Unit 10 - Week 9

Assignment 9

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-04-01, 23:59 IST.

Currents

A current I flows down a wire of radius a.

1) If it is uniformly distributed over the surface, what is the surface current density K ? ***4 points***

- $K = I/\pi a^2$
- $K = 3I/\pi a^2$
- $K = I/2\pi a$
- $K = I/\pi a$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$K = I/2\pi a$

2) If it is distributed in such a way that the volume current density is inversely proportional to the distance from the axis (s), what is J ? ***5 points***

- $J = \frac{I}{2\pi as}$
- $J = \frac{I}{2\pi a}$
- $J = \frac{3I}{4\pi as}$
- $J = \frac{I}{\pi as}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$J = \frac{I}{2\pi as}$

3) Suppose that the magnetic field in some region has the form $\vec{B} = kz\hat{x}$ (where k is a constant). Find the force on a square loop (side a), lying in the yz plane and centered at the origin, if it carries a current I, flowing counterclockwise, when you look down the x axis. ***5 points***

- $F = Ika\hat{z}$
- $F = ka^2\hat{z}$
- $F = Ika^2\hat{z}$
- $F = ka^3\hat{z}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$F = Ika^2\hat{z}$

Biot-Savart Law

4) Find the magnetic field at the center of a square loop, which carries a steady current I. Let R be the distance from center to side. ***4 points***

- $B = \frac{\sqrt{2}\mu_0 I}{\pi R}$
- $B = \frac{\sqrt{2}\mu_0}{\pi R}$
- $B = \frac{2\mu_0 I}{\pi R}$
- $B = \frac{\sqrt{3}\mu_0 I}{\pi R}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$B = \frac{\sqrt{2}\mu_0 I}{\pi R}$

5) Find the field at the center of a regular n - sided polygon, carrying a steady current I. Again, let R be the distance from the center to any side. ***5 points***

- $B = \frac{n\mu_0 I}{2\pi R}\, cos(\pi/n)$
- $B = \frac{n\mu_0 I}{2\pi R}\, sin(\pi/n)$
- $B = \frac{\mu_0 I}{2\pi}\, sin(\pi/n)$
- $B = \frac{\mu_0 I}{2\pi R}\, sin\,(2\pi/n)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$B = \frac{n\mu_0 I}{2\pi R}\, sin(\pi/n)$