Mansoura University
Faculty of science
Physics department
Subject: Experimental biophysics
Course:Biophysics

First term 2015 -2016
Fourth year
Time allowed: 2 h
Full mark: 80

Answer the the following questions

1-a. Discuss the basic spectroscopic instrumentation with applying and sketching the main parts of UV, IR and X-ray spectrometers. (15)

b-A CO molecule in the lowest rotational energy state absorbs radiation of frequency $1.16*10^{11}$ HZ in transferring in the first excited state. Calculate the bond length of this molecule. (5)

2-a- Draw and explain the schematic diagram of biological measurement system. (5)

b-write briefly an types of bio electrodes and the electrode –skin interface with explain the advantage and disadvantage of each. (15)

3-a-Draw and explain the circuit diagram of a lower-pass filter, and show how it can be used for measurement the biological system. (10)

b- Show how you can measure the membrane resting potential. (10)

4-Give the basic difference of biomolecules and explain how these differences can be used for their separation. (20)

With my best wishes

Prof.Dr.F.Richa

Mansoura University Faculty of Science, Physics Department	بسم الله الرحمن الرحيم 1st Term Exam 2015/2016 For the 4th. Year Biophysics Students (Phys. 414)	Time Allowed : Two Hours Subject : Ultrasonic and its medical applications Total Marks = 80 M

Answer the following questions:

1 – a) In short, clarify the origin of Doppler Effect. (10 **M**)

b) Discuss the difference between the straight beam probe and the TR-probe. (10 **M**)

2 – Comment on the differences between the Pulse-Echo and the Through-Transmission testing techniques. (20 **M**)

3 – a) Deduce a mathematical expression for the Doppler shift that is recorded by stationary receiver for moving source of sound. (10 **M**)

b) Explain the meanings of red shift and blue shift. (10 **M**)

4 – a) Explain one use for the angle beam transducers. (10 **M**)

b) List four major advantages and four common disadvantages for the ultrasonic testing techniques. (10 **M**)

Best Wishes from

Prof.Dr. / Maher El-Tonsy

Mansoura University Faculty of science Physics Department Course code: Bio-phys 413	First Semester 2015-2016	4th Level Biophysics students Full mark: 80 Allowed time: 2 hours Course title :Physics of Biomaterials and their Substitutions

FINAL EXAMINATION

Answer the Following questions

		Question	Marks
1	A	A stent is a device that is implanted into an occluded artery to permit increased blood flow. A permanent, yet flexible device is needed for use as a vascular stent. What materials meet that need?	20
	B	What material is preferred to produce a blood bag? A dialysis bag? What design parameters are involved?	
	c	What materials are preferred for reconstructive dental applications? What are some advantages of the composites over a monolithic structure?	
2	A	In short assay, compare between the different classes of polymers.	15
	b	What is the parameters affecting on the ability of a polymer to crystallize.	
3	A	Define what is meant by Tacticity. List its different types.	15
	B	Write a definition of Degree of polymerization.	
	C	What is the effect of polymer chain length on polymer properties.	
4	A	State the physical meaning by Bioerosion of polymer. Discuss in brief the polymer erosion mechanism.	15
	B	Calculate the atomic packing factor for FCC crystal structure.	
	c	Define and classify the biodegradable polymer?	
5		What is the Biomaterials, its types and its requirements.	15

Mansoura University Faculty of Science Physics Department Subject: BioPhysics (412)		4th Level Graduate Students Date : 12-1-2016 Time allowed : 2 hours
Course: Radiation Therapy		Full Mark: 80 Mark

Answer only FOUR questions from the following:

Q1:

Define the following terms;

- Radioactive decay (4)
- Half life time (4)
- Fractionation in radiotherapy (4)
- Field shaping process (4)
- Irradiation with high energy X-rays (4)

Marks (20)

Q2:

a) Describe the term ionizing versus non-ionizing radiation? (5)
b) Discuss how to apply inverse square low in radiation? (5)
c) Write on uses of Microwave in medicine? (10)

Marks (20)

Q3:

a) Write down the factor controls biological effects of radiation? (10)
b) Discuss reoxygenation, redistribution, repopulation and accelerated repopulation process during interaction of radiation with tissues? (10)

Marks (20)

Q4:

a) Explain the radiotherapy treatment steps. (10)
b) Discuss in details brachytherapy, their advantage and disadvantages? (10)

Marks (20)

Q5:

a) What are the main differences between vibrational and rotational energy levels? (5)
b) Write on Femtolasik, steps of procedure, advantages and range of applications? (15)

Marks (20)

With Best Whishes

Dr. Amr M. Abdelghany

Mansoura University
Faculty of Science
Physics Department.
Subject: Physics(316)
Title: Advanced optics

Final term exam – First Term
Third level /physics
4th year bio-phys. &
3rd year phys.
Date: Jan. 2016
Allowed Time: Two hours.

Answer the following questions **Full Mark: 80**

[1] a-Describe, giving both theory and experimental details, how would you produce an interference of polarized light via a crystal plate inserted between two crossed polarizers? [20]Mark

b- Calculate the thickness required for a half wave plate having n_o= 1.764 and n_E= 1.756 using light of wavelength λ= 5461 Å. [5]Mark

[2] a-Deduce the electric field at a large distance from a thin glass plate if a source of light is placed at a large distance from its opposite side? [20] Mark

b- Write down the general formula for dispersion of light? derive Cauchy's relation for normal dispersion ? [10] Mark

[3] a- Derive Rayleigh equation for elastic light scattering by isolated small particle in vacuum illuminated by plane polarized light? [18]Mark

b- Explain an experimental demonstration to show the anomalous dispersion for sodium vapor. [7]Mark

Best wishes: *Prof. Dr. Kermal El-Farahaty*

Mansoura University Faculty of Science Physics Department	Physics, 4th Level	First Term, 2015-2016 January, 2016 Time: 2 hours.

Semiconductors (Ph. 411)

Full Mark: 80 Marks

Answer the following Questions:

1. a)	Study the dependence of the mobility on the effective mass fore both charge carriers.	10 Marks
b)	Starting with the space charge distribution, deduce the electric field at each region at p-i-n diode.	10 Marks
c)	A silicon crystal has donor density$1.6x10^{17}/cm^3$.The donor level lies at energy= 0.45eV,calculate the position of Fermi level and carrier concentration at room temperature, if the density of state at conduction band $=8.8x10^{14}\ T^{3/2}\ /m^3$.	10 Marks
2. a)	Discuss the dependence of the Depletion layer in p-n junction diode on both temperature and doping concentrations.	10 Marks
b)	Study the factors effect the displacing of Fermi level from the middle of the band gap in an extrinsic semiconductor	10 Marks
3. a)	Show how the diffusivity and mobility are related through the Einstein relations.	10 Marks
b)	Discuss the effect of high field on drift velocity.	10 Marks
c)	Define the following: i-Conduction Band, ii –Donor Level, iii-Effective Mass, iv-Fermi Level, v- Hot electrons, vi-Avalanche breakdown, vii-p-n junction, viii-Valence Band, viv-Zincblende& vv-Electron-Hole Pair .	10 Marks

With our best wishes,

Dr. Safaa Abdel-Maksoud & Prof. Dr.A.Oraby

Faculty of science

Mansoura university

Final exam of Human anatomy –1st term of academic year 2015-2016

Fourth year – Biophysics

The exam consists of 4 pages

First question(13 degrees)

Choose the correct word

1) The white blood cells proliferate wildly causing anemia

a) anemia b) hemophilia c) leukemia d) heart attack

2) The tooth

a) its crown covered with enamel

b) its root covered with deciduous set

c) one of its kinds is canine for cutting food

d) its pulp cavity is free of blood vessels and nerves

3) The large intestine

a) Its inner wall has villi

b) its main function is digestion of protein

c) contain many tubular glands

d) its pyloric valve prevent the passage of faecal material back into ileum

4) Convert peptones into single polypeptide

a) rennin b) pepsin c) trypsin d) saliva

5) A part of respiratory passage which communicate with middle ear

a) trachea b) larynx c) bronchus d) nasopharynx

6) The main types of cells which make up the epidermis

a) fibroblasts b) adipocytes c) macrophages d) keratinocytes

7) Its main function is to connect muscles with bones

a) tendons b) ligaments c) joints d) origin

8) Muscles that carry the actual movements is called

a)smooth muscle b) prime mover c) antagonist d) voluntary muscle

9) A layer responsible for keratinization process

a) granulosum b) lucidum c) basale d) spinosum

10) It is not involved in the factors controlling the naming of skeletal muscles

a) number of origins b) shape c) size d) number of receptors

11) Ball and socket joints

a) perform all 4 basic motion b) connect the radius with carpals

c) has free movement in one direction d) ex. Elbow joints

12) It is not involved in the component of blood

a) plasma b) erythrocytes c) leucocytes d) chondrocytes

13) converting protein to amino acid happen in

a) intestine b) stomach c) mouth d) both a and b

Second question (12 degrees)

Give one reason for each of the following

1) Sometimes during cold the hair stands erect.

2) The cardiac muscle resists the high blood pressure and beat as a unit

3) Esophagus able to dilate freely during swallowing food.

4) The lung can slide without friction with the thoracic wall.

Third question (10 degrees)

put √ in front of true statement and X in front of false then correct the false statement.

1) Constricted blood vessel conserves heat.

2) The gastric glands secrete the second digestive fluid.

3) Erythrocytes clot blood by sticking together.

4) Enzymes of intestinal juice convert disaccharide sugar to monosaccharide.

5) Human consumes energy even during sleeping.

6) The volume of thoracic cavity increased by depression of both diaphragm and ribs.

7) The second step of respiration is transferring of oxygen from alveoli to the blood capillaries.

8) Cowper's gland secretes a fluid that lubricates the urethra.

9) The secondary spermatocyte contains the diploid number of chromosomes.

10) Each oogonia produces one ovum, while each spermatogonia produces 4 spermatozoa.

Fourth question (15 degrees)

A) Write the scientific term for each of the following (5 degrees)

1) Released from the nerve terminals to stimulate muscle fibers contraction.

2) Provides protection for the thoracic viscera.

3) Inner projection for small intestine

4) Make the lower surface of the nail thicker

5) Keep the testis at a temperature slightly lower than the rest of the body

B) Write short notes about (10 degrees)

1) The fate of the corpus luteum If fertilization occur (5 degrees)

2) How the skin function as a heat regulator (5 degrees)

Fifth question (10 degrees)

Give only a labeled diagram to compare between the cardiac muscle and the voluntary muscle.

Best of luck

Dr/ Dalia Sabry

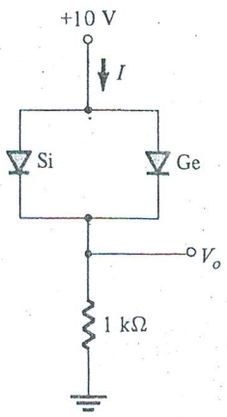
University of Mansoura Faculty of Science Physics Department Subject: Physics		First Term Fourth Level Biophysics Date: Jan..26 / 2016 Time allowed: 2 hours
Course (s): Phys 411 (Electronics Simulation for Biological Systems)		Full Mark: 80

Answer the Following Questions

1- a) Explain the function of using the Zener diode as a voltage regulator
b) Determine V_o and I for the circuit of Fig . (1) . (25 marks)

2- a) For the bipolar junction transistor (BJT) amplifier , show how the position of load line can be determined . Explain and draw the results of correct and incorrect operating points on alternating current and alternating voltage outputs.
b) Determine I_B , I_C and V_{CE} for the circuit of Fig. (2), where $\beta = 100$ for silicon transistor. (30 marks)

3- a) Draw a circuit for a diode clamper and explain how it operates .
b) Determine V_{GS}, I_D, V_{DS}, V_D, V_G, and V_S for the circuit of Fig. (3). (25 marks)



Fig(1)

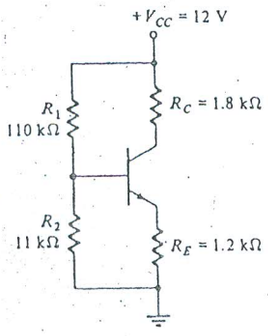


Fig (2)

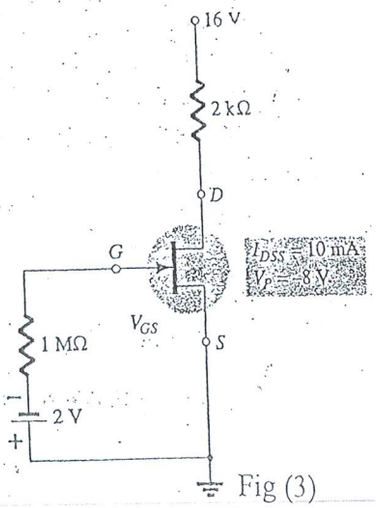


Fig (3)

Examiners:

Prof. Dr. Ahmed H. Oraby