Unit 4 - Week 1

Assignment 1

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

Due on 2019-08-14, 23:59 IST.

1) A vector field is specified (up to a constant) if its _____ and _____ are known. *1 point*

- Gradient and Curl
- Gradient and Divergence
- Divergence and Curl
- All of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Divergence and Curl

2) To what family of computational electromagnetic (CEM) techniques does the commonly used form of the Finite Element Method (FEM) belong? *1 point*

- Time domain, Differential form
- Time domain, Integral form
- Frequency domain, Differential form
- Frequency domain, Integral form

No, the answer is incorrect.
Score: 0
Accepted Answers:
Frequency domain, Differential form

3) If an object (with size of order L meters) is illuminated by an electromagnetic radiation of wavelength λ meters, then in which range are optics/ray-like solutions obtained ? *1 point*

- Low frequency, $L << \lambda$
- Mid frequency, $L \approx \lambda$
- High frequency, $L >> \lambda$
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
High frequency, $L >> \lambda$

4) Which of the following methods are usually formulated in the frequency domain? *1 point*

- FDTD
- IEM
- FEM
- None of the above

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

5) Which of the following methods are formulated using the differential form of Maxwell's equations? *1 point*

- FDTD
- FEM
- IEM
- None of the above

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

6) Tangential component of the electric field $\vec{E}$ to a surface with normal $\hat{n}$ is given by *1 point*

- $\hat{n} \times \vec{E}$
- $\hat{n} \cdot \vec{E}$
- $\hat{n} \cdot (\hat{n} \times \vec{E})$
- $\vec{E} - (\vec{E} \cdot \hat{n})\hat{n}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\vec{E} - (\vec{E} \cdot \hat{n})\hat{n}$

7) Average power density (power per unit area) of an electromagnetic wave is given by the following relation between the field phasors: *1 point*

- $\frac{1}{2} Re(E \times H^*)$
- $\frac{1}{2} Re(E \times H)$
- $\frac{1}{2} Im(E \times H^*)$
- $\frac{1}{2} Im(E \times H)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{1}{2} Re(E \times H^*)$

8) Boundary conditions_____ and _____ are derived from Coulomb's and Faraday's law by applying_____ and _____ theorems, respectively *1 point*

- $\hat{n}.(D_2 - D_1) = \rho_{es}$
- $\hat{n} \times (H_2 - H_1) = J_s$
- $\hat{n} \times (E_2 - E_1) = M_s$
- $\hat{n}.(B_2 - B_1) = \rho_{ms}$
- Gauss Divergence Theorem
- Poynting's Theorem
- Stokes Theorem

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\hat{n}.(D_2 - D_1) = \rho_{es}$
$\hat{n} \times (E_2 - E_1) = M_s$
Gauss Divergence Theorem
Stokes Theorem

9) Electromagnetic fields are uniquely determined if at least which of the following are known: *1 point*

- Tangential component of electric field over surface S
- Normal component of electric field over surface S
- Tangential component of magnetic field over surface S
- Normal component of magentic field over surface S

No, the answer is incorrect.
Score: 0
Accepted Answers:
Tangential component of electric field over surface S
Tangential component of magnetic field over surface S

10) According to the Volume Equivalence theorem, the equivalent currents M_{eq} and J_{eq} are defined, respectively, by *1 point*

- $j\omega(\epsilon - \epsilon_0)E$ and $j\omega(\mu - \mu_0)H$
- $j\omega(\mu - \mu_0)H$ and $j\omega(\epsilon - \epsilon_0)E$
- $j\omega(\mu - \mu_0)E$ and $j\omega(\epsilon - \epsilon_0)H$
- $j\omega(\epsilon - \epsilon_0)H$ and $j\omega(\mu - \mu_0)E$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$j\omega(\mu - \mu_0)H$ and $j\omega(\epsilon - \epsilon_0)E$

11) Tangential boundary conditions state that $\hat{n} \times (E_2 - E_1) =$ _____and $\hat{n} \times (H_2 - H_1) =$ _____, with normal $\hat{n}$ pointing from medium 1 to medium 2 *1 point*

- $-M_s$ and J_s
- J_s and $-M_s$
- M_s and $-J_s$
- $-J_s$ and M_s

No, the answer is incorrect.
Score: 0
Accepted Answers:
$-M_s$ and J_s

12) The main idea behind surface equivalence theorem is to replace the object by *1 point*

- volume charges
- surface charges
- volume currents
- tangential surface currents

No, the answer is incorrect.
Score: 0
Accepted Answers:
tangential surface currents