

# SSLC 2026 Physics Question Paper with Solutions

Time Allowed :1 Hour 45 Mins	Maximum Marks :40	Total Questions :18
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## General Instructions

Read the following instructions very carefully and strictly follow them:

- The first 15 minutes is cool-off time. Use this time to read and understand the questions and plan your answers.
- This question paper has 18 questions in sections A, B, C, D.
- Choices are provided for questions 7, 10, 14, 17 and 18.
- For the questions that offer a choice, you only need to answer one of the options.

**1. What does the term “Ohmic Heating” indicate?**

- (A) Heating in a microwave oven
- (B) Heating in an induction cooker
- (C) Joule heating
- (D) Heating through radiation

**Correct Answer:** (C) Joule heating

**Solution:**

**Concept: Ohmic Heating**

Ohmic heating refers to the heat produced when an electric current flows through a conductor due to its resistance. This phenomenon is governed by Joule’s law.

**Step 1: Joule’s Law of Heating**

The heat produced in a conductor is given by:

$$H = I^2 R t$$

where:

- $I$  = current
- $R$  = resistance
- $t$  = time

**Step 2: Meaning of Ohmic Heating**

When current passes through a resistive material, electrical energy is converted into heat energy. This is called:

Ohmic (or Joule) heating

**Step 3: Identify correct option**

Among the given options:

- Microwave → electromagnetic waves
- Induction → magnetic heating
- Radiation → heat transfer method
- Joule heating → correct definition

**Conclusion:**

Ohmic heating = Joule heating

Quick Tip

Ohmic heating = heat due to resistance of conductor (Joule's law)

**2. Statement:** If the stem of a tuning fork is placed on a table, the sound heard increases.

**Reason:** If the frequency of the forcing object and the natural frequency of the forced object are not equal, then objects are said to be in resonance. The frequency of the object undergoing resonance will increase.

- (A) Both the Statement and Reason are correct.
- (B) Both the Statement and Reason are incorrect.
- (C) The Statement is correct but the Reason is incorrect.
- (D) The Statement is wrong but the Reason is correct.

**Correct Answer:** (C) The Statement is correct but the Reason is incorrect.

**Solution:**

**Concept: Resonance and Sound Amplification**

**Step 1: Analyze the Statement**

When the stem of a tuning fork is placed on a table:

- The table acts as a sounding board.
- It increases the surface area vibrating.
- This amplifies the sound produced.

Hence, the **Statement is correct**.

**Step 2: Analyze the Reason**

The Reason states:

- Resonance occurs when frequencies are **not equal** → Incorrect
- It also says frequency increases during resonance → Incorrect

Correct concept:

Resonance occurs when frequencies are equal

**Step 3: Conclusion**

- Statement → Correct
- Reason → Incorrect

Correct answer: (C)

#### Quick Tip

Resonance occurs when frequencies match, not when they differ.

**3. When passing through water droplets while forming rainbow light rays undergo:**

- (i) Increase in speed.
  - (ii) Internal reflection.
  - (iii) Total internal reflection.
  - (iv) Refraction.
- (A) (i) and (ii) are correct  
(B) (ii) and (iii) are correct  
(C) (i), (ii) and (iv) are correct  
(D) (ii) and (iv) are correct

**Correct Answer:** (B) (ii) and (iii) are correct

**Solution:**

#### **Concept: Formation of Rainbow**

A rainbow is formed due to the interaction of sunlight with water droplets involving refraction and internal reflection.

#### **Step 1: Entry of light into droplet**

When light enters a water droplet:

- It slows down (not increases speed)
- It undergoes refraction

So, statement (i) is **incorrect**.

#### **Step 2: Inside the droplet**

Light reflects inside the droplet:

- This is **internal reflection**
- In rainbow formation, it is specifically **total internal reflection**

So, (ii) and (iii) are **correct**.

#### **Step 3: Exit of light**

Light again refracts when exiting the droplet, but the key distinguishing phenomenon is total internal reflection.

**Step 4: Conclusion**

Correct statements:

(ii) and (iii)

**Quick Tip**

Rainbow formation = Refraction + Total Internal Reflection + Refraction

**4. Match the following and choose the correct option:**

- A. Bar magnet
- B. Magnetism is permanent
- C. Polarity can be changed
- D. Current carrying solenoid
- E. Magnetic strength can be varied
- F. Polarity cannot be changed

- (A) AEC and DBF
- (B) ABC and DEF
- (C) ABF and DEC
- (D) AEF and DBC

**Correct Answer:** (C) ABF and DEC

**Solution:**

**Concept: Types of Magnets**

- **Permanent magnets** (like bar magnets)
- **Electromagnets** (like current carrying solenoids)

**Step 1: Bar magnet properties**

Bar magnet:

- Magnetism is permanent  $\rightarrow$  (B)
- Polarity cannot be changed  $\rightarrow$  (F)

So:

$$A \rightarrow B, F \Rightarrow ABF$$

**Step 2: Current carrying solenoid properties**

Solenoid:

- Polarity can be changed  $\rightarrow$  (C)

- Magnetic strength can be varied  $\rightarrow$  (E)

So:

$$D \rightarrow E, C \Rightarrow DEC$$

**Step 3: Match with options**

Correct pairing:

$$ABF \text{ and } DEC$$

**Conclusion:**

Option (C) is correct

**Quick Tip**

Bar magnet  $\rightarrow$  permanent, fixed polarity

Solenoid  $\rightarrow$  variable strength, reversible polarity

**5. A child standing between two large buildings claps and hears the echo from the first building in 0.2 seconds and the echo from the second building in 0.3 seconds. (Speed of sound in air = 340 m/s)**

- What is the condition to produce an echo?
- Calculate the distance between the two buildings.

**Solution:**

**Concept: Echo and Sound Reflection**

An echo is produced due to reflection of sound waves from a distant surface.

**Part (a): Condition to produce an echo**

**Step 1: Time condition**

For a distinct echo to be heard, the reflected sound must reach the ear after at least:

$$0.1 \text{ seconds}$$

**Step 2: Minimum distance condition**

Using speed of sound:

$$\text{Minimum distance} = \frac{v \times t}{2} = \frac{340 \times 0.1}{2} = 17 \text{ m}$$

**Conclusion (a):**

Reflecting surface must be at least 17 m away

**Part (b): Distance between two buildings**

**Step 1: Distance to first building**

Echo time = 0.2 s (round trip)

$$d_1 = \frac{v \times t}{2} = \frac{340 \times 0.2}{2} = 34 \text{ m}$$

**Step 2: Distance to second building**

Echo time = 0.3 s

$$d_2 = \frac{340 \times 0.3}{2} = 51 \text{ m}$$

**Step 3: Total distance between buildings**

$$\text{Distance} = d_1 + d_2 = 34 + 51 = 85 \text{ m}$$

**Conclusion (b):**

$$\text{Distance between buildings} = 85 \text{ m}$$

**Quick Tip**

Echo distance formula:  $d = \frac{vt}{2}$

Always divide by 2 because sound travels to the object and back.

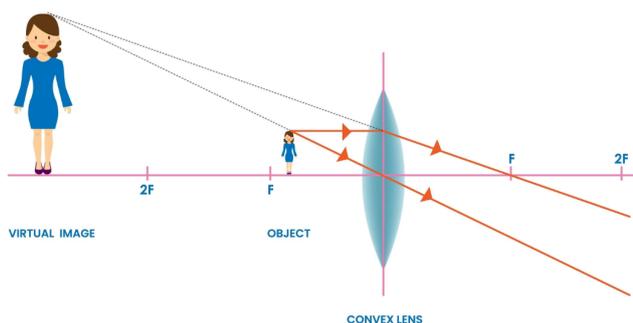
**6. Draw a ray diagram showing the formation of a virtual image by a convex lens.**

**Solution:**

**Concept: Image formation by a convex lens**

A convex lens can form a **virtual, erect, and magnified image** when the object is placed **between the optical centre (O) and the principal focus (F)**.

VIRTUAL IMAGE FORMED BY CONVEX LENS



**Step 1: Position of object**

Place the object between:

$$O \text{ and } F$$

**Step 2: Draw principal rays**

From the top of the object:

- Draw a ray parallel to the principal axis; after refraction, it passes through the focus on the other side.

- Draw a ray through the optical centre; it passes undeviated.

**Step 3: Extend rays backward**

The refracted rays diverge, so extend them backward. Their extensions meet on the same side of the lens.

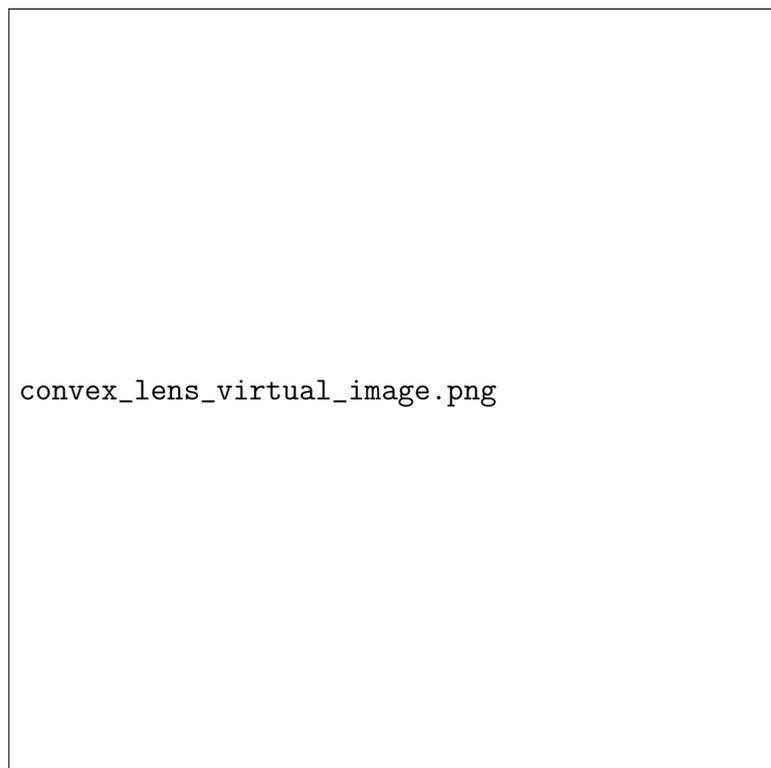
**Step 4: Nature of image**

- Virtual
- Erect
- Magnified
- Formed on the same side of the lens

**Ray Diagram:**

(Virtual image formation by convex lens)

Object between  $O$  and  $F$



**Quick Tip**

Convex lens + object between  $O$  and  $F$  → Virtual, erect, magnified image (same side)

7. (A) The Sun appears red or yellow or orange during sunrise and sunset. But normally the sky appears blue in colour. Describe an experiment that would be helpful in explaining the cause of these phenomena.

OR

(B) In winter, path of light through the gaps of the branches of trees can be seen clearly due to scattering.

- (a) By what name is the phenomenon known where the path of light becomes visible in this manner? Through what type of medium does light travel when this occurs?
- (b) What does the intensity of scattering depend on?

**Solution:**

**(A) Experiment to explain scattering of light**

**Concept: Scattering of light (Tyndall effect)**

The color of the sky and the Sun is explained by scattering of light by small particles in the atmosphere.

**Experiment:**

- Take a glass tank filled with clean water.
- Add a few drops of milk (to create a colloidal solution).
- Pass a beam of white light (torch or laser) through the solution.

**Observation:**

- The path of light becomes visible due to scattering.
- Light coming out from the side appears bluish.
- Light observed at the far end appears reddish.

**Explanation:**

- Shorter wavelengths (blue light) scatter more → sky appears blue.
- At sunrise/sunset, light travels a longer path → blue light scatters away → longer wavelengths (red/orange) dominate.

**Conclusion:**

Scattering of light explains both blue sky and red/orange Sun.

**(B) Scattering of light in atmosphere**

**(a) Name of the phenomenon**

**Step 1: Identify phenomenon**

The visible path of light is called:

Tyndall effect

**Step 2: Type of medium**

This occurs when light passes through a:

colloidal medium (dust, fog, smoke)

**Conclusion (a):**

Tyndall effect in a colloidal medium

**(b) Intensity of scattering**

**Step 1: Dependence on wavelength**

Scattering depends on wavelength:

$$\text{Scattering} \propto \frac{1}{\lambda^4}$$

**Step 2: Other factors**

- Size of particles
- Number of particles
- Nature of medium

**Conclusion (b):**

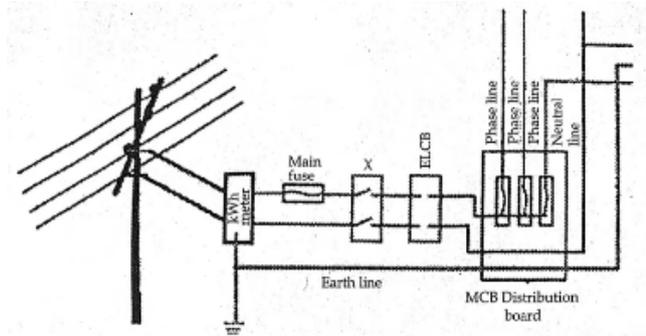
Intensity increases for smaller wavelengths and more particles

**Quick Tip**

Blue light scatters more → sky is blue

Red light least scattered → Sun appears red at sunrise/sunset

8. A portion of electric circuit diagram of a household wiring is given.



(a) What does the part marked as “X” represent in the circuit?

(b) Draw a circuit diagram of a branch circuit which includes one three pin socket with switch.

**Solution:**

**(a) Identification of part “X”**

**Concept: Household wiring components**

In a typical household circuit, the sequence includes:

Main supply → Main fuse → Energy meter → ELCB → Distribution board

**Step 1: Position of X**

The part “X” is placed after the main fuse and before ELCB.

**Step 2: Identify the component**

This component measures electrical energy consumed.

**Conclusion (a):**

$X = \text{Energy meter (Electric meter)}$

**(b) Circuit diagram of a branch circuit with three-pin socket and switch**

**Concept: Three-pin socket connection**

A three-pin socket has:

- Live (L)
- Neutral (N)
- Earth (E)

**Step 1: Connections**

- Live wire passes through a switch to the socket.
- Neutral wire directly connects to the socket.
- Earth wire connects to the earth pin.

**Step 2: Diagram**

Live (L) → Switch → Socket (L)

Neutral (N) → Socket (N)

Earth (E) → Socket (E)

**Step 3: Explanation**

- Switch is always connected in live wire for safety.
- Earth wire prevents electric shock.

**Conclusion (b):**

Branch circuit includes live with switch, neutral direct, and earth connection.

**Quick Tip**

Switch must always be in live wire for safety in household wiring.

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**9. A load of 20000 N is lifted with a wheel and axle system that has a wheel of radius 50 cm and an axle of radius 10 cm.**

- (a) Calculate the mechanical advantage of this wheel and axle.
- (b) How should a wheel and axle be designed to obtain increased mechanical advantage?

**Solution:**

**Concept: Wheel and Axle**

Mechanical advantage (MA) of a wheel and axle is given by:

$$MA = \frac{\text{Radius of wheel}}{\text{Radius of axle}}$$

**(a) Calculation of Mechanical Advantage**

**Step 1: Given data**

$$R = 50 \text{ cm}, \quad r = 10 \text{ cm}$$

**Step 2: Apply formula**

$$MA = \frac{R}{r} = \frac{50}{10} = 5$$

**Conclusion (a):**

$$\text{Mechanical Advantage} = 5$$

**(b) Increasing Mechanical Advantage**

**Step 1: From formula**

$$MA = \frac{R}{r}$$

**Step 2: Ways to increase MA**

- Increase the radius of the wheel ( $R$ )
- Decrease the radius of the axle ( $r$ )

**Conclusion (b):**

Large wheel and small axle give higher mechanical advantage

**Quick Tip**

Wheel bigger + axle smaller  $\Rightarrow$  more mechanical advantage

**10. (A) A heating appliance produces 7200000 J heat in 2 hours.**

- (a) What is the energy change in a heating appliance?
- (b) Calculate the power of the appliance.

**OR**

**(B) An electric grinder with a power of 400 W is working.**

- (a) What is the energy change in this equipment?
- (b) Calculate the work done by this grinder in 1 minute.

**Solution:**

**(A) Heating appliance**

**(a) Energy change**

**Concept:**

A heating appliance converts:

Electrical energy  $\rightarrow$  Heat energy

**Conclusion (a):**

Electrical energy is converted into heat energy

**(b) Power calculation**

**Step 1: Given data**

$$E = 7200000 \text{ J}, \quad t = 2 \text{ hours} = 2 \times 3600 = 7200 \text{ s}$$

**Step 2: Formula**

$$P = \frac{E}{t}$$

**Step 3: Calculation**

$$P = \frac{7200000}{7200} = 1000 \text{ W}$$

**Conclusion (b):**

$$\text{Power} = 1000 \text{ W}$$

**(B) Electric grinder**

**(a) Energy change**

**Concept:**

An electric grinder converts:

Electrical energy  $\rightarrow$  Mechanical energy

**Conclusion (a):**

Electrical energy is converted into mechanical energy

**(b) Work done**

**Step 1: Given data**

$$P = 400 \text{ W}, \quad t = 1 \text{ minute} = 60 \text{ s}$$

**Step 2: Formula**

$$W = P \times t$$

**Step 3: Calculation**

$$W = 400 \times 60 = 24000 \text{ J}$$

**Conclusion (b):**

$$\text{Work done} = 24000 \text{ J}$$

**Quick Tip**

$$\text{Power } P = \frac{E}{t}, \quad \text{Work } W = Pt$$

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**11. Observe the figure showing a rule related to electricity and magnetism. Which law does this figure represent? State the rule.**



**Solution:**

**Concept: Fleming's Right-Hand Rule**

**Step 1: Identify the figure**

The diagram shows three mutually perpendicular directions using the thumb, forefinger, and middle finger of the right hand.

**Step 2: Name of the rule**

This represents:

Fleming's Right-Hand Rule

**Step 3: Statement of the rule**

If the thumb, forefinger, and middle finger of the **right hand** are held mutually perpendicular to each other, then:

- Thumb → direction of motion of conductor
- Forefinger → direction of magnetic field
- Middle finger → direction of induced current

**Step 4: Application**

This rule is used in:

- Electric generators
- Electromagnetic induction problems

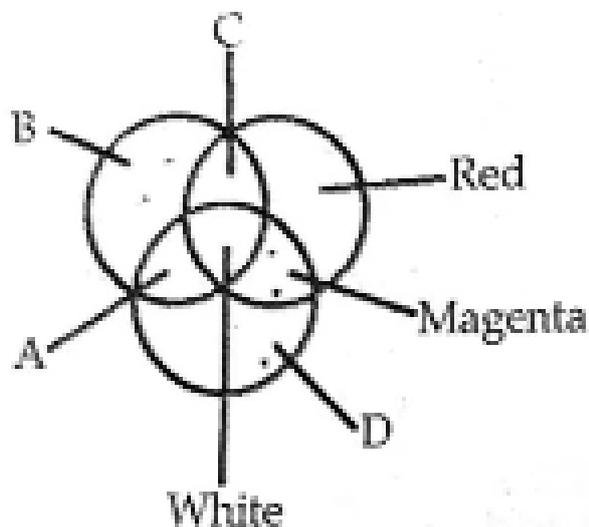
**Conclusion:**

The figure represents Fleming's Right-Hand Rule

### Quick Tip

Right hand  $\rightarrow$  Generator rule (motion  $\rightarrow$  field  $\rightarrow$  current)

12. Observe the figure where three coloured lights are made to fall on a screen.



- Which colours are labelled as A and D?
- Among the colours A, B, C and D identify the primary colours and write down the colours.
- There is a complementary colour pair among A, B, C and D. Pick them out and write down.

**Solution:**

**Concept: Addition of Colours (RGB Model)**

Primary colours of light:

Red, Green, Blue

Their combinations produce:

- Red + Blue = Magenta
- Red + Green = Yellow
- Blue + Green = Cyan
- Red + Green + Blue = White

**(a) Identify colours A and D**

**Step 1: From the diagram**

Given:

- One region is marked Red

- One region is Magenta (Red + Blue)
- Center is White (all three)

**Step 2: Deduce remaining colours**

Thus:

$$A = \text{Green}, \quad D = \text{Blue}$$

**Conclusion (a):**

$$A = \text{Green}, \quad D = \text{Blue}$$

**(b) Primary colours**

**Step 1: Primary colours of light**

Red, Green, Blue

**Step 2: From labels**

$$A = \text{Green}, \quad B = \text{Red}, \quad D = \text{Blue}$$

**Conclusion (b):**

Primary colours: Red, Green, Blue

**(c) Complementary colour pair**

**Concept:**

Complementary colours combine to form white light.

**Step 1: Identify pair**

$$\text{Red} + \text{Cyan} = \text{White}$$

$$\text{Blue} + \text{Yellow} = \text{White}$$

$$\text{Green} + \text{Magenta} = \text{White}$$

**Step 2: From given labels**

Magenta is present, so:

Green and Magenta

**Conclusion (c):**

Complementary pair: Green and Magenta

**Quick Tip**

RGB model: Red, Green, Blue  $\rightarrow$  White

Complementary colours combine to give white light

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**13. The resistance of a heating coil in a heating appliance operating at 200 V is 60  $\Omega$ .**

- (a) Which alloy is used to make heating coil of heating appliances?
- (b) Calculate the amount of heat produced if electricity flows through this appliance for 5 minutes.
- (c) If another appliance with a resistance less than  $60 \Omega$  is operated at the same voltage for 5 minutes, will the amount of heat produced increase or decrease? What is your justification?

**Solution:**

(a) Alloy used

**Concept: Heating elements**

Heating coils are made of materials with high resistivity and high melting point.

**Answer:**

Nichrome (Nickel-Chromium alloy)

(b) Heat produced

**Concept: Joule's Law of Heating**

$$H = \frac{V^2}{R} \times t$$

**Step 1: Given data**

$$V = 200 \text{ V}, \quad R = 60 \Omega, \quad t = 5 \text{ min} = 300 \text{ s}$$

**Step 2: Substitute values**

$$H = \frac{(200)^2}{60} \times 300$$

**Step 3: Calculation**

$$H = \frac{40000}{60} \times 300 = 666.67 \times 300 = 200000 \text{ J}$$

**Conclusion (b):**

$$\text{Heat produced} = 2 \times 10^5 \text{ J}$$

(c) Effect of decreasing resistance

**Step 1: Formula relation**

$$H = \frac{V^2}{R} \times t$$

**Step 2: Observation**

At constant voltage and time:

$$H \propto \frac{1}{R}$$

**Step 3: Conclusion**

If resistance decreases:

$H$  increases

**Final Answer (c):**

Heat produced will increase because heat is inversely proportional to resistance.

**Quick Tip**

At constant voltage: Lower resistance  $\rightarrow$  more current  $\rightarrow$  more heat

**14. (A) Observe the figures.**



- (a) Which one has the mechanical advantage less than one?
- (b) State the principle of a lever.
- (c) The mechanical advantage of a lever is 2. If the length of its effort arm is 1 m, calculate the length of the load arm.

**OR**

**(B) Crowbar can be used as a lever.**

- (a) What do you mean by a lever?
- (b) Among Effort, Load, and Fulcrum, state which one comes in the middle for a second order lever and for a third order lever.
- (c) A metre scale is suspended in equilibrium position. If a weight of 60 g is suspended at a distance of 25 cm from the balanced point, what weight must be suspended on the other side at a distance of 30 cm to keep the metre scale in equilibrium?

**Solution:**

**(A)**

**(a) Mechanical advantage less than 1**

**Concept:**

Mechanical advantage (MA) less than 1 occurs in third-class levers.

**Answer:**

Figure (iii) (scissors-like tool)

**(b) Principle of a lever**

**Principle:**

$$\begin{aligned}\text{Moment of effort} &= \text{Moment of load} \\ \text{Effort} \times \text{Effort arm} &= \text{Load} \times \text{Load arm}\end{aligned}$$

**(c) Calculation of load arm**

**Step 1: Formula**

$$\text{MA} = \frac{\text{Effort arm}}{\text{Load arm}}$$

**Step 2: Given**

$$\text{MA} = 2, \quad \text{Effort arm} = 1 \text{ m}$$

**Step 3: Calculation**

$$2 = \frac{1}{\text{Load arm}} \Rightarrow \text{Load arm} = \frac{1}{2} = 0.5 \text{ m}$$

**Conclusion (c):**

$$\text{Load arm} = 0.5 \text{ m}$$

**(B)**

**(a) Definition of lever**

A lever is a rigid bar that rotates about a fixed point called the fulcrum to lift or move a load.

**(b) Position in levers**

- Second order lever → Load is in the middle
- Third order lever → Effort is in the middle

**(c) Equilibrium of metre scale**

**Step 1: Apply principle of moments**

$$W_1 \times d_1 = W_2 \times d_2$$

**Step 2: Given**

$$W_1 = 60 \text{ g}, \quad d_1 = 25 \text{ cm}, \quad d_2 = 30 \text{ cm}$$

**Step 3: Calculation**

$$\begin{aligned}60 \times 25 &= W \times 30 \\ 1500 &= 30W \Rightarrow W = 50 \text{ g}\end{aligned}$$

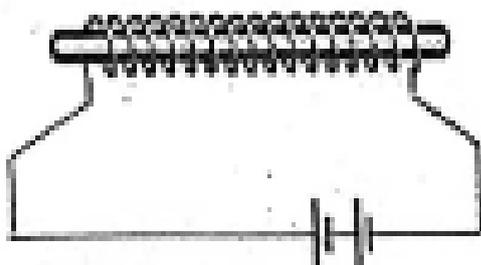
**Conclusion (c):**

$$\text{Required weight} = 50 \text{ g}$$

### Quick Tip

Lever rule:  $\text{Effort} \times \text{effort arm} = \text{Load} \times \text{load arm}$

15. Observe the figure of a current carrying solenoid.



- What is meant by a solenoid?
- The end connected to the positive terminal of the cell will always be the North pole of a solenoid. Is this statement correct? Justify your answer.
- Write any two ways to increase the strength of the magnetic field formed around a current carrying solenoid.

**Solution:**

**(a) Definition of solenoid**

A solenoid is a long cylindrical coil of many closely wound turns of insulated copper wire through which electric current flows.

**(b) Correctness of statement**

**Step 1: Concept of polarity**

The polarity of a solenoid depends on the direction of current.

**Step 2: Right-hand thumb rule**

If we curl the fingers of the right hand in the direction of current, the thumb points towards the North pole.

**Step 3: Conclusion**

The given statement is **incorrect** because:

- The terminal connected to positive does not always become North.
- It depends on the direction of current in the coil.

**Final Answer (b):**

Statement is incorrect

(c) Ways to increase magnetic field strength

Step 1: **Methods**

- Increase the current through the solenoid
- Increase the number of turns (coils)
- Insert a soft iron core inside the solenoid

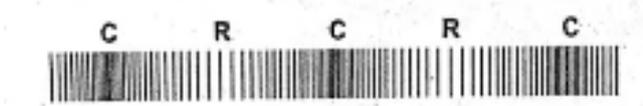
Any two:

Increase current and increase number of turns

Quick Tip

More current + more turns + iron core → stronger magnetic field

16. Observe the illustration of a wave.



- Which type of mechanical wave is this?
- What do the letters C and R indicate?
- If the distance between two consecutive 'C' of the wave is 0.01 m, which is travelling with a speed of 350 m/s, will it be audible to humans? Justify your answer by mathematical calculation.

**Solution:**

(a) **Type of wave**

**Concept:**

The diagram shows regions of compression (C) and rarefaction (R), which are characteristics of longitudinal waves.

**Answer:**

Longitudinal wave

(b) **Meaning of C and R**

- C → Compression (region of high pressure/density)
- R → Rarefaction (region of low pressure/density)

(c) Audibility of the wave

Step 1: Given data

$$\lambda = 0.01 \text{ m}, \quad v = 350 \text{ m/s}$$

Step 2: Formula

$$v = f\lambda \Rightarrow f = \frac{v}{\lambda}$$

Step 3: Calculation

$$f = \frac{350}{0.01} = 35000 \text{ Hz}$$

Step 4: Compare with human hearing range

Human audible range:

20 Hz to 20000 Hz

Step 5: Conclusion

$$35000 \text{ Hz} > 20000 \text{ Hz}$$

So, the sound is:

Not audible (ultrasonic)

Quick Tip

Frequency  $> 20,000 \text{ Hz}$   $\rightarrow$  Ultrasonic (not audible)

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17. (A) An object is placed 20 cm away from a concave lens with a focal length of 10 cm.

- (a) Calculate the distance to the image from the lens.
- (b) Write down the characteristics of the image.

OR

(B) A convex lens forms a virtual image at a distance of 7.5 cm away from it. Focal length of the lens is 15 cm.

- (a) Calculate the distance between lens and the object.
- (b) Write any two instances where a convex lens is used in this manner.

Solution:

(A)

(a) Image distance

**Concept: Lens formula**

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

**Step 1: Sign convention**

For concave lens:

$$f = -10 \text{ cm}, \quad u = -20 \text{ cm}$$

**Step 2: Substitute values**

$$\frac{1}{-10} = \frac{1}{v} + \frac{1}{-20}$$

$$\frac{1}{-10} + \frac{1}{20} = \frac{1}{v}$$

$$\frac{-2 + 1}{20} = \frac{1}{v} = \frac{-1}{20}$$

$$v = -20 \text{ cm}$$

**Conclusion (a):**

$$\text{Image distance} = -20 \text{ cm}$$

**(b) Characteristics of image**

- Virtual
- Erect
- Diminished
- Formed on the same side as object

**(B)**

**(a) Object distance**

**Step 1: Sign convention**

Convex lens:

$$f = +15 \text{ cm}, \quad v = -7.5 \text{ cm}$$

**Step 2: Lens formula**

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

$$\frac{1}{15} = \frac{1}{-7.5} + \frac{1}{u}$$

**Step 3: Calculation**

$$\frac{1}{15} + \frac{1}{7.5} = \frac{1}{u}$$

$$\frac{1 + 2}{15} = \frac{3}{15} = \frac{1}{5}$$

$$u = 5 \text{ cm}$$

**Conclusion (a):**

Object distance = 5 cm

**(b) Uses of convex lens in this manner**

- Magnifying glass
- Simple microscope

#### Quick Tip

Concave lens → always virtual, erect

Convex lens (object inside focus) → virtual, magnified

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