


فيزياء محبوس

	TANTA UNIVERSITY- Faculty of Science -Department of physics			
	EXAMINATION FOR 2 ND LEVEL STUDENTS OF BIOPHYSICS			
	COURSE TITLE:	Electromagnetism II		COURSE CODE: PH2284
DATE:	13 JUNE 2015	TERM: SECOND	TOTAL ASSESSMENT MARKS:100	TIME ALLOWED: 2 HOURS

Answer the following questions:

First Question:

- 1- Define the semiconductor materials, distinguish between intrinsic and extrinsic semiconducting materials, and mention the effect of temperature and impurities on them. [10Marks]
- 2- Let the current density be $J = 2\rho \cos^2 \varphi \mathbf{a}_\rho - \rho \sin 2\varphi \mathbf{a}_\varphi$ A/m² within the region $2.1 < \rho < 2.5$, $0 < \varphi < 0.1 \text{ rad}$, $6 < z < 6.1$. Find the total current I crossing the surface when :
(a) $\rho = 2.2$, $0 < \varphi < 0.1 \text{ rad}$, $6 < z < 6.1$ in the \mathbf{a}_ρ direction;
(b) $\varphi = 0.05$, $2.2 < \rho < 2.5$, $6 < z < 6.1$, in the \mathbf{a}_φ direction.
(c) Evaluate $\nabla \cdot J$ at P($\rho=2.4$, $\varphi = 0.08 \text{ rad}$, $z = 6.05$). [15Marks]

Second Question:

- 1- (a) Solve Laplace's equation for the potential field in the homogeneous region between two concentric conducting spheres with radii a and b, $b > a$, if $V=0$ at $r=b$, and $V=V_0$ at $r=a$.
(b) Find the capacitance between them. [15Marks]
- 2- Conducting cylinders at $\rho = 2 \text{ cm}$ and $\rho = 8 \text{ cm}$ in free space are held at potentials of 60 mV and -30 mV, respectively, (a) Find $E_\rho(\rho)$, (b) Find the surface on which $V=30 \text{ mV}$. [10Marks]

Third Question:

- 1- Write and explain the integral form of the four Maxwell equations under static conditions. [10Marks]
- 2- A current filament carrying 15A in the \mathbf{a}_z direction lies along the entire z axis. Find the value and direction of the produced magnetic field intensity H in Cartesian coordinates at P ($\sqrt{20}, 0, 0$). [10Marks]

Fourth Question:

A portion of a sphere is specified by $r=4$, $0 \leq \theta \leq 0.1\pi$, $0 \leq \varphi \leq 0.3\pi$, and the closed path forming its perimeter is composed of three circular arcs.

For the given field: $H = 6r \sin \varphi \mathbf{a}_r + 18r \sin \theta \cos \varphi \mathbf{a}_\varphi$.

- (a) Find the total current outward from this surface.
- (b) Evaluate each side of Stokes' theorem. [30Marks]

☺ BEST WISHES ☺

EXAMINERS	DR. REDA EL-SAYED EL-SHATER	PROF. DR. SAMIA AHMED SAAFAN
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TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS

EXAMINATION FOR SECOND YEAR

COURSE TITLE:	Physical Optics		COURSE CODE: PH2222
DATE:	10/6/2015	TERM:SECOND	TOTAL ASSESSMENT MARKS: 100
			TIME ALLOWED: 2 HOURS

ANSWER ALL QUESTIONS:

1-a) Find the superposition of two S.H.M. along the same line, have the same frequency and different amplitudes.

b) Describe Fresnel's biprism, Explain how the wave length of light can be determined with it's help.

2-a) How will you determine the wave length by using Michelson interferometer.

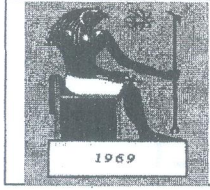
b) In Newton's ring experiment , if drop of water ($n=1.33$) be placed in between the lens and the plate , the diameter of 10th ring is found to be 0.6 cm , obtain the radius of curvature of the face of the lens in contact with the plate. (λ of light used 6000A)

3- Derive an expression for the intensity at a point in the Fraunhofer type of diffraction produced by N nearby parallel narrow slits illuminated by monochromatic light.

4- a) Give three methods producing plane polarized light .

b) Calculate the least width of a plane diffraction grating having 500 line /cm which will just resolve in the second order the sodium lines of wavelength 5890 and 5896 A⁰

Good luck



اختبار نهائي فيزياء حديثة
الفصل الثاني للعام الأكاديمي ٢٠١٤-٢٠١٥
الزمن ساعتان
٢٠١٥/٦/٦ تاريخ الامتحان

جامعة طنطا
كلية العلوم
قسم الفيزياء
اسم الطالب

كتلة الإلكترون $9.1 \times 10^{-31} \text{ Kg}$ ثابت بلانك $= 6.62 \times 10^{-34}$ شحنة الإلكترون $= 1.6 \times 10^{-19}$ كولوم
ثابت كولوم $K = 9 \times 10^9$

(20 marks)

السؤال الاول

8 marks - أ

ضع علامة \checkmark أمام العبارة الصحيحة وعلامة x أمام العبارة الخطأ

- ١- تنطلق الكترونات من النحاس عند سقوط الأشعة المرئية عليه حيث الطول الموجي للضوء المرئي يتراوح بين 4000 الى 7000A وتردد العتبة للنحاس $1.13 \times 10^{15} \text{ Hz}$.
- ٢- اذا كانت طاقة الفوتون $1.6 \times 10^{13} \text{ J}$ فإنه ممكن ان يتحول الى مادة.
- ٣- من الممكن ان ينتج زوج واحد من الالكترونات او زوج واحد من البوزيترونات عند فناء الفوتون.
- ٤- الطيف المميز للأشعة السينية يعتمد على نوعي عنصر مادة الهدف ولا يعتمد على فرق الجهد بين الانود والكاثود في الانبوبة.
- ٥- جهد الايقاف يعتمد على تردد الموجة الساقطة على سطح المعدن ولا يعتمد على شدتها
- ٦- يحدث ازاحة للطول الموجي الذي عنده اعلى اشعاعية كلية للجسم الاسود تجاه الاطوال الموجية الاقل والترددات الاعلى وذلك بزيادة درجة حرارة الجسم الاسود .
- ٧- في حالة اعتبار الطبيعة الموجية للالكترون فان $\Delta \lambda = \Delta \phi = 0$ و $\Delta x = \Delta t = \infty$
- ٨- تظهر الطبيعة الجسيمية للضوء في الطاقات العالية وتظهر الطبيعة الموجية في الطاقات المنخفضة

ب - 12 marks

اختر الاجابة المناسبة من الاجابات الموجودة بعد كل عبارة من العبارات التالية :

- 1- اذا كانت دالة الشغل للنحاس هي 4.77ev فان تردد الاشعة التي تسقط على النحاس لكي تطلق الكترونات ذات طاقة عظمى $E_{\max} = 10 \text{ ev}$ هي
أ - $3.55 \times 10^{15} \text{ Hz}$ ب - $3.55 \times 10^{11} \text{ Hz}$ ج - $5.35 \times 10^{13} \text{ Hz}$ د - $5.35 \times 10^{10} \text{ Hz}$
- 2 - اصطدم فوتون طول موجته قبل التصادم $\lambda = 0.7 \text{ A}$ بالكترون ساكن وطول موجته بعد التصادم $\lambda = 0.724 \text{ A}$ فان طاقة حركة الالكترون هي
أ - 825ev ب - 288ev ج - 588ev د - 385ev
- 3- إذا كان الطول الموجي لأعظم أشعة الشمس $\lambda_{\max} = 4900 \text{ A}$ فان درجة حرارة الشمس هي (ثابت فين $b = 2.9 \times 10^{-3}$)
أ - 5918k ب - 9517k ج - 1859k د - 8591k
- 4 - طاقة حركة الالكترون الذي يجب ان يمتلكها لكي تكون طول موجة دي بروي المصاحبة لحركته 1A
أ - 510ev ب - 150ev ج - 250ev د - 350ev
- 5- اذا كانت طاقة الربط لذرة الهيدروجين هي 13.6 ev فان نصف قطر ذرة الهيدروجين
أ - 0.67 A ب - 0.35A ج - 0.53A د - 0.95A

6- سافر رائد فضاء بسرعة $v = 0.99c$ نحو احد النجوم البعيدة وكان عمره ٢٠ سنة ثم عاد للأرض بعد أن أمضى حسب تقويمه الشخصي ٥ سنوات فان زمن رحلته لمراقب من على الأرض بالسنوات

د- 13.6

ج- 25.4

ب- 35.1

أ- 23.2

الاسئلة المقالية

السؤال الثاني (32 marks)

1- (10 marks)

اثبت ان طول المادة يتقلص عند التحرك بسرعة v

2- (10 marks)

اثبت أن $\phi_0 = h\theta_0$ حيث θ_0 تردد العتبة للإصدار الكهروضوئي و ϕ_0 دالة الشغل .

3- (12 marks)

أ - ارسم مستويات الطاقة لذرة الهيدروجين واحسب قيم طاقة هذه المستويات .

ب - برهن ان طاقة الحركة النسبية تؤول الى طاقة الحركة الكلاسيكية عند $v \gg c$

السؤال الثالث (30 marks)

1- (10 marks)

برهن ان سرعة الجسم تكتب على الصورة $v = c \left[\sqrt{1 - \left(\frac{E_0}{E}\right)^2} \right]$ حيث E الطاقة الكلية E_0

الطاقة السكونية للجسم .

2- (10 marks)

من وجهة نظر الفيزياء الكلاسيكية اذا كان الشك في تحديد تردد موجة هو $\Delta\theta \geq 1. \Delta t$

استنتج الشك في تحديد الطول الموجي

3- (10 marks)

حصل كومبتون على المعادلة التالية من قوانين حفظ الطاقة وكمية التحرك لتفسير تفاعل

الفوتون مع الالكترن $m_0 c^2 (\theta - \theta') = h\theta\theta' (1 - \cos\phi)$ عين التغير في الطول الموجي بدلالة

زاوية الاستطارة ϕ .

السؤال الرابع (18 marks)

1- (8 marks)

عند حدوث حيود من الرتبة الاولى للالكترونات طاقة حركتها 54eV من بلورة النيكل ذات

المسافات البينية بين مستوياتها البلورية $d = 2.15 \text{ \AA}$ عند زاوية حيود $\theta = 50^\circ$ احسب

الطول الموجي المصاحب باستخدام الخاصية الموجية والخاصية الجسيمية للإلكترون

2- (5 marks)


اثبت انه عند فناء الالكترن بوزيترون ينتج زوج من الفوتونات لهما نفس الطاقة

3- (5 marks)

اذكر السلاسل الطيفية لذرة الهيدروجين مع التوضيح بالرسم والقانون المستخدم لكل سلسلة

طيفية

مركز الدراسات والبحوث

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF ZOOLOGY			
	EXAMINATION FOR SECOND YEAR STUDENTS (SOPHOMERES) OF BIOPH/ZOOL			
	COURSE TITLE:	Invertebrate Biology		COURSE CODE: ZO 2242
DATE:	3/6/2015	TERM: SECOND	TOTAL ASSESSMENT MARKS:150	TIME ALLOWED: TWO HOURS

Answer the Following questions:

First Question (35 marks)

- 1- Give a brief definition to the following: (12 marks)
a) Swarming b) Epitoky c) Schizocoelic coelom d) Erythrocrurin
- 2- Describe with labeled drawing the digestive system of *Hirudo medicinalis* with special reference to the modification occurred to adapt its feeding mechanism (11 marks)
- 3- Mention the function of: a) Hirudin b) Nuchal organ c) Nephrostome
d) Botryoidal tissue (12 marks)

Second Question (40 marks)

Section (1) (12 marks)

1- Answer the following:

- a- Put true or false and correct the false statements: (3 marks)
 - 1- Arthropods have a well developed muscular system composed of striated muscles and share in the formation of the body wall.
 - 2- The body of arthropods with internal and endodermal hard exoskeleton.
 - 3- Excretion in crustacean animals is performed by Malpighian tubules
- b- Complete the following: (3 marks)
 - 1- The diversity and success of arthropods are largely related to their,, and
 - 2- The head of Crustacea carries,,and
- 2- With fully labeled drawing explain the digestive system in prawn. (3 marks)
- 3- Illustrate by only Labelled drawing: (3 marks)
 - i - Body wall of prawn.
 - ii - Green gland of prawn
 - iii- Schedule of circulation in prawn

Section (2) (28 marks)

- 1- Explain in details types of crustacean larvae and make a fully labeled drawing if possible (6 marks)
- 2- Mention the function of the following: (12 marks)
 - a. Spinneretes in Spider
 - b. Phyllopodia in Artemia
 - c. Cirriform appendages in Balanus
 - d. Stigmata in Scorpion
 - e. Sleeve valve in oesophagus of Scorpion
 - f. Palpal organ in Spider
- 3- Complete the missing words: (10 marks)
 - a.considered as the most primitive crustacean in phylum arthropods because of
 - b. The main differences between *Artemia* and *Daphnia* in.....,.....,.....
 - c.is a small crustacean adapted to parasitism onof.....
 - d. The respiration in Arachnida by.....and excretion by.....



e. Fertilization in scorpion is..... and male grasps the female by.....

Third Question (40 Marks)

- 1- Mention **2** items only of the economic importance of Mollusks. (4 Marks)
- 2- Mention **three** of the gill plate functions in *Anodonta*. (3 Marks)
- 3- Mention **three** of the defending strategies of *Octopus* to defend itself. (3 Marks)

4- Put \checkmark or \times and correct the wrong statements (10 Marks, 2 marks each)

- a- *Anodonta* has a single protractor muscle ()
- b- *Hexabranhus* belongs to gastropods ()
- c- *Anodonta* has radula ()
- d- *Sepia* has no shell ()
- e. All mollusks have bilateral symmetry ()

5- Complete (10 Marks)

- a- The study of molluscs is called -----
- b- The circulatory system is opened in all molluscs except -----
- c- The sense organs of *Anodonta* include -----, ----- and -----
- d- The shell of *Anodonta* has three layers -----, -----, -----
- e. *Pinctada* has an economic importance because -----
- f- ----- is a structure used in jet propulsion in *Sepia*.

6- Give the scientific terms: (6 Marks, 2 marks each)

- a- It is a period of inactivation and withdrawal of the snail body during summer season.
- b- It is a phenomenon in the larval stages of gastropods in which the mantle cavity and the anus turned to the anterior portion of the body.
- c- Pearl mother layer.

7- Define the homing ability of the Chiton. (2 marks)

8- Give one evidence only to prove that Cephalopods are intelligent animal. (2 Marks)

Fourth Question (35 marks)

1-Write on the following (15 marks)

- a. Digestive system and digestion in Sea star
- b. Relation between phylum Echinodermata and Chordata
- c. Classification and main specific characters of phylum Echinodermata


2- By drawing only show the following (15 marks)

- a. Water vascular system
- b. Digestive system of Sea urchin
- c. T.S of arm of Brittle star

3- Mention the economic importance of Echinodermata (5 marks)

EXAMINERS	Prof. El-Sayed Taha Rizk	Prof. Nahla Omran
	Prof. Hoda kamal	Ass.Prof. Wesam Salama

فيسر بار محمد

 1962	TANTA UNIVERSITY FACULTY OF SCIENCE BOTANY DEPARTMENT		
	Examination / FOR LEVEL TWO BIOPHYSICS		
	Course Title:	Plant Diseases caused by Microorganisms, Insects and Nematode	Course Code: BO 2240
30-5-2015	Term: Second	Total assessment marks: 150	Time Allowed: 2 hours

Answer the following questions

First question : (35 Marks)

- 1- Explain plant disease caused by Citrus black fly.
- 2- Mention the pathogen (etiology), symptoms of dry brown rot of stone fruit disease and How to control the disease draw the sexual stage only of the pathogen.

Second question: (40 Marks)

- 1- Write and draw life cycle only of pathogen *Pythium* sp.
- 2- Explain four stages of development of disease (Inoculation-Penetration-Infection and incubation period).

Third question: Answer the following : (50 Marks)

- a- What are the symptoms and life cycle of Crown Gall disease with drawing .
- b- Describe the symptoms of bacterial leaf spot disease caused by *Xanthomonas campestris*.
- c- What are viruses and symptoms Yellow dwarf of Onion disease.
- d- How can nematode use plant cell sap and describe life cycle of Coconut palm (*Aphelenchus cocophilus*)
- e- Talk briefly method for control of *Aphelenchoides besseyi* (*A. oryzae*) .
nematode disease.

Fourth question: Complete the following sentences : (25 Marks)

- 1 -Bacterial Soft Rot disease caused by
- 2 -Scabies of Potato caused by
- 3 - Bacterial Crown Gall disease caused by
- 4- All nematodes have which used to Plant cells.
- 5- *Aphelenchoides besseyi* causediseases of Rice.

Best wishes

Prof. Dr. Susan Assawah

Prof. Dr. Eman Abd El-Zaher

فزياء و فيزياء ربيعية
 اساتذة
 كمال الدين



TANTA UNIVERSITY
 FACULTY OF SCIENCE
 DEPARTMENT OF PHYSICS

EXAMINATION OF SOPHOMORES (SECOND YEAR) STUDENTS OF PHYSICS

COURSE TITLE:	Analytical Mechanics		COURSE CODE: PH 2242
DATE: 23/05/2015	TERM: SECOND	TOTAL ASSESSMENT MARKS:100	TIME ALLOWED: 2HOURS

Answer the following 4 questions:

Question 1

a) Prove that the velocity (V) of a particle in plane polar coordinates is given by:

$$V = \dot{r}e_r + r\dot{\theta}e_\theta$$

Where e_r is the unit radial vector and e_θ is the unit transverse vector. r is the position vector.

(20 marks)

b) Find the magnitude of the angular momentum (use the velocity expression in a).

(10 marks)

Question 2

A particle moving in a central field describes the spiral orbit $r = r_0 e^{k\theta}$. Show that:

a) The force law is inverse cube.

(15 marks)

b) θ varies logarithmically with t .

(10 marks)

Question 3

Apply Lagrange's equations to find the equations of motion for:

a) One dimensional harmonic oscillator in which the damping force is proportional to the velocity.

(15 marks)

b) A particle moving in a plane polar coordinates under a central force.

(10 marks)

Question 4

Show that the radius for a circular orbit of a synchronous (24-h) Earth satellite is about 6.6 Earth radii. (Earth Radius = 6380 km; acceleration of gravity = 9.8 m/s^2)

(20 marks)

EXAMINERS	DR. MOHAMED SHAHEEN
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أطيب التمنيات بالتوفيق



Solve the Following Questions:

First Question :(25 marks)

- (a) Find both the general and particular solutions of the homogeneous differential equation:

$$y'' + 4y' + 4y = 0$$

When $y(0) = 3$, $y'(0) = 1$

- (b) Find the general solution of the following differential equation, using the undetermined coefficients method:

$$y'' + 2y' + y = x$$

Second Question :(25 marks)

- (a) Using the inverse differential operator method to find the general solution of the equation

$$y'' - 4y = 8xe^{2x}$$

- (b) Solve the differential equation of simple harmonic motion

$$y'' + \omega^2 y = 0$$

Third Question :(25 marks)

- (a) Solve the next differential equation using the variation of parameters method

$$y'' + y = \sin(2x)$$

- (b) Find the general solution of the equation:

$$(y'' + 1)y = \sin x$$

Fourth Question :(25 marks)

- (a) Discuss briefly the following second order differential equations:

- (i) The wave equation
- (ii) The diffusion equation
- (iii) Laplace's equation
- (iv) Poisson's equation
- (v) Schrodinger's equation

- (b) Find the general solution of the two-dimensional Laplace equation

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

With my best wishes.