

Class : XIIth Date : Subject : PHYSICS DPP No. : 5

## **Topic :-Electromagnetic Waves**

- 1. Instantaneous displacement current of 1.0 A in the space between the parallel plate of 1  $\mu$ F capacitor can be estabilished by changing potential difference of a)  $10^{-6}$ Vs<sup>-1</sup> b)  $10^{6}$ Vs<sup>-1</sup> c)  $1 \text{ Vs}^{-1}$ d) $0.1 V s^{-1}$ 2. In a phase electromagnetic wave, the electric filed oscillates sinusoidally at a frequency of  $2.0 \times 10^{10}$  Hz and amplitude 48 Vm<sup>-1</sup>. The wavelength of the wave is a)  $24 \times 10^{-10}$  m b)  $1.5 \times 10^{-2}$  m c)  $4.16 \times 10^8$  m d)  $3 \times 10^{8}$  m 3. Velocity of Electromagnetic Waves in a medium depends upon a) Thermal properties of medium b) Mechanical and electrical properties of medium c) electrical and magnetic properties of the medium d) Mechanical and magnetic properties of the medium 4. The electric field for a plane electromagnetic wave travelling in the positive *z*-direction is represented by which one of the following? b)  $\hat{\mathbf{i}}_1 E_0 e^i (kx - \omega t + \phi)$ a)  $\hat{\mathbf{k}}_1 E_0 e^i (kz - \omega t + \phi)$ c)  $\hat{\mathbf{i}}_1 E_0 e^i (kz + \omega t + \phi)$ d)  $\hat{\mathbf{k}}_1 E_0 e^i (kz + \omega t + \phi)$ 5. The fact that radiosignals reach the earth from outside the atmosphere, was discovered accidently by a) K. G. Jansky b) Millikan c) Arvabhatta d) Prof. Kanu 6. The electric field of an electromagnetic wave travelling through vacuum is given by the
  - equation  $E = E_0 \sin(kx \omega t)$ . The quantity that is independent of wavelength is
    - a)  $\frac{k}{\omega}$  b)  $k\omega$  c)  $\omega$  d) k
- 7. X-rays are produced by jumping of
  - a) Electrons from lower to higher energy orbit b) Electrons from higher to lower energy orbit of atom of atom
  - c) Protons from lower to higher energy orbit of d) Proton from higher to lower energy orbit of nucleus nucleus
- 8. The magnetic field between the plates of radius 12 cm separated by distance of 4 mm of a parallel plate capacitor of capacitance 100 pF along the axis of plates having conduction current of 0.15 A is
  - a) Zero b) 1.5 T c) 15 T d) 0.15 T
- 9. The magnetic field between the plate of a capacitor when r < R is given by

	a) $\frac{\mu_0 i_D r}{2 p^2}$	b) $\frac{\mu_0 i_D}{2}$	c) $\frac{\mu_0 i_D}{2}$	d)Zero			
10	$2\pi R^2$	$2\pi R$	$2\pi r$				
10.	a) Infrared radiations b) Illtraviolet radiations						
	c) X-rays		d) v-rays	15			
11	Out of the following ele	ectromagnetic radiation	which has the shortest	wavelength?			
11.	a) Radiowaves	h) Infrared	c) Illtraviolet	d) X-rays			
12.	A circular ring of radius	s $r$ is placed in a homog	enous magnetic field per	rpendicular to the plane			
	of the ring. The field B chnages with time according to the equation $B = kt$ , where k is a						
	constant and <i>t</i> is the time. The electric field in the ring is						
	kr	kr	, kr	k			
	$a_{\frac{1}{4}}$	b) <u></u>	$c_{J}$	$a)\frac{1}{2r}$			
13.	A cube of edge a has its edges parallel to $x$ , $y$ and $z$ -axis of rectangular coordinate system. A						
	uniform electric field $\vec{E}$ is parallel to y-axis and a uniform magnetic field is $\vec{E}$ parallel to x-axis.						
	The rate at which flows through each face of the cube is						
	$\frac{a^2 \cdot EB}{2w}$ parallel to $x - y$	plane and zero in	$a^{\frac{a^2 EB}{\mu}}$ parallel to $x - y$	v plane and zero in			
	a) $2\mu_0$ others		others				
			$a^2 E B$	с <u>р</u>			
	c) $\frac{a^2 EB}{2\mu_0}$ from all faces		d) $\overline{^{2\mu_0}}$ parallel; to y –	z faces and zero in			
	-r~0		others				
14.	4. A radar sends the waves towards a distant object and receives the signal reflected by object.						
	These waves are						
	a) Sound waves	b) Light waves	c) Radio waves	d) Micro waves			
1 Г	Alassaulassus is south		d la a al- + a a a stala la sa assist	A lasser beam is sent to the moon and reflected back to earth by ay mirror placed on the moo			
15.	A lasser beam is sent to	the moon and reflected	d back to earth by ay min	t take the light to make			
15.	A lasser beam is sent to by an astronaut. If the r	the <mark>moo</mark> n and reflected moon is 384000 km from	l back to earth by ay min n earth, how long does i	t take the light to make			
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15. 16.	A lasser beam is sent to by an astronaut. If the r the round trip? a) 5 min A particles of mass $1 \times ms^{-1}$ along the positive	b the moon and reflected moon is 384000 km from b) 2.5 min 10 <sup>-26</sup> kg and charge 1.6 X-axis enters a region	d back to earth by ay min n earth, how long does i c) 2.5 s $\times 10^{-19}$ C travelling wit	t take the light to make d) 500 s h a velocity $1.28 \times 10^6$ ric field <b>E</b>			
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15.	A lasser beam is sent to by an astronaut. If the r the round trip? a) 5 min A particles of mass $1 \times ms^{-1}$ along the positive and a uniform magnetic $8 \times 10^{-2} \hat{J}$ Wbm <sup>-2</sup> , the	b the moon and reflected moon is 384000 km from b) 2.5 min $10^{-26}$ kg and charge 1.6 e X-axis enters a region c field of induction <b>B</b> are direction of motion of t	d back to earth by ay min m earth, how long does i c) 2.5 s $\times 10^{-19}$ C travelling wit in which a uniform elect e present. If $E = -10.24$ he particles is	trop placed on the moon t take the light to make d) 500 s h a velocity 1.28 × 10 <sup>6</sup> ric field <b>E</b> × 10 <sup>3</sup> $\hat{\mathbf{k}}$ NC <sup>-1</sup> and $B =$			
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<ol> <li>15.</li> <li>16.</li> <li>17.</li> <li>18.</li> <li>10.</li> </ol>	A lasser beam is sent to by an astronaut. If the r the round trip? a) 5 min A particles of mass $1 \times ms^{-1}$ along the positive and a uniform magnetic $8 \times 10^{-2}\hat{J}$ Wbm <sup>-2</sup> , the a) Along the positive <i>X</i> - c) At 45 <sup>o</sup> to the positive A radiation of energy <i>E</i> transferred to the surfa a) $\frac{E}{c}$ Which of the following a) X-rays	b) 2.5 min $10^{-26}$ kg and charge 1.6 e X-axis enters a region is c field of induction <b>B</b> are direction of motion of t -axis e X-axis falls normally on a peri- face is b) $\frac{2E}{c}$ rays is emitted by a hur b) UV rays t of 100 m. How much a	d back to earth by ay min n earth, how long does i c) 2.5 s $\times 10^{-19}$ C travelling wit in which a uniform elect e present. If $E = -10.24$ he particles is b) Along the negative X d) At 135° to the positi fectly reflecting surface. c) Ec nan body? c) Visible rays	cror placed on the moon t take the light to make d) 500 s h a velocity 1.28 × 10 <sup>6</sup> ric field <b>E</b> × 10 <sup>3</sup> $\hat{\mathbf{k}}$ NC <sup>-1</sup> and $B =$ K-axis ve X-axis The momentum d) $\frac{E}{c^2}$ d) IR rays the TV broadcast if the			

average population density around the tower is  $100 \text{ km}^{-2}$  (radius of the earth =  $6.37 \times 10^6 \text{ m}$ ) a) 4 lakh b) 4 billion c) 40,000 d) 40 lakh

- 20. Radio wave diffract around building although light waves do not. The reason is that radio waves
  - a) Travel with speed target than *c*
  - c) Carry news

b) Have much larger wavelength than light d) Are not electromagnetic waves

