

QB365 Question Bank Software Study Materials

Electromagnetic Waves 50 Important 1 Marks Questions With Answers (Book Back and Creative)

12th Standard

Physics

Total Marks : 50

Multiple Choice Question

50 x 1 = 50

- 1) The dimension of $\frac{1}{\mu_0 \epsilon_0}$ is _____.
(a) $[LT^{-1}]$ **(b) $[L^2T^{-2}]$** (c) $[L^{-1}T]$ (d) $[L^{-2}T^2]$
- 2) If the amplitude of the magnetic field is 3×10^{-6} T, then amplitude of the electric field for a electromagnetic waves is _____.
(a) 100 V m^{-1} (b) 300 V m^{-1} (c) 600 V m^{-1} **(d) 900 V m^{-1}**
- 3) Which of the following electromagnetic radiations is used for viewing objects through fog
(a) microwave (b) gamma rays (c) X- rays **(d) infrared**
- 4) Which of the following is false for electromagnetic waves
(a) transverse (b) non-mechanical waves **(c) longitudinal** (d) produced by accelerating charges
- 5) Consider an oscillator which has a charged particle oscillating about its mean position with a frequency of 300 MHz. The wavelength of electromagnetic waves produced by this oscillator is _____.
(a) 1 m (b) 10 m (c) 100 m (d) 1000 m
- 6) The electric and the magnetic fields, associated with an electromagnetic wave, propagating along negative X axis can be represented by _____.
(a) $\vec{E} = E_0 \hat{i}$ and $\vec{B} = B_0 \hat{k}$ **(b) $\vec{E} = E_0 \hat{k}$ and $\vec{B} = B_0 \hat{j}$** (c) $\vec{E} = E_0 \hat{i}$ and $\vec{B} = B_0 \hat{j}$ (d) $\vec{E} = E_0 \hat{j}$ and $\vec{B} = B_0 \hat{i}$
- 7) In an electromagnetic wave traveling in free space the rms value of the electric field is 3 V m^{-1} . The peak value of the magnetic field is _____.
(a) $1.414 \times 10^{-8} \text{ T}$ (b) $1.0 \times 10^{-8} \text{ T}$ (c) $2.828 \times 10^{-8} \text{ T}$ (d) $2.0 \times 10^{-8} \text{ T}$
- 8) If the magnetic monopole exists, then which of the Maxwell's equation to be modified?
(a) $\oint \vec{E} \cdot d\vec{A} = \frac{Q_{enclosed}}{\epsilon_0}$ **(b) $\oint \vec{B} \cdot d\vec{A} = 0$** (c) $\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \epsilon_0 \frac{d}{dt} \oint_s \vec{E} \cdot d\vec{A}$ (d) $\oint \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \Phi_B$
- 9) Which of the following is an electromagnetic wave?
(a) α - rays (b) β - rays **(c) γ - rays** (d) all of them
- 10) Which one of them is used to produce a propagating electromagnetic wave?
(a) an accelerating charge (b) a charge moving at constant velocity (c) a stationary charge (d) an uncharged particle
- 11) If $E = E_0 \sin[10^6 x - \omega t]$ be the electric field of a plane electromagnetic wave, the value of ω is _____.
(a) $0.3 \times 10^{-14} \text{ rad s}^{-1}$ (b) $3 \times 10^{-14} \text{ rad s}^{-1}$ (c) $0.3 \times 10^{14} \text{ rad s}^{-1}$ **(d) $3 \times 10^{14} \text{ rad s}^{-1}$**
- 12) Which of the following is NOT true for electromagnetic waves?
(a) it transport energy (b) it transport momentum (c) it transport angular momentum
(d) in vacuum, it travels with different speeds which depend on their frequency
- 13) The electric and magnetic fields of an electromagnetic wave are _____.
(a) in phase and perpendicular to each other (b) out of phase and not perpendicular to each other

- (c) in phase and not perpendicular to each other (d) out of phase and perpendicular to each other
- 14) An e.m. wave is propagating in a medium with a velocity $\vec{v} = v\hat{i}$. The instantaneous oscillating electric field of this e.m. wave is along + y-axis, then the direction of oscillating magnetic field of the e.m. wave will be along ____.
- (a) -y direction (b) -x direction **(c) +z direction** (d) -z direction
- 15) Fraunhofer lines are an example of ____ spectrum.
- (a) line emission **(b) line absorption** (c) band emission (d) band absorption
- 16) Which of the following E.M waves has the longest wavelength?
- (a) Radio waves** (b) IR (c) X-rays (d) visible
- 17) The EM waves do not transport _____.
- (a) energy **(b) charge** (c) momentum (d) information
- 18) Speed of electromagnetic waves through vacuum is equal to _____.
- (a) $\sqrt{\mu_0\epsilon_0}$ **(b) $\frac{1}{\sqrt{\mu_0\epsilon_0}}$** (c) $\frac{\sqrt{\mu_0}}{\epsilon_0}$ (d) $\sqrt{\frac{\epsilon_0}{\mu_0}}$
- 19) The energy of electromagnetic waves is due to which energy of the oscillating charge?
- (a) mechanical (b) potential **(c) kinetic** (d) electrostatic
- 20) The velocity of light in vacuum can be changed by changing _____.
- (a) frequency (b) amplitude (c) wave length **(d) none of these**
- 21) Which of the following can be used to take photograph over long distance of _____.
- (a) White light (b) U- V radiation **(c) I-R radiation** (d) Microwaves
- 22) The correct definition of spectrum is _____.
- (a) band of colours** (b) band of white light (c) band of frequencies (d) band of amplitudes
- 23) The spectra used for making dyes is _____.
- (a) line spectra (b) continuous absorption spectra (c) fraunhofer spectra **(d) band absorption spectra**
- 24) A red flower seen in the light of mercury vapour lamp through a green filter will appear _____.
- (a) black** (b) red (c) violet (d) white
- 25) The central core of the sun is called _____.
- (a) chromosphere (b) stratosphere **(c) photosphere** (d) thermo sphere
- 26) Electric filament lamp gives rise to _____ spectrum.
- (a) line (b) band **(c) continuous** (d) absorption
- 27) Band spectra are obtained from _____.
- (a) atoms **(b) molecules** (c) solids (d) semisolids
- 28) The waves used in physiotherapy is _____.
- (a) I-R rays** (b) U-V rays (c) μ - waves (d) γ -rays
- 29) Electromagnetic waves are _____ waves.
- (a) longitudinal **(b) Transverse** (c) mechanical (d) sound
- 30) The electromagnetic waves are _____ by electric and magnetic fields
- (a) deflected **(b) not deflected** (c) oscillated (d) scanned

- 31) _____ radiations are used in destroying bacteria.
(a) UV (b) IR (c) X-ray (d) Gamma rays
- 32) _____ are used in forensic labs.
 (a) X-ray **(b) UV** (c) Gamma (d) Visible
- 33) Gamma rays are used in the treatment of _____.
(a) cancer (b) Polio (c) AIDS (d) Tuberculosis
- 34) Every source has its own characteristic _____ spectrum.
 (a) white **(b) emission** (c) scattering (d) absorption
- 35) Continuous spectrum depends only on the _____ of the source.
 (a) characteristic **(b) temperature** (c) density (d) volume
- 36) The absorption spectra are characteristic of the _____.
 (a) source **(b) absorbing substance** (c) time of travel from source to screen
 (d) spectrometer used to study the spectrum
- 37) _____ spectra are used for making dyes
 (a) continuous emission (b) band emission **(c) band absorption** (d) line spectra
- 38) The dark lines in the solar spectrum are called _____ lines.
 (a) Fresnel (b) Newton (c) Compton **(d) Fraunhofer**
- 39) In an electromagnetic wave power is transmitted _____.
 (a) along electric field (b) along magnetic field **(c) in a direction perpendicular to both the fields**
 (d) in a direction parallel to both the fields
- 40) _____ waves have longest wavelength.
 (a) UV (b) IR (c) Micro **(d) Radio**
- 41) In an electromagnetic wave the phase difference between electric field and magnetic field is
 (a) $\frac{\pi}{4}$ **(b) zero** (c) $\frac{\pi}{2}$ (d) $d\pi$
- 42) Velocity of electromagnetic wave through vacuum is _____.
 (a) $\frac{1}{\sqrt{\mu\epsilon}}$ (b) $\sqrt{\frac{\mu_0}{\epsilon_0}}$ (c) $\sqrt{\frac{\epsilon_0}{\mu_0}}$ **(d) $\frac{1}{\sqrt{\mu_0\epsilon_0}}$**
- 43) Experimental verification of electromagnetic waves was done by _____.
 (a) Huygen (b) Maxwell **(c) Hertz** (d) James Clerk
- 44) The idea by Displacement current was given by _____.
 (a) Gauss (b) Ampere **(c) Maxwell** (d) Faraday
- 45) To study about nuclear structure _____ rays are used.
 (a) UV (b) IR **(c) gamma** (d) visible
- 46) _____ spectrum is produced by a gas molecular state.
 (a) pure **(b) band** (c) continuous (d) line
- 47) The line spectra is formed from _____.

(a) molecules in gaseous state **(b) atoms in gases state** (c) atoms liquid state (d) molecules liquid state

48) Name the EM waves used for studying molecular structure and also in forensic investigations:

(a) UV rays (b) Gamma rays (c) X-rays (d) IR rays

49) Match List-I with List-II

	List-I (Electromagnetic waves)	List-II (Wavelength)
(a)	AM radio waves	(i) 10^{-10} m
(b)	Microwaves	(ii) 10^2 m
(c)	Infrared radiations	(iii) 10^{-2} m
(d)	X-rays	(iv) 10^{-4} m

Choose the correct answer from the options given below

(a) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i) (b) (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv) (c) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

(d) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

50) When light propagates through a material medium of relative permittivity ϵ_r and relative permeability μ_r , the velocity of light, v is given by (c-velocity of light in vacuum)

(a) $v = c$ (b) $V = \sqrt{\frac{\mu_r}{\epsilon_r}}$ (c) $V = \sqrt{\frac{\epsilon_r}{\mu_r}}$ **(d) $v = \frac{c}{\sqrt{\epsilon_r \mu_r}}$**