X

Unit 3 - Week 1

Week 1 Assignment 1

The due date for submitting this assignment has passed. **Due on 2018-08-15, 23:59 IST.**
As per our records you have not submitted this assignment.

1) ***2 points***

Describe the state of polarization of the EM wave represented by $\hat{\imath}E_0\cos(kz-\omega t)-\hat{\jmath}E_0\cos(kz-\omega t)$.

(a) linearly polarized with resultant angle $\frac{3\pi}{4}$ (b) circularly polarized

(c) elliptically polarized (d) linearly polarized with resultant angle $\frac{\pi}{3}$

- (a)
- (b)
- (c)
- (d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a)

2) ***2 points***

An EM wave is propagating through a nonconducting medium of permittivity and permeability $2\mu_0$. The magnetic field associated with the wave is $\hat{y}E_0\cos(3z-\omega t)\ A/m$. What is the speed of the wave inside the medium i speed of the light in free space is c.

(a) $0.5\times10^8\ m/s$ (b) $2.5\times10^8\ m/s$ (c) $0.95\times10^8\ m/s$ (d) $0.75\times10^8\ n$

- (a)
- (b)
- (c)
- (d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(c)

3) ***2 points***

An EM wave is propagating through a nonconducting medium of permittivity and permeability $2\mu_0$.The magnetic field associated with the wave is $\hat{y}E_0\cos(3z-\omega t)\ A/m$. What is the amplitude of the associated electric field

(c)
(d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)

4) **2 points**

The energy associated with the EM wave described by the magnetic field $\hat{y}E_0 \cos(7z - \omega t)\ A/m$ propagates along which direction
(a) x direction (b) z direction (c) y direction

(a)
(b)
(c)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)

5) **2 points**

A light bulb of $20\ W$ radiates isotropically. Assuming it a point source calc the strength of the electric field($\overrightarrow{E}$) at a distance $1\ m$ from the bulb
(a) $27.5\ V/m$ (b) $29.5\ V/m$ (c) $24.5\ V/m$ (d) none of these

(a)
(b)
(c)
(d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(c)

6) **2 points**

The dispersion relation for EM waves in certain medium is given by $\omega^2 =$ Where k is the propagation constant and ω is the angular frequency. The vel of the energy propagation in this medium is
(a) $a/2\omega$ (b) $a/4\omega$ (c) a/ω (d) $2a/\omega$

(a)
(b)
(c)
(d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a)

7) **2 points**

Find the angular altitude (angle above the horizontal) of the sun for whic sunlight with reflected from a lake will be plane polarized. If the light comes inside the lake the critical angle is 48.6°.

(a) 48.6° (b) 90° (c) 36.87° (d) 53.13°

(a)

(b)
(c)
(d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(c)

8) **2 points**

A plane EM wave travelling through a transparent medium is given by $\overrightarrow{E_0}\cos(0.4 \times 10^7 \pi x - 6\pi \times 10^{14} t)$ in SI units .Determine the refractive inde the material

(a) 1.5 (b) 1.33 (c) 2 (d) 1.47

(a)
(b)
(c)
(d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(c)

9) **2 points**

Normally the refractive index of a transparent material

(a) is independent of frequency

(b) decreases with increases in wavelength

(c) increses with increases in wavelengt

(d) at first decreases and then increases with wavelength.

(a)
(b)
(c)
(d)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)

10) **0 points**

The static dielectric constant of diamond is 5.50 and its refractive index at wavelength 589.3 μm is 2.417.Fit this data into Sellmeier's dispersion forr with a single natural frequency. Find the free space wavelength correspon to this natural frequency

(a)250 nm (b))156 nm (c))156 μm (d))15.6 nm

(a)
(b)
(c)
(d)

No, the answer is incorrect.
Score: 0

Accepted Answers:

(b)

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