



INDIAN SCHOOL DARSAIT  
DEPARTMENT OF PHYSICS



Subject : PHYSICS	<u>ELECTROMAGNETIC WAVES</u>	Worksheet #9
Resource Person: SUSAN ANIL	Date : 11.10.17	
Name of the Student : _____	Class & Division : _____	Roll Number : ____

	<b><u>One mark questions:</u></b>
1.	Name the part of the electromagnetic spectrum of wavelength $10^{-2}$ m , $10^3$ m and mention its one application. (2008)
2.	The charging current for a capacitor is 0.25 A. What is the displacement current across its plates? (2016)
3.	Why microwaves are considered suitable for radar systems used in aircraft navigation? (2016)
4.	Which part of electromagnetic spectrum (i) has largest penetrating power (ii) is absorbed from sunlight by ozone layer (iii) is used in radar systems (iv) used in satellite communication? (2010)
5.	Name the characteristics of electromagnetic waves that (i) increases (ii) remains constant in the electromagnetic spectrum as one moves from radiowave region towards ultraviolet region.(2009)
6.	Identify the part of the electromagnetic spectrum to which the following wavelengths belong: (i) $10^{-1}$ m (ii) $10^{-12}$ m (iii) $10^{-10}$ m (iv) 1 mm (v) $10^{-11}$ m.
7.	Write the following radiations in ascending order in respect of their frequencies : (2009) Which of the following has the shortest wavelength: (2010) (i) X-rays, microwaves, UV-rays and radio waves (ii) X-rays, Radio waves, Blue light, Infrared light
8.	Name the part of electromagnetic spectrum which is suitable for : (i) radar systems used in aircraft navigation (ii) treatment of cancer tumours.(2008) (iii) studying crystal structure of solids. What is its frequency range?(2009)
9.	Name the electromagnetic radiations which are produced (i) when high energy electrons are bombarded on a metal target (ii) by klystron or a magnetron valve. (2009)
	<b><u>Two marks questions:</u></b>

10.	<p>The oscillating magnetic field in a plane electromagnetic wave is given by  <math>B_y = (8 \times 10^{-6}) \sin [2 \times 10^{11} t + 300 \pi x] T</math></p> <p>(i) Calculate the wavelength of the electromagnetic wave.  (ii) Write down the expression for the oscillating electric field. (2008)</p>
11.	<p>The oscillating electric field of an electromagnetic wave is given by:  <math>E_y = 30 \sin [2 \times 10^{11} t + 300 \pi x] \text{ Vm}^{-1}</math></p> <p>(a) Obtain the value of the wavelength of the electromagnetic wave.  (b) Write down the expression for the oscillating magnetic field. (2009)</p>
12.	<p>What is meant by the transverse nature of electromagnetic waves? Draw a diagram showing the propagation of an electromagnetic wave along the <math>x</math>-direction, indicating clearly the directions of the oscillating electric and magnetic fields associated with it. (2008,2010)</p>
13.	<p>How does a charge <math>q</math> oscillating at certain frequency produce electromagnetic waves? (2009)</p>
14.	<p>Name the electromagnetic radiations having the wavelength range from (i) 1 mm to 700 nm  (ii) 1 nm to <math>10^{-3}</math> nm. Give its two important applications. (2009)</p>
15.	<p>Arrange the following electromagnetic radiations in ascending order of their frequencies:  (i) Microwave (ii) Radio wave (iii) X-rays (iv) Gamma rays .Write two uses of any one of these. (2010)</p>
16.	<p>How are X-rays produced? Write their two important uses. (2010)</p>
17.	<p>(i) How are infrared waves produced? Write their one important use.  (ii) The thin ozone layer on top of the stratosphere is crucial for human survival. Why? (2016)</p>
	<p><b><u>Three marks questions –</u></b></p>
18.	<p>(i) Which segment of electromagnetic waves has highest frequency? How are these waves produced? Give one use of these waves.  (ii) Which em waves lie near the high frequency end of visible part of em spectrum? Give its one use. In what way this component of light has harmful effects on humans? (2016)</p>
19.	<p>Write Maxwell's generalization of Ampere's Circuital Law. Show that in the process of charging a capacitor, the current produced within the plates of the capacitor is</p> $i = \epsilon_0 \frac{d\Phi_E}{dt} \quad . (2016)$
20.	<p>Why are infrared radiations referred to as heat waves also? Name the radiations which are next to these radiations in electromagnetic spectrum having  (i) Shorter wavelength.  (ii) Longer wavelength. (2009)</p>