TANTA UNIVERSITY
FACULTY OF SCIENCE
PHYSICS DEPARTMENT

EXAMINATION FOR MASTER DEGREE

COURSE TITLE: ELECTRONICS AND SOLID STATE — COURSE CODE: 1205

DATE: 2 -7- 2015 — الطالب:أحمد عبده عبده المناوي — مقرر خاص (الكترونيات) — TIME ALLOWED: 3 HOURS

Answer the following questions:

1- Draw the ladder R-2R DAC circuit and solve its output at any two binary digital inputs

2- Using of Karnaugh Map and Min Terms deduce the simplified logic circuit that verify the following Truth Table simplifications

A	B	C	D	Y
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1

3- Draw and discuss two different Shift Register applications

4- Draw the Resistor-Diode - Transistor circuit used for the NAND logic gate and solve it to show that it can verify the NAND Truth Table

Examiner	Dr. Mahmoud Kamel

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	TANTA UNIVERSITY FACULTY OF SCIENCE		
	EXAMINATION FOR THIRD YEAR *BIOCHEMISTRY, PHYICS AND MATHEMATICS*		
1969	COURSE TITLE:	Computer (Excel)	COURSE CODE:
DATE:	JUNE 2011	TOTAL ASSESSMENT MARKS: 30	TIME ALLOWED: 2 HOURS

Answer the following questions:

1- With labeled diagram indicate the elements of application window of Excel and write the name of each component and its function. (4 Marks)

2- The different types of series are: (4 Marks)

a) .....b) .....

c) ..... d).....

3- Cell references types are (give an example for each one) (4 Marks)

a)..... b).....

c)..... d).....

4- a) How to create custom series? (2 Marks)

a) How do you change column width to fit the contents? (2 Marks)

5- The formula elements are: (4 Marks)

a)..... b).....

c)..... d).....

6- Write the differences between the following: (4 Marks)

a) XY (Scatter) and line chart types

b) Count and average functions

c) Pressing Ctrl + ; and pressing Ctrl + Shift+;

d) Copy of formula and copy of cell content

7- By labeled drawing create a chart using "*Chart wizard*" showing the distribution of students number in each department in the Faculty of Science. (3 Marks)

8- How to calculate the profit of 1000 L.E in bank gives 8% interest using relative reference? (3 Marks)

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	PRE-DEGREE EXAM OF M. SC.			
	COURSE TITLE:	RENEWABLE ENERGY RESOURCES AND PHYSICAL ELECTRONICS.		COURSE CODE: 1204
DATE: 5	SEBTEMBER, 2008	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

- Answer the following questions using schematic diagrams whenever possible*

1-Discuss briefly the thermal and electrical applications of solar energy.

[20 Marks]

2- Discuss the physics involved in the following renewable energy resources: Nuclear fusion, Hydropower and OTEC.

[20 Marks]

3- Write short notes on: one part only of the flowing (a or b)

a) Biomass,

b) Wind Energy. [10 Marks]

4- Draw schematic diagrams of the rotary and diffusion pumps, with short comment.

[10 Marks]

5- a) Draw the block diagram of an electronic set-up to measure the Coincidence between $\gamma 1$ and $\gamma 2$ (of a radioactive nucleus) and Comment on each block used in your experiment.

[10 Marks]

b) The field effect transistor is used as a preamplifier circuit. Explain the main characteristics of the FET.

[10 Marks]

6- a.) Give short accounting on the pulse shaping for energy and counting measurements. [10 Marks]

b.) Discuss briefly the main concepts of the detection systems. Give an example for different types of detectors. [10 Marks]

Examiners	Prof. Muhammad R. I Ramadan	PROF. Talaat M. MEAZ

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	PRE-DEGREE EXAM OF M. SC.			
1969	COURSE TITLE:	SPECIAL COURSE " MÖSSBAUER SPECTROSCOPY" الطالبة/هاجر على الشرشابى & الطالب/ أحمد على		COURSE CODE: 1205
DATE: 26	SEBTEMBER, 2010	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

- Answer the following questions using schematic diagrams whenever possible*

1-Discuss briefly and give an expression of the following:
a) Recoil energy loss.
b) Natural line width.
c) Doppler broadening.

[20 Marks]

2- What we meant by:
a) Recoil-Free Emission of gamma rays.
b) The Mössbauer effect.

[20 Marks]

3- Draw schematic block diagram of a Mössbauer spectrometer, Write short comment on each block.

[15 Marks]

4- Discuss briefly the main concepts of the Mössbauer parameters:
a) The isomer- shift,
b) Electric quadrupole interaction,
c) Magnetic hyperfine interaction,
d) Magnetic Hyperfine field.

[20 Marks]

5- Give a brief description of the following magnetic anisotropies:
a) The magneto crystalline anisotropy.
b) Shape anisotropy.
c) Stress anisotropy.
d) Interaction anisotropy.
e) Surface anisotropy.

[25 Marks]

Examiners	*Prof. Mohamed A. Amer*	*PROF. Talaat M. MEAZ*

TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER

EXAMINATION FOR (MASTRE DEGREE)

COURSE TITLE: الكترونيات رقمية و ظواهر النقل COURSE CODE:

DATE: 1-9-2008 SEPTAMPER 2008 TOTAL ASSESSMENT MARKS: TIME ALLOWED: 3 HOURS

Answer the following questions:

1) Draw the diode - resistive logic for both the (AND , OR) principle digital gates, and then show how their truth tables can be verified

2- Show how the operational amplifier can be used in both
(a) digital to analog converter circuit
(b) analog to digital converter
and then discuss its operations

3- Discuss the deferent types of digital shift registers and draw two deferent methods of loading techniques in that registers

4- (a) Give the meaning of quantization of elastic waves; Then discuss the heat capacity of solids according to suitable models, and then show that $C = \gamma T + \alpha T^3$
(b) Write briefly about :
The effects of the glass composition and heat treatment on the refractive index of glasses and conduction mechanisms in short range ordered materials.

5- (a) Write about the classification of solids according to the band theory; Then explain briefly, what is meant by the direct and the indirect absorption processes and the effective mass.
(b) Discuss the transformation range of the supercooled liquid to glass according to the volume diagram and give the meaning of both metastable equilibrium and the liquidus temperature .

6- (a) Write about the electric and magnetic properties exhibited by superconductors and their types; Then give your comments on the Umklapp processes and Schottky barrier .
(b) What is meant by Beer's law? Then write briefly about :
The effect of glass composition on the colours due to Co^{2+} and Ni^{2+} ions in oxide glasses and their absorptivity in the UV and the IR .

Examiners	Dr. Hasannen ellabany	Dr. Mahmoud Kamel

With our Best Wishes

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	PRE-DEGREE EXAM OF M. SC.			
	COURSE TITLE:	RENEWABLE ENERGY RESOURCES AND PHYSICAL ELECTRONICS.		COURSE CODE: 1204
DATE: 10	SEBTEMBER, 2009	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

- Answer the following questions with the aid of schematic diagrams whenever possible*

1- Use schematic diagrams and the energy balance equations to describe a complete system for utilizing Solar energy.

[20 Marks]

2- Compare between biomass and wind energy showing the advantages and disadvantage of each of them.

[20 Marks]

3-a) Fusion nuclear energy and hydropower are two promising examples of renewable energy resources.
Discuss briefly (one type only of) the previous statement.

[10 Marks]

3-b). How we can evacuate a system to 10^{-5} Torr? Explain the used pumps.

[10 Marks]

4-a). Draw the block diagram of an electronic set-up to measure the single spectra " gamma ray" of a radioactive nucleus. Comment on each block used in your experiment.

[10 Marks]

4- b). The field effect transistor is used as a preamplifier circuit. Explain the main Characteristics of the FET .

[10 Marks]

5-a) Give short accounting on the pulse shaping for energy measurements.

[10 Marks]

5-b) Compare between the integral and differential discriminators. Design a single channel analyzer and modify it to design multi-channel analyzer.

[10 Marks]

Examiners	*Prof. Mohamed R. Ismail*	*PROF. Talaat M. MEAZ*

Tanta University Faculty of Science Department of Physics	Final First Term Examination Academic year 2014/2015 Thin Films Course	Course Code: MS 4234 Material Science Date: 27/5/2015 Time allowed: 2 hours	

Solve the Following Questions:

First Question :(25 marks)

(a) What are the types of defects and impurities in solids generally and in thin films particularly?. Explain in details.

(b) Compare explicitly between the thermal evaporation and sputtering techniques of thin film deposition.

Second Question :(25 marks)

(a) To describe the geometric arrangement of the lattice points and hence, the crystal structure we should use many concepts. From which, discuss the Bravais lattices, point groups, space groups and grain boundaries.

(b) Explain the basics of the chemical bath deposition technique. What are the factors governing this process.

Third Question :(25 marks)

(a) Thin film growth process includes many different steps. Explain these steps briefly?

(b) Explain the important techniques used in determine the electrical properties of the thin films (cross resistivity – surface resistivity – material type).

Fourth Question :(25 marks)

(a) What are the types of the vacuum pumps? Explain in details the rotary vane pumps and the oil diffusion pumps.

(b) Mention and explain two methods of thickness measurements of thin films.

With my best wishes.

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	PRE-DEGREE EXAM OF M. SC.			
	COURSE TITLE:	RENEWABLE ENERGY RESOURCES AND PHYSICAL ELECTRONICS.		COURSE CODE: 1204
DATE: 5	SEBTEMBER, 2008	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

- Answer the following questions using schematic diagrams whenever possible*

1-Discuss briefly the thermal and electrical applications of solar energy. [20 Marks]

2- Discuss the physics involved in the following renewable energy resources: Nuclear fusion, Hydropower and OTEC. [20 Marks]

3- Write short notes on: one part only of the flowing (a or b)
a) Biomass,
b) Wind Energy. [10 Marks]

4- Draw schematic diagrams of the rotary and diffusion pumps, with short comment. [10 Marks]

5- a) Draw the block diagram of an electronic set-up to measure the Coincidence between $\gamma 1$ and $\gamma 2$ (of a radioactive nucleus) and Comment on each block used in your experiment. [10 Marks]

b) The field effect transistor is used as a preamplifier circuit. Explain the main characteristics of the FET. [10 Marks]

6- a.) Give short accounting on the pulse shaping for energy and counting measurements. [10 Marks]

b.) Discuss briefly the main concepts of the detection systems. Give an example for different types of detectors. . [10 Marks]

Examiners	*Prof. Muhammad R. I Ramadan*	*PROF. Talaat M. MEAZ*

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	PRE-DEGREE EXAM OF M. SC.			
	COURSE TITLE:	REAEWEBLE ENERGY & PHYSICAL ELECTRONICS		COURSE CODE: 1204
DATE: 25	JUNE , 2015	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 3 HOURS

Section (A)

- Answer the following questions using schematic diagrams whenever possible.

First question: [20 Marks]

With the aid of the energy balance equation, construct a complete system to convert solar radiation into thermal energy. Compute its efficiency.

Second question: [15 Marks]

Compare between biomass and wind energy, showing their advantages and disadvantages, generating energy processes and their importance to solve energy crisis in Egypt.

Third question: [15 Marks]

Fusion nuclear energy and hydropower are two promising examples of renewable energy resources.
Discuss briefly the previous statement.

Section (B)

Fourth question: [20 Marks]

A) Compare and discuss the principals of an electronic set-up to measure the (coincidence and anticoincidence) between $\gamma 1$ and $\gamma 2$ (of a radioactive nucleus) and comment on each block used in your experiment. (10 Marks)

B) Discuss the field effect transistor construction and characterization, showing the advantages of using it as a preamplifier circuit. (10 Marks).

Fifth question: [20 Marks]

A) Discuss the mean principles for different types of evacuation pumps; declare your answer by drawing. (10 Marks)

B) Discuss the different types of radiation detectors, showing the principles of detection, the difference, advantages, disadvantages and the convenience of each detector types. (10 Marks)

Sixth question: [10 Marks]

a) Define the following: 1-rise time 2-delay time 3-decay time. 4-dead time (4 Marks).

b) Design a single channel analyzer and modify it to design multi-channel analyzer. (6 Marks).

Examiners	*Prof. Mohammed R. Ismail*	*Prof. Talaat M. Meaz*

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	Pre – Master Exam		
	COURSE TITLE: Plasma + Laser		COURSE CODE:
DATE: 22/9/2010	TOTAL ASSESSMENT MARK: 100		TIME ALLOWED: 3 HOURS

Answer the following questions:

1) Disquss the principles of the magnetohydro dynamic waves and prove that the Alfven speed is inversely proportional to the root square of the plasma density.

(18 marks)

2) Derive an expression for the collision relaxation time. Prove that the electrons reach to equilibrium distribution much more rapidly than for ions.

(16 marks)

3) Consider the case of Maxwellian plasma. Prove that the cyclotron magnetized radiation power varies with the square of temperature.

(16 marks)

4) Explain one of the following:

(1) CO_2 Laser

(2) He-Ne Laser

(10 marks)

5) To obtain laser output is very important the population inversion between two-levels in active medium. Discuss and explain the population inversion of the four-level model in stationary pumping state (No generation laser).

(20 Marks)

6) a) Mention the types of laser broadening and explain a broadening mechanism occur in an active medium most gas laser.

b) Explain the Lamp-Dip stabilization Laser frequency.

(20 Marks)

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TANTA UNIVERSITY
FACULTY OF SCIENCE
PHYSICS DEPARTMENT

EXAMINATION FOR MASTER DEGREE

COURSE TITLE: ELECTRONICS AND SOLID STATE COURSE CODE:

DATE: 29 - 6 - 2015 TIME ALLOWED: 3 HOURS

Answer the following questions:

1-(a) Discuss the different types of Shift Registers

(b) State some Shift register applications and then draw and explain only one of these applications

2-(a) Show how the operational amplifier can be used in the Digital to Analog converter (DAC)

(b) Draw the block diagram of an Analog to Digital Converter (ADC) and discuss its operation

3- (I) Using of Karnaugh Map and Min Terms deduce the simplified Boolean expression that verify the following Truth Table and draw the equivalent logic circuit

A	B	C	D	Y
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

3- (II) State True or False and correct the false ones of the following:

a- Transparent materials are those though which light is transmitted diffusely, these materials are termed opaque

b- Ferro electric materials are those that may exhibit polarization spontaneously, that is, in the absence of any external electric field

c- The electric conductivity of most materials is proportional to both the number of free neutrons and neutrons mobility

d- For ferromagnetic materials the saturation magnetization decreases with increasing temperature ,and ceases above the Curie temperature

e- The transport of thermal energy from light-to-low-temperature regions of a material is termed electrical conduction

f- Some metals as well as non metals may have more than one Crystal structure, a phenomenon known as poly morphism

g- Substance in which measured properties are independent of the direction of measurements are anisotropic, but those which depend on the directionality of properties are termed isotropic

h- The sum of the transmissivity, absorpitivity, and reflectivity by a solid medium when incident light intensity I_o to its surface, must be equal unity

i- In metals a self-interstitial is an atom from the Crystal that is crowded into an interstitial site, a small void space that under ordinary circumstances is not occupied

j- Laser is just acronym for light amplification by simulated emission of radiation

4-(a) i- Write briefly about the primary and secondary inter atomic bonds

ii- Show for the body-centered cubic crystal structure that the unit cell edge length and the atomic radius are related through the relation $\alpha = 4R/\sqrt{3}$

(b) i- Name and describe three different ionic point defects that are found in ceramic compounds, then sketch the unit cell of the Perovskite crystal structure

ii- Name the two isomeric sub classes found in polymer molecules, then describe briefly the three types of streoisomers

5-(a) i- In terms of electron energy band structure, discuss reasons for the difference in electrical conductivity between metals and dielectrics

ii- Would you expect the **Wiedemann-Franz** law to be valid for ceramic and polymeric materials ?

(b) i- Cite the deferences between hard and soft magnetic materials in terms of both hysteresis behavior and typical application

ii- Briefly describe the phenomenon of electronic polarization by electro-magnetic radiation

Examiner	Prof.Dr. Hassanen ellabany	Dr. Mahmoud Kamel