

Course No: EQUIP 3322
Course Title: Electromagnetism
Date: 18/04/2018
No. of Questions: (3)
Time: 1hour
Using Calculator (Yes)

University of Palestine

Second Midterm Exam
2nd 2018-2017
Total Grade: 15

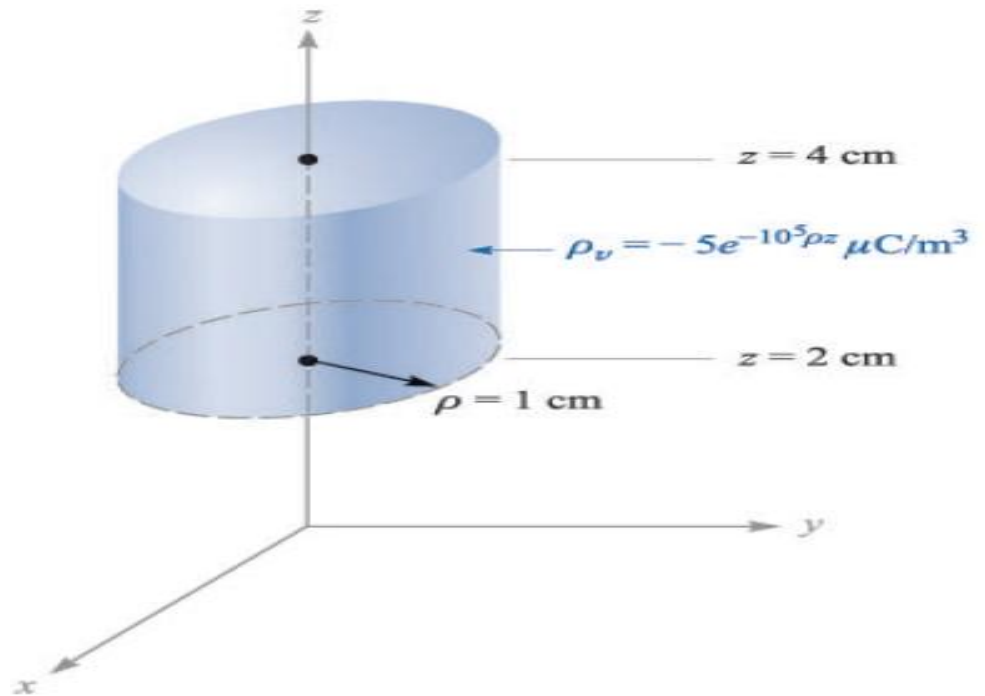
Instructor Name: Eng. M. Timraz
Student No.: _____
Student Name: _____
College Name: _____
Dep. / Specialist: _____
Using Dictionary (No)

Question One:

(05/15)

A) Evaluate the volume integral, find the total charge contained in a 2 cm length of the electron beam as shown in the following figure.

$$\rho_v = -5 e^{-10^5 \rho z}$$



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B) Infinite uniform line charges of 5 nC/m lie along the (positive) x and y axes in free space, Find E at $P_A (0,0,4)$

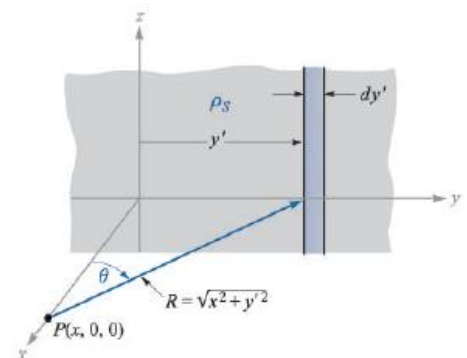
Question Two:

(2.5/15)

An infinite sheet of charge in the $y - z$ plane, a general point \underline{P} on the x axis, and the differential width line charge used as the element in determining the field at \underline{P} by $d\mathbf{E} = \rho_s dy' \mathbf{a}_R / (2\pi \epsilon_0 R)$.

Express the electric field in the normal direction to reach the following form.

$$\mathbf{E} = \frac{\rho_s}{2\epsilon_0} \mathbf{a}_N$$



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Question Three:

(05/15)

- A) Given a 60- μC point charge located at the origin, find the total electric flux passing through:
- (a) That portion of the sphere $r= 26$ cm bounded by $0 < \theta < \pi/2$ and $0 < \phi < \pi/2$;
 - (b) the closed surface defined by $\rho= 26$ cm and $z= \pm 26$ cm;
- B) Given the electric flux density, $D= 0.3r^2 \mathbf{a}_r \text{ nC/m}^2$ in free space:
- (a) Find the electric field at point P($r= 2$, $\theta= 25^\circ$, $\phi= 90^\circ$);
 - (b) Find the total charge within the sphere $r= 3$;
 - (c) Find the total electric flux leaving the sphere $r= 4$.

End of Questions
Good Luck