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PHYSICS · EAPCET (EAMCET)

Electromagnetic Waves

Previous Year Questions with answers

150 questions · **132** papers · **2014–2026** · newest paper first

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What is in this PDF: every Electromagnetic Waves question we hold from past AP and TS EAPCET (called EAMCET until 2020 in Andhra Pradesh and 2023 in Telangana) papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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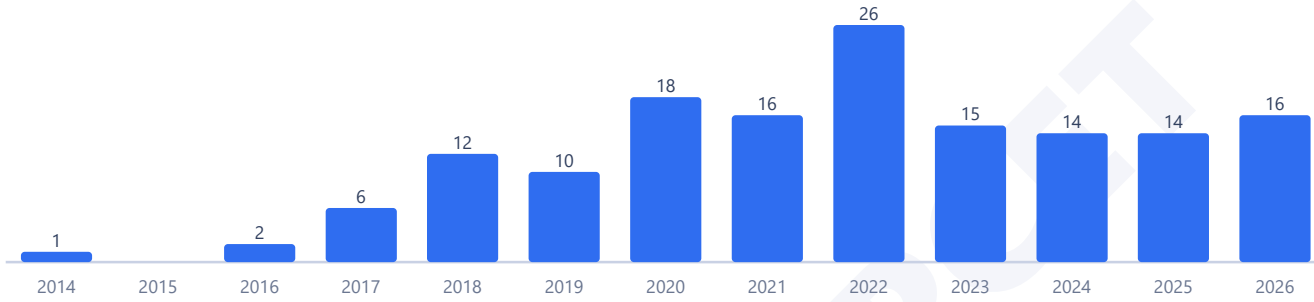
Chapter at a glance

2.8%	150	73 of 77	150 / 0
of Physics questions, 2022–2026	questions, 2014–2026	papers asked it, 2022–2026	MCQ / numerical, 2014–2026

Trend. Falling: 1 questions per paper in 2024–2026 against 1.3 in 2022–2023.

Questions per year



Counts are the questions we hold: 150 in 132 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2014–2026)

EM Waves	130
Electromagnetic Spectrum	20

How often it comes up

Electromagnetic Waves forms a compact, foundational chapter rounding off Class 12 electrodynamics. Between 2022 and 2026, the AP and TS EAPCET papers in our archive recorded 85 questions from this unit across 77 sittings, averaging 1.1 questions per paper and 2.8% of physics questions. Looking at our entire archive spanning 2010 to 2026, Electromagnetic Waves provided 150 questions across 149 papers (1.0 question per paper, 2.5% subject share). During the early window between 2010 and 2021, our database shows 65 questions in 72 papers, which corresponds to a 2.3% share. Across the most recent three years from 2024 to 2026, it brought 44 questions across 46 papers, accounting for 2.4% of the subject. Relative to the early papers, the share in the last three years is about the same, and when matched against the 2022–2026 recent baseline it is also about the same.

State-wise breakdowns demonstrate nearly identical weightings across the two state entrance boards. Between 2022 and 2026, AP EAPCET papers in our set contributed 54 questions across 48 papers, with 44 papers carrying questions (1.1 per paper, 2.8% share). Over the same window, TS EAPCET contributed 31 questions across 29 papers in our set, with all 29 papers featuring questions (1.1 per paper, 2.7% share). Electromagnetic Waves has appeared every year since 2022, though across all 77 recent papers in our collection, four AP sittings missed it, meaning it was not present in all 77 sittings. The chapter ranks 20th of 28 physics chapters by question share between 2022 and 2026. The busiest single sitting in our collection was 2022, which delivered 26 questions across 16 papers.

Most-asked topics

Questions concentrate across two syllabus areas:

- **EM Waves**: This core topic brought 74 questions between 2022 and 2026, contributing to 130 questions across all years in our archive. It tests Maxwell's equations, displacement current I_d = ε_zero (dΦ_E / dt), transverse wave characteristics, electric and magnetic field amplitudes, wave speed c = 1 / √(μ_zero ε_zero), energy density, and radiation pressure.

- **Electromagnetic Spectrum**: Recent examinations included 11 questions, out of 20 questions in the complete record. Key concepts cover frequency and wavelength ordering, generation mechanisms, and practical applications of radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays.

What the questions look like

Numerical problems are largely direct algebraic evaluations relating field amplitudes. A standard question gives the amplitude or equation of the electric field vector E(x, t) = E_zero sin(k x - ω t) j and asks students to deduce the corresponding magnetic field vector B(x, t). Students must determine the magnetic amplitude from B_zero = E_zero / c and identify the correct spatial direction from the Poynting propagation vector S = (E × B) / μ_zero.

Radiation pressure and momentum transfer form another recurrent category. Examiners give the incident power or energy flux of sunlight falling on a surface and ask for the total momentum delivered or force exerted over a given exposure interval. Students must distinguish between complete absorption, where radiation pressure is P = I / c, and complete reflection, where pressure doubles to 2I / c. Spectrum problems test characteristic uses, such as identifying microwaves in radar and cellular links, infrared in thermal imaging, or ultraviolet in water purification.

How to practise it

Start by mastering Maxwell's displacement current and field relations. Displacement current density is J_d = ε_zero (dE / dt), and total displacement current across plate area A is I_d = ε_zero A (dE / dt) = dQ / dt, which matches conduction current in the external connecting leads at every instant. Wave speed in free space satisfies c = 1 / √(μ_zero ε_zero) = E_zero / B_zero = ω / k. In a non-magnetic dielectric medium of refractive index n and relative permittivity ε_r, propagation speed is v = c / √ε_r = c / n.

Next, study energy density and intensity. The instantaneous electric energy density is u_E = (1/2) ε_zero E^2, and magnetic energy density is u_B = B^2 / (two μ_zero). In an electromagnetic wave, energy is shared equally on average between electric and magnetic fields: average total energy density is u_avg = (1/2) ε_zero E_{zero}^2 = B_{zero}^2 / (two μ_zero). Wave intensity is I = u_avg c = (1/2) ε_zero c E_{zero}^2.

Finally, memorize the electromagnetic spectrum sequence in order of decreasing wavelength (and increasing frequency): radio waves, microwaves, infrared rays, visible light, ultraviolet rays, X-rays, and gamma rays. Remember production mechanisms: radio waves from oscillating LC circuits, microwaves from magnetrons and klystrons, infrared from molecular vibrations and hot bodies, ultraviolet from inner shell electronic transitions and mercury lamps, X-rays from high-energy electron bombardment of heavy metal targets, and gamma rays from nuclear radioactive decay.

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Q1 AP EAPCET 2026 · 18 May · Shift 1 MCQ

A light of energy flux $9\ W\ cm^{-2}$ is incident for 20 minutes on a black surface of area $100\ cm^2$ then the maximum average force exerted on the surface is
(velocity of light, $C = 3 \times 10^8\ ms^{-1}$)

(A) $3 \times 10^{-3}\ N$
(B) $3 \times 10^{-6}\ N$
(C) $3 \times 10^{-8}\ N$
(D) $10\ N$

Answer: (B) $3 \times 10^{-6}\ N$ · The council's preliminary key

Q2 AP EAPCET 2026 · 15 May · Shift 1 MCQ

The electric field intensity produced by the radiations coming from 100W bulbs at 3m distance is E. The electric field intensity produced by the radiations coming from 50W bulbs at the same distance is

(A) $\frac{E}{2}$
(B) $2E$
(C) $\frac{E}{\sqrt{2}}$
(D) $\sqrt{2}\,E$

Answer: (C) $\frac{E}{\sqrt{2}}$ · The council's preliminary key

Q3 AP EAPCET 2026 · 15 May · Shift 2 MCQ

If the rms value of the electric field of an electromagnetic wave is $360\sqrt{\pi}\ \mathrm{NC}^{-1}$, the average energy density of the electric field of the wave is

(A) $3.6 \times 10^{-6}\ Jm^{-3}$
(B) $3.6 \times 10^{-9}\ Jm^{-3}$
(C) $1.8 \times 10^{-6}\ Jm^{-3}$
(D) $1.8 \times 10^{-9}\ Jm^{-3}$

Answer: (C) $1.8 \times 10^{-6}\ Jm^{-3}$ · The council's preliminary key

Q4 AP EAPCET 2026 · 14 May · Shift 1 MCQ

Which of the following statements are correct about electromagnetic waves?

i) Electromagnetic waves are produced by accelerating charges

ii) Electromagnetic waves do not transport charge

iii) Energy of electromagnetic waves is shared equally between electric and magnetic fields

iv) Electromagnetic waves travel with same speed in all media

(A) (i) and (iv) only
(B) (ii) and (iii) only
(C) (i), (ii) and (iv) only
(D) (i), (ii) and (iii) only

Answer: (D) (i), (ii) and (iii) only · The council's preliminary key

Q5 AP EAPCET 2026 · 14 May · Shift 2 MCQ

Electromagnetic radiations are emitted from a 15W point source. The peak value of the magnetic field at a distance of 5m from the source is

(A) 4×10^{-8} T
(B) 2×10^{-8} T
(C) 2×10^{-7} T
(D) 4×10^{-7} T

Answer: (B) 2×10^{-8} T · The council's preliminary key

Q6 AP EAPCET 2026 · 13 May · Shift 1 MCQ

Electromagnetic waves do not transport

(A) Charge
(B) Energy
(C) Momentum
(D) Information

Answer: (A) Charge · The council's preliminary key

Q7 AP EAPCET 2026 · 13 May · Shift 2 MCQ

About 5% of the power of a $100\ W$ light bulb is converted to visible radiation. Then the average intensity of visible radiation at a distance of $1\ m$ from the bulb is approximately
(Assume that the radiation is emitted isotropically and neglect refection)

(A) Zero
(B) $0.2\ W\ m^{-2}$
(C) $0.4\ W\ m^{-2}$
(D) $0.6\ W\ m^{-2}$

Answer: (C) $0.4\ W\ m^{-2}$ · The council's preliminary key

Q8 AP EAPCET 2026 · 12 May · Shift 1 MCQ

A parallel plate capacitor of plate separation 2 mm is connected in an electric circuit having source voltage 400 V. If the plate area is 60 cm^2, then the value of displacement current for 10^{-6} sec will be

(A) 1.062 A
(B) 1.062×10^{-2} A
(C) 1.062×10^{-3} A
(D) 1.062×10^{-4} A

Answer: (B) 1.062×10^{-2} A · The council's preliminary key

Q9 AP EAPCET 2026 · 12 May · Shift 2 MCQ

Solar energy flux of $2000\ \mathrm{Wm^{-2}}$ incident normally on a solar plate of $1\ \mathrm{m^2}$ surface area in 1 hour. Then the momentum received by solar plate is

(A) $24 \times 10^{3}\ \mathrm{kgms^{-1}}$
(B) $24 \times 10^{-3}\ \mathrm{kgms^{-1}}$
(C) $48 \times 10^{-3}\ \mathrm{kgms^{-1}}$
(D) $72 \times 10^{3}\ \mathrm{kgms^{-1}}$

Answer: (B) $24 \times 10^{-3}\ \mathrm{kgms^{-1}}$ · The council's preliminary key

Q10 TS EAPCET 2026 · 11 May · Shift 1 MCQ

If the rms value of the electric field of an electromagnetic wave propagating in free space is $30\sqrt{\pi}\ \mathrm{Vm^{-1}}$, then the intensity of the wave is

(A) $30\ \mathrm{Wm^{-2}}$
(B) $3.75\ \mathrm{Wm^{-2}}$
(C) $15\ \mathrm{Wm^{-2}}$
(D) $7.5\ \mathrm{Wm^{-2}}$

Answer: (D) $7.5\ \mathrm{Wm^{-2}}$ · The council's preliminary key

Q11 TS EAPCET 2026 · 11 May · Shift 2 MCQ

The wavelength range of the electromagnetic waves suitable for radar systems used in aircraft navigation is

(A) 0.1 m to 1 mm
(B) 700 nm to 400 nm
(C) 300 nm to 10 nm
(D) 1 nm to 10^{-3} nm

Answer: (A) 0.1 m to 1 mm · The council's preliminary key

Q12 TS EAPCET 2026 · 10 May · Shift 1 MCQ

The frequency of electromagnetic waves produced by a charged particle oscillating about its mean position with a frequency of 10^{8}Hz is

(A) 5×10^7 Hz
(B) 2×10^8 Hz
(C) 10^8 Hz
(D) 2.5×10^8 Hz

Answer: (C) 10^8 Hz · The council's preliminary key

Q13 TS EAPCET 2026 · 10 May · Shift 2 MCQ

The amplitude of the magnetic field of a plane electromagnetic wave travelling along positive x-axis in vacuum is 6 mT. A particle of charge 5 μC is travelling with a velocity of 6×10^5 ms^{-1} along the positive y-axis. If the magnetic field is oriented along positive z-axis, then the maximum force exerted on the particle due to electric field of the wave is

(A) 15 N
(B) 18 N
(C) 9 N
(D) 12 N

Answer: (C) 9 N · The council's preliminary key

Q14 TS EAPCET 2026 · 9 May · Shift 1 MCQ

The rms value of electric field at a distance of 6 m from a 100 W bulb of efficiency 1.2% is

(A) $4\,\mathrm{V\,m}^{-1}$
(B) $1\,\mathrm{V\,m}^{-1}$
(C) $2\,\mathrm{V\,m}^{-1}$
(D) $3\,\mathrm{V\,m}^{-1}$

Answer: (B) $1\,\mathrm{V\,m}^{-1}$ · The council's preliminary key

Q15 TS EAPCET 2026 · 9 May · Shift 2 MCQ

The unification of electromagnetism and optics is based on the discovery that

(A) light is an electromagnetic wave
(B) light travels with a speed equal to speed of sound
(C) light wave consists of electrons
(D) light waves are deflected by electric and magnetic fields

Answer: (A) light is an electromagnetic wave · The council's preliminary key

Q16 TS EAPCET 2026 · 9 May · Shift 2 MCQ

If a plane electromagnetic wave of intensity $9 \times 10^5\ \mathrm{W\,m}^{-2}$ incidents normally on a perfectly absorbing surface of area $2\ \mathrm{m}^2$ for a time of $180\ \mathrm{s}$, then the average force exerted by the electromagnetic wave on the surface during this time is

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(A) 3 mN
(B) 12 mN
(C) 6 mN
(D) 9 mN

Answer: (C) 6 mN · The council's preliminary key

Q17 AP EAPCET 2025 · 27 May · Shift 1 MCQ

If 11% of the power of a 200 W bulb is converted to visible radiation, then the intensity of the light at a distance of 100 cm from the bulb is

(A) $10.5\ \mathrm{W\ m^{-2}}$
(B) $5.25\ \mathrm{W\ m^{-2}}$
(C) $3.5\ \mathrm{W\ m^{-2}}$
(D) $1.75\ \mathrm{W\ m^{-2}}$

Answer: (D) $1.75\ \mathrm{W\ m^{-2}}$ · The council's preliminary key

Q18 AP EAPCET 2025 · 26 May · Shift 2 MCQ

If a 10 W bulb emits electromagnetic waves uniformly in all directions, then the intensity of light at a distance 0.5 m from the source is nearly

(A) $3.18\ \mathrm{W\,m^{-2}}$
(B) $0.31\ \mathrm{W\,m^{-2}}$
(C) $0.62\ \mathrm{W\,m^{-2}}$
(D) $5\ \mathrm{W\,m^{-2}}$

Answer: (A) $3.18\ \mathrm{W\,m^{-2}}$ · The council's preliminary key

Q19 AP EAPCET 2025 · 24 May · Shift 1 MCQ

The oscillating electric and magnetic field vectors of an electromagnetic wave are along

(A) the same direction and in same phase.
(B) the same direction but have a phase difference of 90°.
(C) mutually perpendicular directions and are in same phase.
(D) mutually perpendicular directions but have a phase difference of 90°.

Answer: (C) mutually perpendicular directions and are in same phase. · The council's preliminary key

Q20 AP EAPCET 2025 · 23 May · Shift 1 MCQ

The ratio of the magnitudes of the electric field and 10^8 times the magnetic field of a plane electromagnetic wave is

(A) $1:3$
(B) $3:1$
(C) $1:1$
(D) $1:\sqrt{3}$

Answer: (B) $3:1$ · The council's preliminary key

Q21 AP EAPCET 2025 · 23 May · Shift 2 MCQ

The waves having maximum wavelength among the following electromagnetic waves is

(A) X-rays
(B) Radio waves
(C) UV waves
(D) Visible rays

Answer: (B) Radio waves · The council's preliminary key

Q22 AP EAPCET 2025 · 22 May · Shift 1 MCQ

The magnitude of the electric field of a plane electromagnetic wave travelling in free space is E. If μ_0 and ε_0 are respectively permeability and permittivity of the free space, then the magnitude of magnetic field of the wave is

(A) $E\mu_0\varepsilon_0$
(B) $\dfrac{E}{\mu_0\varepsilon_0}$
(C) $E\sqrt{\mu_0\varepsilon_0}$
(D) $\dfrac{E}{\sqrt{\mu_0\varepsilon_0}}$

Answer: (C) $E\sqrt{\mu_0\varepsilon_0}$ · The council's preliminary key

Q23 AP EAPCET 2025 · 22 May · Shift 2 MCQ

If the rms value of the electric field of electromagnetic waves at a distance of 3 m from a point source is $3\ \mathrm{N\,C^{-1}}$, then the power of the source is

(A) $10.8\ \mathrm{W}$
(B) $8.1\ \mathrm{W}$
(C) $5.4\ \mathrm{W}$
(D) $2.7\ \mathrm{W}$

Answer: (D) $2.7\ \mathrm{W}$ · The council's preliminary key

Q24 AP EAPCET 2025 · 21 May · Shift 2 MCQ

A plane electromagnetic wave of frequency 25 MHz propagates in vaccum along positive x-direction. At a particular point in space and time, if the electric field is $6.3\,\hat{j}\ \mathrm{V\,m^{-1}}$, then the magnitude of the

magnetic field of the wave at this point at the same time is

(A) $2.1 \times 10^{-8}\ \mathrm{T}$
(B) $4.2 \times 10^{-8}\ \mathrm{T}$
(C) $6.3 \times 10^{-8}\ \mathrm{T}$
(D) $8.4 \times 10^{-8}\ \mathrm{T}$

Answer: (A) $2.1 \times 10^{-8}\ \mathrm{T}$ · The council's preliminary key

Q25 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If the rate of change of electric field across the plates of a parallel plate capacitor is E and the displacement current is I, then the area of one plate of the capacitor is (ε_o is permittivity of free space)

(A) $\dfrac{I}{2\varepsilon_o E}$
(B) $\dfrac{2I}{\varepsilon_o E}$
(C) $I\varepsilon_o E$
(D) $\dfrac{I}{\varepsilon_o E}$

Answer: (D) $\dfrac{I}{\varepsilon_o E}$ · The council's preliminary key

Q26 TS EAPCET 2025 · 4 May · Shift 2 MCQ

If the electric field of a plane electromagnetic wave is $E_z = 60 \sin\left(0.5 \times 10^3 x + 1.5 \times 10^{11} t\right)\ \mathrm{Vm}^{-1}$, then the magnetic field of the wave is

(A) $B_y = 2 \times 10^{-7} \sin\left(0.5 \times 10^3 x + 1.5 \times 10^{11} t\right)\ \mathrm{T}$
(B) $B_z = 2 \times 10^{-7} \sin\left(0.5 \times 10^3 x + 1.5 \times 10^{11} t\right)\ \mathrm{T}$
(C) $B_x = 180 \times 10^{8} \sin\left(0.5 \times 10^3 x + 1.5 \times 10^{11} t\right)\ \mathrm{T}$
(D) $B_y = 180 \times 10^{8} \sin\left(0.5 \times 10^3 x + 1.5 \times 10^{11} t\right)\ \mathrm{T}$

Answer: (A) $B_y = 2 \times 10^{-7} \sin\left(0.5 \times 10^3 x + 1.5 \times 10^{11} t\right)\ \mathrm{T}$ · The council's preliminary key

Q27 TS EAPCET 2025 · 3 May · Shift 1 MCQ

If the rate of change in electric flux between the plates of a capacitor is $9\pi \times 10^3\ \mathrm{V\,m\,s}^{-1}$, then the displacement current inside the capacitor is

(A) $0.36\ \mu\mathrm{A}$
(B) $0.25\ \mu\mathrm{A}$
(C) $3.14\ \mu\mathrm{A}$
(D) $4\ \mu\mathrm{A}$

Answer: (B) $0.25\ \mu\mathrm{A}$ · The council's preliminary key

Q28 TS EAPCET 2025 · 3 May · Shift 2 MCQ

The amplitude of the electric field associated with a light beam of intensity $\frac{15}{\pi}\ \mathrm{Wm^{-2}}$ is

(A) $120\ \mathrm{NC^{-1}}$
(B) $15\ \mathrm{NC^{-1}}$
(C) $60\ \mathrm{NC^{-1}}$
(D) $30\ \mathrm{NC^{-1}}$

Answer: (C) $60\ \mathrm{NC^{-1}}$ · The council's preliminary key

Q29 TS EAPCET 2025 · 2 May · Shift 1 MCQ

The dielectric constant of a medium is 8 and its relative permeability is 200. If an electromagnetic wave of frequency 100 MHz travels in this medium, then its wavelength is

(A) 15 m
(B) 15 cm
(C) 7.5 m
(D) 7.5 cm

Answer: (D) 7.5 cm · The council's preliminary key

Q30 TS EAPCET 2025 · 2 May · Shift 2 MCQ

If electromagnetic waves of power 600 W incident on a non-reflecting surface, then the total force acting on the surface is

(A) $12 \times 10^{-6}\ \mathrm{N}$
(B) $9 \times 10^{-9}\ \mathrm{N}$
(C) $6 \times 10^{-6}\ \mathrm{N}$
(D) $2 \times 10^{-6}\ \mathrm{N}$

Answer: (D) $2 \times 10^{-6}\ \mathrm{N}$ · The council's preliminary key

Q31 AP EAPCET 2024 · 23 May · Shift 1 MCQ

For plane electromagnetic waves propagating in the positive Z – direction. The combination which gives the correct possible direction for $\overline{E}$ and $\overline{B}$ fields respectively is

(A) $(-2i-3j)$ and $(3i-2j)$
(B) $(3i+4j)$ and $(4i-3j)$
(C) $(i-2j)$ and $(-2i-j)$
(D) $(-2i+3j)$ and $(i+2j)$

Answer: (A) $(-2i-3j)$ and $(3i-2j)$ · The council's preliminary key

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Q32 AP EAPCET 2024 · 22 May · Shift 1 MCQ

The structure of solids is investigated by using

(A) Cosmic rays
(B) β-rays
(C) X-rays
(D) γ-rays

Answer: (C) X-rays · The council's preliminary key

Q33 AP EAPCET 2024 · 22 May · Shift 2 MCQ

The radiation of energy 'E' falls normally on a perfectly reflecting surface. The momentum transferred to the surface is

(A) $\frac{E}{c}$
(B) $\frac{2E}{c}$
(C) $\frac{E}{c^2}$
(D) $\frac{2E}{c^2}$

Answer: (B) $\frac{2E}{c}$ · The council's preliminary key

Q34 AP EAPCET 2024 · 21 May · Shift 1 MCQ

Which of the following produces electromagnetic waves

(A) Stationary charges
(B) Charges in uniform motion
(C) Accelerating charges
(D) Stationary magnet

Answer: (C) Accelerating charges · The council's preliminary key

Q35 AP EAPCET 2024 · 21 May · Shift 2 MCQ

The rms value of the electric field of an electromagnetic wave emitted by a source is $660\ \mathrm{NC}^{-1}$. The average energy density of the electromagnetic wave is

(A) $1.75 \times 10^{-6}\ \mathrm{J\,m^{-3}}$
(B) $2.75 \times 10^{-6}\ \mathrm{J\,m^{-3}}$
(C) $4.85 \times 10^{-6}\ \mathrm{J\,m^{-3}}$
(D) $3.85 \times 10^{-6}\ \mathrm{J\,m^{-3}}$

Answer: (D) $3.85 \times 10^{-6}\ \mathrm{J\,m^{-3}}$ · The council's preliminary key

Q36 AP EAPCET 2024 · 20 May · Shift 1 MCQ

The average value of electric energy density in an electromagnetic wave is.

[where E_o is peak value]

(A) $\frac{\epsilon_o E_{rms}^2}{4}$
(B) $\frac{1}{2}\epsilon_o E_o^2$
(C) $\frac{1}{2}\epsilon_o E_o$
(D) $\frac{1}{4}\epsilon_o E_o^2$

Answer: (D) $\frac{1}{4}\epsilon_o E_o^2$ · The council's preliminary key

Q37 AP EAPCET 2024 · 20 May · Shift 2 MCQ

Inner shell electrons in atoms moving from one energy level to another lower energy level produce

(A) Gamma rays
(B) Microwaves
(C) Radio waves
(D) Ultraviolet rays

Answer: (D) Ultraviolet rays · The council's preliminary key

Q38 AP EAPCET 2024 · 19 May · Shift 2 MCQ

An electromagnetic wave travel in a medium with a speed of $2 \times 10^8\ \mathrm{ms}^{-1}$. The relative permeability of the medium is 1. Then the relative permittivity is

(A) 1.75
(B) 2
(C) 2.25
(D) 2.75

Answer: (C) 2.25 · The council's preliminary key

Q39 AP EAPCET 2024 · 18 May · Shift 1 MCQ

The Solar Radiation is

(A) Stationary wave
(B) Mechanical wave
(C) Transverse EM wave
(D) Longitudinal EM wave

Answer: (C) Transverse EM wave · The council's preliminary key

Q40 TS EAPCET 2024 · 11 May · Shift 1 MCQ

For the displacement current through the plates of a parallel plate capacitor of capacitance $30\ \mu\mathrm{F}$ to be $150\ \mu\mathrm{A}$, the potential difference across the plates of the capacitor has to vary at the rate of

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(A) $10\ \mathrm{Vs}^{-1}$
(B) $5\ \mathrm{Vs}^{-1}$
(C) $15\ \mathrm{Vs}^{-1}$
(D) $20\ \mathrm{Vs}^{-1}$

Answer: (B) $5\ \mathrm{Vs}^{-1}$ · The council's preliminary key

Q41 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If the peak value of the magnetic field of an electromagnetic wave is 30×10^{-9} T, then the peak value of the electric field is

(A) $3\ \mathrm{Vm}^{-1}$
(B) $12\ \mathrm{Vm}^{-1}$
(C) $6\ \mathrm{Vm}^{-1}$
(D) $9\ \mathrm{Vm}^{-1}$

Answer: (D) $9\ \mathrm{Vm}^{-1}$ · The council's preliminary key

Q42 TS EAPCET 2024 · 10 May · Shift 2 MCQ

The efficiency of a bulb of power 60 W is 16%. The peak value of the electric field produced by the electromagnetic radiation from the bulb at a distance of 2 m from the bulb is

$\left(\frac{1}{4\pi\epsilon_0} = 9 \times 10^9\ \mathrm{Nm^2C^{-2}}\right)$

(A) $24\ \mathrm{Vm}^{-1}$
(B) $16\ \mathrm{Vm}^{-1}$
(C) $9\ \mathrm{Vm}^{-1}$
(D) $12\ \mathrm{Vm}^{-1}$

Answer: (D) $12\ \mathrm{Vm}^{-1}$ · The council's preliminary key

Q43 TS EAPCET 2024 · 9 May · Shift 1 MCQ

If the amplitude of the magnetic field part of a harmonic electromagnetic wave in vacuum is 270 nT, the amplitude of the electric field part of the wave is

(A) $90\ \mathrm{NC}^{-1}$
(B) $81\ \mathrm{NC}^{-1}$
(C) $9\ \mathrm{NC}^{-1}$
(D) $30\ \mathrm{NC}^{-1}$

Answer: (B) $81\ \mathrm{NC}^{-1}$ · The council's preliminary key

Q44 TS EAPCET 2024 · 9 May · Shift 2 MCQ

A plane electromagnetic wave of electric and magnetic fields E_0 and B_0 respectively incidents on a surface. If the total energy transferred to the surface in a time of 't' is 'U', then the magnitude of the total momentum delivered to the surface for complete absorption is

(A) $\frac{UE_0}{B_0}$
(B) $\frac{UB_0}{E_0}$
(C) $\frac{U}{E_0B_0}$
(D) $\frac{UB_0}{E_0^2}$

Answer: (B) $\frac{UB_0}{E_0}$ · The council's preliminary key

Q45 AP EAPCET 2023 · 19 May · Shift 1 MCQ

Electromagnetic waves of energy flux $75 \times 10^4\ \mathrm{Wm^{-2}}$ incidents normally on a surface of area $40\ \mathrm{cm^2}$. If the surface absorbs the flux completely, the total momentum delivered to the surface in one second is

(A) $10^{-2}\ \mathrm{kgms^{-1}}$
(B) $10^{-3}\ \mathrm{kgms^{-1}}$
(C) $10^{-4}\ \mathrm{kgms^{-1}}$
(D) $10^{-5}\ \mathrm{kgms^{-1}}$

Answer: (D) $10^{-5}\ \mathrm{kgms^{-1}}$ · The council's preliminary key

Q46 AP EAPCET 2023 · 18 May · Shift 1 MCQ

If E_0 and B_0 are the magnitudes of the electric and magnetic fields respectively of an electromagnetic wave in vacuum, then among the following the correct relation is

(μ_0 - permeability of free space, ε_0 - permittivity of free space)

(A) $E_0 = B_0\sqrt{\mu_0\varepsilon_0}$
(B) $E_0\varepsilon_0 = B_0\mu_0$
(C) $E_0\sqrt{\varepsilon_0} = \frac{B_0}{\sqrt{\mu_0}}$
(D) $\frac{E_0}{\sqrt{\varepsilon_0}} = \frac{B_0}{\sqrt{\mu_0}}$

Answer: (C) $E_0\sqrt{\varepsilon_0} = \frac{B_0}{\sqrt{\mu_0}}$ · The council's preliminary key

Q47 AP EAPCET 2023 · 18 May · Shift 2 MCQ

To heat the food containing water, the frequency of the microwaves used in microwave oven is

(A) independent of the resonant frequency of water molecules.
(B) equal to the resonant frequency of water molecules.
(C) 100 times the resonant frequency of water molecules.
(D) $\frac{1}{100}$ times the resonant frequency of water molecules.

Answer: (B) equal to the resonant frequency of water molecules. · The council's preliminary key

Q48 AP EAPCET 2023 · 17 May · Shift 1 MCQ

The electric field in NC^{-1} of an electromagnetic wave is $E = 36\sqrt{\pi}\,\sin(\omega t - kx)$. The average energy density of the electromagnetic wave due to the electric field is $\left(\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9\ \mathrm{Nm^2C^{-2}}\right)$

(A) $36 \times 10^{-9}\ \mathrm{Jm^{-3}}$
(B) $18 \times 10^{-9}\ \mathrm{Jm^{-3}}$
(C) $36 \times 10^{-7}\ \mathrm{Jm^{-3}}$
(D) $18 \times 10^{-7}\ \mathrm{Jm^{-3}}$

Answer: (B) $18 \times 10^{-9}\ \mathrm{Jm^{-3}}$ · The council's preliminary key

Q49 AP EAPCET 2023 · 17 May · Shift 2 MCQ

An electric charge oscillating harmonically with frequency 750 kHz produces electromagnetic waves of frequency

(Speed of light in vacuum is $3 \times 10^8\ \mathrm{ms^{-1}}$)

(A) 250 kHz
(B) 500 kHz
(C) 750 kHz
(D) 1000 kHz

Answer: (C) 750 kHz · The council's preliminary key

Q50 AP EAPCET 2023 · 16 May · Shift 1 MCQ

If $\vec{E}$ and $\vec{B}$ are the electric and magnetic field vectors of an electromagnetic wave, then the direction of propagation of the electromagnetic wave is

(A) along the direction of $\vec{E}$
(B) along the direction of $\vec{B}$
(C) parallel to the direction of $\vec{E} \times \vec{B}$
(D) perpendicular to the direction of $\vec{E} \times \vec{B}$

Answer: (C) parallel to the direction of $\vec{E} \times \vec{B}$ · The council's preliminary key

EdLoop EAPCET

Q51 AP EAPCET 2023 · 15 May · Shift 1 MCQ

The average power output of a point source of electromagnetic radiation is 1080 W. The maximum value of the rms value of the electric field at a distance of 3 m from the source is

(A) $20\ \mathrm{Vm}^{-1}$
(B) $40\ \mathrm{Vm}^{-1}$
(C) $60\ \mathrm{Vm}^{-1}$
(D) $90\ \mathrm{Vm}^{-1}$

Answer: (C) $60\ \mathrm{Vm}^{-1}$ · The council's preliminary key

Q52 AP EAPCET 2023 · 15 May · Shift 2 MCQ

The relation between permittivity of free space, the permeability of free space and speed of light is

(A) $\varepsilon_0\mu_0 = \frac{4\pi}{c^2}$
(B) $\varepsilon_0\mu_0 = \frac{1}{c^2}$
(C) $\varepsilon_0\mu_0 = \frac{1}{c}$
(D) $\varepsilon_0\mu_0 = c^2$

Answer: (B) $\varepsilon_0\mu_0 = \frac{1}{c^2}$ · The council's preliminary key

Q53 AP EAPCET 2023 · 15 May · Shift 2 MCQ

The device used to detect infrared radiations is

(A) tachometer
(B) bolometer
(C) photocell
(D) point contact diode

Answer: (B) bolometer · The council's preliminary key

Q54 TS EAMCET 2023 · 14 May · Shift 1 MCQ

Electromagnetic radiation of intensity $0.6\ \mathrm{Wm}^{-2}$ is falling on a black surface. The radiation pressure on the surface is

(A) $2 \times 10^{-9}\ \mathrm{Nm}^{-2}$
(B) $3 \times 10^{-9}\ \mathrm{Nm}^{-2}$
(C) $4 \times 10^{-9}\ \mathrm{Nm}^{-2}$
(D) $6 \times 10^{-9}\ \mathrm{Nm}^{-2}$

Answer: (A) $2 \times 10^{-9}\ \mathrm{Nm}^{-2}$ · The council's preliminary key

EdLoop EAPCET

Q55 TS EAMCET 2023 · 14 May · Shift 2 MCQ

Match the electromagnetic radiations given in List – I with their uses given in List – II.

List – I	List – II
A) X-rays	P) Remote switches
B) UV-rays	Q) Finger prints in forensic Labs
C) Radio waves	R) Crystal structure study
D) IR - rays	S) TV communication system.

(A) $A \to Q, B \to R, C \to P, D \to S$
(B) $A \to R, B \to Q, C \to S, D \to P$
(C) $A \to R, B \to S, C \to Q, D \to P$
(D) $A \to S, B \to R, C \to Q, D \to P$

Answer: (B) $A \to R, B \to Q, C \to S, D \to P$ · The council's preliminary key

Q56 TS EAMCET 2023 · 13 May · Shift 1 MCQ

The displacement current through the plates of a parallel plate capacitor of capacitance 30 μF is 150 μA. The capacitor is charged by a source of varying potential at the rate of

(A) $3.5\ \mathrm{Vs}^{-1}$
(B) $2\ \mathrm{Vs}^{-1}$
(C) $5\ \mathrm{Vs}^{-1}$
(D) $3\ \mathrm{Vs}^{-1}$

Answer: (C) $5\ \mathrm{Vs}^{-1}$ · The council's preliminary key

Q57 TS EAMCET 2023 · 13 May · Shift 2 MCQ

The speed of electromagnetic waves in a medium is $1.5 \times 10^8\ \mathrm{ms}^{-1}$. If relative permittivity of that medium is 2, then its magnetic susceptibility is (speed of light in vacuum is $3 \times 10^8\ \mathrm{ms}^{-1}$).

(A) 2
(B) 3
(C) 1
(D) -1.5

Answer: (C) 1 · The council's preliminary key

Q58 TS EAMCET 2023 · 12 May · Shift 1 MCQ

If a plane electromagnetic wave has electric field oscillations of frequency 3 GHz then the wavelength of the wave is
(speed of light in vacuum = 3×10^8 ms^{-1})

(A) 0.1 m
(B) 0.2 m
(C) 100 m
(D) 0.003 m

Answer: (A) 0.1 m · The council's preliminary key

Q59 TS EAMCET 2023 · 12 May · Shift 2 MCQ

The correct statement among the following is

(A) Electromagnetic waves cannot travel in vacuum
(B) Electromagnetic waves are longitudinal waves
(C) Electromagnetic waves are produced by charges moving with uniform velocity
(D) Electromagnetic waves carry both energy and momentum as they propagate through space.

Answer: (D) Electromagnetic waves carry both energy and momentum as they propagate through space. · The council's preliminary key

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Q60 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

On a particular day, the sun delivers an average power of $\left(\frac{6}{\pi} \times 10^3\right) \frac{\mathrm{W}}{\mathrm{m}^2}$ to the top of Earth's atmosphere. Find the amplitude of magnetic field for the electromagnetic waves above atmosphere. (Take $\mu_0 = 4\pi \times 10^{-7}$ SI unit)

(A) 5×10^{-5} T
(B) 4×10^{-6} T
(C) 6×10^{-6} T
(D) 3×10^{-5} T

Answer: (B) 4×10^{-6} T · The council's preliminary key

Q61 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

In a plane EM wave the electric field oscillates sinusoidally at a frequency of 30 MHz and amplitude 150 V/m. Identify the correct expression of $\vec{B}$ assuming the wave is propagating along x-axis and is oscillating along y-axis.

(A) $5 \times 10^{-7} \sin\left[\frac{x}{3} - 6 \times 10^{+7} t\right] \hat{z}\ \mathrm{T}$
(B) $5 \times 10^{-7} \sin\left[\pi\left(\frac{x}{5} - 6 \times 10^{+7} t\right)\right] \hat{z}\ \mathrm{T}$
(C) $5 \times 10^{-7} \sin\left[\pi\left(\frac{x}{10} - 3 \times 10^{+7} t\right)\right] \hat{z}\ \mathrm{T}$
(D) $5 \times 10^{-7} \sin\left[\pi\left(\frac{2x}{5} - 6 \times 10^{+8} t\right)\right] \hat{z}\ \mathrm{T}$

Answer: (B) $5 \times 10^{-7} \sin\left[\pi\left(\frac{x}{5} - 6 \times 10^{+7} t\right)\right] \hat{z}\ \mathrm{T}$ · The council's preliminary key

Q62 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

About 20% of the power of a 100 W bulb is converted to visible radiation. Assuming that the radiation is emitted isotropically and neglecting reflection, the average intensity of visible radiation at a distance of 5 m is $\frac{\alpha}{25\pi}$ W/m^2. The value of α is

(A) 15
(B) 5
(C) 37.5
(D) 30

Answer: (B) 5 · The council's preliminary key

Q63 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

A laser beam has intensity $2.1 \times 10^{15}\ \mathrm{W/m^2}$. The amplitude of magnetic field in the beam in approximately is

(A) 1.4 T
(B) 4.2 T
(C) 1 T
(D) 1.5 T

Answer: (B) 4.2 T · The council's preliminary key

Q64 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

An electromagnetic wave is propagating in vacuum along $-\hat{j}$ direction. The magnetic field of the wave is given by $\vec{B} = (2 \times 10^{-8}) \cos\left[\pi \times 10^{15}\left(t + \frac{y}{c}\right)\right] \hat{k}\ T$. The electric field $\vec{E}$ of this wave is ($c \equiv$ speed of light)

(A) $\vec{E} = (4) \cos\left[\pi \times 10^{15}\left(t + \frac{y}{c}\right)\right] \hat{j}\ V/m$
(B) $\vec{E} = (6) \cos\left[\pi \times 10^{15}\left(t + \frac{y}{c}\right)\right] \hat{i}\ V/m$
(C) $\vec{E} = (6) \cos\left[\pi \times 10^{15}\left(t - \frac{y}{c}\right)\right] \hat{j}\ V/m$
(D) $\vec{E} = (4) \cos\left[\pi \times 10^{15}\left(t - \frac{y}{c}\right)\right] \hat{i}\ V/m$

Answer: (B) $\vec{E} = (6) \cos\left[\pi \times 10^{15}\left(t + \frac{y}{c}\right)\right] \hat{i}\ V/m$ · The council's preliminary key

Q65 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

An electromagnetic wave has its electric and magnetic fields given by
$\vec{E}(t) = \vec{E}_m \sin(kx - \omega t)$
$\vec{B}(t) = \vec{B}_m \sin(kx - \omega t)$
If the direction of $\vec{E}_m$ & $\vec{B}_m$ are in the direction of $\hat{i} + \hat{j}$ and $\hat{i} - \hat{j}$ respectively, the unit vector that gives the direction of propagation of the wave is

(A) $-\hat{k}$
(B) $\hat{k}$
(C) $\hat{i}$
(D) $-\hat{i}$

Answer: (A) $-\hat{k}$ · The council's preliminary key

Q66 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

A beam of white light is incident normally on a plane surface absorbing 70 % of the light and reflecting the rest. If the incident beam carries 10 W of power, the force exerted by it on the surface is

(A) 3.3×10^{-8} N
(B) 4.33×10^{-8} N
(C) 2.3×10^{-8} N
(D) 3.53×10^{-8} N

Answer: (B) 4.33×10^{-8} N · The council's preliminary key

Q67 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

In a plane electromagnetic wave, the maximum value of the electric field component is $4.4\ \mathrm{Vm^{-1}}$. The intensity of the wave is nearly

(A) $22.4\ \mathrm{mW\,m^{-2}}$
(B) $25.7\ \mathrm{mW\,m^{-2}}$
(C) $65.5\ \mathrm{mW\,m^{-2}}$
(D) $45.6\ \mathrm{mW\,m^{-2}}$

Answer: (B) $25.7\ \mathrm{mW\,m^{-2}}$ · The council's preliminary key

Q68 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

If the amplitude of the magnetic field in a travelling plane electromagnetic wave is 2.2×10^{-4} T, then the intensity of the wave is nearly

(A) $5.8 \times 10^{6}\ \mathrm{Wm^{-2}}$
(B) $4.2 \times 10^{6}\ \mathrm{Wm^{-2}}$
(C) $1.2 \times 10^{7}\ \mathrm{Wm^{-2}}$
(D) $8.8 \times 10^{5}\ \mathrm{Wm^{-2}}$

Answer: (A) $5.8 \times 10^{6}\ \mathrm{Wm^{-2}}$ · The council's preliminary key

Q69 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

Light falls on a non-reflecting surface normally. If the average force exerted on a surface with area $15\ \mathrm{cm^2}$ during 20 minute time interval is 10^{-6} N, then energy flux of light is
(Velocity of light = $3 \times 10^{8}\ \mathrm{ms^{-1}}$)

(A) $20 \times 10^4\ \mathrm{Wm}^{-2}$
(B) $15 \times 10^4\ \mathrm{Wm}^{-2}$
(C) $25 \times 10^4\ \mathrm{Wm}^{-2}$
(D) $10 \times 10^4\ \mathrm{Wm}^{-2}$

Answer: (A) $20 \times 10^4\ \mathrm{Wm}^{-2}$ · The council's preliminary key

Q70 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

The correct ascending order of the wavelengths of the following electromagnetic waves is Ultraviolet, x-rays, infrared, gamma rays and visible light.

(A) x-ray, gamma ray, ultraviolet, infrared, visible light
(B) Gamma ray, x-ray, ultraviolet, visible light, infrared
(C) Gamma ray, x-ray, infrared, visible light, ultraviolet
(D) Gamma ray, x-ray, ultraviolet, infrared, visible light

Answer: (B) Gamma ray, x-ray, ultraviolet, visible light, infrared · The council's preliminary key

Q71 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

A bulb of power 660 W radiates uniformly in all directions. The pressure exerted by the radiation on the surface at a distance of 5 m is

(A) 5×10^{-8} Pa
(B) 2×10^{-9} Pa
(C) 7×10^{-9} Pa
(D) $\frac{3}{\pi} \times 10^{-8}$ Pa

Answer: (C) 7×10^{-9} **Pa** · The council's preliminary key

Q72 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

The equation that represents magnetic field of a plane electromagnetic wave which is propagating along x-direction with wavelength 10 mm and maximum electric field $60\ \mathrm{V\,m}^{-1}$ in y-direction is (c - speed of light)

(A) $(6 \times 10^{-7}) \sin[0.2\pi(ct - x)]\ \hat{k}$ tesla
(B) $(2 \times 10^{-7}) \sin[200\pi(ct - x)]\ \hat{k}$ tesla
(C) $(2 \times 10^{-7}) \sin[200\pi(ct - x)]\ \hat{i}$ tesla
(D) $(6 \times 10^{-7}) \sin[0.2\pi(ct - x)]\ \hat{i}$ tesla

Answer: (B) $(2 \times 10^{-7}) \sin[200\pi(ct - x)]\ \hat{k}$ **tesla** · The council's preliminary key

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Q73 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

In a plane electromagnetic wave, U_E and U_B are average energy densities of electric field and magnetic field respectively, then the correct option in the following is

(A) $U_E = \frac{U_B}{2}$
(B) $U_E = 2U_B$
(C) $U_E = U_B$
(D) $U_E \neq U_B$

Answer: (C) $U_E = U_B$ · The council's preliminary key

Q74 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

Light of wavelength 1 nm belongs to the following class of waves

(A) Radio waves
(B) Micro waves
(C) x-rays
(D) Gamma rays

Answer: (C) x-rays · The council's preliminary key

Q75 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

The radiation pressure 1 m away from a 330 W electric bulb is

(A) $1.25 \times 10^{-7}\ \mathrm{P_a}$
(B) $8.75 \times 10^{-8}\ \mathrm{P_a}$
(C) $5.45 \times 10^{-8}\ \mathrm{P_a}$
(D) $8.50 \times 10^{-7}\ \mathrm{P_a}$

Answer: (B) $8.75 \times 10^{-8}\ \mathrm{P_a}$ · The council's preliminary key

Q76 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

Among the following, the incorrect Maxwells Electromagnetic equation is

(A) $\oint \vec{B} \cdot d\vec{l} = \mu_o i_c + \mu_o \varepsilon_o \frac{d\phi_E}{dt}$
(B) $\oint \vec{B} \cdot d\vec{A} = \frac{Q}{\varepsilon_o}$
(C) $\oint \vec{E} \cdot d\vec{l} = \frac{-d\phi_B}{dt}$
(D) $\oint \vec{E} \cdot d\vec{A} = \frac{Q}{\varepsilon_o}$

Answer: (B) $\oint \vec{B} \cdot d\vec{A} = \frac{Q}{\varepsilon_o}$ · The council's preliminary key

Q77 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

Microwaves are used in the following

(A) FM radio
(B) Eye surgery
(C) Cancer treatment
(D) Radar system

Answer: (D) Radar system · The council's preliminary key

Q78 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

The magnetic field in a plane electromagnetic wave is given $\vec{B} = (3 \times 10^{-7}\ \mathrm{T}) \sin(3 \times 10^4 x + 9 \times 10^{12} t)\, \hat{j}$. The electric field of this wave is given as

(A) $90 \sin(3 \times 10^4 x + 9 \times 10^{12} t)\, \hat{i}\ \mathrm{Vm}^{-1}$
(B) $90 \sin(3 \times 10^4 x + 9 \times 10^{12} t)\, \hat{k}\ \mathrm{Vm}^{-1}$
(C) $45 \sin(3 \times 10^4 x + 9 \times 10^{12} t)\, \hat{i}\ \mathrm{Vm}^{-1}$
(D) $45 \sin(3 \times 10^4 x + 9 \times 10^{12} t)\, \hat{k}\ \mathrm{Vm}^{-1}$

Answer: (B) $90 \sin(3 \times 10^4 x + 9 \times 10^{12} t)\, \hat{k}\ \mathrm{Vm}^{-1}$ · The council's preliminary key

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Q79 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

A plane electromagnetic wave of frequency 50 MHz travels in free space. If the average energy densities in the electric field and magnetic field are K_E and K_B respectively, then the correct option in the following is

(A) $K_E = K_B$
(B) $K_E = K_B = 0$
(C) $K_E > K_B$
(D) $K_E < K_B$

Answer: (A) $K_E = K_B$ · The council's preliminary key

Q80 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

The correct order of electromagnetic waves with increasing frequency is

(A) Infrared, x-rays, gamma rays
(B) Gamma rays, visible light, x-rays
(C) Visible light, infrared, ultraviolet
(D) Visible light, ultraviolet, infrared

Answer: (A) Infrared, x-rays, gamma rays · The council's preliminary key

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Q81 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

A plane electromagnetic wave travels in free space along z - axis. At a particular point in space, the electric field along x-axis is 8.7 Vm^{-1}. The magnetic field along y - axis is

(A) 2.9×10^{-8} T
(B) 3×10^{-6} T
(C) 8.7×10^{-6} T
(D) 3×10^{-5} T

Answer: (A) 2.9×10^{-8} T · The council's preliminary key

Q82 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

If the average power per unit area delivered by an electromagnetic wave is 9240 Wm^{-2}, then the amplitude of the oscillating magnetic field in EM wave is

(A) 4.4 μT
(B) 6.6 μT
(C) 8.8 μT
(D) 10.2 μT

Answer: (C) 8.8 μT · The council's preliminary key

Q83 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

A beam of light with intensity 10^{-3} $\mathrm{W\,m^{-2}}$ and cross sectional area 20 cm^2 is incident on a fully reflective surface at angle 45°. Then the force exerted by the beam on the surface is

(A) 2.3×10^{-15} N
(B) 1.33×10^{-14} N
(C) 6.67×10^{-15} N
(D) 9.4×10^{-15} N

Answer: (D) 9.4×10^{-15} N · The council's preliminary key

Q84 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

A light of intensity 12 Wm^{-2} incidents on a black surface of area 4 cm^2. The radiation pressure on the surface is

(A) 1×10^{-8} Pa
(B) 4×10^{-8} Pa
(C) 1.6×10^{-7} Pa
(D) 4.8×10^{-7} Pa

Answer: (B) 4×10^{-8} Pa · The council's preliminary key

Q85 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

The electric field (E) and magnetic field (B) of an electromagnetic wave passing through vacuum are given by
$E = E_o \sin(kx - \omega t)$

$B = B_o \sin(kx - \omega t)$

Then the correct statement among the following is

(A) $E_o k = B_o \omega$

(B) $E_o \omega = B_o k$

(C) $E_o B_o = \omega k$

(D) $E_o B_o = \frac{\omega}{k}$

Answer: (A) $E_o k = B_o \omega$ · The council's preliminary key

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Q86 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

If $\vec{E}$ and $\vec{B}$ represent electric and magnetic field vectors of the electromagnetic wave, then the direction of propagation of electromagnetic wave is along

(A) $\vec{E}$

(B) $\vec{B}$

(C) $\vec{B} \times \vec{E}$

(D) $\vec{E} \times \vec{B}$

Answer: (D) $\vec{E} \times \vec{B}$ · The council's preliminary key

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Q87 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

Which one of the following is the property of a monochromatic, plane electromagnetic wave in free space?

(A) Electric and magnetic fields have a phase difference of $\frac{\pi}{2}$

(B) The energy contributions of both electric and magnetic fields are equal

(C) The direction of propagation is in the direction of $\vec{B} \times \vec{E}$

(D) The pressure exerted by the wave is the product of its speed and energy density

Answer: (B) The energy contributions of both electric and magnetic fields are equal · The council's preliminary key

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Q88 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

Suppose that the electric field of an electromagnetic wave in vacuum is $E = (3.1\ \mathrm{N.C^{-1}}) \cos[(1.8\ \mathrm{rad.m^{-1}})y + (5.4 \times 10^6\ \mathrm{rad.s^{-1}})t]\,\hat{i}$. What is the wavelength λ?

(A) $3.49\ \mathrm{m}$

(B) $3.50\ \mathrm{m}$

(C) $3.40\ \mathrm{m}$

(D) $3.45\ \mathrm{m}$

Answer: (A) $3.49\ \mathrm{m}$ · The council's preliminary key

Q89 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

Generation, propagation and detection of electromagnetic waves is the basis of _____

(A) LASERS
(B) Reactors
(C) Radio and television
(D) Computer

Answer: (C) Radio and television · The council's preliminary key

Q90 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

A radio receiver antenna that is $4\ m$ long is oriented along the direction the electromagnetic wave and it receives a signal of intensity $8 \times 10^{-16}\ W.m^{-2}$. The maximum instantaneous potential difference across the two ends of the antenna is _____

(A) $1.23\ \mu V$
(B) $3.1\ \mu V$
(C) $31\ \mu V$
(D) $7.76\ \mu V$

Answer: (B) $3.1\ \mu V$ · The council's preliminary key

Q91 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

Assertion (A): Electromagnetic waves exert pressure, called radiation pressure.
Reason (R): This is because they carry energy.

(A) Both A and R are true and R is a correct explanation for A
(B) Both A and R are true but R is not a correct explanation for A
(C) A is true, R is false
(D) A is false, R is true

Answer: (B) Both A and R are true but R is not a correct explanation for A · The council's preliminary key

Q92 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

The electric and the magnetic fields associated with an electromagnetic wave propagating along the Z- axis, can be represented by _____.

(A) $[\vec{E} = E_0\hat{i}, \vec{B} = B_0\hat{j}]$
(B) $[\vec{E} = E_0\hat{k}, \vec{B} = B_0\hat{i}]$
(C) $[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{i}]$
(D) $[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{k}]$

Answer: (A) $[\vec{E} = E_0\hat{i}, \vec{B} = B_0\hat{j}]$ · The council's preliminary key

Q93 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

The law which states that 'a variation in an electric field causes magnetic field', is

(A) Faradays law
(B) Bio-Savart Law
(C) Modified Ampere's Law
(D) Lenz's Law

Answer: (C) Modified Ampere's Law · The council's preliminary key

Q94 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

The magnetic field of a plane electromagnetic wave is given by $B = (400\ \mu\mathrm{T}) \sin\left[\left(4.0 \times 10^{15}\ \mathrm{s}^{-1}\right)\left(t - \frac{x}{c}\right)\right]$. Average energy density corresponding to the electric field is _____

(A) $8 \times 10^{-3}\ \mathrm{J.m^{-3}}$
(B) $31.8 \times 10^{-3}\ \mathrm{J.m^{-3}}$
(C) $80 \times 10^{-3}\ \mathrm{J.m^{-3}}$
(D) $3.18 \times 10^{-3}\ \mathrm{J.m^{-3}}$

Answer: (B) $31.8 \times 10^{-3}\ \mathrm{J.m^{-3}}$ · The council's preliminary key

Q95 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

In the following List A consists of wave length range of different of E.M waves and List B consists of ways to produce them. Match the following
List-A
A) 400 nm to 1 nm
B) >0.1 nm
C) 1 mm to 700 nm
D) $<10^{-3}$ nm
List-B
I) Radioactive decay of the nucleus
II) Vibration of atoms and molecules
III) Rapid acceleration and deceleration of electron in aerials
IV) Inner shell electrons in atoms moving from one energy level to a lower level
The correct match is

(A) A-III, B-II, C-I, D-IV
(B) A-II, B-III, C-IV, D-I
(C) A-IV, B-III, C-II, D-I
(D) A-I, B-IV, C-III, D-II

Answer: (C) A-IV, B-III, C-II, D-I · The council's preliminary key

EdLoop EAPCET

Q96 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

A radiation of energy E falls normally on a perfectly reflecting surface. The momentum transferred to the surface is (c is velocity of light)

(A) Ec
(B) E/c
(C) $2E/c$
(D) E/c^2

Answer: (C) $2E/c$ · The council's preliminary key

Q97 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

Thermopile Bolometer is used to detect

(A) Ultraviolet radiation
(B) X - rays
(C) Gamma radiation
(D) Infrared radiation

Answer: (D) Infrared radiation · The council's preliminary key

Q98 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

A laser beam has intensity 17.7×10^{14} W/m^2. The amplitude of the electric field is
[Use $\varepsilon_0 = 8.85 \times 10^{-12}\ \frac{C^2}{N\text{-}M^2}$]

(A) $\frac{10}{\sqrt{3}} \times 10^9$ N/C
(B) $10^{10}\ \frac{N}{C}$
(C) $\frac{\sqrt{3}}{2} \times 10^9$ N/C
(D) $\frac{2}{\sqrt{3}} \times 10^9$ N/C

Answer: (D) $\frac{2}{\sqrt{3}} \times 10^9$ **N/C** · The council's preliminary key

Q99 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

A light bulb of power 100 W is placed at the centre of a hollow sphere of radius 10 cm. If the 66 % of the energy is converted into light, then the pressure exerted by the light on the surface of the sphere will be
(Assume the surface of sphere to be perfectly absorbing)

(A) 1.0×10^{-5} N/m^2
(B) 1.5×10^{-7} N/m^2
(C) 1.75×10^{-6} N/m^2
(D) 7.5×10^{-5} N/m^2

Answer: (C) 1.75×10^{-6} N/m^2 · The council's preliminary key

Q100 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

For an EM Wave, the electric and magnetic fields are 300 V/m and 7.9 A/m respectively. The maximum rate of energy flow is

(A) $2730 \ \frac{\text{watt}}{\text{m}^2}$
(B) $2790 \ \frac{\text{watt}}{\text{m}^2}$
(C) $2370 \ \frac{\text{watt}}{\text{m}^2}$
(D) $2390 \ \frac{\text{watt}}{\text{m}^2}$

Answer: (C) $2370 \ \frac{\text{watt}}{\text{m}^2}$ · The council's preliminary key

Q101 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

If 10 % of the power of a (100π) W light bulb is converted to visible radiation, then the average intensity of visible radiation at a distance of 10 m is

(A) $0.025 \ \text{W/m}^2$
(B) $0.01 \ \text{W/m}^2$
(C) $0.031 \ \text{W/m}^2$
(D) $0.05 \ \text{W/m}^2$

Answer: (A) $0.025 \ \text{W/m}^2$ · The council's preliminary key

Q102 AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

An accelerated electric charge emits _____

(A) α-rays
(B) β-rays
(C) Electro Magnetic waves
(D) Matter waves

Answer: (C) Electro Magnetic waves · The council's preliminary key

Q103 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

W K Roentgen discovered _____

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(A) Short radio waves
(B) X-rays
(C) Electrons
(D) Laws of electromagnetic induction

Answer: (B) X-rays · The council's preliminary key

Q104 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

A circular parallel plate capacitor of radius 'R' and spacing 'd' is being charged by a constant current 'I_D'. Find the magnetic field between the plates at a distance 'r' from the axis, where $r > R$.

(A) $\frac{\mu_o I_D r}{2\pi R^2}$
(B) $\frac{\mu_o I_D}{2\pi R}$
(C) $\frac{\mu_o I_D}{2\pi r}$
(D) Zero

Answer: (C) $\frac{\mu_o I_D}{2\pi r}$ · The council's preliminary key

Q105 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

Light is an electromagnetic wave. Its speed in vacuum is given by the expression _____

(A) $\sqrt{\mu_0 \varepsilon_0}$
(B) $\sqrt{\frac{\mu_0}{\varepsilon_0}}$
(C) $\sqrt{\frac{\varepsilon_0}{\mu_0}}$
(D) $\frac{1}{\sqrt{\mu_0 \varepsilon_0}}$

Answer: (D) $\frac{1}{\sqrt{\mu_0 \varepsilon_0}}$ · The council's preliminary key

Q106 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

If a source is transmitting electromagnetic wave of frequency 8.2×10^6 Hz, then wavelength of the electromagnetic waves transmitted from the source will be _____

(A) 36.5 m
(B) 40.5 m
(C) 42.3 m
(D) 50.9 m

Answer: (A) 36.5 m · The council's preliminary key

Q107 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

Pick out the longest wavelength from the following types of radiations

(A) visible blue light
(B) Ultraviolet light
(C) X- rays
(D) visible red light

Answer: (D) visible red light · The council's preliminary key

Q108 AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

Practically ozone layer absorbs radiations of wavelength

(A) Less than $3 \times 10^{-7}\,\mathrm{m}$
(B) Greater than $3 \times 10^{-7}\,\mathrm{m}$
(C) Equal to $3 \times 10^{-7}\,\mathrm{m}$
(D) All of these answers are correct

Answer: (A) Less than $3 \times 10^{-7}\,\mathrm{m}$ · The council's preliminary key

Q109 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

Electromagnetic waves are produced by _____

(A) Charges at rest only
(B) Changes in uniform motion only
(C) Accelerated or decelerated charges only
(D) An uncharged stable particle at rest

Answer: (C) Accelerated or decelerated charges only · The council's preliminary key

Q110 AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

Microwaves are used in

(A) T.V.
(B) Radio transmission
(C) Radar
(D) Atmospheric research

Answer: (C) Radar · The council's preliminary key

Q111 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

Light from a source travels out with a velocity 'c'. If the source moves away from the observer with a velocity 'v', then the relative velocity of light w.r.t. observer is _____

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(A) c
(B) $c+v$
(C) $c-v$
(D) $\sqrt{c^2+v^2}$

Answer: (A) c · The council's preliminary key

Q112 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

Radiations of intensity 0.5 $\mathrm{W.m^{-2}}$ are striking a metal plate, the pressure on the plate is

(A) $0.166 \times 10^{-8}\ \mathrm{N.m^{-2}}$
(B) $0.332 \times 10^{-8}\ \mathrm{N.m^{-2}}$
(C) $0.111 \times 10^{-8}\ \mathrm{N.m^{-2}}$
(D) $0.083 \times 10^{-8}\ \mathrm{N.m^{-2}}$

Answer: (A) $0.166 \times 10^{-8}\ \mathrm{N.m^{-2}}$ · The council's preliminary key

Q113 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

A radiation of energy 'E' falls on a perfectly reflecting surface. The momentum transferred to the surface is
(let c $\equiv$ speed of light)

(A) $\frac{E}{c}$
(B) $\frac{2E}{c}$
(C) Ec
(D) $\frac{E}{c^2}$

Answer: (B) $\frac{2E}{c}$ · Official TGCHE final key

Q114 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

The radiation energy emitted per second of a point source is 100 W. If the efficiency of the source is 4%, then the rms value of the electric field at distance of 2m is
[Use $\frac{1}{4\pi\,\epsilon_o} = 9 \times 10^9$ in S.I. Unit]

(A) $\sqrt{60}\ \mathrm{V/m}$
(B) $\sqrt{30}\ \mathrm{V/m}$
(C) $\sqrt{50}\ \mathrm{V/m}$
(D) $\sqrt{40}\ \mathrm{V/m}$

Answer: (B) $\sqrt{30}\ \mathrm{V/m}$ · Official TGCHE final key

Q115 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

At an instant, a plane electromagnetic wave has its magnetic field in the direction of the vector $\hat{i}-\hat{j}$ and its electric field is in the direction of $\hat{i}+\hat{j}$. The wave is travelling along which direction?

(A) $+$x direction
(B) $-$ x direction
(C) $+$z direction
(D) $-$ z direction

Answer: (D) $-$ z direction · Official TGCHE final key

Q116 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

The typical wave length of X-ray is

(A) $10^{-10}\,\mathrm{m}$
(B) $10^{-15}\,\mathrm{m}$
(C) $10^{-6}\,\mathrm{m}$
(D) $10^{6}\,\mathrm{m}$

Answer: (A) $10^{-10}\,\mathrm{m}$ · Official TGCHE final key

Q117 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

What is the amplitude of the electric filed in a parallel beam of light intensity $\left(\frac{15}{\pi}\right)\frac{W}{m^2}$ (Assume $\frac{1}{4\pi\varepsilon_o}=9\times10^9\ \frac{\mathrm{Nm^2}}{\mathrm{C^2}}$)

(A) 60 N/C
(B) 50 N/C
(C) 40 N/C
(D) 30 N/C

Answer: (A) 60 N/C · Official TGCHE final key

Q118 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

A parallel-plate capacitor with circular plates is being discharged. The radius of the circular plate is 10 cm. A circular loop of radius 20 cm is concentric with the capacitor and located halfway between the plates. If the electric field between the plates is charging at the rate 3.6×10^{12} V/(ms), then the displacement current through the loop is:
(Assume $\frac{1}{4\pi\epsilon_0}=9\times10^9\ \mathrm{Nm^2/C^2}$)

(A) 1 A
(B) 2 A
(C) 3 A
(D) 4 A

Answer: (A) 1 A · Official TGCHE final key

Q119 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

Consider a parallel plate capacitor which is maintained at potential 200 V. The separation distance between the plates of capacitor and the area of plates are 1mm and $20\ \mathrm{cm}^2$ respectively. Calculate displacement current in $1\ \mu s$. [$\varepsilon_0 = 8.85 \times 10^{-12}$ F/m]

(A) 3.5 mA
(B) 2.5 mA
(C) 1.5 mA
(D) 0.5 mA

Answer: (A) 3.5 mA · Official TGCHE final key

Q120 TS EAMCET 2019 · 4 May · Shift 2 MCQ

In a travelling plane electromagnetic wave, the maximum magnetic field is 1.26×10^{-4} T. The intensity of the wave is (Assume $\mu_0 = 1.26 \times 10^{-6}$ H/m)

(A) 1.56×10^6 W/m^2
(B) 1.89×10^6 W/m^2
(C) 8.92×10^5 W/m^2
(D) 4.62×10^6 W/m^2

Answer: (B) 1.89×10^6 W/m^2 · Official TGCHE final key

Q121 TS EAMCET 2019 · 3 May · Shift 1 MCQ

An electromagnetic wave of frequency 3.0 MHz passes from vacuum into a non-magnetic medium with permittivity $\epsilon = 16\,\epsilon_0$ where ϵ_0 is the free-space permittivity. The change in wavelength is

(A) -75 m
(B) $+75$ m
(C) -50 m
(D) $+50$ m

Answer: (A) -75 m · Official TGCHE final key

Q122 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

A parallel plate capacitor consists of two circular plates each of radius $2\ \mathrm{cm}$, separated by a distance of $0.1\ \mathrm{mm}$. If the potential difference across the plates is varying at the rate of $5 \times 10^6\ \mathrm{Vs}^{-1}$, then the

value of displacement current is

(A) $5.56\ \mathrm{A}$

(B) $5.56\ \mathrm{mA}$

(C) $0.556\ \mathrm{mA}$

(D) $2.28\ \mathrm{mA}$

Answer: (C) $0.556\ \mathrm{mA}$ · Official APSCHE final key

Q123 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

Match the following List-I with List-II

List - I

A) $\oint_s E\,dA$

B) $\oint_s B\,dA$

C) $\oint_i E\,dl$

D) $\oint_i B\,dl$

List - II

I) 0

II) $-\frac{d\phi_B}{dt}$

III) $\frac{Q}{\epsilon_0}$

IV) $\mu_0(i_c + i_d)$

The correct answer is

(A) A-III, B-II, C-I, D-IV

(B) A-IV, B-I, C-III, D-II

(C) A-III, B-I, C-II, D-IV

(D) A-III, B-I, C-IV, D-II

Answer: (C) A-III, B-I, C-II, D-IV · Official APSCHE final key

Q124 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

A point source of electromagnetic radiation has an average power output of 960 W. The peak value of the electric field at a distance 400 cm from the source is

(A) $60\ \mathrm{Vm^{-1}}$

(B) $120\ \mathrm{Vm^{-1}}$

(C) $30\ \mathrm{Vm^{-1}}$

(D) $180\ \mathrm{Vm^{-1}}$

Answer: (A) $60\ \mathrm{Vm^{-1}}$ · Official APSCHE final key

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Q125 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

A plane electromagnetic wave propagating in a non-magnetic dielectric medium is given by $E = E_0\left[4 \times 10^{-7}x - 50t\right]$ where 'x' is in metre and 't' is in second. If the relative permeability of the medium, $\mu_r = 1$ then the dielectric constant of the medium is

(A) 2.42
(B) 5.76
(C) 8.26
(D) 4.84

Answer: (B) 5.76 · Official APSCHE final key

Q126 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

Which of the following is/are the property/properties of a monochromatic electromagnetic wave propagating in free space?
a) Electric and magnetic fields will have a phase difference $\frac{\pi}{2}$.
b) The energy of the wave is distributed equally between electric and magnetic fields.
c) The pressure exerted by the wave is the product of its speed and energy density.
d) The speed of the wave is equal to the ratio of magnetic field to the electric field.

(A) (a) and (c)
(B) Only (b)
(C) (b) and (c)
(D) Only (d)

Answer: (B) Only (b) · Official APSCHE final key

Q127 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

The amplitude of the electric field in a parallel beam of plane electromagnetic waves of intensity $53.1\ \mathrm{W\,m^{-2}}$ is
(Permittivity of free space $= 8.85 \times 10^{-12}\ \mathrm{C^2\,N^{-1}\,m^{-2}}$)

(A) $400\ \mathrm{NC^{-1}}$
(B) $50\ \mathrm{NC^{-1}}$
(C) $100\ \mathrm{NC^{-1}}$
(D) $200\ \mathrm{NC^{-1}}$

Answer: (D) $200\ \mathrm{NC^{-1}}$ · Official APSCHE final key

Q128 AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

An electromagnetic wave of frequency 1×10^{14} Hz is propagating along Z-axis. The amplitude of electric field is $4\ \mathrm{Vm^{-1}}$, then energy density of electric field will be
(Permittivity of force space (sic) = $8.8 \times 10^{-12}\ \mathrm{C^2N^{-1}m^{-2}}$)

(A) $35.2 \times 10^{-13}\ \mathrm{Jm}^{-3}$
(B) $70.4 \times 10^{-13}\ \mathrm{Jm}^{-3}$
(C) $70.4 \times 10^{-12}\ \mathrm{Jm}^{-3}$
(D) $35.2 \times 10^{-12}\ \mathrm{Jm}^{-3}$

Answer: (D) $35.2 \times 10^{-12}\ \mathrm{Jm}^{-3}$ · Official APSCHE final key

Q129 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

A lamp delivers a luminous flux of 100 W to an absorber of area $1\ \mathrm{cm}^2$. The force due to radiation pressure is

(A) $3.3 \times 10^{-4}\ \mathrm{N}$
(B) $16.5 \times 10^{-7}\ \mathrm{N}$
(C) $3.3 \times 10^{-6}\ \mathrm{N}$
(D) $3.3 \times 10^{-7}\ \mathrm{N}$

Answer: (D) $3.3 \times 10^{-7}\ \mathrm{N}$ · Official APSCHE final key

Q130 TS EAMCET 2018 · 7 May · Shift 1 MCQ

The law not described by any four of the Maxwell's equations is

(A) Gauss' law for electricity
(B) Le-Chatelier's law of equilibrium
(C) Gauss' law for magnetism
(D) Faraday's law of induction

Answer: (B) Le-Chatelier's law of equilibrium · The council's preliminary key

Q131 TS EAMCET 2018 · 7 May · Shift 1 MCQ

Let $\vec{E}_0$ and $\vec{B}_0$ denote the amplitude of electric and magnetic field of a plane electromagnetic wave in air. The magnitude of the average momentum transferred per unit area and per unit time to a totally absorbing surface is

(A) $\frac{1}{2}\epsilon_0 E_0^2$
(B) $\frac{1}{2}\mu_0 B_0$
(C) $\epsilon_0 E_0^2$
(D) $2\frac{B_0^2}{\mu_0}$

Answer: (A) $\frac{1}{2}\epsilon_0 E_0^2$ · The council's preliminary key

Q132 TS EAMCET 2018 · 5 May · Shift 1 MCQ

A laser beam is operating at 100 mW. The amount of energy stored by 90 cm length of the laser beam will be

(A) 2×10^{-10} J
(B) 3×10^{-10} J
(C) 8×10^{-11} J
(D) 6×10^{-11} J

Answer: (B) 3×10^{-10} J · The council's preliminary key

Q133 TS EAMCET 2018 · 5 May · Shift 2 MCQ

An electromagnetic wave having frequency 4×10^{14} Hz is passing through a small volume. The energy contained in this volume oscillates with frequency

(A) 0 Hz
(B) 4×10^{14} Hz
(C) 8×10^{14} Hz
(D) 2×10^{14} Hz

Answer: (C) 8×10^{14} Hz · The council's preliminary key

Q134 TS EAMCET 2018 · 4 May · Shift 1 MCQ

A 100 W electric bulb produces electromagnetic radiation with electric field amplitude of $\frac{2V}{m}$ at a distance of 10 m. Assuming it as a point source, estimate the efficiency of the bulb.

(A) 4.9%
(B) 2.5%
(C) 6.6%
(D) 19.7%

Answer: (C) 6.6% · The council's preliminary key

Q135 TS EAMCET 2018 · 4 May · Shift 2 MCQ

If the magnetic field of a plane electromagnetic wave is given by $5 \times 10^{-6} \sin\left(0.6 \times 10^{2} x + 0.5 \times 10^{10} t\right)$, then the speed of the wave is

(A) 0.83×10^{7} m/s
(B) 0.83×10^{8} m/s
(C) 5.24×10^{8} m/s
(D) 5.24×10^{9} m/s

Answer: (B) 0.83×10^{8} m/s · The council's preliminary key

Q136 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

An electromagnetic wave of frequency 45 MHz travels in free space along X-axis. At some point and at some instant, the electric field has a maximum value of $750\ \mathrm{NC}^{-1}$ along Y-axis. The magnetic field at this position and time is

(A) $2.5 \times 10^{-6}\,\hat{j}\ \mathrm{T}$
(B) $5 \times 10^{-6}\,\hat{k}\ \mathrm{T}$
(C) $2.5 \times 10^{-6}\,\hat{k}\ \mathrm{T}$
(D) $2.5 \times 10^{-6}\,\hat{i}\ \mathrm{T}$

Answer: (C) $2.5 \times 10^{-6}\,\hat{k}\ \mathrm{T}$ · The council's preliminary key

Q137 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

An electromagnetic wave of wavelength $2 \times 10^{-10}\ \mathrm{m}$ passes from vacuum into a dielectric medium of relative permitivity 4. Then its wavelength will be

(A) $0.5 \times 10^{-10}\ \mathrm{m}$
(B) $0.7 \times 10^{-10}\ \mathrm{m}$
(C) $1.8 \times 10^{-10}\ \mathrm{m}$
(D) $2.8 \times 10^{-10}\ \mathrm{m}$

Answer: (A) $0.5 \times 10^{-10}\ \mathrm{m}$ · The council's preliminary key

Q138 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

An electromagnetic radiation has an energy 14.4 keV. To which region of the electromagnetic spectrum it belongs

(A) Infrared
(B) Visible
(C) Ultraviolet
(D) X - ray

Answer: (D) X - ray · The council's preliminary key

Q139 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

The oscillating electric field of an electromagnetic wave is given by $E_y = 30\sin(2 \times 10^{11}t + 300\pi x)\ \mathrm{Vm}^{-1}$. Then the value of wavelength of the electromagnetic wave is _____

(A) $5.67 \times 10^{-3}\ \mathrm{m}$
(B) $6.67 \times 10^{-3}\ \mathrm{m}$
(C) $66.7 \times 10^{-3}\ \mathrm{m}$
(D) $7.66 \times 10^{-3}\ \mathrm{m}$

Answer: (B) $6.67 \times 10^{-3}\ \mathrm{m}$ · The council's preliminary key

Q140 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

In a plane electromagnetic wave, the electric field oscillates with a frequency $2 \times 10^{10}\ \mathrm{s}^{-1}$ and amplitude $40\ \mathrm{Vm}^{-1}$, then the energy density due to electric field is _____
($\varepsilon_0 = 8.85 \times 10^{-12}\ \mathrm{Fm}^{-1}$)

(A) $1.52 \times 10^{-9}\ \mathrm{Jm}^{-3}$
(B) $2.54 \times 10^{-9}\ \mathrm{Jm}^{-3}$
(C) $3.54 \times 10^{-9}\ \mathrm{Jm}^{-3}$
(D) $4.56 \times 10^{-9}\ \mathrm{Jm}^{-3}$

Answer: (C) $3.54 \times 10^{-9}\ \mathrm{Jm}^{-3}$ · The council's preliminary key

Q141 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

An electromagnetic wave of frequency 2 MHz propagates from vacuum to a non-magnetic medium of relative permittivity 9. Then its wavelength

(A) Increases by 100 m
(B) Increases by 50 m
(C) Decreases by 50 m
(D) Decreases by 100 m

Answer: (D) Decreases by 100 m · The council's preliminary key

Q142 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

The amplitude of electric field in an electromagnetic wave is $60\ \mathrm{Vm}^{-1}$. Then the amplitude of magnetic field is

(A) $2 \times 10^{7}\ \mathrm{T}$
(B) $6 \times 10^{7}\ \mathrm{T}$
(C) $6 \times 10^{-7}\ \mathrm{T}$
(D) $2 \times 10^{-7}\ \mathrm{T}$

Answer: (D) $2 \times 10^{-7}\ \mathrm{T}$ · The council's preliminary key

Q143 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

A plane electromagnetic wave of wavelength 3.0 m travels in vaccum (sic) along the positive X-axis. The electric field of amplitude $300\ \mathrm{Vm}^{-1}$ oscillates parallel to the Y-axis. Then the intensity of the wave is ($\mu_0 = 4\pi \times 10^{-7}\ \mathrm{Hm}^{-1}$, $c = 3 \times 10^{8}\ \mathrm{ms}^{-1}$)

(A) $119.4\ \mathrm{Wm}^{-2}$
(B) $109.4\ \mathrm{Wm}^{-2}$
(C) $129.4\ \mathrm{Wm}^{-2}$
(D) $1\ \mathrm{Wm}^{-2}$

Answer: (A) $119.4\ \mathrm{Wm}^{-2}$ · The council's preliminary key

Q144 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

If 'c' is the speed of electromagnetic waves in vacuum, then their speed in a medium of dielectric constant 'K' and relative permittivity 'μ_r' is _____

(A) $\frac{1}{\sqrt{\mu_r K}}$
(B) $c\sqrt{\mu_r K}$
(C) $\frac{c}{\sqrt{\mu_r K}}$
(D) $\frac{K}{\sqrt{\mu_r c}}$

Answer: (C) $\frac{c}{\sqrt{\mu_r K}}$ · The council's preliminary key

Q145 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

A parallel plate capacitor is completely immersed in a liquid of resistivity $0.25\ \Omega\text{m}$ and relative permittivity 80. If the plates of the capacitor are connected to an alternating voltage source of $V_0 \sin(\omega t)$ volt at a frequency of 0.4 GHz, then the ratio of the amplitudes of the displacement current and conduction current is _____
$\left(\frac{1}{4\pi\epsilon_0} = 9 \times 10^9\ \text{Nm}^2\text{C}^{-2}\right)$

(A) $3:7$
(B) $2:5$
(C) $2:3$
(D) $4:9$

Answer: (D) $4:9$ · The council's preliminary key

Q146 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

A plane electromagnetic wave of frequency 25 MHz travels in free space along the X-direction. At a particular point in space and time the electric field is $\vec{E} = 6.3\,\hat{j}\ \text{Vm}^{-1}$. Then the magnetic field at that point is

(A) $2.1 \times 10^{-8}\,\hat{k}$ T
(B) $2.1 \times 10^{8}\,\hat{k}$ T
(C) $2.1 \times 10^{-8}\,\hat{j}$ T
(D) $2.1 \times 10^{8}\,\hat{j}$ T

Answer: (A) $2.1 \times 10^{-8}\,\hat{k}$ T · The council's preliminary key

Q147 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

A light with an energy flux of $18\ \text{W cm}^{-2}$ falls on a non-reflecting surface at normal incidence. If the surface has an area of $20\ \text{cm}^2$, the average force exerted on the surface during a 30 minute time span is _____ ($c = 3 \times 10^8\ \text{ms}^{-1}$).

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(A) 1.2×10^{-6} N
(B) 2.1×10^{-6} N
(C) 3.1×10^{-6} N
(D) 4.8×10^{-6} N

Answer: (A) 1.2×10^{-6} N · The council's preliminary key

Q148 TS EAMCET 2016 · 15 May · Offline MCQ

Two equations are given below :
(A) $\oint \overline{E} \cdot d\overline{A} = \frac{Q}{\epsilon_0}$; (B) $\oint \overline{B} \cdot d\overline{A} = 0$
They are

(A) (A) — Ampere's law; (B) — Gauss law for electricity
(B) (A) — Gauss law for electric fields; (B) — Gauss law for magnetic fields
(C) (A) — Faraday law; (B) — Gauss law for electric fields
(D) Both (A) and (B) represent Faraday law

Answer: (B) (A) — Gauss law for electric fields; (B) — Gauss law for magnetic fields · Official TGCHE final key

Q149 AP EAMCET 2016 · 29 Apr · Offline MCQ

Choose the correct sequence of the radiation sources in increasing order of the wavelength of electromagnetic waves produced by them.

(A) X-ray tube, Magnetron valve, Radio active source, Sodium lamp
(B) Radio active source, X-ray tube, Sodium lamp, Magnetron valve
(C) X-ray tube, Magnetron valve, Sodium lamp, Radio active source
(D) Magnetron valve, Sodium lamp, X-ray tube, Radio active source

Answer: (B) Radio active source, X-ray tube, Sodium lamp, Magnetron valve · The council's preliminary key

Q150 AP EAMCET 2014 · 22 May · Offline MCQ

The electric field for an electromagnetic wave in free space is $\vec{E} = \hat{i}\, 30 \cos(kz - 5 \times 10^8 t)$ where magnitude of E is in V/m. The magnitude of wave vector, k is (velocity of em wave in free space = 3×10^8 m/s)

(A) 0.46 rad m^{-1}
(B) 3 rad m^{-1}
(C) 1.66 rad m^{-1}
(D) 0.83 rad m^{-1}

Answer: (C) 1.66 rad m^{-1} · The council's preliminary key