Unit 10 - Week 8

Assignment 8

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

Due on 2020-11-11, 23:59 IST.

1) The force $\vec{F}$ experienced by a test charge q that moves at a velocity $(\vec{v})$ in resultant electromagnetic field is given by the Lorentz force law $\vec{F} = q(\vec{E} + \vec{v}X\mu_o\vec{H})$. Here, $\mu_o\vec{H}$ is the : *1 point*

- electric field density
- magnetic field intensity
- magnetic flux density
- permeability of free space

No, the answer is incorrect.
Score: 0
Accepted Answers:
magnetic flux density

2) Which of the following represents a charge conservation equation? *1 point*

- $\frac{\partial \rho}{\partial t} + \vec{\nabla}.\vec{I'} = 0$
- $\frac{\partial \rho}{\partial t} = q\vec{v}X\,\mu_o\vec{H}$
- $\int_s \vec{I'}dA + \frac{d}{dt}\int_v \rho dV = 0$
- $\vec{\nabla}.\vec{I'} = 0$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{\partial \rho}{\partial t} + \vec{\nabla}.\vec{I'} = 0$
$\int_s \vec{I'}dA + \frac{d}{dt}\int_v \rho dV = 0$

3) According to Gauss' law, *1 point*

- the net charge enclosed in a volume *V*, enclosed by a surface *S* is related to the net electric flux through that surface
- the magnetic field intensity is related to its source
- an electric current and a time-variant electric flux produce a magnetic field.
- the magnetic field intensity is not related to its source

No, the answer is incorrect.
Score: 0
Accepted Answers:
the net charge enclosed in a volume V, enclosed by a surface S is related to the net electric flux through that surface

4) Identify the Laplace equation for electric potential *1 point*

- $\nabla^2 V = -\frac{\rho}{\epsilon}$
- $\nabla^2 V = \frac{\rho}{\epsilon}$
- $\nabla^2 V = -\frac{\epsilon}{\rho}$
- $\nabla^2 V = 0$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\nabla^2 V = 0$

5) The plasma membrane can be equated to which of the following electrical elements *1 point*

- Resistor
- Capacitor
- Diode
- Transistor

No, the answer is incorrect.
Score: 0
Accepted Answers:
Capacitor

6) Identify from below the equation relating electric field and magnetic flux *1 point*

- $\oint \vec{E}.d\vec{S} = -\frac{d}{dt}\int_s \mu_0\vec{H}.d\vec{A}$
- $\oint \epsilon_0\vec{E}.d\vec{A} = -\int_V \rho dV$
- $\oint \vec{H}.d\vec{S} = I + \epsilon_0\frac{d\varphi_E}{dt}$
- $\vec{\nabla}.\mu_0\vec{H} = 0$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\oint \vec{E}.d\vec{S} = -\frac{d}{dt}\int_s \mu_0\vec{H}.d\vec{A}$

7) A solution is electrically neutral when *1 point*

- Number of positive charges > number of negative charges
- Number of negative charges > number of positive charges
- when the net charge of the system is non zero
- Number of negative charges = number of positive charges

No, the answer is incorrect.
Score: 0
Accepted Answers:
Number of negative charges = number of positive charges

8) Charge relaxation time is defined as *1 point*

- $\tau_r = \frac{1}{k_e}$
- $\tau_r = \frac{\epsilon}{k_e}$
- $\tau_r = \frac{k_e}{\epsilon}$
- $\tau_r = \frac{1}{\epsilon}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\tau_r = \frac{\epsilon}{k_e}$

9) A comparative study was done on the charge relaxation time of water-ethanol mixture at various proportions. A 60% ethanol-water mixture had a τ_r of 80 ps and 80% ethanol- water mixture had a τ_r of 120 ps. If a uniform charge density is added to equal volumes of both of these mixtures at the same time under the same conditions, which one would reach the equilibrium faster? *1 point*

- 60% ethanol-water mixture
- 80% ethanol-water mixture
- both will reach the equilibrium at the same time
- equilibrium will not be reached

No, the answer is incorrect.
Score: 0
Accepted Answers:
60% ethanol-water mixture

10) Debye length is the small distance in the electrolyte solution where *1 point*

- electroneutrality is valid
- electroneutrality is not valid
- electric current is applied
- the net charge is zero

No, the answer is incorrect.
Score: 0
Accepted Answers:
electroneutrality is not valid