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**I. Choose the correct answer**

- The refractive index of four substances A, B, C and D are 1.31, 1.43, 1.33, 2.4 respectively. The speed of light is maximum in  
a) A    b) B    c) C    d) D
- Where should an object be placed so that a real and inverted image of same size is obtained by a convex lens  
a)  $f$                                   b)  $2f$   
c) infinity                              d) between  $f$  and  $2f$
- A small bulb is placed at the principal focus of a convex lens. When the bulb is switched on, the lens will produce  
a) a convergent beam of light  
b) a divergent beam of light  
c) a parallel beam of light  
d) a coloured beam of light
- Magnification of a convex lens is  
a) Positive                                  b) negative  
c) either positive or negative        d) zero
- A convex lens forms a real, diminished point sized image at focus. Then the position of the object is at  
a) focus                                      b) infinity  
c) at  $2f$                                       d) between  $f$  and  $2f$
- Power of a lens is  $-4D$ , then its focal length is  
a) 4m                                         b)  $-40m$   
c)  $-0.25 m$                                 d)  $-2.5 m$
- In a myopic eye, the image of the object is formed  
a) behind the retina    b) on the retina  
c) in front of the retina    d) on the blind spot
- The eye defect 'presbyopia' can be corrected by  
a) convex lens                              b) concave lens  
c) convex mirror                            d) Bi focal lenses
- Which of the following lens would you prefer to use while reading small letters found in a dictionary?  
a) A convex lens of focal length 5 cm  
b) A concave lens of focal length 5 cm  
c) A convex lens of focal length 10 cm  
d) A concave lens of focal length 10 cm
- If  $V_B$ ,  $V_G$ ,  $V_R$  be the velocity of blue, green and red light respectively in a glass prism, then which of the following statement gives the correct relation?  
a)  $V_B = V_G = V_R$                       b)  $V_B > V_G > V_R$   
c)  $V_B < V_G < V_R$                       d)  $V_B < V_G > V_R$

**II. Fill in the blanks:**

- The path of the light is called as \_\_\_\_\_
- The refractive index of a transparent medium is always greater than \_\_\_\_\_
- If the energy of incident beam and the scattered beam are same, then the scattering of light is called as \_\_\_\_\_ scattering.
- According to Rayleigh's scattering law, the amount of scattering of light is inversely proportional to the fourth power of its \_\_\_\_\_
- Amount of light entering into the eye is controlled by \_\_\_\_\_

**III. True or False. If false correct it.**

- Velocity of light is greater in denser medium than in rarer medium
- The power of lens depends on the focal length of the lens
- Increase in the converging power of eye lens cause 'hypermetropia'
- The convex lens always gives small virtual image.

#### IV. Match the following:

Column - I		Column - II	
1	Retina	a	Path way of light
2	Pupil	b	Far point comes closer
3	Ciliary muscles	c	near point moves away
4	Myopia	d	Screen of the eye
5	Hypermetropia	f	Power of accommodation

#### V. Assertion and reasoning type

Mark the correct choice as

- If both assertion and reason are true and reason is the correct explanation of assertion.
- If both assertion and reason are true but reason is not the correct explanation of assertion.
- Assertion is true but reason is false.
- Assertion is false but reason is true.

1. **Assertion:** If the refractive index of the medium is high (denser medium) the velocity of the light in that medium will be small

**Reason:** Refractive index of the medium is inversely proportional to the velocity of the light

2. **Assertion:** Myopia is due to the increase in the converging power of eye lens.

**Reason:** Myopia can be corrected with the help of concave lens.

#### VI. Answer Briefly

- What is refractive index?
- State Snell's law.
- Draw a ray diagram to show the image formed by a convex lens when the object is placed between F and 2F.
- Define dispersion of light
- State Rayleigh's law of scattering
- Differentiate convex lens and concave lens.
- What is power of accommodation of eye?
- What are the causes of 'Myopia'?

9. Why does the sky appear in blue colour?

10. Why are traffic signals red in colour?

#### VII. Give the answer in detail

- List any five properties of light
- Explain the rules for obtaining images formed by a convex lens with the help of ray diagram.
- Differentiate the eye defects: Myopia and Hypermetropia
- Explain the construction and working of a 'Compound Microscope'.

#### VIII. Numerical Problems:

- An object is placed at a distance 20cm from a convex lens of focal length 10cm. Find the image distance and nature of the image.
- An object of height 3cm is placed at 10cm from a concave lens of focal length 15cm. Find the size of the image.

#### IX. Higher order thinking (HOT) questions:

- While doing an experiment for the determination of focal length of a convex lens, Raja Suddenly dropped the lens. It got broken into two halves along the axis. If he continues his experiment with the same lens, (a) can he get the image? (b) Is there any change in the focal length?
- The eyes of the nocturnal birds like owl are having a large cornea and a large pupil. How does it help them?



#### REFERENCE BOOKS

- Fundamentals of optics by D.R. Khanna and H.R. Gulati, R. Chand & Co.
- Principles of Physics - Halliday, Resnick & Walker, Wiley Publications, New Delhi.



#### INTERNET RESOURCES

- [www.physicsabout.com](http://www.physicsabout.com)
- [www.khanacademy.org](http://www.khanacademy.org)