



ÉCOLE GLOBALE

INTERNATIONAL GIRLS' SCHOOL

Dehradun

HOLIDAY HOMEWORK - CLASS X B Physics

Assignment -1

(Unit: Eye and the colourful world)

1. What is dispersion of white light? State its cause. Draw a ray diagram to show the dispersion of white light by a glass prism. (2)
2. A student suffering from myopia is not able to see distinctly the objects placed beyond 5 m. List two reasons due to which this defect of vision may have arisen. With the help of ray diagrams, explain (3)
 - (i) why the student is unable to see distinctly the objects placed beyond 5 m from his eyes.
 - (ii) if in this case the numerical value of the focal length of the corrective lens is 5 m, find the power of the lens .
3. An old man cannot see objects closer than 1m from the eye clearly. Name the defect of vision he is suffering from. How can it be corrected? Draw a ray diagram for the (i) defect of vision and also (ii) for its correction. (3)
4. (A) Explain the formation of rainbow in the sky with the help of a diagram. List the three phenomena of light involved. Which colour – violet or red appears at top of the rainbow? (5)
(B) What is the difference in colours of the sun observed during sunrise/sunset and noon? Give explanation for each.
5. A student finds the writing on the blackboard as blurred and unclear when sitting on the last desk in the classroom. He however, sees it clearly when sitting on the front desk at an approximate distance of 2m from the blackboard. (5)
Draw ray diagrams to illustrate the formation of image of the blackboard writing by his eye-lens when he is seated at the (i) last desk (ii) front desk.
Name the kind of lens that would help him to see clearly even when he is seated at the last desk. Draw a ray diagram to illustrate how this lens helps him to see clearly.

6. (a) Define angle of deviation. Why do different components of white light split up into spectrum when it passes through a triangular glass prism ? (b) What is rainbow? State the two necessary conditions for the formation of rainbow in the sky. (3)

7. A child while playing with his father's spectacles burnt a hole in a piece of them tissue paper by focusing the image of the Sun on it. a) Name the defect of vision his father is suffering from. b) List two causes of the defect. c) Draw a ray diagram to show how this defect may be corrected using a suitable lens. (3)

Unit : Sources of energy

1. Define calorific value of a fuel. (1)
2. Sun is the ultimate source of Fossil fuels. Justify the statement. (2)
3. What is the full form of LPG? Write two advantages of using LPG as a Fuel. (2)
4. Why is charcoal considered a better fuel than wood? (2)
5. Why is the inside surface of the solar cooker is painted black? (1)
6. A solar cooker has a plane glass reflector. The plane glass should be replaced by what to increase the heating effect of solar cooker ? (1)
7. Write 2 limitations of using solar cooker. (1)
8. Name the energy that does not come directly or indirectly from solar energy. (1)
9. Name the reaction that is the source of Sun's energy. (1)

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Assignment -2

Unit : Magnetic effects of electric current.

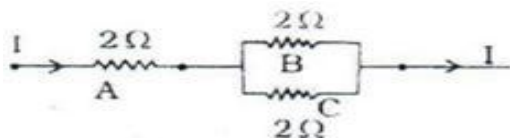
1. Name the electric device that converts mechanical energy into electrical energy. Draw the labelled diagram and explain the principle involved in this device. (3)
2. i) What is the function of earth wire in electrical instruments? (3)
ii) Explain what is short circuiting an electric supply.
iii) What is the usual current rating of the fuse wire in the line to feed
(a) Lights and fans? (b) Appliances of 2kW or more power?
3. With the help of a labelled circuit diagram wire describe an activity to illustrate the pattern of the magnetic field lines around a straight current carrying long conducting wire . (5)
i) Name the rule that is used to find the direction of magnetic field associated with a current carrying conductor.
ii) Is there a similar magnetic field produced around a thin beam of moving (a) alpha particles and (b) neutrons? Justify your answer.

4. The magnetic field in a given region is uniform. Draw a diagram to represent a uniform magnetic field. (1)
 5. State the function of fuse in a circuit. How is it connected in the domestic circuit? (2)
 6. An electric fuse of rating 3 A is connected in a circuit in which an electric iron of power 1 kW is connected which operates at 220 V. What would happen ? Explain (2)
 7. What does the magnetic field pattern inside the solenoid indicate? How can you utilize a solenoid to make an electromagnet? State two ways by which strength of this electromagnet can be increased?(3)
 8. A coil 'A' of insulated Cu wire is connected to a galvanometer. What would you observe when (1)
 - (a) a current coil 'B' is brought near 'A'?
 - (b) strength of current in coil B is changed?
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Assignment -3

(Unit: Electricity)

1. Draw a schematic diagram of a circuit consisting of a battery of five 2 V cells, a 5 ohm resistor, a 10 ohm resistor and a 15 ohm resistor, and a plug key, all connected in series.
 - ii. Calculate the electric current passing through the above circuit when the key is closed. (3)
2. Three $2\ \Omega$ resistors, A, B and C, are connected as shown in Figure. Each of them dissipates energy and can withstand a maximum power of 18 W without melting. Find the maximum current that flow through the three resistors. (2)



3. Draw a circuit diagram of an electric circuit containing a cell, a key , an ammeter , a resistor of $4\ \Omega$ in series with a combination of two resistors ($8\ \Omega$ each) in parallel and a voltmeter across parallel combination. Each of them dissipate maximum energy and can withstand a maximum power of 16W without melting. Find the maximum current that can flow through the three resistors. (3)
4. Rohit focused the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle , screen and lens as under :

Position of candle	=	26.0 cm
Position of convex lens	=	50.0 cm
Position of screen	=	74.0 cm

 - i) What is the focal length of the convex lens?
 - ii) Where will the image be formed if he shifts the candle towards the lens at a position of 38 cm?
 - iii) Draw a ray diagram to show the formation of the image in case (ii) as said above? (3)
5. With the help of a labelled circuit diagram wire describe an activity to illustrate the pattern of the magnetic field lines around a straight current carrying long conducting wire .
 - i) Name the rule that is used to find the direction of magnetic field associated with a current carrying conductor.
 - ii) Is there a similar magnetic field produced around a thin beam of moving (a) alpha particles and (b) neutrons? Justify your answer. (5)
6. Prabha needs a lens of power -4.5 D for correction of her vision. (5)
 - a) What kind of defect in vision is she suffering from?

- b) What is the focal length and nature of the corrective lens?
 c) Draw ray diagrams showing the (a) defected eye and (b) correction for this defect.
 d) What are the causes of this defect?

7. The values of current I flowing in a given resistor for the corresponding values of potential difference V across the resistor are given below:

I (ampere)	0.5	1.0	2.0	3.0	4.0
V (volt)	1.6	3.4	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance of the resistor. (2)

8. In a given ammeter, a student sees that needle indicates 17 divisions in ammeter while performing an experiment to verify Ohm's law. If ammeter has 10 divisions between 0 and 0.5A, then what is the value corresponding to 17 divisions? (unitary method) (1)

9. In a household electric circuit different appliances are connected in parallel to one another. Give two reasons. (1)

10. An electrician puts a fuse of rating 5A in that part of domestic electrical circuit in which an electrical heater of rating 1.5kW, 220V is operating. What is likely to happen in this case and why? What change, if any, needs to be made? (2)

11. Calculate the electric energy consumed by a 1200 W toaster in 20 min. (ans: 0.4 kWh) (2)

12. Distinguish between the terms electrical resistance and resistivity of a conductor. (1)

13. A Cu wire of resistivity $1.6 \times 10^{-8} \Omega m$ has a cross sectional area of $20 \times 10^{-4} cm^2$. Calculate the length of this wire required to make a 10 ohm coil. (ans : 125 m) (2)

Assignment –4

(Unit :Light)

1. An object is placed at a distance of 15 cm from a convex lens of focal length 20 cm. List four characteristics of the image formed by the lens. (2)

2. Draw ray diagrams to show the formation of three times magnified (a) real and (b) virtual image of an object by a converging lens. Mark the positions of O,F and 2 F in each diagram. (3)

*3. Analyse the following table showing variation of image – distance with object distance in case of a convex lens and answer the questions that follow without doing any calculations: (3)

S.no	U(object distance)	V(image distance)
1	-100	25
2	-60	30
3	-40	40
4	-30	60
5	-25	100
6	-15	120

(a) What is focal length of the convex lens? Give reason to justify answer.

(b) Write the serial number of the observations which is not correct. On what basis have you arrived at this conclusion?

(c) Select an appropriate scale and draw a ray diagram for the observation at S.no.2. Also find the approximate value of the magnification.

4. If image formed by a mirror for all positions of the object placed in front of it is always diminished, erect and virtual, state the type of the mirror and also draw a ray diagram to justify your answer. Write one use such mirrors are put to and why? (2)

5. Define radius of curvature of spherical mirrors. Find the nature and focal length of a spherical mirror whose radius of curvature is + 24 cm. (2)

6. State the type of mirrors used for (a) headlights (b) rear view mirrors. Give reason to justify your answer in each case. (2)

7. A 4 cm tall object is placed perpendicular to the principal axis of convex lens of focal length 24 cm. The distance of the object from the lens is 16 cm. Find the position, size and nature of the image formed using lens formula. (3)

8. With the help of a ray diagram, state what is meant by refraction of light. State Snell's law for refraction and also express it mathematically. (5)

The refractive index of air with respect to glass is $\frac{2}{3}$ and the refractive index of water with respect to air is $\frac{4}{3}$. If the speed of light in glass is $2 \times 10^8 \text{ m/s}$, find the speed of light in (i) air and (ii) water.

9. (i) Which property of concave mirror is utilized for using them as shaving mirrors? (ii) Light passes through a rectangular glass slab and through a triangular glass prism. Using proper ray diagram, explain in what way does the direction of the two emergent beams differs with respect to the incident beam of light. (iii) A concave lens has a focal length of 50 cm Calculate its power. (5)

10. (i) Rohit claims to have obtained an image twice the size of object with a concave lens. Is he correct? Give reason for your answer. (ii) Where should an object be placed in case of a convex lens to form an image of same size as of the object? Show with the help of ray diagram the position and the nature of the image formed. (iii) With the help of ray diagram, illustrate the change in position, nature and size of the image formed if the convex lens in case of (ii) is replaced by concave lens of same focal length. (5)

11. A student obtained a sharp image of a lighted candle on a screen using a convex lens. Now he wants to focus a distant lamp on a far away electric pole. In which direction should the lens be moved for this purpose with respect to the screen, to get a sharp image on the screen? Justify your answer. (1)

12. The following table gives the values of refractive indices of a few media.

s.no	1	2	3	4	5
medium	water	Crown glass	rocksalt	ruby	Diamond

Refractive index	1.33	1.52	1.54	1.71	2.42
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Use this table to give an example of (i) a medium pair so that light speeds up when it goes from one of these media to another. (ii) a medium pair so that light slows down when it goes from one of these media to another. (1)

13. Two lenses have power of (i) + 2D (ii) - 4D. What is the nature and focal length of each lens.?

(b) An object is kept at a distance of 100cm from each of above lenses.

Calculate the (i) image distance (ii) magnification in each of the two cases. (3)

14. (a) Define magnification by a spherical mirror and express it in terms of object distance and image distance for the mirror. (1)

(b) The magnification produced by a convex lens is -2 . What is meant by this statement and also write the information regarding image obtained from it? (1)

15. (a) Define lens. (5)

(b) Without touching the surface how would you differentiate between convex lens and concave lens.

(c) State the behaviour of light ray when it passes from optical centre of a lens. Show it on a figure for both type of lens.

(d) Draw ray diagram to show the formation of image by convex lens when the distance of object from lens is equal to its focal length. Mention its position and nature.

16. (a) The magnification produced by a concave mirror is $m = +4$. Write the information about the image given by this statement. (1 +2)

(b) Draw a ray diagram for the following and show the formation of the images in case of concave mirror when the object is placed : (i) Between the pole and focus point (ii) at the centre of curvature

17. A student is determining the focal length of a concave mirror by obtaining a sharp image of a distant object . To obtain the image on a screen the student should move the (choose the correct option) (1)

(a) Mirror slightly towards the screen. (b) Screen slightly away from the mirror.

(c) Screen and the mirror away from the object. (d) Screen and mirror towards the object.