PART 1 - PHYSICS

Topic : Electromagnetic waves

SECTION–A : (Maximum Marks : 4)

- This section contains **ONE** question.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks	: +4	ONLY if (all) the correct option(s) is(are) chosen;
Partial Marks	: +3	If all the four options are correct but ONLY three options are chosen;
Partial Marks	: +2	If three or more options are correct but ONLY two options are chosen, both of which are correct;
Partial Marks	: +1	If two or more options are correct but ONLY one option is chosen and it is a correct option;
Zero Marks	: 0	If none of the options is chosen (i.e. the question is unanswered);
Negative Marks	: −1	In all other cases.

- For example, in a question, if **(A), (B) and (D)** are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get −1 marks.

1. The electric field associated with an electromagnetic wave travelling in vacuum is given by $E_0\sin(3y+4z+\omega t)\hat{i}$, where ω is the angular frequency. All quantities are in SI units. The correct statement(s) about this wave is/are:
[Given: speed of light in vacuum $c = 3 \times 10^8$ ms^{-1}.] [JEE Advanced 2026 Paper 1]

(A) The wave is travelling in $-\frac{1}{5}(3\hat{j}+4\hat{k})$ direction.

(B) The magnitude of the wave vector is 0.5 m^{-1}.

(C) The value of ω is 1.5×10^9 rad s^{-1}.

(D) The magnetic field associated with this wave is given by $\frac{E_0}{c}\sin(3y+4z+\omega t)(4\hat{j}-3\hat{k})$.

Scan or tap for the full solution

Space for Rough Work

SECTION–B : (Maximum Marks : 4)

- This section contains **ONE** question.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, −0.33, −.30, 30.27, −127.30) in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If ONLY the correct answer is entered;
Zero Marks : 0 In all other cases.

2. A cube of unit volume contains 35×10^7 photons of frequency 10^{15} Hz. If the energy of all the photons is viewed as the average energy being contained in the electromagnetic waves within the same volume, then the amplitude of the magnetic field is $\alpha \times 10^{-9}$ T. Taking permeability of free space $\mu_0 = 4\pi \times 10^{-7}$ Tm/A, Planck's constant $h = 6 \times 10^{-34}$ Js and $\pi = \frac{22}{7}$, the value of α is ____ [JEE Advanced 2025 Paper 1]

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Space for Rough Work

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TEST SERIES
(Academic Session : 2026-2027)

JEE ADVANCED ELECTROMAGNETIC WAVES — PROPERTIES OF EM WAVES (SPEED, TRANSVERSE NATURE, ENERGY, MOMENTUM, INTENSITY) — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION–A

Ques.	1																								
Ans.	**A, C**																								

SECTION–B

Ques.	2															
Ans.	**21 to 25**															