Mansoura University
Faculty of Science
Physics Department

Course code: Phys 210

Summer semester 2012-2013

2nd level Physics Students
Full Mark: 80
Allowed time: 2 hours
Course title: Thermodynamics

Answer all the following questions: Marks

1-	a-	Find the entropy of a perfect gas as a function of (T,V) , (T,P) and (P,V).	25
	b-	Calculate the change in entropy if the gas is heated from 300 to 600 °K while pressure drops from 400 to 300 N/m^2 (C_p=1.04 KJ/Kgm °K , R=8.3 K Jolue/Kgm.°K).	
2-	a-	One gram mole of a gas C_v =20.8 J/gm mole °K at temperature 127 °C and pressure 1 atmosphere. The gas is heated at constant volume until its pressure doubled, then the gas expands adiabatically until its temperature returns to 127 °C and finally the gas compressed isothermally until return to its initial volume. 1- Draw the cycle on (P-V) and on (T-S) diagram 2- Calculate i. The work done during adiabatic change ii. The change in enthalpy and entropy during the isothermal change iii. The efficiency of the cycle (R=8.3 J/gm mole °K).	25
3-	a-	Show that the slope of an isenthalpic curve on a T-P diagram at any point (the Joule –Kelvin coefficient is given by $\mu_j = \frac{V}{C_P}(\beta T - 1)$	30
	b-	Derive an expression gives μ_J for a gas obeying the Vander Waals equation of state and find the value of μ_J for a perfect gas.	

Best wishes:

Dr. Anwar Megahed

المادة : معادلات تفاضلية (204) المستوى : الثاني (فيزياء + فيزياء حيوى) أستاذ المادة ا.د.على شمندى	كلية العلوم – قسم الرياضيات	دور صيف : ٢٠١٣ الزمن : ساعتان التاريخ : ١٨/٨/٢٠١٢

أجب عن الاسئله التاليه :

السؤال الاول: اوجد حل المعادلات التفاضلية التالية

(i) $\frac{dy}{dx}\left[\sin^2\left(\frac{x}{y}\right)+\frac{x}{y}\right]=1$ (8marks)

(ii) $(D^2-16)\,y=\sin^2 x+7e^{3x}$. (12marks)

السؤال الثانى :

a) أوجد مجموعه المسارات المتعامدة مع المجموعه $x^2+(y-c)^2=c^2$ (10marks)

b) اوجد حل المعادله التفاضلية $(y'+1).\mathrm{Ln}\left(\frac{y+x}{x+3}\right)=\frac{y+x}{x+3}$. (10marks)

السؤال الثالث:

a) استخدم التحويلات و التحويلات العكسية للابلاس فى حل المعادله التفاضلية :

$$ty''(t)+y'(t)=4t^2\ ,\ y(0)=1\ ,\ y'(0)=0$$ (10mark)

b) اوجد حل المعادله التفاضلية :

$$\frac{dy}{dx}(x^2y^3+xy)=1$$ (10mark)

السؤال الرابع :

اوجد حل المعادلات التفاضلية التاليه :

(a) $\frac{d^2y}{dx^2}-3\frac{dy}{dx}+2=\frac{1}{xe^x}$ باستخدام طريقه تغيير البارامتر (10mark)

(b) $(\tan^{-1}y)^6\,(x^3-6x^2+11x-6)\,dy+(1+y^2)\,dx=0$ (10mark)

فح ١١ فيزياء حيوية - (فيزياء، فيزياء حيوي، مجموعة البيولوجي)

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

September 2013
Date:18-8-2013

2nd Level students
Biophysics-Physics-Microbiology-Chemistry-Biochemistry-Chemistry Botany - Chemistry Zoology and Environmental Science
Full Mark: 80
Allowed time: 2 hours

Answer all the following questions:

1- A- Write true (√) or False (χ) **[each item = 1.5 Mark]**

i. The ear canal behaves like a pipe open from one end and the other end is closed by tympanic membrane.
ii. The frequency range detected by the human ear is between 20 Hz-20000 Hz.
iii. Hypermetropia caused by irregularity shaped cornea results in light focusing in front of retina.
iv. There are three types of color sensitive rods in retina.
v. The human eye is organ design to receive visible light having wavelengths between 380 and 760 μm.
vi. The afferent neurons are those axons travel from sensing areas to the spinal cord
vii. Non ionizing radiations are known to cause DNA damage, cancer, mutation and birth defects.
viii. The electric potential of the brain can be measured by electro-encephalogram ECG.
ix. There are negative charges on the outside of the cell membrane of neurons than the inside produces a resting potential of -90 mV.
x. The conduction speed of myleinated axons is given by $u = 1.8\sqrt{a}$ (m/sec) where a is the radius of axon (μm).

B- Calculate the capacitance per unit length and area of an unmyleinated axon, if the material in the axon membrane has dielectric constant K=7 and ε_0=8.85x10^{-12} S/ohm-m and the radius a= 3.5x10^{-6} m and thickness of membrane is b=5x10^{-9} m. **[5 Marks]**

C- What is the total flow resistance of a two parallel arteries in a calf have radius 0.4 mm and length 120 mm? If the volume flow rate of blood through these arteries is 1.4x10^{-6} m^3/sec, what is the pressure drop across the arties knowing that η_{blood}=3.5x10^{-3} poise.

[5 Marks]

2- A- Complete the following sentences: (each item = 2 Mark)

- In ......(1).......effect, electron is ejected from the atom and is accompanied by scattered ...(2).........

الإمتحان مكتوب على وجهي الورقة

- The P-Wave in ECG indicates .....(3).....of the right and left .....(4).....
- The alpha waves of EEG have frequency range .....(5).....Hz in .....(6).....state.

B- Find an expression given for the decay constant of a radionuclide and its relation with the half life time? **[8 Marks]**

C- If a person has an unaided near point of 0.4 m, what would the power of a lens make him able to see an object at 25 cm? **[5 Marks]**

3- A- Choose the correct answer : **[each item = 1 Mark]**

i. The retina of the eye contains two types of photoreceptors cones and ..... (Spheres- triangles- rods-rectangles).

ii. 1 gray equal (1 rad- 10 rad-100 rad-1000 rad).

iii. The flow of ions causes an electric current in the ion chamber with intensity proportional to the .....of ions (volume- number-density –shape).

iv. About ..... of cones are green sensitive. (32%-42%-52%-62%).

v. 1 rem equal (0.1 Sv-0.01 Sv-0.001 Sv-0.0001 Sv).

vi. The beta particles are a fast moving .....(protons-neutrons-electrons-photons).

vii. ..... provide the eye's color sensitivity (Rods –Cones- Corneas –Irises).

viii. The percent of hydrogen atoms in human body is (53%-63%-73%-83%).

B- Define the following: **[each item = 2 Marks]**

a. Radiation flux
b. Graded potential
c. Depolarization
d. Decibel
e. Magnetic resonance imaging

C- Calculate the lowest frequency in which sound resonates in ear, knowing that the velocity of sound is C=350 m/sec and the ear canal length is L=2.5 cm (n=1 when $L=\lambda/4$). **[6 Marks]**

D- If you have 1gm of ^{226}Ra that emits $3.7x10^{10}$ photon/sec. What is the decay constant and half life time knowing that Avogadro's number=$6.02x10^{23}$. **[6 Marks]**

Best wishes:

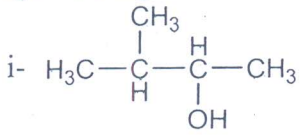
Dr Hany Kamal

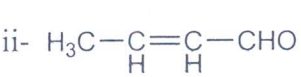
Mansoura University
Faculty of Science
Chemistry Department
Subject: Organic Chemistry

First Term
2nd year: Biology & Biophysics Student
Date: Sep. 2013
Time Allowed: 2 h
Full Marks: 60 Marks

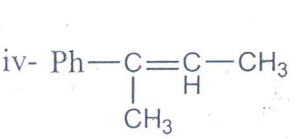
Answer the following questions:

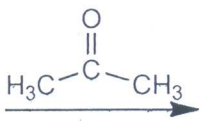
Q1- Complete the following equations: [20 marks]

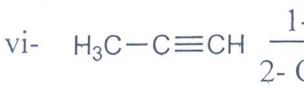
i-  conc. H_2SO_4 ⟶ .....

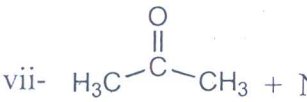
ii-  $NaBH_4$ ⟶ .....

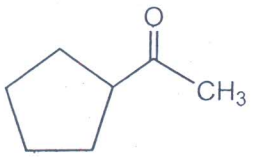
iii- Ph-CHO $\xrightarrow{NaOH}$ .....

iv-  $KMnO_4$ ⟶ .....

v- CH_3-Br + Mg ⟶ .....  .....

vi-  1-Na, 2- CH_3-Cl ⟶ ..... $\xrightarrow[H^{\oplus}]{HOH}$ .....

vii-  + NH_2-NH_2 ⟶ .....

viii-  I_2/NaOH ⟶ .....

ix- Ph-CHO + HCN ⟶ ..... $\xrightarrow[H^{\oplus}]{HOH}$ .....

x- CH_3-CH=CH_2 + Cl_2/H_2O ⟶ .....

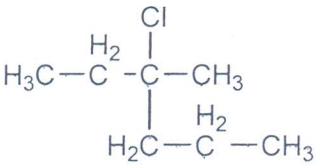
Q2: Illustrate the following: [20 marks]

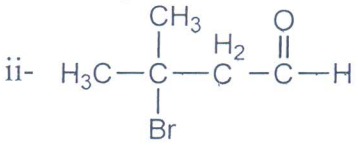
a) Draw the chemical structure of the following compounds:

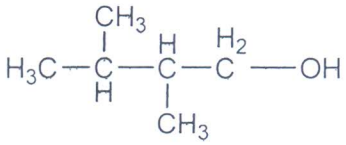
i- 3-bromo-1-butanol
ii- Isoheptyl alcohol
iii- 2-buten-1-ol

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- 2-Butene
ii- $C_5H_{10}O_2$
iii- 1,2,3-Butantriol.

Q3- By chemical equations illustrate how to make the following conversions. [20 marks]

i- Ethylene to acetone
ii- Methyl bromide to acetic acid
iii- Ethanol to 2-propanol
iv- Acetone to 2-butanol
v- 2-Bromopropane to tert-butyl alcohol

With our best Wishes

Examiners:

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

> فيزياء. ف ١٠ المرونة

Mansoura University Faculty of Science Physics Department Course Title: Elasticity Date: 27/8/2013		Exam Type: Summer Second Level : (Physics) Time: 2 Hours Full Mark: 80 Mark

Answer the following questions:

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

b- What is the meant by fatigue. Mention the type of fatigue [6 Mark]

c- Write on the following: - Stress- Elasticity- Strain [9 Mark]

2- a- What is the meant by creep. Mention the types of creep [10 Mark]

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

Dynamic modulus- Deformation- Toughness- Resilience

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

b- Write on the following:-

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

c- Discuss Stress- Strain curve [5 Mark]

With best wishes

Examiner

أ.د. أبوبكر البديوى

University of Mansoura Faculty of Science Physics Department Subject: Physics		Summer semester exam Sophomore Students Date : August 2013 Time allowed : 2 hours
Course (s): Phys 220	Modern Physics	Full Mark:: 80

Answer The Following Questions

1- a) What potential difference is required to accelerate an electron from rest to velocity o.6 *c*?

Rest mass of the electron = 511 keV (10 marks)

b) The kinetic energy and the momentum of a particle deduced from measurements on its track in nuclear photographic emulsions are 250 MeV and 368MeV/*c* , respectively. Determine the mass of the particle in terms of electron mass and identify it. (10 marks)

2- An electron has kinetic energy equal to its rest energy. Show that the energy of a photon which has the same momentum as this electron is given by $E_\gamma = \sqrt{3}E_0$, where $E_0 = m_e c^2$ (15 marks)

3-a) Write about and discuss the spectrum of the black body radiation and show how the ultra-violet catastrophe can be explained (10 marks)

b) State and discuss the deBroglie hypothesis (5 marks)

c) The position of a point in the four-dimensional space is expressed by a space-time four-vector of length S. Prove that S is invariant quantity. (10 marks)

4-a) Find a relation between the proper length and improper length (10 marks)

b) Write and explain the ultraviolet catastrophe in blackbody spectra (10 marks)

Prof. Dr.: M.A Abouzeid

Mansoura University **Faculty of Science** **Physics Department** **Subject: Physics**		**Summer Term** **Credit Hour Students: Physics** **Date : 22 August 2013** **Time allowed : 2 hours**
Course: Physics 212, Meteorology & Astronomy		**Full Mark : 80 Mark**

Answer the 1st question, then any other two questions

[1] a- Derive the orbital potential energy equation for the orbit of a body moves under the effect of a central force , when $r \neq r(\theta)$ [10] Marks

b- A body moves under the effect of central force in an orbit of radius is given by $r = 2a \cos \theta$, determine:

i- The potential energy V(r), [10] Marks

ii- The force F(r). [5] Marks

c- Calculate the mass of Sun using the facts that the distance between earth and the Sun is 150×10^6 Km and earth revolution time is 365 days. [5] Marks

[$G = 6.67 \times 10^{-11}$ N m^2 Kgm^{-2}]

[2] a- State Kepler's 1st law. [3] Marks

b- Define the Eccentricity. [7] Marks

c- Using the definition of the Eccentricity derive Kepler's 1st law. [7] Marks

d- Define each of the following: [8] Marks

i- Dynamic meteorology. **ii-** Synoptic meteorology.

iii- Agricultural meteorology. **iv-** Climatology.

[3] a- For El-Mansoura of latitude 31°N, on 22 of Mars, Calculate: [12] Marks

i-The declination angle. **ii-**The zenith angle, at 10:00 LAT.

iii-The time of sunrise **iv-**The day length.

b-The density of the atmosphere depends on the temperature and on the altitude. Discuss this phrase with deriving the corresponding equations. [13] Marks

[4] a- Mercury has no atmosphere. Discuss this phrase. [9] Marks

b- The weather is affected by atmospheric parameters. Discuss this phrase giving the names of at least 5 instruments are used for measuring these parameters. [8] Marks

c- Describe the airing method for determination of relative humidity. [8] Marks

Good Luck

Examiners: 1- Prof. Dr. Magdy Tadros Yacoub* **2-** Prof. Dr. Emad Khedr