المستوى الثانى - فيزياء حيوية - دراسة خلوية (ج ١٢٢)

Mansoura University
Faculty of Science
Zoology Department
El- Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم علم الحيوان
المنصورة - مصر

First Semester, Jan. 2012

Academic year: 2nd Level
Time: 3hr
Date: 20/01/2012

Program: Biophysics
Subject: Cytogenetics
Course :Z221
Full Mark: 60

Answer All The Following Questions:

1. Write short notes on the following: *10 Mark*

A: Disorders Structure of Chromosomes.

B: Endoplasmic Reticulum.

2. What do you know about: *20 Mark*

A: The Nucleus.

B: Mitochondria.

C: Disorders of Chromosomal Replication.

D: Tight Junctions.

3. Discuss: *10 Mark*

A: Osmosis.

B: Exocytosis.

4. Compare between: *20 Mark*

A: Prokaryotes and Eukaryotes.

B: Diffusion and Active transport.

With My Best Whishes.....

.....Dr. Sayed Kamel

Mansoura University Faculty of Science Physics Department		**First Term Exam.** Date: **1-1-2012** Time allowed : **2 hours** Full Mark: **80 Mark**
Subject: **Physics**		Course: **221 ف Physical Optics**

Answer the Following Questions

[1]a- Demonstrate an explanatory diagram of the optical arrangement of Young's experiment on interference. Drive the theory of interference for this experiment. **[10 Marks]**

b- Explain how you can determine the thickness of a thin sheet of transparent material using Fresnel's biprism. **[8 Marks]**

c- Good fringes were observed with Michelson interferometer with monochromatic light, when the movable mirror is shifted 0.015 mm, a shift of 50 fringes is observed. What is the wavelength of light used. **[8 Marks]**

[2] a- Discus Fraunhofer diffraction using a rectangular slit. Drive an expression for the intensity distribution of the observed diffraction pattern. **[15 Marks]**

b- A parallel beam of monochromatic light is allowed to be incident normally on a plane spectra grating having 6000 lines/cm and a second order spectral line is observed to be deviated through 30^{o} Calculated the wavelength of the spectral line. **[12 Marks]**

[3]a- Explain with the necessary theory of interference in thin films due to reflected light. **[9 Marks]**

b- How can you obtain polarized light by refraction? **[9 Marks]**

c- In a Jamin's refractometer, two evacuated tubes each of length 20 cm are placed in the two beams. A gas at a known temperature and pressure is slowly and 100 fringes cross the centre of the field of view. Calculate the refractive index of the gas. (where the used source have wavelength $\lambda = 5460\ A^{o}$). **[9 Marks]**

Good Luck

Examiners: Prof. Dr. Taha Sakkar, Prof. Dr. Eman seisa , Prof. Dr. Mohamed Kabeel

المستوى الثانى - فيزياء حيوية - فيزياء طبية (ف ٢٢٠)

Mansoura University
Faculty of science
Physics Department
El-Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم الفيزياء
المنصورة- مصر

First Term Examination

Second Year: Biophysics | *Jun. 2012* | Date: 18/ 1 / 2012

Time allowed: 2 hrs | *Modern Physics (Phys.220)* | Full Mark: 80

Answer the following questions:

1 *(a)* The period of a pendulum is 2.0 s in a stationary inertial frame of reference. What is its period when measured by an observer moving at a speed of 0.8 *c* with respect to the inertial frame of reference? {6}marks

(b) A space probe has an 18.0-m length when measured at rest. What length does an observer at rest measure when the probe is going by at a speed of 0.7*c* . {6}marks

(c) A proton moves with a speed of 0.6 *c* in an accelerator. Find *(i)* its total energy *(ii)* its kinetic energy *(iii)* its relativistic momentum. {15}marks

2 *(a)* An FM radio transmitter has a power output of 150 kW and operates at a frequency of 99.7 MHz . How many photons per second does the transmitter emit? {6}marks

(b) Bragg reflection results in a first-order maximum at 14.2°. In this case, at what angle would the second-order maximum occur? {6}marks

(c) When light of wavelength 350 nm falls on a potassium surface, electrons are emitted that have a maximum kinetic energy of 1.31 eV. Find *(i)* the work function of potassium, *(ii)* the cutoff wavelength, and *(iii)* the frequency corresponding to the cutoff wavelength {15}marks

3 *(a)* What is the minimum x-ray wavelength produced when electrons are accelerated through a potential of 50.000 V. {6}marks

(b) If the wavelength of an electron is equal to 5.00×10^{-7} m, how fast is it moving? and if the electron has a speed of 1.00×10^{7} m/s, what is its wavelength. {6}marks

(c) After a 0.800 nm x-ray photon scatters from a free electron, the electron recoils with a speed equal to 1.40×10^{6} m/s. *(i)* What was the Compton shift in the photon's wavelength, *(ii)* Through what angle was the photon scattered?. {14}marks

$(h = 6.63 \times 10^{-34}\ J{\cdot}s,\ c = 3.00 \times 10^{8}\ m/s,\ 1\ nm = 10^{-9}\ m,\ 1\ eV = 1.6 \times 10^{-19}\ J$
$m_{electron} = 9.11 \times 10^{-31}\ kg,\ m_{proton} = 1.67 \times 10^{-27}\ kg)$

Good Luck *Prof. Dr. Mohamed Kabeel*

Mansoura University Faculty of Science Physics Department Course Title: Elasticity Date: 26-12-2011		Jan. 2012 Exam Type: Final Second Level : (Physics) Time: 2 Hours Full Mark: 80 Mark

Answer the following questions:

1- a- Compared between elastic behavior and viscoelastic behavior? [10 Mark]

b- Write briefly on the following: - [15 Mark]

1) Stress- Fatige- Elasticity- Strain

2- a- What is the meant by creep? [3 Mark]

Mention the types of creep? [7 Mark]

b- Write on the following: - [15 Mark]

Dynamic modulus- Effects of temperature on

Viscoelastic behaviour- Deformation

3- a- Explain the factors affecting on the fatigue life. [10 Mark]

b- Write on the following:-

1) Elastic moduli- Fracture – Stages of creep [15 Mark]

2) Discuss Stress- Strain curve [5 Mark]

With best wishes

Examiners

أ.د. محمود أحمد أبوزيد أ.د. أبوبكر البديوى د.عادل داود

المستوى الثانى - فيزياء - ف ٢١١ اهتزازات وموجات
فيزياء عامة

Mansoura University | first Semester

Faculty of Science

Physics Department | Date : jan 2012

Subject : Physics | Time Allowed: 2 hours

Course(s): code 211 (Waves & vibrations) | Full Mark: 80 Mark

Answer The following questions

[1]	a- Solve the differential equation of damping oscillating waves. b- Find the apparent frequency at a detector for a source of waves moves with velocity U away from the detector.	[15] Mark [12] Mark
[2]	a- Find the energy of 2-dimensioal oscillator. b- Define the transmittance coefficient and prove that it depends on the density per unit length of both parts of the string.	[10]Mark [16]Mark
[3]	A-- A spring is hanged vertically and fixed at the upper end. A mass of 7 Kg is fixed at the other end. The mass is pulled down a distance of 5 cm and left, find i) the maximum amplitude ii) the periodic time iii) the total energy if the spring constant = 700 N/m b-Find the condition to obtain a straight line with negative slope as a resultant of the superposition of two perpendicular waves.	[12]Mark [15] Mark
Examiners Prof. Dr. Mahrous Shaker		

المستوى الثانى - فيزياء - ف ٢١١ اهتزازات وموجات
فيزياء عامة

Mansoura University | first Semester

Faculty of Science

Physics Department | Date : jan 2012

Subject : Physics | Time Allowed: 2 hours

Course(s): code 211 (Waves & vibrations) | Full Mark: 80 Mark

Answer The following questions

[1]	a- Solve the differential equation of damping oscillating waves. b- Find the apparent frequency at a detector for a source of waves moves with velocity U away from the detector.	[15] Mark [12] Mark
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Examiners Prof. Dr. Mahrous Shaker		

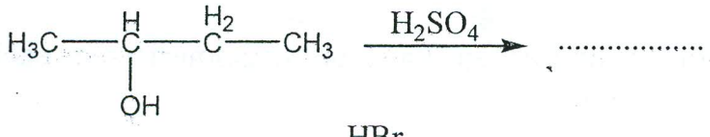
Mansoura University
Faculty of Science
Chemistry Department
Subject: Organic Chemistry

First Term
2nd year: Biology & Biophysics Student
Date: Jan 2012
Time Allowed: 2 h
Full Marks: 60 Marks
Code: 235

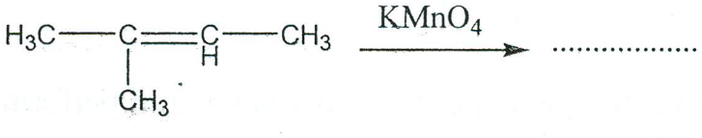
Answer the following questions:

Q1- Complete the following equations: [20 marks]

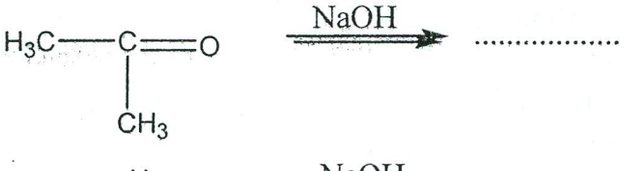
i- $2\ CH_3\text{-}Cl \xrightarrow{Na}$ .....

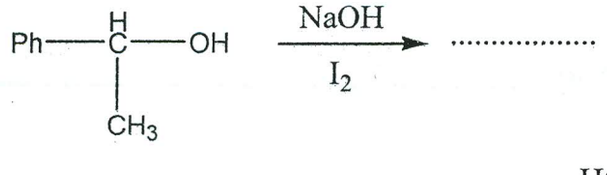
ii-  .....

iii-  .....

iv-  .....

v- $CH_3\text{-}CHO + NH_2\text{-}OH \longrightarrow$ .....

vi-  .....

vii-  .....

viii- $CH_3\text{-}Br + Mg \longrightarrow$ ..... $\xrightarrow{HCHO}$ .....

ix- $HC\equiv CH \xrightarrow[2\text{- }CH_3\text{-}Cl]{1\text{- Na}}$ ..... $\xrightarrow[H^+]{HOH}$ .....

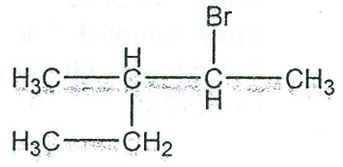
x- $Ph\text{-}CHO + HCN \longrightarrow$ .....

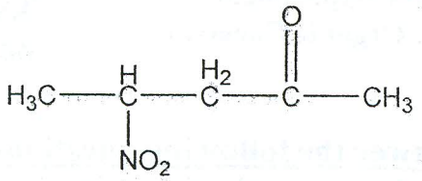
Q2- Illustrate the following: [20 marks]

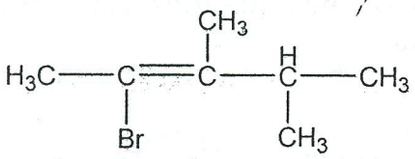
a) Draw the chemical structure of the following compounds:
i- 3-methyl-1-butanol.
ii- neohexylchloride.
iii- 2-buten-1-ol.

P.T.O ⟶

b) Write the IUPAC name of the following:

i- 

ii- 

iii- 

c) Draw all isomers and assign the type of isomerism in each of the following compounds:

i- 1,2-dichloroethylene.
ii- $C_4H_{10}O$.
iii- 2,3-dibromo-1-butanol.

Q3- Using the chemical equations, show how you could perform the following conversions. [20 marks]

i- Ethylene to acetone.
ii- Methyl chloride to ethanol.
iii- 1-propanol to 2-propanol.
iv- Ethanol to crotonaldehyde.
v- Acetylene to acetone.

With our best Wishes

Examiners:

Prof. A.A. Fadda, Dr. M. Monier, Dr. D.M. Ayad and Dr. M. Elsayed

Faculty of Science
Physics Department

First semester 2011-2012
Date: 13/1/2012

Full Mark: 80
Allowed time: 2 hours
Course title: Electricity in Biosystems
Course Code :Bio Phys. 210

Answer **The Following** Questions

1- a) Derive the condition required for stable biasing of the transistor circuit shown in figure (1-a).

b) The Zener diode used in the regulator circuit of figure (1- b) has the following data : I_{zk} =1 mA , I_{zM} = 540 mA , r_z'=3 ohms and (V_z=15 volts at I_{zT}=160 mA) .Determine the output voltage V_{out} at I_{zk} and at I_{zM} then, determine the minimum value of R_L that can be used .

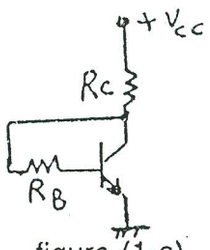


figure (1-a)

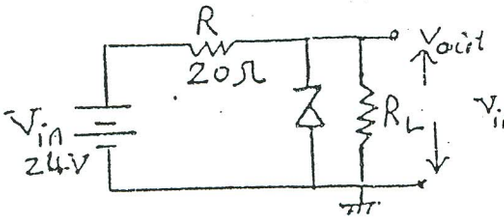


figure (1-b)

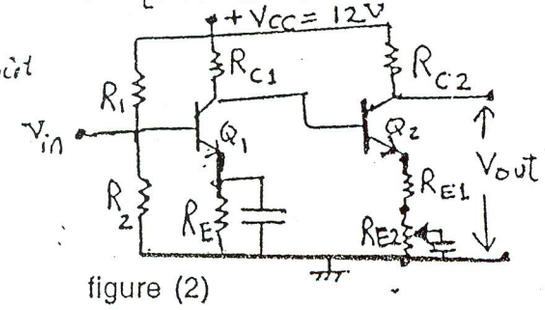


figure (2)

2- a) Derive an expression for the voltage gain of the non - inverting operational amplifier.

b) Determine the overall minimum and maximum gain of the two stage amplifier circuit shown in figure (2) , where R_1 = 10 K, R_2 = 2.2 K , R_{C1} = 3 K , R_E = 650 ohm & R_{C2} =1 K , R_{E1}= 100 , R_{E2} = 0 To 900 ohm & $\beta_{dc} = \beta = 150$.

3 - a) Derive an expression for the voltage gain of the inverting operational amplifier.

b) Determine the values of R in figure (3) which make the voltage gain of the inverting - operational amplifier varries from −10 to − 60 .

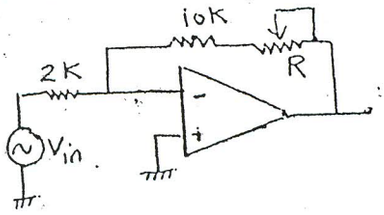


figure (3)

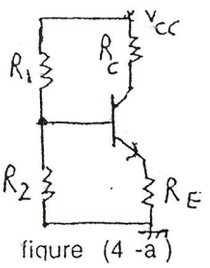
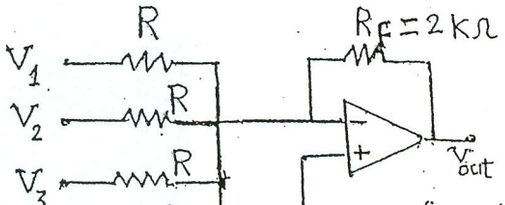


figure (4 -a)

4-a) Derive the condition required for stable operating point of the transistor circuit shown in figure (4 -a) .

b) Derive an expression for the output voltage of the operational amplifier circuit In figure (4-b) ,then determine the value of R which make the output voltage equal the average value of the input voltages



المستوى الثانى - مقدمة فى الفيزياء الحيوية (فع ٢١١)

Mansoura University
Faculty of Science
Physics Department
Course code: Bio-Phys 211
Course title: General Biophysics

First semester 2011-2012
Date: 22-1-2012

2nd Level students
برامج (فيزياء حيوية- ميكروبيولوجى- كيمياء حيوان-كيمياء -كيمياء حيوية -كيمياء نبات)
Full Mark: 80
Allowed time: 2 hours

Answer all the following questions:

			Marks
1-	a-	When an animal takes a step, the leg swing naturally from the hip bone, much like a pendulum in a gravitational field. Derive an expression for the time taken of a leg to swing once a time?	7
	b-	Define the following: Depolarization – Activity of a radioactive source - Hematocrit- Heat Flux	6
	c-	If you have 4 gram of pure ^{40}K emits $2x10^5$ β- particles/sec. Calculate the decay constant λ and half life time $t_{1/2}$? (Avogadro's number $=6.02x10^{23}$).	7
2-	a-	If we have 1 mole of glucose, How much energy will be produced during metabolism?	7
	b-	Calculate the photon flux at 1 m and 2 m from a Cs ^{137} gamma source of activity 800 MBq?	6
	c-	Describe with drawing the continuous and characteristic X-rays.	7
3-	a-	Derive an expression to calculate half life time of a radioactive source.	7
	b-	Write on resonant frequency and various sensations observed by humans subjected to variations of different frequencies.	6
	c-	Explain the physical concept to measure signals from the heart using electrocardiogram. Draw and explain an ECG chart?	7
4-	a-	Compare between α - particles, β- particles and γ-rays?	7
	b-	Discuss the basic principle of magnetic resonance imaging (MRI).	6
	c-	i. Calculate the capacitance per unit area of an unmyelinated axon of membrane thickness is $b = 6 \times 10^{-9}$ m knowing that the material in the axon membrane has dielectric constant K= 7 and $\varepsilon_o = 8.85\times10^{-12}$ s/ohm-m.	7
		ii. Calculate the number of elementary charges per m^2 if the charge is $1.6x10^{-19}$C and the potential difference =70mV.	

Best wishes:

Examiners: * د. هانى كمال د.محمد منصور د. نبيل قناوى