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Std 10 (English)

Science And Technology - I

Date 29-09-20

Time 1HRS

Chapter 7.00

Marks 30

**Q.1 Multiple Choice Questions** **3**

- 1 The power of the lens with focal length 20 cm is  
a. 3D      b. 5D      c. 15D      d. 4D

**Ans** Option b.

- 2 The incident ray passes without changing its direction, when it passes through.  
a. focus      b. optical centre      c. parallel to principal axis      d. None of the above

**Ans** Option b.

- 3 When the incident ray passes through the principal focus, the refracted ray.  
a. passes without changing its direction  
b. is parallel to Principal axis  
c. passes through optical centre  
d. None of the above

**Ans** Option b.

**Q.2 Find the odd one out** **2**

- 1 Presbyopia, Retina, Near Sightedness, Far Sightedness

**Ans** Retina, as it is the part of eye and rest all are defect of vision.

- 2 Motion picture, Colour blindness, T.V, Buring of incense stick and revolving it

**Ans** Colour blindness, it is defect and others are example of persistence of vision.

**Q.3 Give scientific reasons** **4**

- 1 We can not clearly see an object kept at a distance less than 25 cm from the eye.

**Ans** i. The eye lens become more rounded when we try to see a nearby object.  
ii. Due to this its focal length decreases and a clear image of the object is formed on the retina of the eye.  
iii. But the focal length of the eye lens cannot be decreased beyond some limit.  
iv. There fore we cannot clearly see an object kept at a distance less than 25 cm from the eye.

- 2 Piece of paper held in front of the Concave lens will not burn.

**Ans** i. The concave lens is a diverging lens.  
ii. It will diverge the rays of sunlight falling on it.  
iii. So the paper will not burn.

**Q.4 Write Short Notes** **4**

- 1 Define Principal Focus (F) of Concave lens.

**Ans** Rays travelling parallel to the principal axis falling on a Concave lens diverge after refraction in such a way that they appear to be coming out of a point on the Principal axis. This point is called Principal Focus of the Concave lens.

2 Give the characteristics of image formed by refracting telescope

- Ans**
- i. Highly magnified
  - ii. Virtual
  - iii. On the same side of the object
  - iv. Inverted.

**Q.5 Laws/define/principles**

4

1 Define centre of curvature of lens.

- Ans**
- i. The centre of imaginary sphere, whose parts form the surfaces of the lenses are called centre of curvature of the lenses.
  - ii. A lens with both surfaces spherical has two centres of curvature  $C_1$  and  $C_2$ .

2 What is lens formula.

- Ans**
- i. The relation ship between the distance of object (u), the distance of image (v) and the focal length (f) is called the lens formula.
  - ii.  $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$
  - iii. The lens formula is same for any spherical lens and any distance of the object from lens.
  - iv. It is however necessary to use the sign conventions properly.

**Q.6 Distinguish between(Any One)**

2

1 Mirror and Lens

	Mirror	Lens
i.	A mirror is not transparent. It is opaque.	A lens is transparent.
ii.	A mirror has one reflecting surface	A lens has two surfaces that form an image by refraction of light.
iii.	Convex mirror is diverging	Convex lens is Converging.

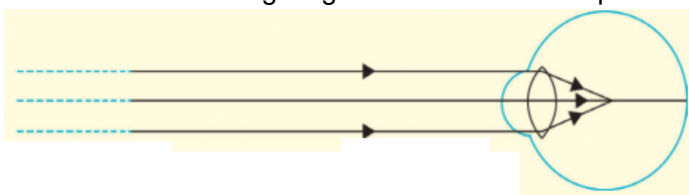
2 Farsightedness (Hypermetropia) and Near sightedness (Myopia)

	Farsightedness	Nearsightedness
i.	In this defect human eye can see distant objects distinctly but is unable to see nearby objects clearly.	In this defect human eye can see near by objects distinctly but is unable to see distant objects clearly.
ii.	Image of the near by object is formed behind the retina.	Image of the distant object is formed in front of retina.
iii.	Can be corrected using Convex lens.	Can be corrected using Concave lens.

**Q.7 Write answers based on given diagram/figure(Any One)**

3

1 Observer the following diagram and answer the questions



- i. Which eye defect is shown in this diagram?
- ii. What are the possible reasons for this eye defect?
- iii. How this defect is corrected, write it in brief?

**Ans** i. Myopia or Nearsightedness

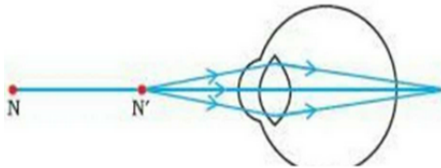
ii. Possible reasons of defect

a. The curvature of the cornea and the eye lens increases. The muscles near the lens cannot relax so that the converging power of the lens remains large.

b. The eyeball elongates so that the distance between the lens and the retina increases.

iii. correction of defect: this defect can be corrected using spectacles with concave lens. This lens diverges the incident rays and these diverged rays can be converged by the lens in the eye to form image on the retina.

**2** Observe the diagram and answer the questions :



- i. Recognize the defect.
- ii. Write reason for the defect.
- iii. Write in brief about its correction.

**Ans** i. Hypermetropia.

ii. a. Curvature of the cornea and the eye lens decreases so that, the converging power of the lens becomes less.

b. Due to the flattening of the eye ball the distance between the lens and retina decreases.

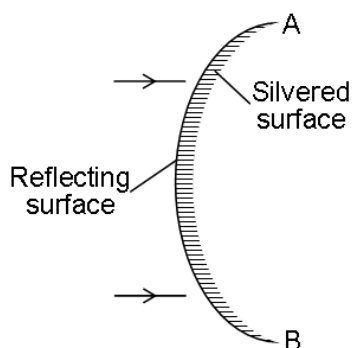
iii. This defect can be corrected by using a **convex lens** with proper focal length. This lens converges the incident rays before they reach the lens. The lens then converges them to form the image on the retina.

**Q.8** Answer the following(Any One)

**3**

**1** Explain with the help of a diagram what is convex mirror ?

**Ans** A convex mirror is made by silvering on the inner surface such that reflection takes place from outer (bulged) surface.



**2** Match the table and explain in short its defect and correction:

Column 1	Column 2	Column 3
Farsightedness	Nearby object can be seen clearly	Bifocal lens
Presbyopia	Far away object can be seen clearly	Concave lens
Nearsightedness	Problem of old age	Convex lens

**Ans** i. Farsightedness → Far away object can be seen clearly → Convex lens

**Explanation:** In farsightedness, the human eye can see far away object clearly but cannot see nearby objects distinctly. To correct this defect, a convex lens with proper focal length is used.

ii. Presbyopia → Problem of old age → Bifocal lens.

**Explanation:** The ability of the muscles near the eye lens to change the focal length of the lens decreases with age. This defect is known as presbyopia. In this defect, sometimes people suffer from both nearsightedness and farsightedness. Therefore, bifocal lenses are required to correct this defect.

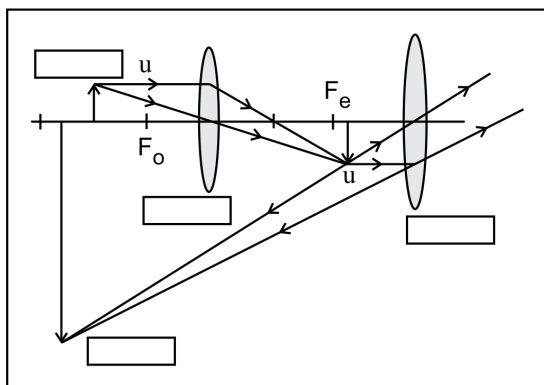
iii. Nearsightedness → Nearby object can be seen clearly → concave lens

**Explanation:** In nearsightedness, the human eye can see nearby objects clearly but cannot see far away objects distinctly. To correct this defect, a concave lens with proper focal length is used.

**Q.9 Answer the following in detail (Any One)**

5

1



i. Which type of microscope has the arrangement of lenses shown in the adjoining figure?

ii. Label the figure correctly.

iii. Write the working of this microscope.

iv. Where does this microscope used?

v. Suggest a way to increase the efficiency of this microscope.

**Ans** i. Compound microscope

ii. Scientifically and technically correct figure. (Object, Objective lens, Eye piece, Image)

iii. Magnification is obtained by the combined effect of two lenses. The magnification occurs in two stages. The image formed by the first lens acts as the object for the second lens. Clear image can be obtained by adjusting the distance between two lenses.

iv. To study small sized objects like blood cells, animal and plant cells, bacteria.

v. Any relevant remedy (For example, Selection of lens with appropriate focal length)

2

i. In a compound microscope, which lens has greater focal length?

ii. Where do you place the object to be observed with a compound microscope?

iii. State which distance is adjusted to observe the object with a compound microscope.

iv. State the nature of the final image in a compound microscope relative to the object.

v. State the use of a compound microscope.

**Ans** i. In a compound microscope, the eyepiece has greater focal length.

ii. In a compound microscope, the object to be observed is placed in front of the objective lens, slightly beyond the focus of the objective lens.

iii. To observe the object with a compound microscope, the distance between the object and objective lens is adjusted.

iv. In a compound microscope, the final image is virtual, highly enlarged and inverted relative to the object.

v. A compound microscope is used to observe blood cells, microorganisms, etc.

