	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT F PHYSICS			
	EXAMINATION THIRD YEAR FRESH STUDENTS OF PHYSICS			
	COURSE TITLE:	Solar Energy		COURSE CODE: PH3212
DATE:	24 / 5 /2018	TERM:JUNE	TOTAL ASSESSMENT MARKS: 100	TIMEALLOWED: 2HOURS

Answer the following questions:

1) Explain in details the different parameters affecting the efficiency of the flat - plate solar collector. **(25 Marks)**

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2) *Write briefly on*: **(30Marks)**

i) Different types of heat exchangers for latent heat thermal energy storage and give an example for each.

ii) The integration of a stratified hot water tank in solar system for space heating and hot water production.

iii Methods to minimize radiation and convection losses in solar collector

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3) a- Write the definition and explain the physical meaning of the dimensionless Numbers Nusselt , Prantdl, Grasshof **(10 Marks)**

b- *Write short notes on* : **(15 Marks)**

i) The compatibility the molten PCM with the heat exchanger materials

ii) Different types solar radiation and different devices to measure them

iii) The differential energy equation for time dependent and time independent with and without internal source

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4) a) Explain how you can calculate the thermal resistance in the three heat transfer mechanisms (conduction, convection and radiation) . **(10 Marks)**

b)Write the Hottel-Whiller equation, draw and discuss its graphical presentation for single glass and double glass solar collector and show the maximum efficiency in each case **(10 Marks)**

Best Wishes

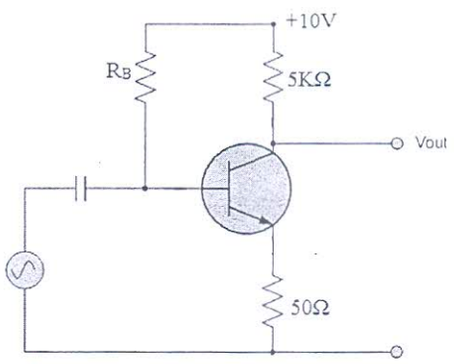
Examiner :Dr Saad Aboul Enein

1969	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	FINAL EXAMINATION FOR FRESHMEN (THIRD LEVEL) MATERIAL SCIENCE STUDENTS شعبةعلوم المواد طلاب المستوي الثالث			
	COURSE TITLE:	ANALOG ELECTRONICS الكترونيات تناظرية		COURSE CODE: MS3252
DATE:	MAY 2018	TERM: SECOND	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOURS

Answer the following questions:-

1- a- compare between different types of transistor, BJT, FET, and MOSFET.

b- In the following circuit calculate R_B necessary to have a good amplifier if transistor $\beta = 200$. **(37.5 Marks)**



2- a- TIL222 is a LED diode. Design a circuit to use it, if its forward voltage is 2.3V and current is 17mA. Use a transistor with $\beta = 100$ and battery 5V.

b- Why we use voltage divider in biasing a transistor? **(37.5 Marks)**

3- a- Compare between SCR and Triac.

b- Design a circuit to control the power in heater if the main voltage is 220V, 50Hz. Describe the function of each components. **(37.5 Marks)**

4- a- By using the full wave rectifier, draw a circuit to supply a load with 100mA and the optimum variation of the voltage is ±0.1V. Explain the function of the capacitor.

b- Explain the characteristics of diac. **(37.5 Marks)**

With my best wishes

Examiner	*Prof. Mostafa K. Elnimr*

TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS

EXAMINATION FOR THRID YEAR PHYSICS

COURSE TITLE: ELECTRONICS AND DEVICES PH 3252

DATE: 27 - 5- 2018 MARKS: 100 TIME 2 HOURS

Answer all the following questions:

1- (A) draw and discuss the operation of **JFET** transistors. (15 Marks)
(b) Draw and discuss any application circuit of a **JFET** (10 Marks)

2- (A) Discuss the **Miller theory** and calculate the equivalent input and output **Miller** impedance (10 Marks)

(B) Discuss the effect of capacitors and transistor **inter-electrode** capacitance on the frequency response of a transistor amplifier and show its response **only** in case **Low frequency** signals (15 Marks)

3- (A) Find the condition necessary to get maximum power on a load R_L from a voltage source with resistance R_s (10 Marks)

(B) Draw a **Common Emitter** transistor Amplifier and by solving its equivalent circuit deduce all important circuit parameters (15 Marks)

4-(A) Write the different types of **Feed Back** classifications and drive the general relation between gains **with** and **without** feed back. (15 Marks)

(B) Just write the different possible advantages of **Negative** Feed Back in amplifier circuits and **prove only any two cases**. (10 Marks)

Examiner	Dr. Mahmoud Kamel

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS (FACULTY OF SCIENCE)			
	EXAMINATION FOR THIRD YEAR STUDENTS OF BIOPHYSICS (SEMESTER 2)			
	COURSE TITLE:	SIMULATED ELECTRONICS OF THE BIOLOGICAL SYSTEMS		COURSE CODE: PB3258
DATE: 29	MAY, 2018	TERM: SECOND	TOTAL ASSESSMENT MARKS:50	FINAL EXAM

Answer The Following:

1- (20 points) First Question:

a. (5 points) Using circuit diagram explain DC defibrillator circuit operation.

b. (5 points) Using timing schemes explain the operation of Pulse Oximeter. While explaining illustrate the advantages of using a pulsing signal.

c. (10 points) choose the correct answer:

1. (Hydrozation – Hybridization- Printed circuit board) is to telescope the size requirements of discretely packed circuit components onto a single compact package.
2. Einthoven triangle postulates that (the voltage sum of the three limb lead positions is equal to zero- the vector sum of the projection of the three limb lead positions is equal to zero- the vector voltage sum of the three limb lead positions is equal to zero)
3. So that all the wanted signals find a way through the amplifier and all unwanted signals get rejected in the preamplifier stage, the CMRR of preamplifier should be (as high as possible- as low as possible- equal to zero).
4. In biofeedback technique, the electrodermal activity signal is filtered through RC circuit to measure (Basal – Galvanic –both) skin response.
5. Inside the cell, the action potential is (negative – positive – differential) with respect to its surrounding tissue.

2- (10 points) Second Question:

Explain the circuit part that performs the following jobs:

a. Helps the pacemaker lead **design** overcome the increased threshold of fibrous tissue.

b. Minimizes the common mode signal between the body of the patient and the floating ground in ECG circuit design.

c. Eliminates ground loops in signal cables for minimum noise pick up.

d. Provides uniform and simultaneous contraction of the heart muscle fibers with protection against accidental shock in internal or external defibrillator electrode design.

e. Performs a band pass filter using operational amplifiers?

3- (10 points) Third Question:

Define the following:

a. Warburg Hypothesis.

b. Linear variable differential transducer.

c. Cardio version.

d. Sino Atrial Node.

e. Percentage of Oxygen Saturation.

4- (10 points) Third Question:

Complete the following sentences

a. The main difference between Active and Passive transducers is.....

b. In signal conditioning circuits, the main job of signal excitation part is.....

c. The main difference between differentiator and differential circuits is.....

d. The main disadvantage of external pacing is.....

e. In ECG signal, the interval QT corresponds to.....

6- Types of radiation
7- Describe evidence that light behaves like a particle and evidence that light a wave behaves like.

Third question: (20 marks:) Choose the correct answer from the table.

1- Alpha particle is	MeV, J , eV
2- Electromagnetic radiation is	Isotopes
3- Beta particle is	Roentgen
4- Atoms having the same number of electrons is	Gray(Gy) , rad
5- Forms of radiations are……..	Isotones
6- Atoms having the same number of neutrons are called	Isomers
7- Elements have different physical and chemical properties are.	Isoelectronic
8- Atoms have same number of both protons & neutrons are.	Electron capture
9- Molecules having same number of atoms & same electrons are	Half-life
10-The nucleus captures an electron from K-shell is	- &+ charge
11-The rate of reduced radioactive nuclei is	+ charge
12-Unites used for measuring radioactivity are	Isosters
13-Units used for measuring radiation energy are	Isobars
14-Units used for measuring radiation exposure are	Element
15-Units used for measuring radiation dose are	Ci ' Bq '

Fourth question: (20 Marks): what meant by:

- Non-ionizing radiation.
- radioactive nuclei.
- positron decay.

With my best wishes for success. *Prf.KH.M.Omar*

	TANTA UNIVERSITY FACULTY OF SCIENCE PHYSICS DEPATMENT			
	FINAL EXAMINATION FOR THIRD LEVEL STUDENTS OF MATERIAL SCINCE			
	COURSE TITLE: RADIATION DOSIMETRY		COURSE CODE: MS3292	
DATE:22	MAY, 2018	FINAL EXAME	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

First question:(20 Marks): Match each word to the sentence where it beast fits:

1- Planck's constant	**7- detector**
2-diffraction pattern	**8- optical fibers**
3- photoelectric effect	**9- photon**
4- pixel	**10- polarization**
5- quantum physics	**11- spectrograph**
6- threshold frequency	**12- work function**

1- --- is/are a technology that transmits light and information using a process of total internal reflection.
2- The _____ is the photon energy needed to liberate an electron from a metal.
3- The _____ is an experiment that is explained using wave–particle duality.
4- Light shining on a metal will eject no electrons unless the light exceeds the _____.
5- The _____ is a scientific instrument that disperses light.
6- The _____ projected onto a screen shows waves alternately adding and canceling each other.
7- That light can be considered as an indivisible bundle of energy is a phenomenon of the field of _____.
8- The image taken by a digital camera might have thousands or millions of individual _____(s).
9- The value of _____ is 6.63×10^{-34} J s.
10- That light comes in discrete packets is the essential concept of the _____ model of light.

Second question:(40 Marks) Write no more 40 words in each of the following:

1- The relationship between the index of refraction of a material and the speed light travels in that material
2- The characteristic of x-rays allows them to be used to image the bone structure of patients in medical facilities?
3- Electromagnetic waves enter a new medium, such as water, what happens to their speed? Is this like what happens to sound waves?
4- What effects do different doses of radiation have one people?
5- Radioactive decay

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION of (Third & Second Year) students OF Physics group			
	COURSE TITLE:	**Nuclear Physics**		COURSE CODE:PH 3262
DATE:	13 / 6/2018	TERM: SCOND	TOTAL ASSESSMENT MARKS :100	TIME ALLOWED: 2 HOURS

Answer the following questions:

1- **a)** Discuss two properties of nuclear force and two properties of nuclear states. (15 Marks)

b) Calculate the separation energy of neutron from $_6C^{14}$ and the specific binding energy of $_6C^{14}$. (10 Marks)

2- a) Explain and write the semi- empirical mass formula. (15 Marks)

b) Compute the spin and parity for these nuclei

$_{13}Al^{26}$, $_{14}Si^{27}$ (10Marks)

3- a) Write the equations for the decay energy of ß –particle emission.

(15 Marks)

b) Nucleus $_zX^A$ **emitted α-particle with two groups** K_1 **and** K_2 **Find the energy of ɣ-ray. (10 Marks)**

4- a) Draw and explain a relation of specific binding energy as a function of mass number. (15 Marks)

b) Draw the distribution of nuclear charge density. (10 Marks)

Hint: M (n)=1.008665u ,M(p)=1.007825u
M $(_6c^{13})$ **=13.003354u** ,$M(_{6C}{}^{14})$**=14.003242u**

EXAMINER	Prof. Dr.Neima Zakaria Darwish

☺ أطيب التمنيات بالتوفيق ☺

	TANTA UNIVERSITY FACULTY OF SCIENCES DEPARTMENT OF PHYSICS			
	EXAMINER:	PROF. DR. RIYAD A.M. GHAZY		
	TITLE:	laser physics		CODE:3222
DATE:	10 JUN. 2018	TERM: 2ND	TOTAL MARKS:200	PERIOD: 2 HOURS

Please, Kindly answer the following questions :-

1- *Give a short note about the following:*

- Properties of a laser beam;
- Spontaneous emission and the Einstien A- coefficient;
- Stimulated emission and the Einstein B- coefficient; and
- Absorption and stimulated emission coefficients.

2- *Name* the theories of the laser which treat the interaction between light and atoms in the resonator under the influence of pumping and relaxation evaluating the relationship between the maximum the laser output power and the optimum output coupling coefficient discussing the effect of the relative excitation of the lasing active medium?

3- *"The frequency of the laser lies between the resonant frequency of the optical resonator and the frequency of the laser transition, its nearer to the frequency of one having a higher quality factor".*

Prove the relation by which you can explain that phenomena? Showing the frequency pulling effect?

4- *In terms of:*

- the reflectance of the resonator's mirrors R_1 and R_2,
- the transition dipole moment of the laser's active medium μ_{21}; and
- the effective loss L_{eff} in the optical resonator and the spectral line width $\Delta\omega$.

Find the threshold value ΔN_{th} of the population inversion of the lasing process in case of steady- state oscillation?

?? e N d

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		PHYSICS DEPARTMENT
	FINAL EXAM. FOR MATERIALSCIENCE(LEVELTHREE)		
	COURSE TITLE: Corrosion and Degradation of Materials	COURSE CODE: MS3242	
DATE: 03/06/2018	SEMESTER:TWO	TOTAL ASSESSMENT MARKS: 100	TIME: 2 HOURS

Answer the following questions:

Question [1] : **(25 Mark)**

i- Briefly explain: Electrochemical Considerations and passivity . **(14 Mark)**

ii-Put (√) or (X) for the following and then correct the false: **(11 Mark)**

a-The site at which oxidation takes place is called the cathode oxidation is sometimes called an cathodic reaction.

b-Both oxidation and reduction reaction are necessary for corrosion to occur.

c-A potential of 0.870 V results for a copper–iron galvanic cell when the temperature is (57 ℉).

d-The potential difference for any galvanic cell depends upon only the two solutions.

e-The corrosion potential, E_{corr} is the closed circuit potential of a corroding metal.

f-The cell halves are separated by a membrane, which limits the mixing of the two solutions.

g-Erosion–corrosion arises from the combined action of chemical attack and mechanical abrasion or wear as a consequence of fluid motion.

.....

Question[2]: **(25 Mark)**

Write in details about the following:

Activation Polarization and Concentration polarization .

.....

Question[3]: **(25 Marks)**

Briefly explain three types from, Forms of Corrosion.

.....

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Question[4]: **(25 Mark)**

1-In the following table, weight gain–time data for the oxidation of some metal at an elevated temperature are given.

$W\ (mg/cm^2)$	$Time\ (min)$
1.90	25
3.76	75
6.40	250

(a) Determine whether the oxidation kinetics obey a linear, parabolic, or logarithmic rate expression.
(b) Now compute W after a time of 3500 min. **(12 Mark)**

.....

2- Zinc experiences corrosion in an acid solution according to the reaction

$$Zn + 2H^+ \rightarrow Zn^{2+} + H_2 .$$

The rates of both oxidation and reduction half-reactions are controlled by activation polarization.
(a) Compute the rate of oxidation of Zn (in $mol/cm^2.s$) given the following activation polarization data:

For Zn	For H
$V(Zn/Zn^+)=-0.763V$	$V(H^+/H_2) =- 0V$
$i_o = 10^{-7} A/cm^2$	$i_o = 10^{-10} A/cm^2$
$\beta = +0.09$	$\beta = -0.08$

(b) Compute the value of the corrosion potential. **(13 Mark)**

.....

Examiner	Dr. Samy El-Attar.

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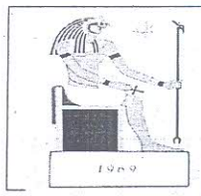

اختبار نهائي خواص فيزيائية الفصل الدراسي الثاني للعام الأكاديمي ٢٠١٧-٢٠١٨ ١٠٠ درجة الزمن ساعتان تاريخ الامتحان ٢٠١٨/ ٥/٢٣	جامعة طنطا كلية العلوم قسم الفيزياء

كتلة الالكترون 9.1×10^{-31} Kg ثابت بلانك = 6.62×10^{-34} J.s شحنة الالكترون $=1.6\times10^{-19}$ كولوم

ثابت كولوم $K= 9\times10^{9}$ عدد افوجادرو $N=6.02\times10^{23}$ ثابت بولتزمان $K=1.38\times10^{-23}$

a-First question: **(30 marks)**

a - Put(√) for true sentences and(x) for false sentences:

1- Weidman- Frantz ratio(k/σ) is the same for all metals at fixed temperature.

2- The contribution of phonons is greater than electrons for thermal conductivities in metals .

3- In monoatomic lattice the vibrating frequency of atoms has the same values and independent of atom positions.

4- The crystalline lattice acts as a filter for short wavelength and high frequencies.

5 – In monoatomic lattice vibration the force constant $\mu = 0$ at $k = \frac{\pi}{a}$ and the lattice vibrates as gelatinous mass .

6 - The maximum frequency of acoustic branch for diatomic lattice is $\sqrt{\frac{2\mu}{m}}$, where m is the small mass.

b-choose the correct answers for the following statements:

1-The resistivity of a metal ρ equals 3.2×10^{-7} Ω. m, the concentration of electrons n= 5.2×10^{28} m^{-3}, so the mobility of electrons in (m/v.s) equals

a – 5.7×10^{-4} b- 3.7×10^{-4} c- 7.5×10^{-5} d – 5.7×10^{-3}

2- A current density $J=2\times10^{5}$ A/m^2 passes in x direction through sheet of material with thickness 2mm ,the normal magnetic flux density B =1.5 Tesla , if Hall voltage equals 0.22 μv , the concentration of charge carriers in m^{-3} equals

a- 8.5×10^{28} b- 1.7×10^{28} c- 8.5×10^{16} d – 8.5×10^{34}

3 - In Ga As with $\sigma = 10^{6}$ $(\Omega .m)^{-1}$, $\mu_h = 0.45$, $\mu_n = 0.85$ m /V.s , the concentration of charge carriers n_i equals

a - 2.08×10^{-19} b – 4.8×10^{24} c – 4.8×10^{21} d – 5.7×10^{12}

4 - If the Debye Temperature Θ_D=335 k so the maximum frequency of the lattice is

a- 3.6×10^{12} Hz b- 2.1×10^{12} Hz c- 4.4×10^{13}Hz d- 3.5×10^{14}Hz

5 - The maximum frequency in Hz of the monoatomic lattice with $a= 5A^0$ and the velocity of waves propagated through it = 3×10^{5} cm/s

a - 3×10^{12} b- 7×10^{12} c- 9×10^{12} d- 5×10^{12}

6 - The maximum frequency of Cu lattice 8.4×10^{7}Hz , its atomic weight is 63.5 and the lattice constant is 3×10^{-8}cm , its elastic modulus in N/m^2

a-38 b- 100 c- 24 d- 75

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7 - The specific heat of Al using Debye theory at 40 k if θ_D =398k , R = 8.31 J/mol.k

a - 9.41 b- 4.91 c- 1.96 d- 2.65

8 - The maximum difference between group velocity and phase velocity occurs at

a- $k = 0$ b- $k = \frac{2\pi}{a}$ c- $k = \frac{\pi}{a}$ d- $k = \frac{\pi}{2a}$

9 – In monoatomic at long waves and low frequencies the lattice frequency is given by

a- $\omega = v_s k$ b -$\omega = 2\sqrt{\frac{\mu}{m}}$ c- $\omega = \sqrt{\frac{2m}{\mu}}$ d- $\omega = \sqrt{\frac{2\mu}{m}}$

10- The lower frequency for optical branch in diatomic lattice is given by

a- $2\sqrt{\frac{\mu}{m}}$ b- $2\sqrt{\frac{m}{\mu}}$ c- $\sqrt{\frac{2m}{\mu}}$ d- $\sqrt{\frac{2\mu}{m}}$

where m is the light mass

Second question: **(25marks)**

1- From the dispersion relation for diatomic lattice

$$\omega^2 = (\frac{1}{M}+\frac{1}{m})\mu \pm \mu\sqrt{(\frac{m+M}{mM})^2 - \frac{4\sin^2 ka}{mM}}$$

Find the frequencies of acoustic and optical branches and draw the dispersion curve, illustrate the forbidden and Brillion zone region.

2- If you know the following

$\omega_D = (6n\pi^2)^{\frac{1}{3}} V_s$ and $\bar{u} = 9RT(\frac{T}{\theta_D})^3 f(\frac{\theta_D}{T})$

Find C_v at high and low temperature in Debye model.

Third question: **(25 marks)**

1-NaCl crystal absorbs infrared at wavelength = 50 μ m calculate the lattice constant if the elasticity modulus E= $5x10^{11}$ dyne/cm^2 .

2- Knowing that $E_n = \frac{\hbar^2}{8mL^2}(n_x^2 + n_y^2 + n_z^2)$ in quantum theory of free electron, prove that the energy level of electron is given by

$$E_n = \frac{\hbar^2}{2m}(K_x^2 + K_y^2 + K_z^2)$$

Determine the degenerate and non-degenerate energy levels.

The fourth question **(20 marks)**

Prove that the energy of electrons at Fermi level in metal is given by

$$E_f = \frac{\hbar^2}{2m^*}(3n\pi^2)^{2/3}$$

Where m^* is thee effective mass of electron.

2- The density of Copper is 8.96g/cm^3 and its atomic weight 63.5 g/mol .

a- Calculate the Fermi energy for copper.

b- Find the classical electron velocity V_f and Fermi temperature T_f .

مع تمنياتي بالتوفيق

	TANTA UNIVERSITY FACULTY OF SCIENCE PHYSICS DEPATMENT			
	FINAL EXAMINATION FOR (THERED LEVEL) STUDENTS OF SPECIAL PHYSICS & BIOPHYSICS			
	COURSE TITLE: RADIATION PHYSICS		COURSE CODE: PH3292	
DATE:20	MAY, 2018	FINAL EXAME	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

First question (25 marks): Write not more 40 words in **only four** of the following:

- Production of radiation.
- Irradiation and contamination.
- Types of Attenuation coefficients.
- The different types of absorption radiation ranges.
- Benefit of radiation in health.
- Radiation physics and dosimetry.

Second question (25 marks): answer:

1. Define: 1-Nuclear Stability – 2- Radioactivity – 3- Half-life – 4- Dose.
2. What are the photon interactions with matter (6 interactions)?
3. What is the decay constant for $_{88}Ra^{226}$ if it has $T_{½} = 1602$ y.?
4. If you have 60 g of radioactive element, after 1 hour become 10 g what is its half-life? Where the 50 g go? And if this element emitted "Alpha" write the decay equation?
5. In the nuclear field what is the average energy of charged particles resulting triplet production created by 4 MeV photon?
6. What are Radioactivity and Radiation?
7. If uranium-238 undergoes alpha decay, what is the product? write the decay equation?
8. What is Radiation dose?
9. After a tree dies, the carbon-14 in it stops being replenished and starts decaying. After 11,460 years, what percentage of carbon-14 is left?
10. When a radioactive isotope emits an alpha particle, what happens with it's mass number will?

Third question (20 marks): Rewrite the following states and complete it?

1- The different types of scattering radiation are .....
2- The different types of radiation absorption cross section are .....
3- The radiation one typically encounters is one of four types
4- The three principles of ALARA system include .....
5- Radiative stopping powers ... .. are .....

P.T.O.

Fourth question (30 marks): Match each word to the sentence where it best fits.

Electromagnetic wave - Scattering - vacuum - light - speed of light - Dispersion - gamma rays – infrared radiation – radiation – spectrum - electromagnetic spectrum – Index of refraction – microwaves – radio wavers – ultraviolet light.

1. The daytime sky appears blue because of the _____ of blue light by small particles in the Earth's atmosphere.
2. The _____ is 3×10^8 m/s.
3. A/An _____ is an oscillating electric and magnetic field.
4. The volume inside a bell jar, when it has been evacuated of all matter, is a/an _____.
5. Electromagnetic waves are also called _____.
6. The mobile phone network transmits information at the wavelength region corresponding to _____.
7. Sunscreen is important to protect your skin from the damaging effects of _____.
8. The Sun's light energy travels to us as electromagnetic _____.
9. Radio waves, infrared light, ultraviolet light, and x-rays are all part of the _____.
10. The most energetic form of electromagnetic waves is _____.
11. The _____ of a material represents how the speed of light within the material differs from the speed of light in a vacuum.
12. mal leaks from houses can be detected using a camera that is sensitive to _____.
13. The longest wavelength electromagnetic waves are _____
14. A triangular glass prism separates white light into its constituent colors through _____.
15. The _____ of visible light are the colors, wavelengths, and frequencies from red to green to violet

With my best wishes for success.

Prf.KH.M.Omar

20/5/2018

P.T.O.

	Tanta university Faculty of Science DEPARTMENT OF PHYSICS			
	EXAMINATION FOR (Third YEAR) STUDENTS OF Bio-PHYSICS			
	Biological Signal Analysis (BP3260)			
DATE	7/6/2018	TERM: Second	TOTAL ASSEAAMENT MARK: 100	TIME ALLOWED: 3h

ANSWER ALL THE QUESTIONS:

Question (1)

A) Describe in details the different between the Depolarization and Repolarization?

B) What is the result to allow the inability of Na+ to penetrate a cell membrane?

C) Give in details the difference between the electroneurogram (ENG) and the electromyogram (EMG)?

Question (2)

A) Describe the discrete time signals and defined the sampling and the Aliasing with drawing the signals?

B) List the basic discrete time signals system operations and describe each of them?

Question (3)

A) Consider the following sequences:

$a[n]=\{-1\ 5\ 3\ -5\ -8\}, -3 \leq n \leq 1;$

$b[n]=\{-3\ -1\ 0\ 9\ 6\ -3\}, -2 \leq n \leq 3;$

$c[n]=\{1\ 8\ -3\ 2\ -6\}, 3 \leq n \leq 7.$

The sample values of each of the above sequences outside ranges specified are all zeros. Generate the following sequences (put an arrow at n=0):

$W[n]=a[-n+3];$

$S[n]=a[n]+b[-n+2]+c[-n].$

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B) Describe the low pass filter, high pass filter and Band bass filter and draw the graph that show Magnitude frequency response of a BPF?

Question (4)

A) Drive the Discrete Fourier transform to determine the magnitude and phase spectra?

B) Create a MATLAB code to calculate a magnitude and a phase spectra-using DFT?

Good Luck

	TANTA UNIVERSITY FACULTY OF SCIENCE PHYSICS DEPATMENT			
	FINAL EXAMINATION FOR (THERED LEVEL) STUDENTS OF SPECIAL PHYSICS & BIOPHYSICS			
	COURSE TITLE: RADIATION PHYSICS		COURSE CODE: PH3292	
DATE:20	MAY, 2018	FINAL EXAME	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

First question (25 marks): Write not more 40 words in **only four** of the following:

- Production of radiation.
- Irradiation and contamination.
- Types of Attenuation coefficients.
- The different types of absorption radiation ranges.
- Benefit of radiation in health.
- Radiation physics and dosimetry.

Second question (25 marks): answer:

1. Define: 1-Nuclear Stability – 2- Radioactivity – 3- Half-life – 4- Dose.
2. What are the photon interactions with matter (6 interactions)?
3. What is the decay constant for $_{88}Ra^{226}$ if it has $T_{½} = 1602$ y.?
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5. In the nuclear field what is the average energy of charged particles resulting triplet production created by 4 MeV photon?
6. What are Radioactivity and Radiation?
7. If uranium-238 undergoes alpha decay, what is the product? write the decay equation?
8. What is Radiation dose?
9. After a tree dies, the carbon-14 in it stops being replenished and starts decaying. After 11,460 years, what percentage of carbon-14 is left?
10. When a radioactive isotope emits an alpha particle, what happens with it's mass number will?

Third question (20 marks): Rewrite the following states and complete it?

1- The different types of scattering radiation are .....
2- The different types of radiation absorption cross section are .....
3- The radiation one typically encounters is one of four types
4- The three principles of ALARA system include .....
5- Radiative stopping powers ... .. are .....

P.T.O.

Fourth question (30 marks): Match each word to the sentence where it best fits.

Electromagnetic wave - Scattering - vacuum - light - speed of light - Dispersion - gamma rays – infrared radiation – radiation – spectrum - electromagnetic spectrum – Index of refraction – microwaves – radio wavers – ultraviolet light.

1. The daytime sky appears blue because of the _____ of blue light by small particles in the Earth's atmosphere.
2. The _____ is 3×10^8 m/s.
3. A/An _____ is an oscillating electric and magnetic field.
4. The volume inside a bell jar, when it has been evacuated of all matter, is a/an _____.
5. Electromagnetic waves are also called _____.
6. The mobile phone network transmits information at the wavelength region corresponding to _____.
7. Sunscreen is important to protect your skin from the damaging effects of _____.
8. The Sun's light energy travels to us as electromagnetic _____.
9. Radio waves, infrared light, ultraviolet light, and x-rays are all part of the _____.
10. The most energetic form of electromagnetic waves is _____.
11. The _____ of a material represents how the speed of light within the material differs from the speed of light in a vacuum.
12. mal leaks from houses can be detected using a camera that is sensitive to _____.
13. The longest wavelength electromagnetic waves are _____
14. A triangular glass prism separates white light into its constituent colors through _____.
15. The _____ of visible light are the colors, wavelengths, and frequencies from red to green to violet

With my best wishes for success.

Prf.KH.M.Omar

20/5/2018

P.T.O.

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION OF SOLID STATE (THIRD YEAR) STUDENTS OF BIOPHYSICS			
	COURSE TITLE:	Solid State		COURSE CODE:
DATE:	24-5-2018	TERM: SCOND	TOTAL ASSESSMENT MARKS:100	TIME ALLOWED:TWO HOURS

Q1-Choose the correct answer (20)

1- Which one of the following is not a strong bond?
(a) van der Waals bond (b) Covalent bond (c) Metallic bond (d) Ionic bond.

2 –The angle between [111] and [11–2] directions in a cubic crystal is (in degrees)
(a) 0 (b) 45 (c) 90 (d) 180

3-The Miller indices of planes parallel to the x and y axes are
(a) (010) (b) (001) (c) (111) (d) (100)

3-The number of atoms present in body-centred cube is .....
(a) 1 (b) 2 (c) 3 (d) 4

4-The relation $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90$ belong to the crystal system
(a) triclinic (b) monoclinic (c) rhombic (d) cubic

5-Which of the following are correct for hexagonal system (a) $a=b=c$, $\alpha = \beta = \gamma \neq 90$ (b) $a=b \neq c$, $\alpha = \beta = 90$,$\gamma=120$ (c) $a \neq b \neq c$, $\alpha = \beta = \gamma = 90$ (d) $a \neq b \neq c$, $\alpha \neq \beta \neq \gamma \neq 90$

6-The most unsymmetrical and symmetrical systems are respectively (a)tetragonal ,cubic (b)triclinic, cubic (c) rhombohedral , cubic (d) orthorhombic ,cubic

7-In cubic system the [101] direction is on
(a) (101) plane (b) (111) plane (c) (1 11) plane (d) (111) plane

8-The system characterized by a single six-fold rotation axis is:
(a)Cubic (b) Tetragonal (c) Hexagonal (d) Monoclinic

9-In the x-ray diffraction of a set of crystal planes having d equal to 0.18 nm a first order reflection is found to be at an angle of 22°. The wave length of x-ray is - (given sin 22° = 0.208) (a) 0.0749 nm (b) 0.0374 nm (c) 0.749 nm (d) None of these

10- Crystal lattice is actually (a)array of points (b)lines of points (c)sum of points (d)triangle of points

11-A metallic bond forms by (a) transferring of an electron from one atom to another (b)charing an electron between twoatoms (c) charing electrons among all atoms

Q2 a-In tetragonal lattice a=b=3.0 A, c=2 A. Deduce the lattice spacing between (211) planes

b-The energy of two particles in the field of each other at a separation **r** is given by $U = \alpha/r + \beta/r^8$ where α and β are constants . At what separation on they will form a stable compound?

c-Assuming the X-ray unit is operated with an accelerating voltage of 40 kV, what is the shortest X-ray wavelength (λ) obtained from it?

d-The zones containing (2021),(0110) and (1010),(0111).Find the face common to them both.(25)

Q3 a-Derive the expression of Bragg's law for x-ray diffraction.

b- Explain the significance of the following notations: (a) (khl), (b) {hkl}, (c) [hkl], (d) <hkl>, (f) (hkil) .

c-Drive the relation $d=a/\sqrt{h^2+k^2+l^2}$

d-Classify the crystals according to their binding between their constituents. Give the examples of crystals in each class.(20)

Q4 a. Write a note on : various symmetry operations present in a crystal-Two method of x-ray production –Laue photograph- the two types of crystal lattices

b-) Explain the origin of all characteristic "λ's" on a schematic drawing (35)

EXAMINERS	Prof. Dr Dalal Hemeda.

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