

Course No : ENGI 1307
 Course Title : Physics II
 Date : 17 /04/2017
 No. of Questions : 3
 Time : 1 hour
 Using Calculator (yes)

University of Palestine

 Second Midterm Exam
 2nd Term 2016/2017
 Total Grade: 30

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

$g = 10 \frac{m}{s^2}$, $e = 1.602 \times 10^{-19} C$, $m_e = 9.11 \times 10^{-31} kg$, $\epsilon_0 = 8.85 \times 10^{-12} \frac{C^2}{Nm^2}$, $k = 9 \times 10^9 \frac{Nm^2}{C^2}$

Question One: Choose the Correct Answer (10 Marks)

1	2	3	4	5

1. The charge of an ion accelerated through a potential of 100 v and experience a potential energy difference of $7 \times 10^{-17} J$ is:

- A. $7 \times 10^{-17} C$ B. $7 \times 10^{-19} C$ C. $7 \times 10^{-15} C$ D. $7 \times 10^{-10} \mu C$

2. The units of electric potential are except:

- A. $\frac{V}{m}$ B. $\frac{J}{C}$ C. $\frac{Nm}{C}$ D. V

3. If the electric potential of a ring is $V = \frac{KQ}{\sqrt{X^2+a^2}}$, then the electric field is:

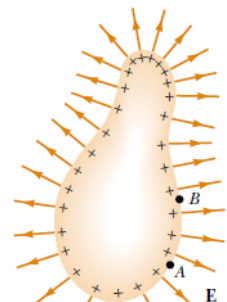
- A. $E = \frac{KQ}{(x^2+a^2)^{\frac{2}{3}}}$ B. $E = \frac{KQX}{(x^2+a^2)^{\frac{2}{3}}}$ C. $E = \frac{KQ}{(X^2+a^2)^{\frac{3}{2}}}$ D. $E = \frac{KQX}{(x^2+a^2)^{\frac{3}{2}}}$

4. How many capacity of $1 \mu F$ must be connected in parallel so they can be charge 3C with a voltage difference of 300V

- A. 1000 B. 60000 C. 10000 D. 900

5. For the following charged conductor:

- A. $V_A = V_B$ B. $E_{inside} = Zero$ C. $Q_{inside} = Zero$ D. All



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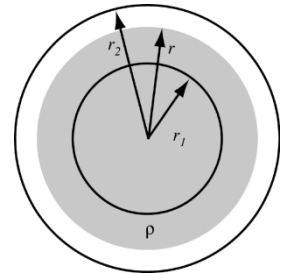
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Question Two

(12 Marks)

An insulating solid sphere of radius r has a uniform positive volume charge density ρ and total charge Q . (Show your answer in details)

- (A) Find The Electric Field at a point outside the sphere, that is, for $r_2 > r$. Using Gaus Law.
- (B) Find The Electric Potential at a point outside the sphere using E calculated in part A.
- (C) Find The Electric Field at a point inside the sphere, that is, for $r_1 < r$. Using Gaus Law.
- (D) Find The Electric Potential at a point inside the sphere using E calculated in part C.



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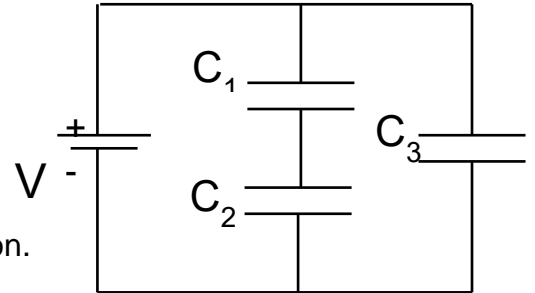
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Question Three

(8 Marks)

For the following circuit:

$C_1 = 10 \mu\text{F}$, $C_2 = 5.0 \mu\text{F}$ and $C_3 = 4.0 \mu\text{F}$



1. Find the equivalent capacitance of the whole combination.
2. If $V = 100$ volts, what is the charge Q_1 , Q_2 and Q_3 ?
3. What is the total energy stored in the circuit?
4. If the three capacitors have a dielectric material of $k=2.1$, what is the new total energy stored in the circuit.