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The University of Jordan
School of Science
Department of Physics

2nd Summer Semester 2017
General Physics-2
First Exam, August 9, 2017

Name (In Arabic) : **Instructor :**
Student Number : **Section :**

$k = 1/4\pi\varepsilon_o = 9 \times 10^9$ N.m^2/C^2; $\varepsilon_o = 8.85\times10^{-12}$ C^2/N.m^2; e = 1.6×10^{-19} C; g = 9.8 m/s^2

Write the letter corresponding to the correct answer in the table

1) The magnitude of the electric field (in N/C) at a point that is 3.0 m away from a 2.0 μC point charge is

a) 230 b) 2300 c) 2000 d) 1000 e) 4600

2) Two point charges, 3.5 μC and 1.0 μC, are separated by 1 cm. The magnitude of the force (in N) exerted by one charge on the other is

a) 135 b) 315 c) 225 d) 405 e) 495

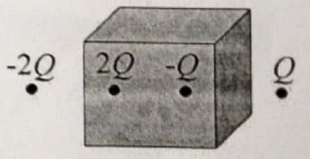
3) The magnitude of the acceleration (in m/s^2) of a proton ($m = 1.67 \times 10^{-27}$ kg) in a uniform electric field of magnitude 6×10^4 N/C is

a) 1.9×10^{12} b) 3.8×10^{12} c) 2.9×10^{12} d) 6.7×10^{12} e) 5.7×10^{12}

4) The local surface charge density at a point on the surface of an arbitrarily shaped conductor is 1 nC/m^2. The magnitude of the electric field at that point (in N/C) is

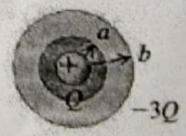
a) 113 b) 452 c) 678 d) 340 e) 1130

5) The figure shows a closed cubical surface with the charges $2Q$ and $-Q$ inside the cube and the charges $-2Q$ and Q outside the cube. If $Q = 6$ nC the net electric flux (in N.m^2/C) through the surface of the cube is



a) 282 b) 0 c) 678 d) 339 e) 565

6) A conducting spherical shell with inner radius a and outer radius b has a positive point charge Q located at its center. The total charge on the shell is $-3Q$, and it is insulated from its surroundings. The surface charge density on the outer surface of the conducting shell is

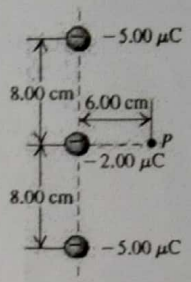


a) $\frac{-3Q}{4\pi a^2}$ b) $\frac{-3Q}{4\pi b^2}$ c) $\frac{-Q}{2\pi b^2}$ d) $\frac{3Q}{4\pi a^2}$ e) $\frac{-Q}{4\pi a^2}$

7) The electric field at a distance of 0.145 m from the surface of a solid insulating sphere with radius 0.355 m is 1750 N/C. Assuming the sphere's charge is uniformly distributed, the electric field (in N/C) inside the sphere at a distance of 0.300 m from the center is

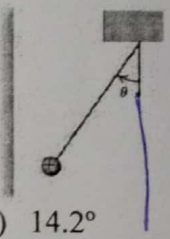
a) 0 b) 1750 c) 2940 d) 1960 e) 980

8) Three negative point charges lie along a line as shown in the figure. The magnitude of the electric field (in N/C) this combination of charges produces at point *P*, which lies 6.00 cm from the -2.00μC charge measured perpendicular to the line connecting the three charges is



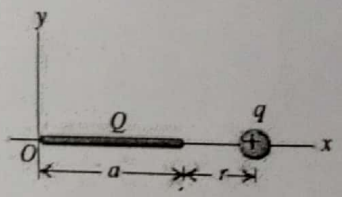
a) 1.0×10^{7} b) 2.0×10^{7} c) 0.5×10^{7}
d) 2.4×10^{5} e) 1.0×10^{5}

9) A small sphere with mass 4.00×10^{-6} kg and charge 4.00×10^{-8} C hangs from a thread near a very large, charged insulating sheet. The charge density on the surface of the sheet is uniform and equal to -2.50×10^{-9} C/m2. The angle of the thread is



a) 8.2° b) 12.2 ° c) 10.2° d) 9.2° e) 14.2°

10) Positive charge Q is distributed uniformly along the x-axis from $x = 0$ to $x = a$. A positive point charge q is located on the positive x-axis at $x = a + r$, a distance $r=a/4$ to the right of the end of Q. The force (magnitude and direction) that the charge distribution Q exerts on q is



a) $\frac{qQ}{3\pi\varepsilon_0 a^2}(-\hat{i})$ b) $\frac{qQ}{3\pi\varepsilon_0 a^2}\hat{i}$ c) $\frac{4qQ}{5\pi\varepsilon_0 a^2}(-\hat{i})$ d) $\frac{4qQ}{5\pi\varepsilon_0 a^2}\hat{i}$ e) $\frac{qQ}{4\pi\varepsilon_0 a^2}\hat{i}$

Q	1	2	3	4	5	6	7	8	9	10
Answer	c	b	e	a	c	b	b	a	d	e