

Course No: *Engi1304*  
Course Title: *Physics II*  
Date: *24-05-2018*  
No. of Questions: *(5)*  
Time: *2:00hours*  
Using Calculator: *(Yes)*

University of Palestine



Final Exam  
2017-2018  
Total Grade: 50

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

رقم الشعبة:

الرقم الجامعي:

اسم الطالب:

Useful Constant:  $k = 9 \times 10^9$ ,  $\epsilon_0 = 8.85 \times 10^{-12}$ ,  $m_e = 9.11 \times 10^{-31} \text{kg}$ ,  $q_e = 1.6 \times 10^{-19} \text{C}$ .

**Question 1: Answer all the following questions clearly. (9/50)**

(1) The A charge  $+Q$  is fixed at each of two opposite corners of a square as shown in figure. A charge  $-q$  is placed at each of the other two corners. If the resultant electrical force on  $Q$  is **Zero**.  
**How are  $Q$  and  $q$  related?**

(2) What potential difference is needed to stop an electron with an initial speed of  $4.2 \times 10^5 \text{m/s}$ ?

(3) Calculate the cost of using 5 lamps which everyone is 40w and lighting for 5 hours. Assume the cost of energy is 0.05 \$/kWh.

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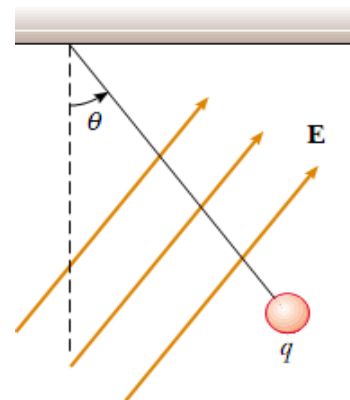
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**Questio2 :** **(10/50)**

A small ball charge of mass 1g is hanged on a light string, in a uniform electric field as in figure.

When  $E=(3i+5j)\times 10^5\text{N/C}$ , the ball is in equilibrium at  $\theta=37^\circ$ .

- Draw free-body diagrams for this charge.
- Find the charge on the ball and



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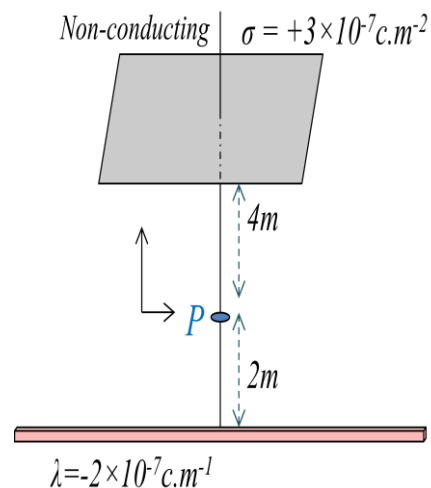
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**Questio3 :**

**(10/50)**

- 1- A rod of negative charge per unit Length  $\lambda = -2 \times 10^{-7} \text{ C.m}^{-1}$   
Find the electric field at point P that located on the y-axis at distance  $2\text{m}$ .
- 2- A non conducting plate with positive charge  $\sigma = +3 \times 10^{-7} \text{ C.m}^{-2}$   
Find the electric field at point P that located on the y-axis at distance  $4\text{m}$ .
- 3- Find the net electric field (*magnitude and direction*) at point P.

Note: You need to derive the relations before use



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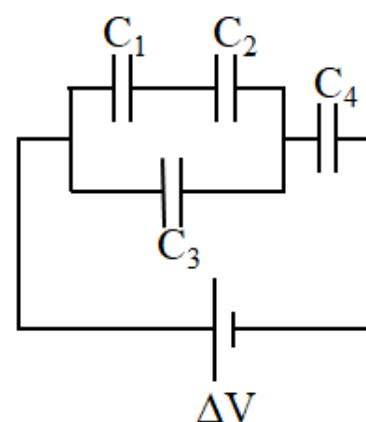
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**Question 4:**

**(11/50)**

For the capacitor circuit shown,  $C_1 = 3\mu\text{F}$ ,  $C_2 = 6\mu\text{F}$ ,  $C_3 = 2\mu\text{F}$ , and  $C_4 = 4\mu\text{F}$ .

- Find the equivalent capacitance.
- If  $\Delta V = 12\text{ V}$ , find the potential difference across  $C_4$ .
- Find charges on  $C_1$ ,  $C_4$ .
- Find energy stored in the capacitor  $C_3$ .
- Calculate a new capacitance of  $C_2$  with dielectric insulating material ( $\kappa = 6.7$ ).



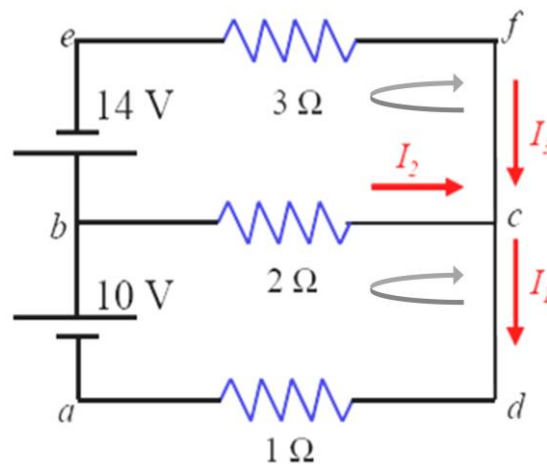


**Question 5:**

**(10/50)**

In the following electrical circuit:

- 1-Find all currents,
- 2-Find the voltage for resistance  $R=3\Omega$  .
- 3- What power is delivered to resistor  $R=2\Omega$  .



*End of Questions*

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