

Girls' High School & College, Prayagraj

Worksheet No. - 6

Session 2020-2021

Class - X A B C D E F

Subject- Physics

Chapter- Spectrum

Instructions: - Parents are expected to ensure that the student spends two days to read and understand the chapter according to the books and website referred and thereafter answer the given questions. Student should refer to the following books/website-

Concise Physics, for class 10, By R. P. Goyal and S. P. Tripathi (Selina Publishers) OR

A New Approach to I.C.S.E. Physics by V. K. Sally and R N Das Gupta (Goyal Brothers Prakashan) OR

ICSE Physics By S C Gupta and Smita Aggarwal (Srijan Publishers) OR

website-http://quiznext.in/study-material/learning_material/ICSE-10-Physics/Spectrum/deviation-dispersion-and-spectrum/

Topics: - 1. DEVIATION, DISPERSION AND SPECTRUM
2. ELECTROMAGNETIC SPECTRUM AND ITS BROAD CLASSIFICATION
3. SCATTERING OF LIGHT AND ITS APPLICATIONS

1) Questions based on Deviation, Dispersion and Spectrum:-

Answer the following questions briefly: -

Q.1:- Name three factors on which the deviation produced by a prism depends and state how does it depend on the factors stated by you.

Q.2:- How does the speed of light in glass change on increasing the wavelength of light?

Q.3:- Which color of the white light travels (a) fastest (b) slowest, in glass?

Q.4:- Write the approximate wavelength range(in Å^0) for

- a) blue,
- b) red, and
- c) white light.

Q.5:- Which colour of the white light is deviated by a glass prism (i) the most, and (ii) the least?

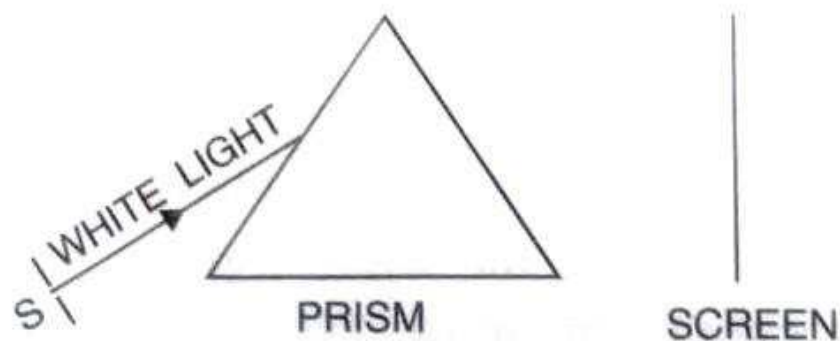
Q.6:- The wavelength for the light of red and blue colours are nearly 7.8×10^{-7} m and 4.8×10^{-7} m respectively.

- a) Which colour has the greater speed in vacuum?
- b) Which colour has the greater speed in glass?

Q.7:- Define the term dispersion of white light through a prism.

Q.8:- Explain the cause of dispersion of white light through a prism.

Q.9:- Figure given below shows a thin beam of white light from a source S striking on one face of a prism.



- a) Complete the diagram to show the effect of prism on the beam and to show what is seen on the screen.
- b) If a slit is placed in between the prism and the screen to pass only the light of green colour, what will you then observe on the screen?
- c) What conclusion do you draw from the observation in part (b) above?

Q.10:- A glass prism is able to produce a spectrum when white light passes through it, but a glass slab does not produce any spectrum. Why?

2) Questions based on Electromagnetic Spectrum and Its Broad Classification:-

Answer the following questions briefly: -

Q.1:- Arrange the following radiations in the order of their increasing wavelength :
X-rays, infrared rays, radio waves, gamma rays and microwaves.

Q.2:- Name two sources, each of infrared radiations and ultraviolet radiations.

Q.3:- Name the region just beyond (i) the red end, and (ii) the violet end, of the spectrum.

Q.4:- Name the radiation which can be detected by (a) a thermopile (b) a solution of silver chloride.

Q.5:- From the following, identify the electromagnetic waves having (a) maximum, and (b) minimum frequency:
Radio waves, γ -rays, visible light, microwaves, ultraviolet rays and infrared rays

Q.6:- Name any two electromagnetic waves which have a frequency higher than that of violet light. State one use of each.

Q.7:- Which part of electromagnetic spectrum is absorbed from incident sunlight by the ozone layer of the earth's atmosphere?

Q.8:- Give one use each of (a) microwaves, (b) ultraviolet radiations (c) X-rays.

Q.9:- Name the radiation which is used for satellite communication?

Q.10:- Give reason for the following:

a) Infrared radiations are used for photography in fog.

- b) Infrared radiations are used for signals during the war.
- c) A quartz prism is required for obtaining the spectrum of the ultraviolet light.
- d) A rock salt prism is used instead of a glass prism to obtain the infrared spectrum.

3) Questions based on Scattering of Light and Its Application :-

Answer the following questions briefly: -

Q.1:- What is meant by scattering of light?

Q.2:- When sunlight enters the earth's atmosphere, state which colour of light is scattered (i) the most, and (ii) the least.

Q.3:- The colour of sky, in direction other than of the sun, is blue. Explain.

Q.4:- Why does the sun appear red at sunrise and sunset?

Q.5:- The sky at noon appears white. Give reason.

Q.6:- Why is the colour red used as a sign of danger?

4) Multiple choice questions :-

Q.1:-The light of different colours have same speed in :

- a) glass
- b) prism
- c) water
- d) air.

Q.2:-When a white light ray falls on a prism, the ray at its first surface suffers :

- a) no refraction
- b) only dispersion
- c) only deviation
- d) both deviation and dispersion.

Q.3:- The part of electromagnetic spectrum that excite our retina to produce the sensation of vision is :

- a) Visible light
- b) Infrared rays
- c) Ultraviolet radiations
- d) Gamma rays.

Q.4:- In the spectrum of white light by a prism, the colour at the extreme end opposite to the base of prism is :

- a) violet
- b) yellow
- c) red
- d) blue.

Q.5:-The frequency of ____ colour of light is maximum and ____ colour of light is minimum.

- a) violet, red
- b) blue, red
- c) green, blue
- d) red, violet.

Q.6:- _____ is the characteristic of colour, irrespective of its origin.

- a) frequency
- b) wavelength
- c) speed
- d) spectrum.

Q.7:-The phenomenon of splitting of white light by a prism into its constituent colours is known as:

- a) reflection
- b) scattering
- c) dispersion
- d) interference.

Q.8:-The most energetic electromagnetic radiations are:

- a) microwaves
- b) ultraviolet waves
- c) X- rays
- d) gamma rays.

Q.9:-To an astronaut in a space-ship, the earth appears:

- a) white
- b) red
- c) blue
- d) black.

Q.10:-The band of colours obtained by dispersion of light is called ____ of light.

- a) spectrum
- b) diffraction
- c) propagation
- d) interference.

Q.11:-The least scattered colour is :

- a) red
- b) blue
- c) yellow
- d) green.

Q.12:-According to Rayleigh, the phenomenon of absorption of light and then re-emission of it by the molecules of atmosphere in different directions is called ____ of light.

- a) scattering
- b) dispersion
- c) diffraction
- d) interference.

END