

1. Why does a ray of light passing through the centre of curvature of a concave mirror after reflection is reflected back along the same path? (1m)
2. Name the mirror used as a rear view mirror of the car. (1m)
3. A lens X has focal length 20 cm and lens Y has focal length 40 cm. which lens would you select to obtain a more convergent beam of light ? (1m)
4. A ray of light falls normally on the surface of a transparent glass slab. Draw a ray diagram to show its path and mark angle of incidence and angle of emergence. (2m)
5. What is difference between concave mirror and convex mirror? (2m)
6. Write a short note on the sign conventions of spherical mirrors. (2m)
7. (a) With the help of ray diagram, show that light falls obliquely on a side of a rectangular glass slab, the emergent ray is parallel to the incident ray.  
(b) Show the lateral displacement of the ray on the diagram. (3m)
8. Refractive indices of kerosene, turpentine and water are 1.44, 1.47 and 1.33 respectively. Through which of these media, light travels fast. Explain (2m)
9. An object of size 5 cm is kept at a distance 25 cm from the optical centre of a converging lens of focal length 10 cm. Calculate the distance of the image from the lens and size of the image. (3m)
10. A concave mirror produces a real image of size 3 times that of the object at a distance of 30 cm to form a real image whose size is  $\frac{1}{5}$ th of the size of the object. (3m)
11. A Spherical mirror produces an image of magnification  $-1$  on a screen placed at a distance of 30 cm from the pole of the mirror (a) write the type of the mirror in this case
12. (a) State the laws of refraction of light, Write an expression to relate absolute refractive index of a medium with speed of light in vacuum.  
(b) The refractive index of a medium 'x' with respect to 'y' is  $\frac{2}{3}$  and the refractive index of medium 'y' with respect to 'z' is  $\frac{4}{3}$ . Calculate the refractive index of medium 'z' with respect of 'x'.
13. Name the type of mirror used in the following situations  
(a) Headlights of a car (b) Rear-view mirror of vehicles (c) Solar Furnace  
Support your answer with reason
14. An object of size 7 cm is placed at 27 cm in front of a concave mirror of focal length 18 cm. At what distance from the mirror should a screen be placed, so that a sharp focussed image can be obtained? Find the size and nature of the image.
15. An object of height 5 cm is placed at a distance of 27 cm from a converging mirror of focal length 18 cm. Find the nature, size and position of the image formed.
16. State Snell's law of refraction. Refractive index of a diamond is 2.42. What does it mean? Find the speed of light in diamond.
17. Name the mirror which forms  
(a) Virtual, erect and diminished image (b) Virtual image of the same size as object
18. Draw a diagram to show why a pencil dipped in water appears broken when viewed from sides.
19. A spherical mirror produces an image of magnification  $-\frac{1}{2}$  on the screen when an object is placed at a distance of 60 cm from it  
(a) Calculate the focal length of the mirror (b) State the type of mirror  
(c) Draw a ray diagram to show image formation in the above case
20. Draw a ray diagram to show the path of the reflected ray in each of the following cases. A ray of light incident on a convex mirror  
(a) Strikes at its pole making an angle  $\theta$  from the principal axis  
(b) is directed towards its principal focus  
(c) is parallel to its principal axis
21. A concave lens of focal length 20 cm forms an image at a distance of 10 cm from the lens. What is the distance of the object from the lens? Also draw ray diagram.

22. The image of an object formed by a convex lens is of the same size as that of the object. If the image is formed at a distance of 50 cm from the lens, at what distance from the lens is the object placed? Find the focal length and the power of the lens.
23. A convex lens has a focal length of 20 cm. At what distance from the lens, a 5 cm tall object be placed so that it formed an image at 15 cm from the lens? Also calculate the size of the image formed?
24. A convex lens of focal length 25 cm is placed in contact with a concave lens of focal length 20 cm. find (i) the focal length of the combination of lens (ii) power of the combination. What is the nature of the combination?
25. An object is placed at a distance 10 cm from a lens of power -4D. Find the position and nature of a image so formed.

**Work sheet-02****Topic : Electricity**

1. A lamp rated 100 W at 220 V is connected to mains electric supply. (i) What amount of current is drawn from the supply line if the voltage is 220 V? (ii) What is the resistance?
2. (a) What is meant by Electric Resistance of a conductor.  
(b) A wire of length L and resistance R is stretched so that its length is doubled and the area of cross section is halved. How will its (a) resistance change (ii) Resistivity change.
3. A wire is cut into three equal parts and then connected in parallel. How will its (a) resistance (b) Resistivity get affected.
4. Electrical resistivity of some substances at 20 C are given
 

Silver	$1.60 \times 10^{-8}$ ohm – m
Copper	$1.62 \times 10^{-8}$ ohm – m
Tungsten	$5.20 \times 10^{-8}$ ohm – m
Iron	$10 \times 10^{-8}$ ohm – m
Mercury	$94 \times 10^{-8}$ ohm – m
Nichrome	$10 \times 10^{-6}$ ohm – m
- (a) Among silver and copper which one is better conductor ? Why ?
- (b) Which material would you advice to be used in electrical heating devices ? Why?
5. Two metallic wires A and B are connected in series. Wire A has length L and radius R, while wire B has length 2L and radius 2R. Find the ratio of the total resistance of series combination and the resistance of wire A, If both the wires are of same material.
6. Two metallic wires A and B of same material are connected in parallel. Wire A has length L and radius R and wire B has length 2L and 2R. Compute the ratio of the total resistance of parallel combination and the resistance of wire A.
7. Two electric circuits 1 and 2 shown in figure

(i) Which of the two circuits has more resistance.

(ii) Though which circuit, more current passes ?

(iii) in which circuit, the potential difference across each resistor is equal.

8. What would be the reading of ammeter and voltmeter in the given circuit??

9. Calculate the equivalent resistance from the following combination of resistors
10. How would reading of V changes if it is connected between B and C. Justify your answer?
11. An electric bulb draws a current of 0.8 A and works on 250 V on the average 8 hours a day. If energy costs 3 per kWh. calculate the monthly bill for 30 days.
12. Draw the schematic diagram of a circuit consisting of a battery of 12 V, three resistors of 5 ohm, 10 ohm and 20 ohm connected in parallel, an ammeter to measure the total current through the circuit, voltmeter to measure potential difference across the combination of resistors.
13. For an electric heater rated 4 kW, 200 V. Calculate (i) the current required (ii) the resistance of heater (iii) the energy consumed in 1 hour.
14. A wire is stretched so that its length becomes  $\frac{6}{5}$  times its original length. If its original resistance is 25 ohm. Find its new resistance and resistivity.
15. An electric lamp is marked 100 W, 220 V. It is used 5 hours daily. Calculate (a) its resistance, while glowing (b) energy consumed in kWh per day
16. In the circuit diagram given below  
Calculate (a) the total effective resistance of the circuit  
(b) the total current in the circuit  
(c) the current through each resistor