PHYSICS

BOOKS - SARAS PUBLICATION

ELECTROMAGNETIC WAVES

Example

1. The electric and magnetic field of an electromagnetic wave are :

A. in phase and perpendicular to each other

B. in phase and parallel to each other

C. in opposite phase and perpendicular to each other

D. in opposite phase and parallel to each other

Answer:

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2. Four identical thin rods each of mass M and length l , from a square frame. Moment of intertia of this frame about an axis through the centre of the square and perendicular to its plane is :

A. $\frac{2}{3}Ml^2$

B. $\frac{13}{3}Ml^2$

C. $\frac{1}{3}Ml^2$

D. $\frac{4}{3}Ml^2$

Answer:

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3. An ideal spring of spring constant k, is suspended from the ceiling of a room and a blok of mass m is fastened to its lower end. If the block

is released when the spring is un-stretched, then then maximum extension in the spring is :

A. $2Mg/k$

B. $2Mg/k$

C. $Mg/2k$

D. Mg/k

Answer:

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4. A 220 volt input is supplied to a transformer.The output circuit draws a currnt of 2.0 ampere at 440 volts If the efficency of the transformer is 80% the current drawn by the primary windings of the transformer is :

A. 3.6 ampere

B. 2.8 ampere

C. 2.5 ampere

D. 5.0 ampere

Answer:

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5. Two waves are represents by the equations $y_1 = a\sin(\omega t + kx + 0.57)m$, $y_2 = a\cos(\omega t + kx)m$,where x is inmetre and t in s The phase difference between them is

A. 0.57 radian

B. 1.0 radian

C. 1.25 radian

D. 1.57 radian

Answer:

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6. The decreaseing order of wavelength of infrared, microwave ultraviolet and gamma rays is.

A. Infrared, microwave, ultraviolet,gamma rays

B. Microwave, infrared, ultraviolet, gamma rays

C. Gamma rays, ultraviolet, inftared, microwaves

D. Microwaves, gamma rays,infrared, ultraviolet

Answer:

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7. The wavelength of the first line of Lyman series for hydrogen atom is equal to that of the second line of Balmer series for a hydrogen like ion.The atomic number Z of hydrogen like ion is .

A. 2

B. 3

C. 4

D. 1

Answer:

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8. Electron in hydrogen atom first jumps from third excited state to second excited state and then from second excited to the first excited state. The ratio of the wavelengths $\lambda_1 : \lambda_2$ emitted in the two cases is

A. $27/20$

B. $27/5$

C. $20/7$

D. $7/5$

Answer:

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9. The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by.....

A. $\lambda_p \propto \lambda_e^2$

B. $\lambda_p \propto \lambda_e$

C. $\lambda_p \propto \lambda_e$

D. $\lambda_p \propto \frac{1}{\lambda_e}$

Answer:

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10. An electromagnetic wave of frequency ν=3.0 MHz passes from vacuum into a dielectric medium with relative permittivity ε=4.0.Then

A. Wavelength is doubled and frequency unchanged

B. Wavelength is doubled and frequency becomes half

C. Wavelength is halved and frequency remains unchanged

D. Wavelength and frequency both remain unchanged

Answer:

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11. A paralel beam of light of wavelength $\lambda$is incident normally on a narrow slit.A diffraction pattern is formed on a screen placed perpendicular to the direction of the incident beam.At the second minimum of the diffraction pattern.the phase difference between the rays coming from from the two edges of slit is

A. $\pi\lambda$

B. 2π

C. 3π

D. 4π

Answer:

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12. The energy of the EM waves is of the order of 15 ke V. to which part of the spectrum does it belong?

A. $\gamma - rays$

B. `X-rays

C. Infra-red rays

D. Ultraviolet rays

Answer:

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13. A unifrom rope of length L and mass $m_1$hangs vertically from a rigid support.A block of mass m_2 is attached to the free end of the rope.A transverse pulse of wavelengh λ_1 is produced at the lower end of the rope.The wavelength of the

pulse when it reaches the top of the rope is λ_2.The ratio λ_1 / λ_2 is :

A. $\sqrt{\frac{m_1 + m_2}{m_1}}$

B. $\sqrt{\frac{m_1}{m_2}}$

C. $\sqrt{\frac{m_1 + m_2}{m_2}}$

D. $\sqrt{\frac{m_2}{m_1}}$

Answer:

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14. Out of the following options which one can be used to produced a propagating electromagnetic wave?

A. An accelerating charge

B. A charge moving at constant velocity

C. A stationary charge

D. A chargeless particle

Answer:

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15. Two cars moving in opposite directions approach each other with speed of $22m/s$ and $16.5m/s$ respectively.The driver of the first car blows a horn having a frequency 400Hz.The frequency heard by the driver of the second car is [velocity of sound $340m/s$]

A. 361 Hz

B. 411 Hz

C. 448 Hz

D. 350 Hz

Answer:

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