المستوى الرابع - فيزياء موجية - فصل متقدم ف ٣١٦

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

Final term exam – First Term
Third level /physics
Date: Jan. 2014
Allowed Time: Two hours.
Full Mark: 80

Answer the following questions

[1] -Considering an isolated small particle in vacuum illuminated with monochromatic Plane polarized light, deduce Rayleigh's equation for elastic light scattering? Discuss why the sky is blue ?

[20] Mark

[2] a- Explain, giving both theory and experimental details, how you would produce elliptically and circular polarized light? [15]Mark

b- Describe the basic principles of holography (clarify your answer with suitable drawing) [15] Mark

[3] a- Using the dispersion equation , $n-1=\frac{Ne^2}{2\varepsilon_o m(\omega_o^2-\omega^2)}$, derive Caushy's equation for normal dispersion? [15] Mark

b- Describe the anomalous dispersion phenomenon using Sellmeier's mechanism (clarify your answer with suitable drawing) ? [15] Mark

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

ع فيزياء حيوى - فيزياء تجريبية حيوية ف ع ٢٠١٤

Mansoura University
Faculty of Science
Physics Department
Subject: Experimental Biophysics
Courses: Biophysics

First Term
Fourth year
29/12/2013
Time allowed: 2 hours
Full Mark: 80 Marks

Answer the following questions:

[1] Mass spectrograph is used for determining very accurate atomic masses, show how it can be used and sketch the main parts of its constructure. (20)

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[2] Why would one want to use a bumper array device over the other current methods of biomolecular molecules separation, and explain their theory. (20)

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[3] Discuss the basic terms of electrophoresis separation technique (amphoteric nature of proteins, Zwitteian, and isoelectric point). Give the factors that infleuence the migration of charged molecule. (20)

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[4] Sketch the basic components of Infra Red, Ultra Violet, and X-Ray spestrometers, and show how they can be functions? (20)

With my best wishes

Prof. Dr. F.Richa

المستوى الرابع - فيزياء حيوى - فوتوبيولوجيا وتطبيقاتها الحيوية فى ٤١٤

Mansoura University Faculty of Science, Physics Department	بسم الله الرحمن الرحيم **First Term Final Exam** **2013/2014** **For the 4th. Year Biophysics Students** **(Phys. 414)**	**Time Allowed : Two Hours** **Subject : Medical Ultrasonic** **Total Marks = 80 M**

Answer the following questions:

1 – Explain with drawings, principles of the immersion testing technique for solid sample contains a defect. Then show the advantages of this technique over other ultrasonic testing techniques.

2 – a) Drive an expression for Doppler shift as detected by a stationary receiver for moving source.

b) A 5 MHz transducer detects a peak Doppler shift of 12 kHz in an artery. With a 2.5 MHz transducer, what expected peak Doppler shift, the same artery would be produce?

3 – a) Explain the Piezoelectric Effect and then show how this effect could be used for the construction of ultrasonic transducers.

b) If blood is flowing directly toward a 8 MHz transducer at 2.5 m/s, calculate the Doppler frequency.

4 – Discuss the importance of using a coupling medium between the ultrasonic probes and the tested object.

With Best Wishes

Prof. Maher M. El-Tonsy

Jan. 2014

المستوى الرابع - فيزياء حيوية - فيزياء المواد الحيوية البديلة فص ٤١٣

Mansoura University
Faculty of Science
Physics Department
Course code: Bio-Phys 413

First semester 2013-2014
Date : 1-1-2014

4th Level Biophysics students
Full Mark: 80
Allowed time: ٢ hours
Course title: Physics of Biomaterials and Their Substitutions

Answer all the following questions: **Marks**

1- What is the Biomaterials and its requirements .List some of its applications. In short note, study one of these applications. **20**

2- Show that the atomic packing factor for the FCC crystal structure is 0.74 **10**

3-a . What is the difference between atomic structure, crystal structure and a crystal system? **5**

b What is the distinction between electronic and ionic conduction? **5**

4- In terms of electron energy band structure, discuss reasons for the difference in electrical conductivity between metals, semiconductors, and insulators. **10**

5- Write a short note about the meaning of Materials Science and its classifications **10**

6- What's meant by Polymers. Discuss the physical characteristics of the different molecular structure of Polymers **10**

7- Write short notes on the mechanical behavior (Stress – Strain behavior) in Polymers **10**

Best wishes:

Prof.Dr. Naer Bakr

٤ فيزياء حيوى - فيزياء العلاج الإشعاعى فع ٤١٢

Mansoura University
Faculty of Science
Physics Department
Course code: Bio-Phys 412

First term 2013-2014
Date: 5 -1-2014

4th Level Biophysics students
Full Mark: 80
Allowed time: 2 hours
Course title: Physics of Radiotherapy

Answer all the following questions: Marks

1- a- Discuss the basic components of linear accelerator (Lin-Ac) machine. **10**

b- Thermo luminance dosimetry (TLD) is one of the most common dosimetric techniques; Describe this dosimetric technique briefly showing its advantages and disadvantages. **10**

C- During the operation of the Intra-oral radiographic machine, Explain protection procedures to the patient. **10**

2- a- There are some vital steps taken during the pre-treatment process that ensure accurate and reproducible beam direction? List each of them with short notes for each step? **10**

b- What is meaning of radiotherapy and palliative treatment? Why we do radiotherapy? **10**

3- a- Define the following: **10**

- Dose
- Phantom
- In vivo dosimetry
- Dose response curve
- Absolute and relative dosimetry.

b- What do we mean by: Bragg peak-cyclotron–Tomotherapy. **10**

C- Write on Beam quality as Parameter of Isodose Curves? **10**

Best wishes:

Dr Hany Kamal

Mansoura University **Faculty of Science** **Physics Department** **Course Title: Semiconductor** **Date: 12/1/2014**		**Jan. 2014** **Exam Type: Final** **Four Level: (Biophysics)** **Time: 2 Hours** **Full Mark: 80 Mark**

Answer **the following questions:-**

Q1: [25 Mark]

a- What is a semiconductor?

b- Discuss the semiconductor applications

c- How do semiconductors work?

Q2:- [25 Mark]

a- How to made semiconductor?

b- Discuss the importance the importance of semiconductor?

c- Explain the types of semiconductor

Q3:- [30 Mark]

Write with details on:-

a) Photoconductivity

b) Oorganic semiconductor

c) Luminescence

With best wishes

Examiners

أ.د. أبوبكر البديوى د. أنور مجاهد

المستوى الرابع - فيزياء حيوية - شرح أدبي ع ٢٠١٤

Mansoura University
Faculty of Science
Zoology Department

Final exam, January, 2014.

Education year: 4th level of bio-physics | **Subject: Zoology**
Date: 15/ 1/ 2014 | **Course: Human anatomy**
Code: Z 422 | **Full Mark: 60**

Q1- Choose the correct answer of the following: (20) marks

1- Areolar and reticular layers are two types of cells belonged the ..... tissues.
a- Epithelial b- connective c- muscular

2- Crypts of Lieberkuhn (glands) is classified as ..... type.
a- Branched tubular b- coiled tubular c- tubular

3- One of the following tissues is not represent the muscle, it is ... . tissue.
a- cardiac b- adipose c-striated

4- The skin has two major layers which are made of different tissues, they are .....
a- cartilage & bon b- striated & unstriated muscle c- epidermis & dermis

5- The layer of skin that responsible for keeping harmful substances out is .....
a- Dermis b- epidermis c- subcutaneous

6- Erector muscle can contract to pull upright ....
a- Radius & ulna b- tibia & fibula c- hair fiber

7- Femur is a type of bone that classified as ..... bone.
a- long b- short c- flat

8- Ellipsoid is a type of joint that permits the movement in ..... direction.
a- one b- two c- three

9- Acetylcholine being released from terminal nerve plays a role in .....
a- Mechanical of breath b- muscle contraction c- not a or b

10- Tendons are flexible bands that connect .....
a- Joint to bone b- muscle to bone c- bone to bone

11- One of the following muscles plays a role in regulation of the body temperature, it is ....
a- cardiac muscle b- erector muscle c- smooth muscle

12- Skeletal system acts as a protective structure for vital organs as..... protect lungs.
a- rib cage b- skull c- femur

13- Intra cellular fluid is the fluid exists ..... all the body cells.
a- outside b- inside c- both of them

14- Extra cellular fluid is divided into .....
a- Blood plasma only b- interstitial fluid only c- both

15- Interstitial fluid is similar to plasma content except that plasma has its own former ....
a- Proteins b- corpuscles c- haemoglubin

16- Epiglottis is a part of the respiratory system that close the ..... during passage of food.
a- nasal cavity b- larynx c- lung

17- Arteries are blood vessel, that they move ..... from the heart.
a- away b- toward c- not A or B

18- Myocardium is composed of cardiac muscle and responsibility for ..... contracting.
a- Lung b- heart c- leg

19- Bicuspid valve ensure one-way blood flow in between .....
a- Left atrium & ventricle b- right atrium & ventricle c- left ventricle & aorta

20- Each spermatozoon consists of ..... main parts.
a- one b- two c- three

Q2- Compare between *four only* of the following couples: **(20) marks**

a- Morphological and numerical abnormalities.
b- The function of sweet glands and sebaceous glands.
c- Gliding joint & ball and socket joint.
d- Red blood corpuscles and white blood corpuscles.
e- Tendons and joints.
f- Albumin and fibrinogens of plasma proteins.

Q3- Write short note on *four only* of the following: **(20) marks**

a- Muscle contraction.
b- Function of skeletal system.
c- Structure and function of liver.
d- The epidermis layer of skin.
e- Transport of gases in blood.
f- Prostate gland.

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With my best wishes ..... Dr. Manal Ramadan

المستوى الرابع - فيزياء حيوى - معامل الكترونية للأنظمة الحيوية فيزا ٤١١

Mansoura University
Faculty of Science
Department of Physics

First Term Exam 2013-2014
(Electronic Simulation for Biological Systems)
Course code: BioPhys 411

4th level Biophysics Students
Full Mark: 80
Allowed Time: 2 hours
Date: 22 / 1 / 2014

Answer the following Questions:

Question 1:

a) Explain the function of using the zener diode as a voltage regulator.

(5 marks)

b) Describe the construction and operation of liquid crystal displays.

(10 marks)

c) Compare between the LCD and LED devices. (5 marks)

Question 2:

a) Describe the rules must be followed in biasing a transistor. (5 marks)

b) Draw the V-I characteristic curve for JFET, and explain why the curve has this shape. (5 marks)

c) Draw the universal biasing circuit for a bipolar transistor amplifier.

Explain the significance of each element in the circuit. (10 marks)

Question 3:

a) Explain the conduction mechanism of the pn junction in the forward bias, reverse bias, and breakdown voltage. (10 marks)

b) Draw a circuit for diode clamper and explain how it operates.

(10 marks)

Question 4:

a) **Describe the main difference between the unipolar and bipolar devices.**

(8 marks)

b) **Determine I_B, I_C and V_{CE} for the circuit of Fig. (1). Calculate the thermal stability of the circuit then comment on the result. (12 marks)**

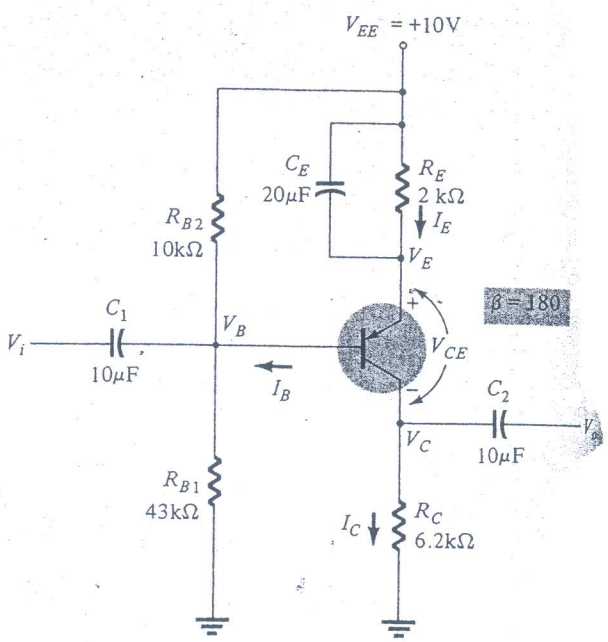

Fig. (1)

Examiners:

1) **Prof. Dr. Ahmed H. Oraby**
2) **Prof. Dr. Fikry Richa**