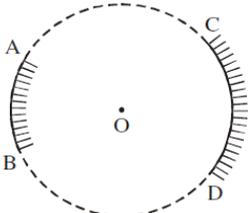


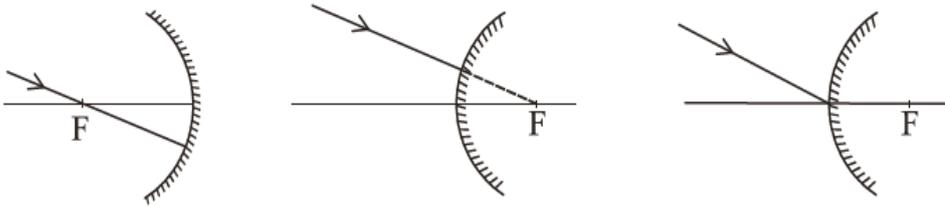
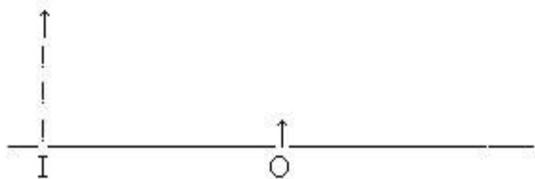
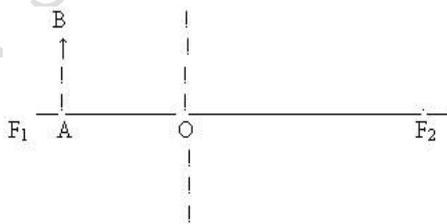


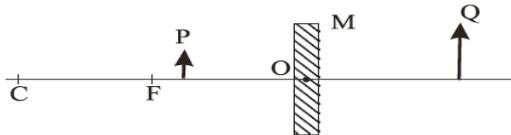
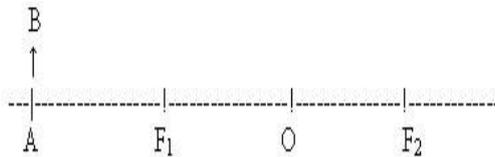
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DEPARTMENT OF SCIENCE

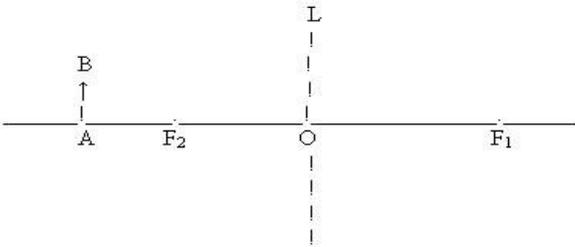


Subject : Physics	Topic : LIGHT- REFLECTION & REFRACTION	Date of Worksheet : 3.5.18
Resource Person: Susan Anil		Worksheet #1
Name of the Student : _____	Class & Division : X _____	Roll Number : ____

1)	<p>AB and CD, two spherical mirrors, form parts of a hollow spherical ball with its centre at O as shown in the diagram. If arc AB = $\frac{1}{2}$ arc CD, what is the ratio of their focal lengths? State which of the two mirrors will always form virtual image of an object placed in front of it and why?</p> 	1
2)	<p>“The magnification produced by a spherical mirror is -3.” List four information you obtain from this statement about the mirror/image.</p>	1
3)	<p>Name the type of mirrors used in the design of solar furnaces. Explain how high temperature is achieved by this device.</p>	1
4)	<p>State two positions in which a concave mirror produces a magnified image of a given object. List two differences between the two images.</p>	1
5)	<p>List four characteristics of the images formed by plane mirrors.</p>	1
6)	<p>The image of an object formed by a mirror is real, inverted and is of magnification -1. If the image is at a distance of 40cm from the mirror, where is the object placed? Where would the image be if the object is moved 20cm towards the mirror? State the reason and also draw ray diagram for the new position of the object to justify your answer?</p>	2
7)	<p>To construct a ray diagram we use two rays of light which are so chosen that it is easy to determine their directions after reflection from the mirror. Choose these two rays and state the path of these rays after reflection from a concave mirror. Use these two rays to find the nature and position of the image of an object placed at a distance of 15cm from a concave mirror of focal length 10cm.</p>	2

8)	<p>Draw the following diagram, in which a ray of light is incident on a concave/convex mirror, on your answer sheet. Show the path of this ray, after reflection, in each case.</p> 	2
9)	<p>The diagram given below shows an object O and its image I. Copy the diagram and draw suitable rays to locate the lens and its focus. Name the type of lens in this case.</p> 	2
10)	<p>Figure below shows an object AB placed on the principal axis of a convex lens placed in air. F₁ and F₂ are the two foci of the lens. Copy the diagram:</p> <p>(i) Draw a ray of light starting from B and passing through O. Show the same ray after refraction by the lens. (ii) Draw another ray from B which passes through F₂ after refraction by the lens. (iii) Locate the final image formed. (iv) Is the image formed real and inverted?</p> 	2
11)	<p>A convergent lens of power 8D is combined with a divergent lens of power -10 D. Calculate focal length of the combination.</p>	2
12)	<p>An object 5cm height is placed at a distance of 12cm in front of a concave mirror it forms a real image 4 times larger than the image. Calculate the distance of the image from the mirror?</p>	3
13)	<p>Radius of curvature of a convex mirror used on a moving automobile is 2m. A truck is coming behind it at a constant distance of 3m. Calculate the position, size, nature of the image formed?</p>	3

14)	<p>(a) An object is placed at 20 cm in front of a convex mirror of focal length 10 cm. Find the image distance and magnification.</p> <p>(b) A convex mirror of focal length 20 cm forms image of magnification $\frac{3}{5}$ for one position of the object. The object is shifted by $\frac{16}{3}$cm towards the mirror. By what distance and what direction the image will move?</p>	3
15)	A dentist mirror (concave) has a radius of curvature of 3 cm. How far must it be placed from a small dental cavity to give virtual image of cavity that is magnified 5 times?	3
16)	If the image formed by a mirror for all positions of the object placed in front of it is always erect and diminished, what type of mirror is it? Draw a ray diagram to justify your answer. Where and why do we generally use this type of mirror?	3
17)	<p>(a) Draw ray diagrams to show the principal focus of a :</p> <p>(i) Concave mirror</p> <p>(ii) Convex mirror</p> <p>(b) Consider the following diagram in which M is a mirror and P is an object and Q is its magnified image formed by the mirror. State the type of the mirror M and one characteristic property of the image Q.</p> 	3
18)	<p>An object is placed in front of a lens between its optical centre and the focus. The image formed is virtual, erect and diminished.</p> <p>(i) Name the lens which forms this image.</p> <p>(ii) Draw a ray diagram to show the formation of an image with the above characteristics.</p>	3
19)	<p>An object AB is placed on the principal axis of a convex lens as shown in figure below. Copy the diagram. Using three rays starting from B and the properties of the points marked F1, O and F2 obtain the image formed by the lens.</p> 	3
20)	Is it possible to burn a piece of paper using a convex lens in day light without using matches or any direct flame? Draw a ray diagram to illustrate your answer.	2
21)	Figure below shows an object AB placed on the principal axis of a lens L. The two foci of the lens are F1 and F2. The image formed by the lens is erect, virtual and diminished. Copy the diagram and answer the following questions:	3

	<p>i) Draw the outline of lens L used. ii) Draw a ray from B, and passing through O. Show the ray after refraction by the lens. iii) Draw a ray of light starting from B, which after passing parallel to the principal axis, is incident on the lens and emerges after refraction from it. iv) Locate the final image formed.</p> <div style="text-align: center;">  </div>	
22)	A concave lens has focal length of 15 cm. At what distance should the object from the lens be placed so that it forms an image at 10 cm from the lens? Also, find the magnification produced by the lens.	3
23)	A 2.0 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 10 cm. The distance of the object from the lens is 15 cm. Find the nature, position and size of the image. Also find its magnification.	3
24)	A concave lens of focal length 25 cm and a convex lens of focal length 20 cm are placed in contact with each other. What is the power of this combination? Also, calculate focal length of this combination.	3
25)	At what distance the object should be placed so that the image will be formed at a distance 10 cm from a concave lens? Focal length of the lens is 20 cm.	3