REDA EL-SHATER
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