

- 14) Ion exchange chromatography is based on the
- a. Electrical mobility of ionic species
 - b. Adsorption chromatography
 - c. Electrostatic attraction
 - d. Partition chromatography
- 15) Which type of liquid chromatography separation depends on interactions between solute, mobile phase, and immobilized liquid stationary phase?
- (a) Adsorption.
 - (b) Partition.
 - (c) Ion-exchange.
 - (d) Size exclusion.
- 16) Sample retention in the column is measured by
- a) Retention time
 - b) Retention factor
 - c) Retention index
 - d) All of these
- 17) Capillary columns are sometimes preferred in gas chromatography over packed columns because they
- (a) Have higher resolving power.
 - (b) Are easier to prepare in the laboratory.
 - (c) Prevent detector overloading.
 - (d) Permit easier injection.
- 18) Normal-phase liquid chromatography refers to
- a) The use of a nonpolar solvent as the eluent in HPLC.
 - b) The use of a polar material as the stationary phase in a chromatographic column.
 - c) The use of a nonpolar material as the stationary phase in a chromatographic column.
- 19) What is the function of the detector in HPLC?
- a. It detects disturbances in the current.
 - b. It detects stray light.
 - c. It detects the molecules coming out from the column.
 - d. It detects leakage.
- 20) What is the function of the GC injector?
- a. It injects the sample solution into the HPLC system.
 - b. It injects energy into the column to facilitate the separation.
 - c. It injects light into the detector.
 - d. It injects liquid into the reservoir.

***** Good luck *****

Examiner: *Prof. Dr. Ahmed Rehab, and Prof. Dr. Mohamed Hany*



Tanta University - Faculty of Science - Chemistry Department
Final Exam of "Instrumental 2"
For Third Level students (Material Science Section)
Course Code: **CH 3119** - Total assessment marks: **100**
Date: **15/ 1 / 2018** - Time Allowed: **2h**

Answer the following Questions

Question 1): Write on three only of the following: (20 mark)

- 1) Definition and determination of ion exchange capacity.
- 2) Analytical Applications of ion exchange chromatography.
- 3) Properties of eluent and stationary phase used in HPLC.
- 4) Frontal Development.

Question 2): Compare between the following: (20 mark)

- 1) Columns and packing material in HPLC and GC.
- 2) Normal and reverse phase chromatography.
- 3) Ion exchange and gel chromatography.

Question 3): (20 mark)

- 1) What are the acceptable properties of eluent and stationary phase used in Ion exchange and gel chromatography?
- 2) Mention the factors affecting gas chromatography and explain three of them.



TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS

EXAMINATION FOR FRESHMEN (THIRD YEAR) STUDENTS OF PHYSICS & M.SCIENCE

COURSE TITLE: COMPUTATIONAL PHYSICS فيزياء حاسوبية COURSE CODE: PH3181

TERM: 17/1/2018 TERM: FIRST TOTAL ASSESSMENT MARKS: 100 TIME ALLOWED: 2 HOURS

Answer The Following Questions:

First Question: (25 mark)

- Construct a flowchart to read two numbers X and Y and print out which number is larger.
- Draw a flowchart to determine if a point (x, y) lies within a circle of radius, r, centered at the origin. Use the condition that if $(x^2 + y^2)^{1/2} < r$, then the point is within the circle. If the point lies within the circle, print out a message and the distance, z, of that point from the center of the circle.

Second Question: (25 mark)

- Write short notes about unconditional and conditional transfer statements in Fortran language and state an example for each statement.
- By using mathematical If statement and formatted input and output write a FORTRAN program to compute the values of the variable ,a , which is given by:

$$\begin{cases} a = 5b + 2c & \text{if } L < 0 \\ a = (\sin(c) / \tan(b)) & \text{if } L = 0 \\ a = 3b^2 + 7 & \text{if } L > 0 \end{cases}$$

Third Question: (25 mark)

- State the general form of the counted DO loop and write down its rules.
- Write a program to compute the value of, a, given by the following series:

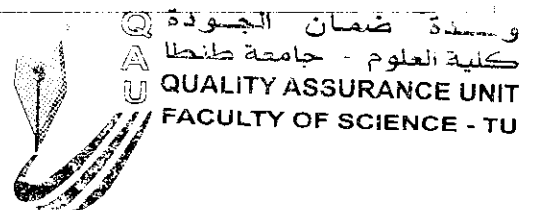
$$a = \frac{1}{2} + \frac{3}{4} + \frac{5}{6} + \dots \dots \dots \frac{87}{88}$$


- Write a program to print out the odd numbers from 1 to 100.

Fourth question: (25 mark)

- By using MATHEMATICAL GO TO and formatted input and output write a Fortran program to read the value of the nshape and calculate the following:
 - The area and perimeter of a rectangle if nshape = 1
 - The area and perimeter of a square. if nshape = 2
 - $x = y^2 + z^2$ if nshape = 3
 - $a = b |\cos(c)|$ if nshape = 4
- Using nested DO loop write a program to print out the values of the variable X, which is given by the formula $X = b^3 + 6c^4 + 5d^2$ for the values of, b, c and d between -5 and 5 in increment of 0.1

EXAMINERS	PROF.DR. G.A.GABALLA
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	TANTA UNIVERSITY- FACULTY OF SCIENCE –DEPARTMENT OF PHYSICS			
	EXAMINATION FOR THIRD LEVEL STUDENTS OF MATERIAL SCIENCE			
COURSE TITLE:	SOLID STATE PHYSICS 1		COURSE CODE :PH3161	
DATE:	24,DECEMBER, 2017	TERM :FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED :2 HOURS

ANSWER THE FOLLOWING QUESTIONS:

First Question

- a) Name the seven types of crystal systems and give the relation of lengths of axes and the relation of angles between the axes of each type. (13 marks)
- b) Describe briefly the powder photograph. (12 marks)

Second Question

- a) In a cubic unit cell draw the planes (111), (202), (432) and (100). Calculate the inter planer distances for these planers if $a=3.5\text{\AA}$. (13 marks)
- b) Discuss in details the inter atomic forces in crystals. (12 marks)


Third Question

- a) Derive an expression for the determination of unit cell dimensions of a rectangular unit cell. (13 marks)
- b) Prove that the Fermi energy E_f in an intrinsic semiconductor lies half way between the top of the valence band and the bottom of the conduction band. (12 marks)

Fourth Question

Discuss in details the free electron model in a metal and derive an expression for the energy level in three dimensions. (25 marks)

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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	FINAL EXAMINATION FOR FRESHMEN (THIRD LEVEL) STUDENTS OF MATERIAL SCIENCE			
	COURSE TITLE:	Atomic And molecular spectroscopy		COURSE CODE:MS3121
DATE:28	DEC. 2017	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions:

- 1) a- Give a definition of the following: (20 mark)
De Broglie Hypothesis – Hamiltonian – Bremsstrahlung –
Positronium – electron spin.

b- compare between the two processes pair production and pair
annihilation. (10 mark)
- 2) give short note about:
a- Rutherford scattering experiment. (10 mark)
b- The quantum numbers n, l, m_l . (10 mark)
- 3) A- Compare between the transition series of hydrogen and doubly
ionized helium atoms. (10 mark)


b- Write the formula of the following: Rydberg constant, reduced
mass, Bohr magneton, Sommerfeld fine structure constant.

(20 mark).
- 4) A- Draw the complete wavelength and frequency chart of
electromagnetic spectrum as is it now known diagram. (5 mark)
b- Classify the spectra into groups. (5 mark)
c- give short notes about only one of later groups. (5 mark)
d- Discuss briefly about only one of light sources. (5 mark)

Good luck

Examiner	Dr.Nagwa M. Abdel-Moniem
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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION of (Third Level) students of Material Science group			
COURSE TITLE:	Solar Energy Conversion Devices I			COURSE CODE: MS3111
DATE:	4/1/2018	TERM: JANUARY 2018	TOTAL ASSESSMENT MARKS : 100	TIME ALLOWED: 2 HOURS

Answer the following questions

First question (25 marks)

- Discuss the construction, basic principles of flat plate collectors with single glass and describe the various mechanisms of heat transfer happening between different layers. **(15 marks)**
- Write in brief about the various components of solar radiation incident on the earth surface and derive an expression for the total solar radiation incident on a tilted surface. **(10 marks)**

Second question (25 marks)

- Discuss the various factors affecting the single basin solar still performance. **(10 marks)**
- Write about different types of solar dryers and give mathematical formula for the main drying parameters. **(15 marks)**

Third questions (25 marks)

- Write expressions for the dimensionless numbers and explain how they can be used for calculation of the convective heat transfer coefficient. **(15 marks)**
- Discuss briefly different families of phase change materials (PCMs) and mention the criterias required for selection of the PCMs. **(10 marks)**

Fourth questions (25 marks)

- Define and give units for the following quantities **(10 marks)**:
Solar constant; daily productivity; Thermal diffusivity, absorbitivity
- Discuss the procedures followed to evaluate the solar cooker performance. **(15 marks)**

Examiner: Prof. Ahmed A. El-Sebaii

