




المستوى الثانى

فيزياء

مركز الرياضيات
 كلية العلوم
 جامعة طنطا

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	EXAMINATION OF (LEVEL TWO) STUDENTS OF PHYSICS		
COURSE TITLE:	Mathematical physics 2		COURSE CODE: PH 2262
DATE: 16/2017	FINAL EXAM	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions:

First question:- (25 Marks)

(i) Observe that $y = x$ is a solution of

$$y'' - [(x + 2)/x]y' + [(x + 2)/x^2] y = 0$$

And solve $y'' - [(x + 2)/x]y' + [(x + 2)/x^2] y = x e^{-x}$

(ii) Solve $y'' - 5y' + 6y = x^2 e^{3x}$

Second question:- (25 Marks)

Solve (i) $y'' + 3y' + 2y = e^x - 3$

(ii) $\Gamma(1/3) \Gamma(2/3) = ??$

(iii) $\beta(x, y)$ at $x=4, y=7$

Third question:- (25 Marks)

Prove that,

$$\Gamma(x+1) = x \Gamma(x)$$

Find, $\int_0^1 x^7(1-x)^8 dx$, $2 \int_0^{\pi/2} \sin^7(x) \cos^8(x) dx$


Fourth question:- (25 marks)

(i) Write about Angular momentum operators

(ii) find, $x^2 T'' + x T' + (x^2 - 1/4) T = 0$

EXAMINERS	DR. Atef Elbendary
	أطيب التمنيات بالتوفيق

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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS		
	COURSE TITLE:	ENERGY PHYSICS EXAM	COURSE CODE: PH2232
	DATE:	JUNE, 2017	TREM: SECOND · TOTAL ASSESSMENT MARK: 100

- Answer the following questions:
 1. a. Define the following physical terms:
"Perfect black body", "electric current", "binding nuclear energy",
"efficiency", "critical mass in nuclear fission" and "mechanical energy."
[15 Marks]
 - b. Discuss the two laws of thermodynamics. [10 Marks]
 2. a. Discuss the green house gases and the global warming issues.
[10 Marks]
 - b. Compare between nuclear fission and nuclear fusion reactions.
Comment on the energy generated in both cases.
[10 Marks]
 - c. Explain briefly the energy balance equation. [5 Marks]
 3. a. Describe the advantages and disadvantages of solar energy.
[10 Marks]
 - b. Draw a schematic diagram for the flat-plate solar collector. Describe
its function. [10 Marks]
 - c. Draw a schematic diagram for a typical solar cell. [5 Marks]
 4. a. Use schematic diagrams to describe how to obtain biogas from
biomass. [10 Marks]
 - b. Draw a schematic diagram for a wind mill and explain its function.
[5 Marks]
 - c. Discuss the issues of energy conservation.
[10 Marks]
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TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS

EXAMINATION FOR SECOND YEAR

COURSE TITLE:	Physical Optics	COURSE CODE: PH2222
DATE: 29/5/2017	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



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DEPARTMENT OF PHYSICS

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 TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
SECOND YEAR (PHYSICS)			
COURSE TITLE:	تيار متردد		COURSE CODE: PH2282
DATE:	12-6- 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS:100
			TIME ALLOWED: 2 HOUR

Please Answer the Following:

Question (1):

- Plot a schematic of the oscilloscope, periodic current, and non-periodic current.
- Calculate using the mathematical method the total impedance and the phase angle of R-C circuit in series.

(25 Marks)

Question (2):

- Calculate the current across and the impedance of the giving circuit in fig (1).
- Find the equilibrium conditions of Maxwell Bridge as shown in fig (2).

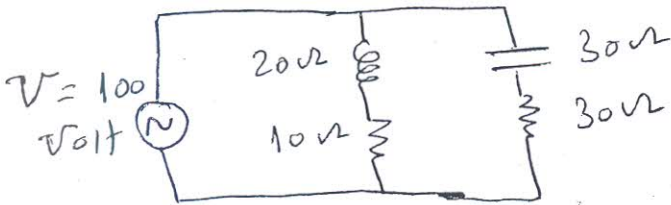


Fig (1)

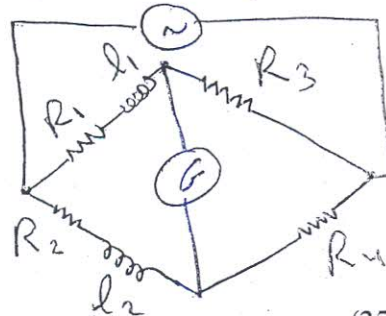


Fig (2)

(25 Marks)

Question (3):

- Explain the half wave voltage doubler.
- Resonance ac circuit consists of a coil, a capacitor, and a resistance in series. The self-inductance of the coil is $300 \mu H$. The capacitance of the capacitor is $0.0003 \mu F$ and the resistance is 30 Ohm . If the applied voltage across the circuit is 0.3 volt , calculate the resonance frequency and the voltage across the coil and the capacitance.

(25 Marks)

Question (4): Write short notes on:


- The diode approximations.
- Characteristic curve of a diode.
- Intrinsic semiconductor versus Extrinsic semiconductor.

(25 Marks)

☺ ☺ Best Wishes ☺ ☺

Dr. Mohammed Shihab

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	Tanta University Faculty of Science Physics Department	
	Examination of Level 2 Physics and Biophysics Programs	
	Course Title Analytical mechanics	Course Code: PH2242
	Date 17-6-2017	Second semester

Question 1 (30 points):

Rewrite these sentences. Then complete them: -

1. The path of the particle under the effect of the attractive force proportional to the inverse square of the distance is
2. The equation of the energy for the particle under the effect of the central force is written as
3. When the total energy of the particle under the effect of the attractive force proportional to the inverse square of the distance equals zero., then the path of the particle is.....where the eccentricity equals
4. The angular speed of the earth about its axis equals
5. The centrifugal force acting on a train of mass 200,000 kg at colatitude 30° equals N. Where the maximum value of centrifugal acceleration 3.38 cm/sec^2 .
6. The coefficient of restitution is defined as And when its value equals one, we have
7. The time rate of change of the angular momentum of a system of particles equals to the
8. Hamilton's variational principle states that
9. The minimum number of independent coordinates needed to specify the motion are calledand denoted by and can beor
10. The potential corresponding to the force fields defined by $F = \sin \pi r r_0$
Where r_0 unite vector in the direction of r equals

Question 2(20 points):


Show that the angular momentum of a two particle system is $r_{cm} \wedge m v_{cm} + R \wedge \mu v$ about the origin o
Where r_{cm} the position vector of the center of mass and v_{cm} is its velocity, R is the relative position vector, v is the relative velocity of the two particles , $m = m_1 + m_2$, μ is the reduced mass and give physical interpretation of that result .

Question 3 (25 points)

Prove that the orbits $r = e^{-\theta}$ and $r = 1/\theta$ have the same law of the central force .

Question 4 (25 points)

Set up the Lagrangian, the Hamiltonian, Lagrange's and Hamilton's equations of motion for the simple pendulum for small oscillation .

	Tanta University Faculty of Science Physics Department	
	Examination of Level 2 Physics and Biophysics Programs	
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	Date 17-6-2017	Second semester

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ثريا دريس

صالح
كريم

1 ع

علوم واد

	اختبار نهائي فيزياء حديثة الفصل الثاني للعام الأكاديمي 2016-2017 الزمن ساعتان 100 درجة تاريخ الامتحان 3/3/2017	جامعة طنطا كلية العلوم قسم الفيزياء اسم الطالب

ثابت بلانك = 6.62×10^{-34} شحنة الإلكترون = 1.6×10^{-19} كولوم

كتلة الإلكترون 9.1×10^{-31} Kg

ثابت كولوم $K = 9 \times 10^9$

First question (12 marks)

Choose the correct answers after each sentences:

1- The work function of Cu is 4.7ev , the photon frequency needed to produce photo electrons with $E_{max}=10$ ev is

- أ - 3.55×10^{15} Hz - ب - 3.55×10^{11} Hz - ج - 5.35×10^{13} Hz - د - 5.35×10^{10} Hz

2- A photon with wavelength $\lambda = 0.7$ A make a collision with rest electron , after collision its wavelength becomes $\lambda = 0.724$ A, the K.E of electron is

- أ - 825ev - ب - 288ev - ج - 588ev - د - 385ev

3- The $\lambda_{max} = 4900$ A for solar radiation, the temperature of sun surface is (Wien constant $b = 2.9 \times 10^{-3}$)

- أ - 5918k - ب - 9517k - ج - 1859k - د - 8591k

4 - Kinetic energy of the electron, which must possess in order to have 1A wavelength associated with the movement .

- أ - 510ev - ب - 150ev - ج - 250ev - د - 350ev

Essay questions:

second question

(32 marks)

1- Prove that the length L contracts when moving by velocity V

2- Prove that $\phi_0 = h\nu_0$ where ν_0 is threshold frequency for photoelectric emission and ϕ_0 the work function.

3-a- Prove That $k = [1 + \frac{v^2}{2c^2}]$ if $c \gg v$

b- Prove that the relative and classical kinetic energy are the same when $c \gg v$.

h نظر خلف الورقة

Third question

(36 marks)

a-Prove that the particle velocity is given by $v = c \sqrt{1 - \left(\frac{E_0}{E}\right)^2}$

Where E and E_0 are the total and rest energies respectively.

b-From conservation of energy and momentum, Compton obtain the equation $m_0 c^2 (\gamma - \gamma') = h\gamma\gamma'(1 - \cos\phi)$. Determine $\Delta\lambda$ as a function of scattering angle ϕ .

The fourth question

(20 marks)

a- Diffraction of the first order of the electrons with energy 54eV occurs from Ni crystal of interlayer distance $d = 2.15 \text{ \AA}$ at the diffraction angle $\theta = 50^\circ$. Calculate the wavelength associated by considering the electron is a wave and then as a particle.

b- Prove that when the electron-positron is annihilated, two photons are produced with the same energy.