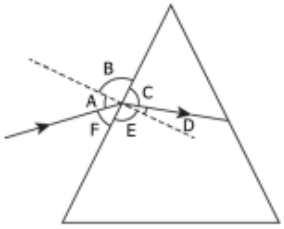
INDIAN SCHOOL AL WADI AL KABIR		
Class: X	DEPARTMENT OF SCIENCE -2021-22 SUBJECT: PHYSICS	DATE OF COMPLETION: 04.09.2021
WORKSHEET NO:3 WITH ANSWERS	TOPIC: THE HUMAN EYE AND THE COLOURFUL WORLD	A4 FILE FORMAT (PORTFOLIO)
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

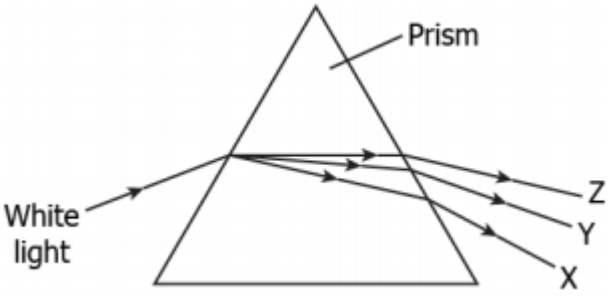
OBJECTIVE TYPE QUESTIONS

1. The image shows a light ray incident on a glass prism.



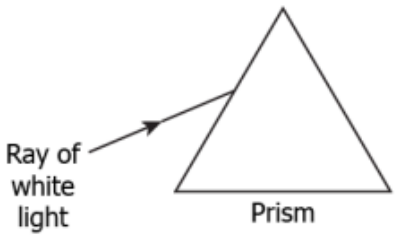
The various angles are labelled in the image.
Which angle shows the angle of incidence and angle of refraction, respectively?
(a) A and D (b) B and E (c) C and F (d) D and F

2. The image shows the dispersion of the white light in the prism.



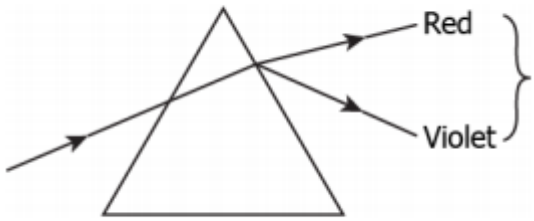
What will be the colours of the X, Y and Z?
(a) X: red; Y: green; Z: violet
(b) X: violet; Y: green; Z: red
(c) X: green; Y: violet; Z: red
(d) X: red; Y: violet; Z: green

3. A ray of light is incident on one face of the prism, as shown

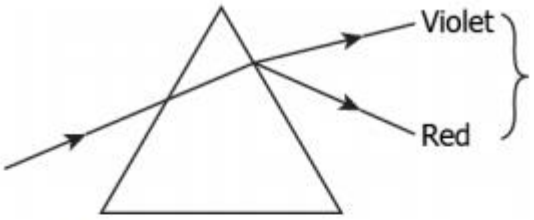


How will the ray of light disperse in the prism?

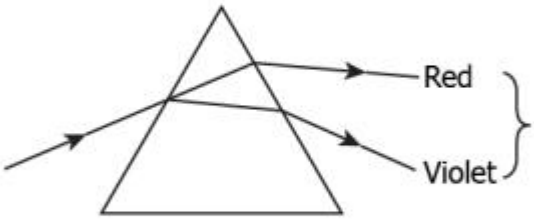
(a)



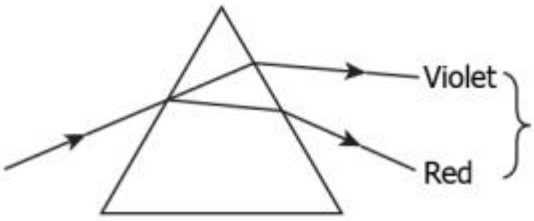
(b)



(c)



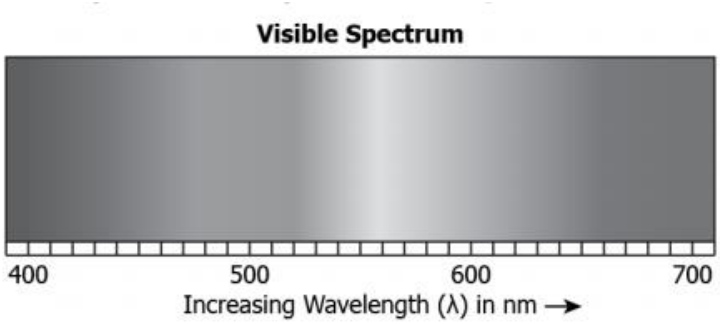
(d)



4. Why stars appear to twinkle at night?
(a) because the light of stars travels in different media
(b) because the distance of star varies when earth rotates
(c) because the star changes its position relative to earth
(d) because the atmosphere reflects the light at different angle

5.Which option justifies that the Sun appears red at sunrise and sunset?
(a) red scatters highest by the atmosphere
(b) the distance between the sun and earth reduces
(c) red has high wavelength, so it travels longer distance
(d) the smaller wavelength colours get scattered by the particles, only red passes through the atmosphere

6. A student learns that the scattering of sunlight depends on the wavelength of the light and size of particles present in the atmosphere. The student collects the data about the wavelength of the visible lights and size of the particle as shown



Particle	Size (nm)
P	350
Q	430
R	520
S	650

Which particles will scatter blue light?

(a) P and R
(b) R and S
(c) P and Q
(d) Q and S

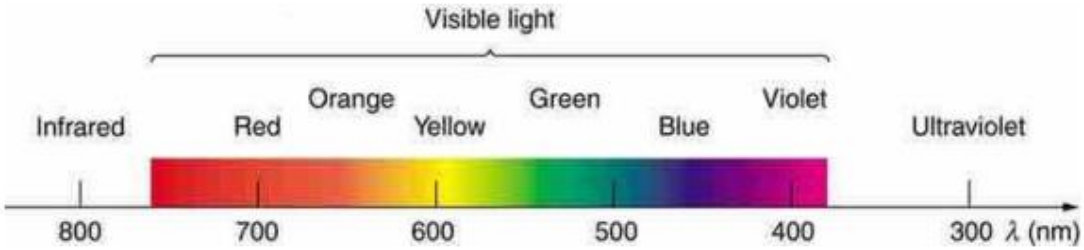
QUESTIONS 7- 11 ARE ASSERTION REASON TYPE QUESTIONS

a. If both *Assertion* and *Reason* are correct and *Reason* is the correct explanation of *Assertion*.
b. If both *Assertion* and *Reason* are correct but *Reason* is not the correct explanation of *Assertion*.
c. If *Assertion* is correct and *Reason* is wrong.
d. If *Assertion* is wrong and *Reason* is correct.

7. Assertion: Blue colour of sky appears due to scattering of blue colour.
Reason: Blue colour has shortest wave length in visible spectrum.
8. Assertion: A white light on passing through prism splits into its component colours as such that the red light emerges nearest to the base of the prism.
Reason: Wavelength of red light is more than other component colours and hence, red light deviates least.
9 Assertion: Rainbow is an example of the dispersion of sunlight by the water droplets.
Reason: Light of shorter wavelength is scattered much more than light of larger wavelength.
10 Assertion: Danger signals are made of red colour.
Reason: Velocity of red light in air is maximum, so signals are visible even in dark.
11 Assertion: The sky looks dark and black instead of blue in outer space.
Reason: There is no atmosphere in the outer space to scatter sunlight.

CASE STUDY BASED QUESTIONS

12. Rainbows are produced by a combination of refraction and reflection. You may have noticed that you see a rainbow only when you look away from the sun. Light enters a drop of water and is reflected from the back of the drop. The light is refracted both as it enters and as it leaves the drop. Since the index of refraction of water varies with wavelength, the light is dispersed, and a rainbow is observed. (There is no dispersion caused by reflection at the back surface, since the law of reflection does not depend on wavelength.) The actual rainbow of colours seen by an observer depends on the myriad of rays being refracted and reflected toward the observer's eyes from numerous drops of water. The arc of a rainbow comes from the need to be looking at a specific angle relative to the direction of the sun. We see about six colours in a rainbow—red, orange, yellow, green, blue, and violet; sometimes indigo is listed, too. These colours are associated with different wavelengths of light. White light, in particular, is a fairly uniform mixture of all visible wavelengths. Sunlight, considered to be white, actually appears to be a bit yellow because of its mixture of wavelengths, but it does contain all visible wavelengths. The sequence of colours in rainbows is the same sequence as the colours plotted versus wavelength. What this implies is that white light is spread out according to wavelength in a rainbow. Dispersion is defined as the splitting of white light into its full spectrum of wavelengths. More technically, dispersion occurs whenever there is a process that changes the direction of light in a manner that depends on wavelength. Dispersion, as a general phenomenon, can occur for any type of wave and always involves wavelength-dependent processes.



i)By which optical phenomenon does the splitting of white light into seven constituent colours occur?
[a] Refraction [b] Reflection [c] Dispersion [d] Interference

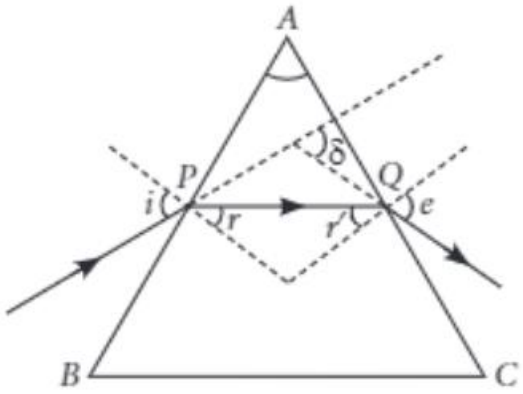
ii)Sun appears ……when it is near horizon
[a] red [b] blue [c] white [d] pale blue

iii)Which colour of light deviates minimum in the dispersion of white light by prism?
[a] Violet [b] Blue [c] Green [d] Red

iv) Which phenomenon is responsible for the twinkling of stars?
[a] Atmospheric reflection [b] Atmospheric refraction [c] Reflection [d] Total internal reflection

13. A prism is a transparent refracting medium bounded by two plane surfaces inclined to each other at a certain angle The refraction of light through the prism follows the laws of refraction In the prism refraction takes place at its refracting surfaces when the light enters and leaves the prism The

refraction through the prism is given in the diagram Here ∟A is the angle of the prism ∟i is the angle of incidence and ∟e is the angle of emergence The incident undergoes a deviation ∟δ due to the refraction through the prism This angle is called the angle of deviation



(i). The angle between two refracting surfaces of the prism is called

(a) Angle of prism (b) Angle of deviation (c) Angle of incidence (d) Angle of emergence

(ii) The angle between the incident ray and emergent ray is called

(a) Angle of prism (b) Angle of deviation (c) Angle of incidence (d) Angle of emergence

(iii) When a ray is refracted through a prism then

(a) ∟i = ∟δ (b) ∟i = ∟e + ∟δ (c) ∟δ = ∟e (d) ∟i > ∟r

(iv) The rectangular surfaces of prism are known as

(a) Reflecting surfaces (b) Dispersing surfaces (c) Refracting surfaces (d) None of these

Answers

1.	a
2.	b
3.	c
4.	a
5.	d
6.	c
7.	a
8.	d
9.	b
10	c
11	a
12	(i) c (ii) a (iii) d (iv) b
13	(i) a (ii) b (iii) d (iv) c
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