Course No: *Eng1307*
Course Title: *Physics II*
Date: *19/5/2015*
No. of Questions: *(6)*
Time: *2:00hours*
Using Calculator: *(Yes)*

University of Palestine

Final Exam
2014/2015
Total Grade:60

Instructor Name:
Student No.: _____
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College Name: _____
Dep. / Specialist: _____
Using Dictionary: *(No)*

اسم الطالب:	اسم المدرس:	رقم الشعبة

Question 1: **(10)**

A) State Gauss law.

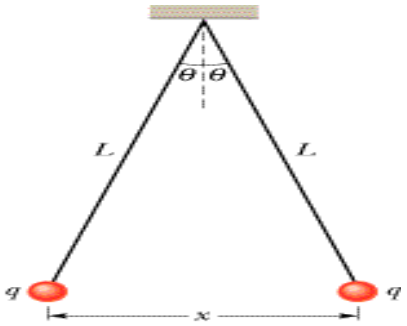
B) Two conducting balls of identical mass *m* and identical charge *q* hang from non-conducting strings of length *L*.

Assume that Θ is so small that (tan Θ) can be replaced by its approximate equal (sin Θ).

(a) Draw free-body diagrams of the left ball.

(b) Show that the equilibrium separation (*x*) of the balls gives by:

$$x \approx \left[2k\frac{q^2L}{mg}\right]^{\frac{1}{3}}$$



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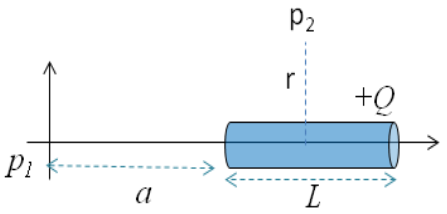
Question 2: (10)

A metal rod of length L and a radius r has a uniform positive charge per unit length λ and a total charge Q.

(I) - Calculate the electric field at points P_1 that is located along the long x- axis of the rod and distance a from one end.

(II)- A)- Find the electric field at points P_2 that located on the y-axis at distance r from the rod.

B)- If $\lambda = 30nC/m$. Find E_1 if $r_1 = 3cm$, and find E_2 if $r_2 = 10cm$.



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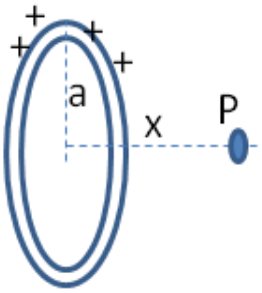
Question 3: (10)

A- Defend Kirchhoff law.

B- (I) Calculate the Electric Field (E) and direction at point (P) for positive charged ring.
(II) Calculate (E) if : x>>a.
(III) Calculate (E) if : x=a.



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Question 4: (10)

A parallel plate capacitor whose plates have an area of 1 m^2 and are separated by a distance of *1cm*. The capacitor is charged to an initial voltage of 4 kV and then disconnected from the charging source.
An insulating material is placed between the plates, completely filling the space, resulting in a decrease in the capacitors voltage to 2 kV. Determine:

1- Determine the original capacitance,.
2- Determine the dielectric constant of the material.
3- Determine the new capacitance
4- Determine the charge on the capacitor.
5- The stored electric energy.

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Question 5: (10)

A- Prove that: ***Newton/coulomb = Volt / Meter***

B- A metallic bar length L=1m and its diameter d=0.55 cm and its resistance between The ends is $R=2.87x10^{-3}$ Ohm.
From the same material fabricates a disk its diameter d=2cm and its thickness h=1mm.
Calculate its resistance between the faces of this disk.

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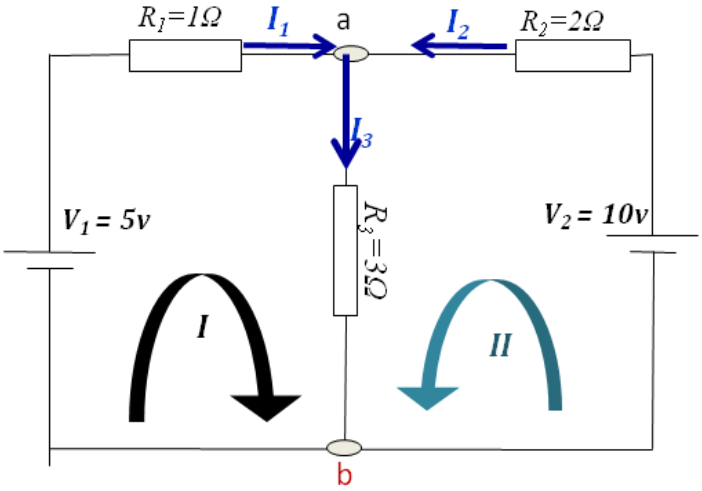
Question 6: **(10)**

1- Using Kirchhoff's rules find the current in the following circuit.
2- Find the voltage and power at R_1.



End of Questions

Useful Constant: $k = 9 \times 10^{9}$, $\xi_o = 8.85 \times 10^{-12}$, $m_e = 9.11 \times 10^{-31} kg$, $q_e = 1.6 \times 10^{-19} C$.