	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	EXAMINATION FOR SOPHOMORES (2 ND LEVEL) STUDENTS OF CHRMISTRY/BIOCHEMISTRY & BIOCHEMISTRY		
COURSE TITLE:	BIOPHYSICS	COURSE CODE:PH2292	
DATE:23 30 MAY 2015	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50	TIME ALLOWED: 2 HOURS

ANSWER THE FOLLOWING QUESTIONS:

1- Write on:

(12 mark)

- a) X-ray effects on living tissues,
- b) Hydrostatics,
- c) Sound transitions in biomaterials.

2- Explain:

(12 mark)

- a) Transitions of molecules in the nerve systems,
- b) Bioelectrical Potentials,
- c) The vision theory.

3- Discuss:

(12 mark)

- a) The electromagnetic forces,
- c) The effect of magnetic fields on human cells,
- b) The Hearing theory.

4- Explain the applications of x- ray in medicine.

(14 mark)

والله ولي التوفيق

EXAMINERS:	Prof.Dr. G. FARAG	&	Prof. Dr. M, El Khosht
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COURSE TITLE:	ENERGY PHYSICS EXAM		COURSE CODE: PH2232
10 JUNE, 2015	TREM: SECOND	TOTAL ASSESSMENT MARK: 100	TIME ALLOWED: 2HOURS

- Good Luck

۴۰۰. نمر، اُفتہ، سہ ماہی

فزياء
علاوة

	TANTA UNIVERSITY- Faculty of Science -Department of physics			
	EXAMINATION FOR 2 ND LEVEL STUDENTS OF MAETRIALS SCIENCE			
	COURSE TITLE:	Electromagnetic Theory II		COURSE CODE: PH2252
DATE:	1-JUNE - 2015	TERM: SECOND	TOTAL ASSESSMENT MARKS:100	TIME ALLOWED: 2 HOURS

Answer the following questions:

First Question:

- 1- Illustrate the concept of bands in crystalline solid? [10Marks]
- 2- Explain the conductor properties through Ohm's and Gauss's law? [5 Marks]
- 3- Given the vector current density $J = 10\rho^2 z \mathbf{a}_\rho - 4\rho \cos \sin^2 \varphi \mathbf{a}_\varphi$ A/m²:
 - (a) Find the current density at P ($\rho=3$, $\varphi=30^\circ$; $z = 2$);
 - (b) Determine the total current flowing outward through the circular band $\rho=3$, $0<\varphi<2\pi$, $2<z<2.8$.

[10Marks]

Second Question:

- 1- Solve Laplace's equation to find the capacitance of a parallel plate capacitor of spacing (d) and potential difference (V_0) with plate area (S). [10Marks]
- 2- Find |E| at P(3,1,2) for the field of: (a) two coaxial conducting cylinders, $V=50V$ at $\rho=2m$, and $V=20V$ at $\rho=3m$; [15Marks]
- (b) two radial conducting planes, $V=50V$ at $\varphi = 10^\circ$, and $V=20V$ at $\varphi = 30^\circ$.

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 \mathbf{H} in Cartesian coordinates at P ($\sqrt{20}, 0, 0$). [10Marks]

[10Marks]

Fourth Question:

An infinitely long coaxial transmission line carrying a uniformly distributed total current I in the center conductor of radius a and $-I$ in the outer conductor of inner radius b and outer radius c . Find:

- a) H_φ if $\rho < a$, $a < \rho < b$, $b < \rho < c$, and $\rho > c$.
- b) The flux (Φ) for $\rho < a$, $a < \rho < b$, and $\rho > c$.
- c) $\nabla \times \mathbf{H}$ for $\rho < a$, $a < \rho < b$, and $\rho > c$.

[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 2ND LEVEL STUDENTS OF MAETRIALS SCIENCE

COURSE TITLE:

Electromagnetic Theory II

COURSE CODE: PH2252

DATE:

1-JUNE - 2015

TERM: SECOND

TOTAL ASSESSMENT MARKS:100

TIME ALLOWED: 2 HOURS

Answer the following questions:

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c) $\nabla \times \mathbf{H}$ for $\rho < a$, $a < \rho < b$, and $\rho > c$.

[30Marks]

☺ BEST WISHES ☺

EXAMINERS

DR. REDA EL-SAYED EL-SHATER

PROF. DR. SAMIA AHMED SAAFAN



TANTA UNIVERSITY- Faculty of Science -Department of physics

EXAMINATION FOR 2ND LEVEL STUDENTS OF PHYSICS

COURSE TITLE:

Electromagnetic Theory II

COURSE CODE: PH2252

DATE:

1-JUNE 2015

TERM: SECOND

TOTAL ASSESSMENT MARKS:100

TIME ALLOWED: 2 HOURS

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c) $\nabla \times \mathbf{H}$ for $\rho < a$, $a < \rho < b$, and $\rho > c$.

[30Marks]

☺ BEST WISHES ☺

EXAMINERS

DR. REDA EL-SAYED EL-SHATER

PROF. DR. SAMIA AHMED SAAFAN



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 6000Å)

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 Å⁰

Good luck



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.

 1969	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION OF SOPHOMORES (SECOND YEAR) STUDENTS OF <u>PHYSICS</u>			
	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/s²)

(20 marks)

EXAMINERS	DR. MOHAMED SHAHEEN

أطيب التمنيات بالتوفيق



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 $6.62 \times 10^{-34} \text{ شحنة الإلكترون} = 1.6 \times 10^{-19} \text{ كولوم}$

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 الاشعة 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 $1.6 \times 10^{13} \text{ J}$ فانه 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 نوعى 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 الإجابة المناسبة من الإجابات 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

الالكترونات 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 $\lambda = 0.7 \text{ A}$ بالالكترون 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 لأشعة الشمس $\lambda = 4900 \text{ A}_{\max}$ 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 فإن 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 $\phi_0 = h\nu_0$ حيث ν_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 $v = c \left[1 - \left(\frac{E_0}{E} \right)^2 \right]$ 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 $\Delta\nu$ ، $\Delta t \geq 1/\Delta\nu$ استنتج الشك في تحديد الطول الموجي

3- (10 marks)

حصل كومبتون على المعادلة التالية من قوانين حفظ الطاقة وكمية التحرك لتفسير تفاعل الفوتون مع الالكترون $m_0 c^2 (\nu - \nu') = h\nu\nu' (1 - \cos\phi)$ 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 الالكترون بوزيترون ينتج زوج من الفوتونات لهما نفس الطاقة

3- (5 marks)

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

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS				
EXAMINATION FOR SOPHOMORES (SECOND LEVEL) STUDENTS OF PHYSICS (فيزياء)					
COURSE TITLE:		A.C Current تيار متردد		COURSE CODE: PH2282	
DATE: 25	MAY, 2015	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS	

Answer The Following:

First question:

{25 Marks}

A) Define the following:

(5 Marks)

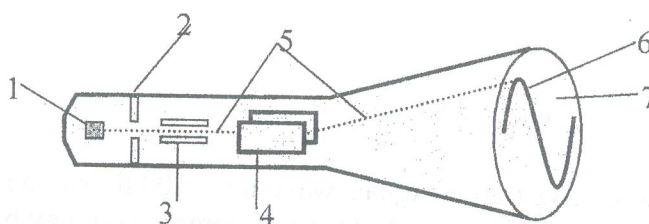
- a) T parameter. b) Z parameter. c) Tolerance. D) Dielectric Strength.

B) Chose the correct answer:

(10 Marks)

- For any electric circuit, the maximum value of dissipated power occurred when:
 - Internal resistance > external resistance
 - Internal resistance < external resistance
 - Internal resistance = external resistance
- In High Pass Filter circuits, it allow the signals with;
 - high frequency
 - low frequency
 - with 0 frequency
 - between two values f_{c1} & f_{c2}
- In Low Pass Filter circuits, it allow the signals with;
 - high frequency
 - low frequency
 - with 0 frequency
 - between two values f_{c1} & f_{c2}
- In Band Pass Filter circuits, it allow the signals with;
 - high frequency
 - low frequency
 - below f_{c1} & above f_{c2}
 - between two values f_{c1} & f_{c2}
- In Band Reject Filter circuits, it allow the signals with;
 - high frequency
 - low frequency
 - below f_{c1} & above f_{c2}
 - between two values f_{c1} & f_{c2}

C) In the figure displayed (C.R.T), defined the name and the function of each component? Write on the Quantities that can be measured by the Oscilloscope. (10 Marks).



Second question:

{25 Marks}

A) In an AC Circuit which $I = I_0 \sin \omega t$, prove that,

$$I_{av} = \frac{2 I_0}{\pi}$$

(7 Marks)

B) Compare between the two methods of reading the value of the resistors? Showing, how you could determine the tolerance?

(8 Marks)

C) Resistance, capacitance and a coil connected in parallel, deduce how you could determine the following: 1) Resonance frequency 2) the impedance of the circuit 3) The phase angle (ϕ)

Given:

$$V = V_0 \sin \omega t$$

(10 Marks)

Please turn over



Third question:

{25 Marks}

- a) A coil has inductance $400 \mu\text{H}$ connected in series with capacitance $0.0001 \mu\text{F}$.
If the total impedance is 8Ω , if the voltage of circuit 0.1 volt

Calculate:

- 1- resonant frequency
- 2- voltage across capacitor at resonance.
- 3- Show how you could increase the voltage across the capacitors.

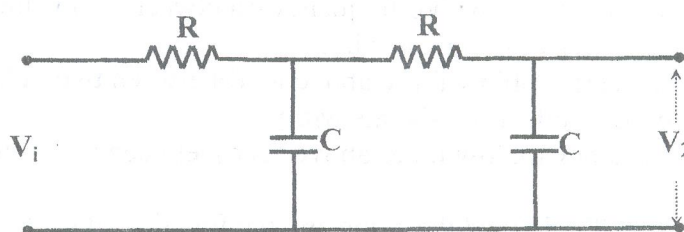
(7 Marks)

- b) Give the reason:

- I) The resonance frequency in parallel (RLC) circuit is different than that of series (RLC) circuit, even, if it has the same elements values.
- II) The capacitors prevent the DC current.
- III) The coils use to resist AC current, while it allows the DC current to pass.
- IV) There are no ideal coils. (Give expiration for the impedance of ideal & real coils).

(8Marks)

- c) In the given circuit (Two-stage RC filter in cascade) deduce an expiration to calculate the gain T factor, and Z parameters, and show how you could determine the cutoff frequency f_c .

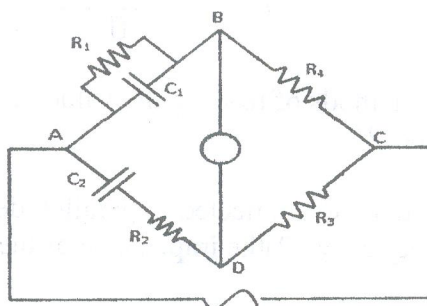


(10 Marks)

Fourth question:

{25 Marks}

- 1) Design a filter circuit with $f_c = 8.5 \times 10^6 \text{ Hz}$. (7Marks)
- 2) Design a circuit to give output signals wave form 100 times, the input signal, draw the circuit, and calculate the magnitude of every element you may be use. (8Marks)
- 3) Deduce the two balance equations of the mention Bridge. (10 Marks)
Maintain the application of such similar bridge in Materials science.



Examiners	Prof. Talaat M. Meaz	Dr. Magda. Zaki
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