امتحان بحثي

الفصل الدراسي الثاني لعام   2019-2020

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كود المقرر: هكر123

بيانات الطالب

الاسم	....
الرقم الاكاديمي	....
الفرقة	الأولى
القسم	الهندسة الكهربائية
المقرر	نظرية المجالات (1)

موضوع البحث

أكتب رقم البحث الذي أخترته:..

تقييم البحث	
لم يجتاز	اجتاز

نتنتت

توقيع المصحح

....

ملاحظات

يبدأ تسليم البحث من 202/5/31 الى 2020/6/15 طبقاً للشروط المعلنة.	

DO ONE REPORT ONLY

REPORT(1)

1) State and explain Coulomb's law.

2) Transform the vector field **G**= (xz/y) $\mathbf{a}_x$ into:

  i) Spherical coordinate system.

  ii) Cylindrical coordinate system.

3) Find electric field **E** at the origin if the following charge distributions are present in free space: point charge, 12 nC at P (2, 0, 6); uniform line charge density of $\rho_l = 3$ nC/m and located at x = -2, y = 3; uniform surface charge density $\rho_s = 0.2$ nC/m^2 located at x = 2.

4) Consider the uniform line charge distribution ρ_l lying along the z axis and extending from $-\infty$ to $+\infty$. Use Gauss's law to find expression for the electric field intensity and the electric flux density at point P (x, y, z) in free space.

5) what do we mean by:

  i) the absolute potential at a point.

  ii) conduction current.

6) Write some comments for an air-filled parallel-plate capacitor with plate separation d and plate area A and connected to a battery that applies a voltage V_0 between plates. If the distance between the plates are increased to 10d. Write in your comments by what factor each of the following quantities changes: V_0, C, E, D, Q, ρ_S, W_E.

=== **Best Wishes**===

REPORT(2)

1) State and explain Gauss's law.

2) A triangle is defined by the three points A(2, -5, 1), B(-3, 2, 4), C(0, 3, 1). Find:

  i) the R_{BC} X R_{BA},

  ii) the area of the triangle,

3) Find electric field **E** at the origin if the following charge distributions are present in free space: point charge, 12 nC at P (2, 0, 6); uniform line charge density of $\rho_l = 3$ nC/m and located at x = -2, y = 3; uniform surface charge density $\rho_s = 0.2$ nC/m^2 located at x = 2.

4) Consider a uniform sphere centered at the origin of radius a, having a surface charge ρ_s distributed along its surface. Use Gauss's law to find expression for the electric field intensity and the electric flux density inside and outside the sphere.

5) What is the physical explanation of:

  i) voltage difference between two points,

  ii) the polarization in a dielectric medium.

6) Write some comments describing the boundary condition of the electric field intensity and electric flux density and explain why they should be satisfied at the boundary between any two media.

=== **Best Wishes**===

REPORT(3)

1) State and explain the divergence theorem.

2) A perpendicular cylinder its axis is the z-axis of a Cartesian coordinate system and its bottom surface is on the z=0 plane. The point (5,0.2π,3) is located on the cylinder side surface and the point (3,0.1π,15) is located on the top surface of the cylinder. Find:

   i) the cylinder side surface area,

   ii) the volume of the cylinder.

3) Find electric field **E** at the origin if the following charge distributions are present in free space: point charge, 10 nC at P (4, 0, 3); an infinite planar uniform surface charge density $\rho_s = 0.2$ nC/m^2 located at x = 2.

4) Consider a uniform sphere centered at the origin of radius a, having a surface charge ρ_s distributed along its surface. Use Gauss's law to find expression for the electric field intensity and the electric flux density inside and outside the sphere.

5) What is the physical explanation of:

   i) a capacitance,

   ii) the polarization in a dielectric medium.

6) Write some comments describing the electric energy stored in a volume having an electric field. and explain why it should be related to the electric flux in that volume.

=== **Best Wishes**===