4/12/16

Activity – 4

Polarisation of light

AIM

To observe polarisation of light using 2 polarsoids.

APPARATUS REQUIRED

glass sheet, a source giving monochromatic light beam with parallel rays, a polarsoid.

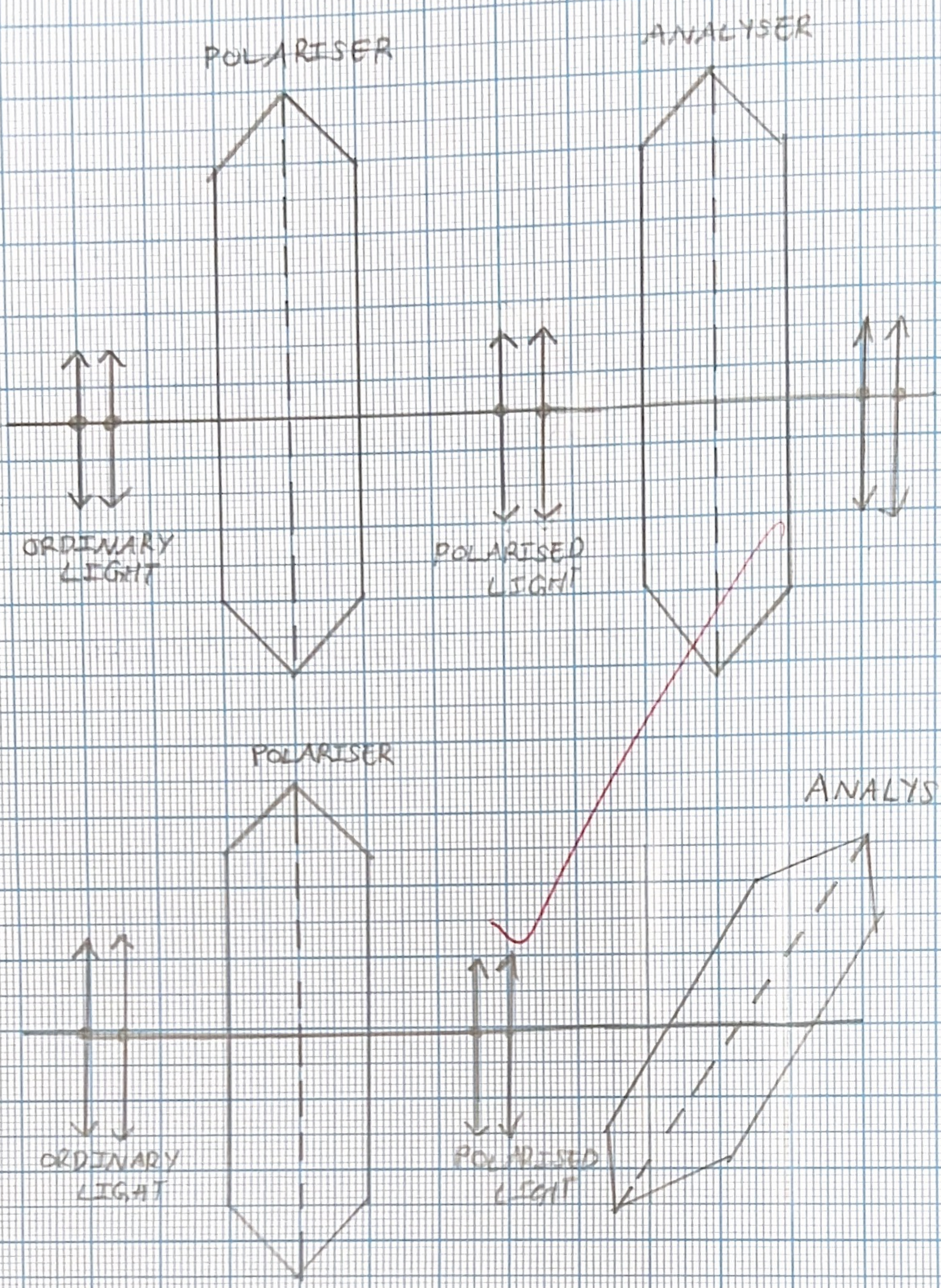
THEORY

When an unpolarised light is made incident on the interface of 2 transparent media at polarising angle, the refracted and reflected ray depart from each other at an angle of 90°.

The reflected ray is completely plane polarised. It can be tested by a polarsoid.

PROCEDURE

1. Keep the thin glass sheet in a horizontal plane surface with a hole under the sheet.
2. Take a beam of monochromatic light having parallel rays and make it incident on the upper face of the


POLARISER
ANALYSER
ORDINARY LIGHT
POLARISED LIGHT
POLARISER
ANALYSER
ORDINARY LIGHT
POLARISED LIGHT
NO LIGHT

glass sheet.

3. Adjust the angle of incidence to 57.5°.
4. Observe the reflected rays and the refracted rays. They must make an angle of 90 with each other.

TESTING OF POLARISATION

1. Take a polarsid (P) and keep it is between incident light and your eyes. Rotate it about an axis along incident ray. No change is intensity of light will be detected. It is so because the incident light is unpolarised.

2. Take the 2nd polaroid (A) and keep it at proper distance between polaroid (P) and eye and parallel to it. Light is visible through them.

3. Now rotate the polaroid (A) ranging from 0° to 360°. Keeping the polaroid (P) fixed and note intensity of transmitted light.

4. When polaroid (A) and polaroid (P) at 90° then transmitted light through polaroid (A) will be zero.

RESULTS

When the 2 polaroids are parallel, light is transmitted through it. But when they are perpendicular there is no transmitted light. The light obtained through poloid (P) is plone polarised. The light have transverse nature.

PRECAUTIONS

1. Two polaroids and source of light should be iis a straight line.
2. Rotate only 2nd polariser from 0° to 360°.

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Activity - 5

Identification of circuit elements

AIM

To identify a diode, an LED, a transistor, an IC chip, a resistor, a capacitor from a mixed collection of items.

APPARATUS REQUIRED

Multimeter, A battery eliminator, reversing key, etc.

THEORY

For identification, appearance and working of each item we have to consider :

i) A diode is 2 - terminal device, it conducts when forward biased and does not conduct when reverse biased.

ii) A transistor is a 3 - terminal device, which represents the emitter, base and collector.

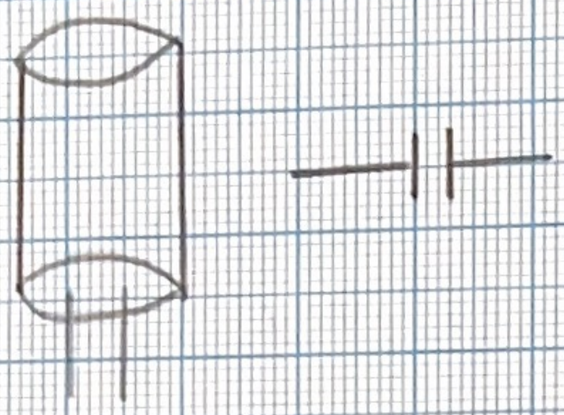
iii) An integrated circuit is a multi-terminal device in the form of a chip.

iv) A resistor is a 2 terminal device. It conducts in either forward or reverse biased.

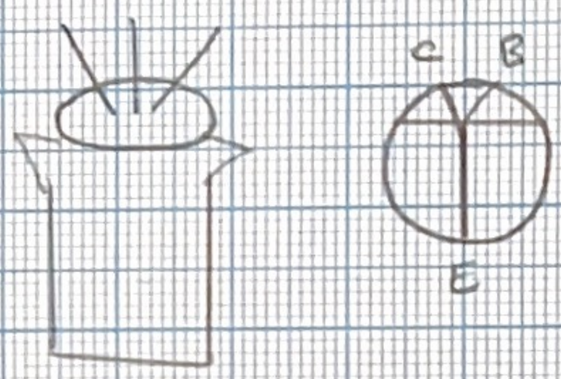
v) A capacitor is also a 2-terminal device.

CARBON RESISTOR

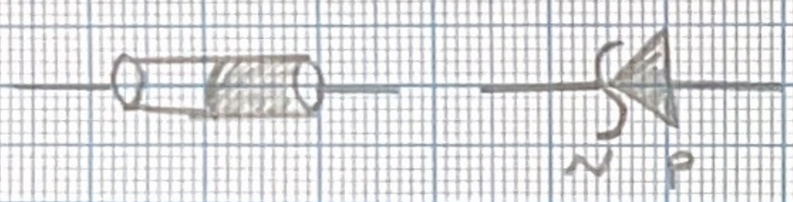
CAPACITOR



TRANSISTOR

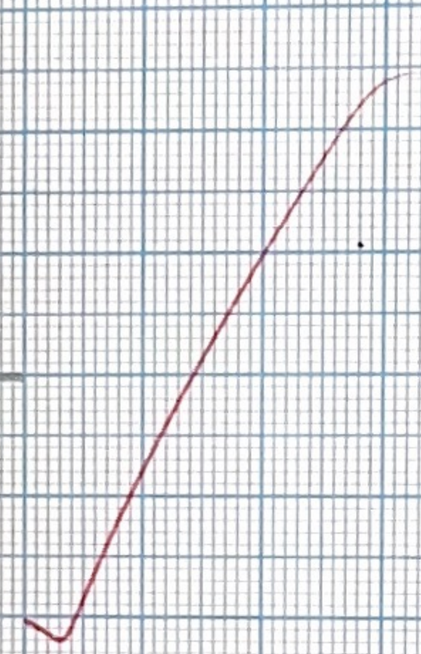


DIODE



LED

INTEGRATED CIRCUIT



It conducts when forward or reverse biased.

PROCEDURE

1. Look at the collection and identify the one with maximum no. of legs.
2. It is an IC chip.
3. The components with 3 legs is a transistor.
4. Use a multimeter with selector switch turned to R for checking continuosly.
5. The LED emits light on connecting across the poles of a multimeter.
6. The device that gives full scale deflection is a capacitor.

RESULT

The given items are identified.

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Activity - 6

Nature of image formed by concave mirror and convex lens

AIM

To study the nature and seze of image formed by a convec lens and concave mirrors.

APPARATUS REQUIRED

convex lens, concave mirror, conolle, meter scale, screen.

THEORY

Image formation by a lens and a mirror depends on the position of the object with respect to the lens or the mirror.

PROCEDURE

For convec lens

i) Determine the appropriate rough focal length of the gives lens by obtaining a sharp and clear image of a destont object on the screen.

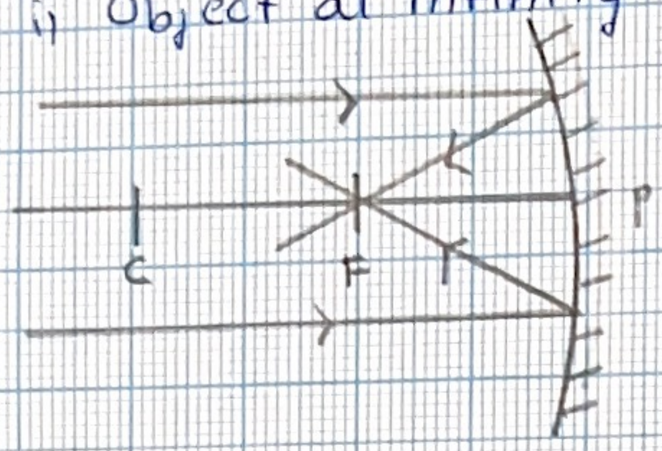
ii) Mount the lens on the stond.

iii) If an optical bench is used, mount the lens iis the centre and the conolle and the screen on either side of lens.

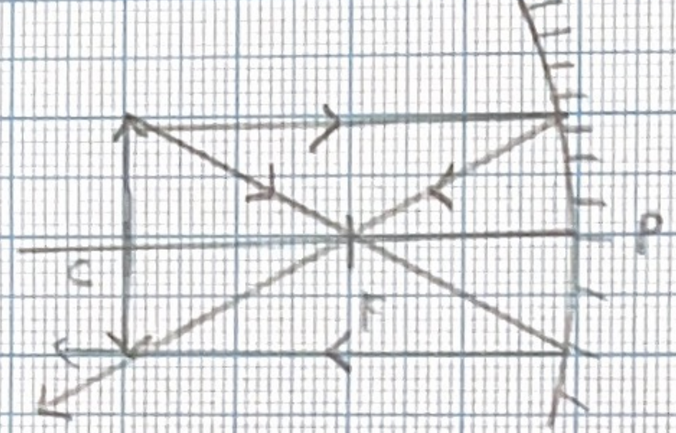
RAY DIAGRAMS

a) Concave Mirror

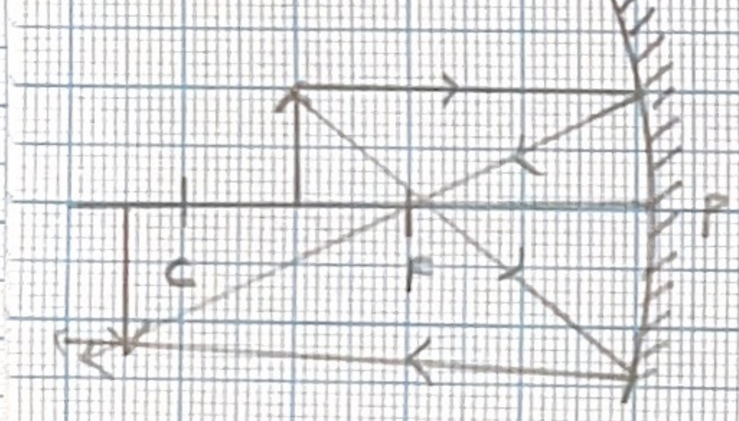
i) Object at infinity



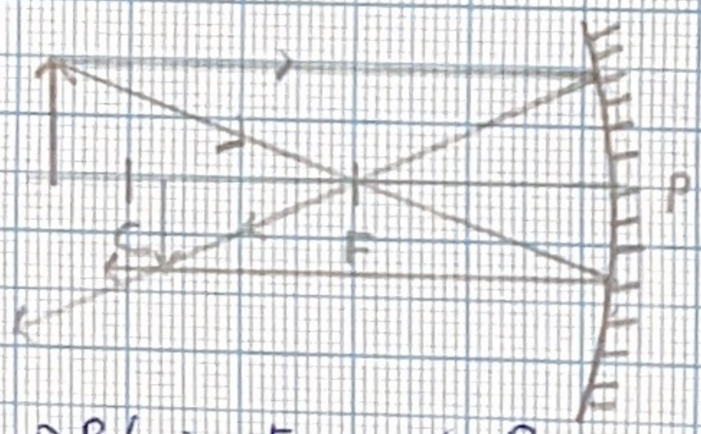
ii) Object at C



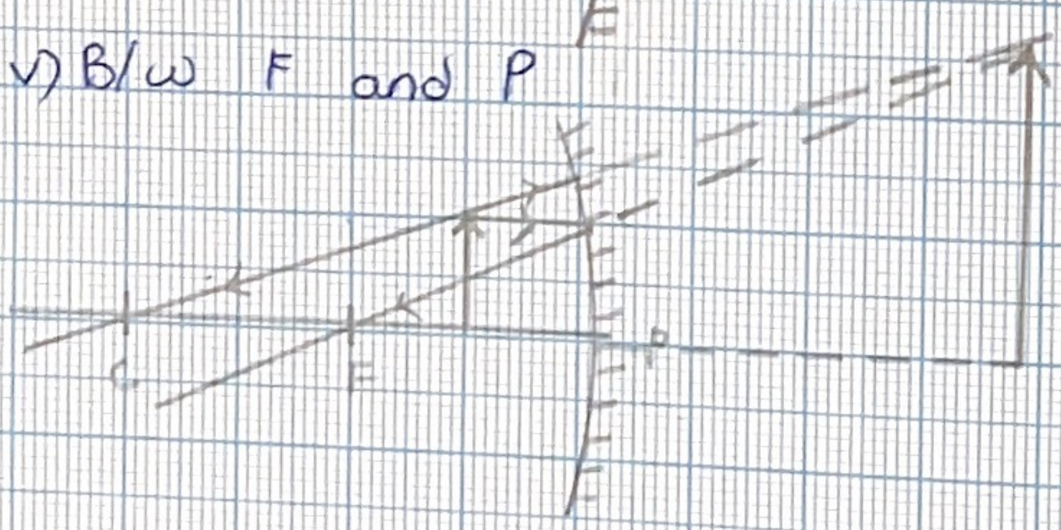
iii) Object b/w F and C



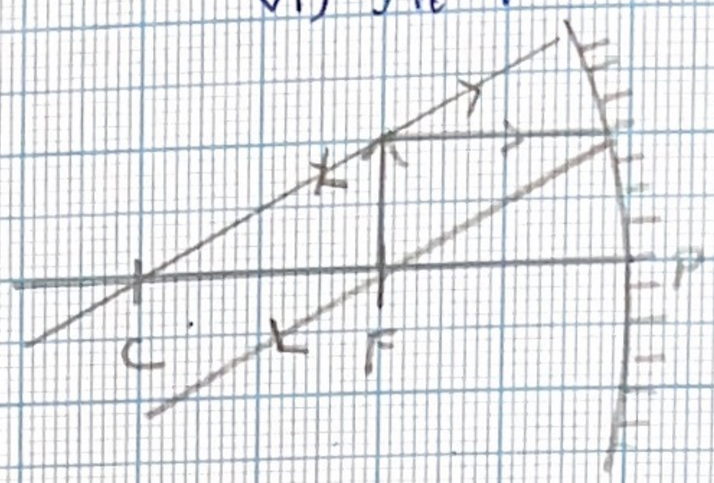
iv) Object is beyond C



v) B/w F and P



vi) At F



iv) Adjust their heights in such a way that the tip of the flame and the centres of the lens and the screen lie on the same straight line, parallel to the optical bench. Measure different values of the object distance and take corresponding values of image distance

For Concave Mirror

i) Find the rough focal length by focussing on a distant object and obtaining it's image on the screen.

ii) Mount the screen on the second upright and the candle on third upright. Adjust object distance and image distance so as to obtain a real, inverted image on the screen whose size varies with position.

iii) If at any point, the candle and the screen are to be in the same position, ignore the readings and interchange the uprights. Repeat for different values of object distance (u).

RESULT

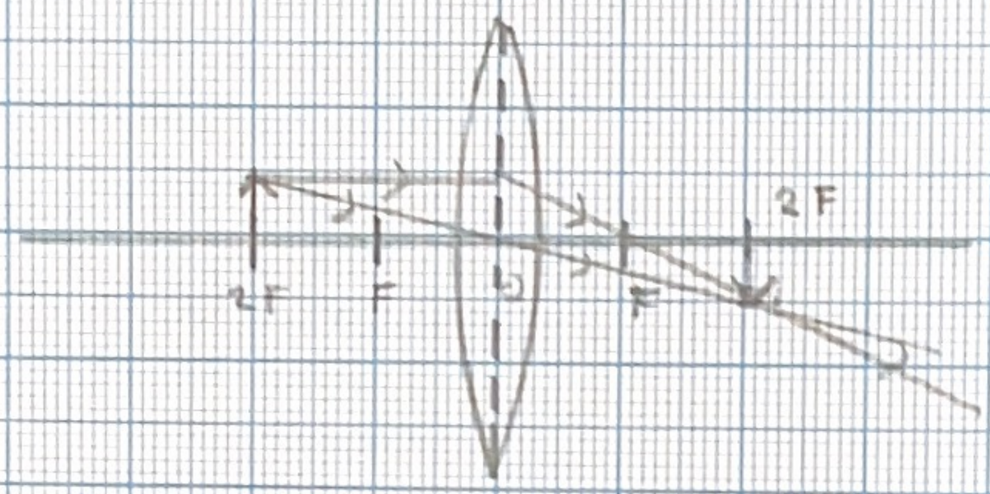
convex lens

The optical object is moved to the optical

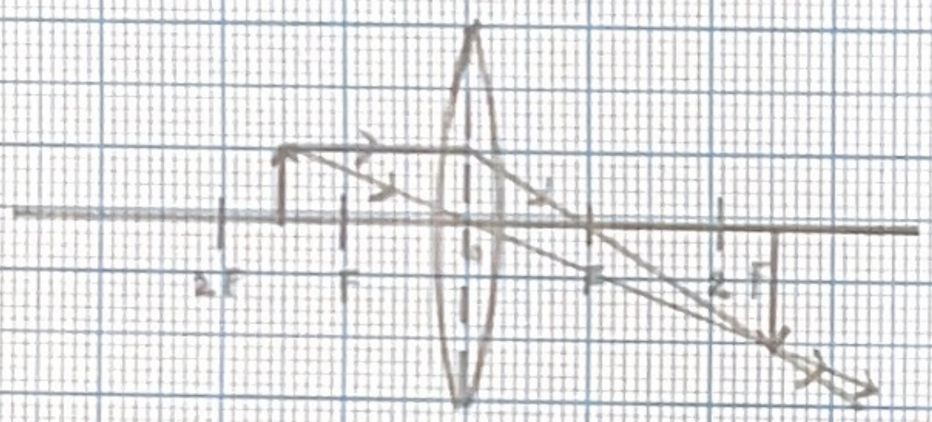
Convex lens

a) Object at ∞

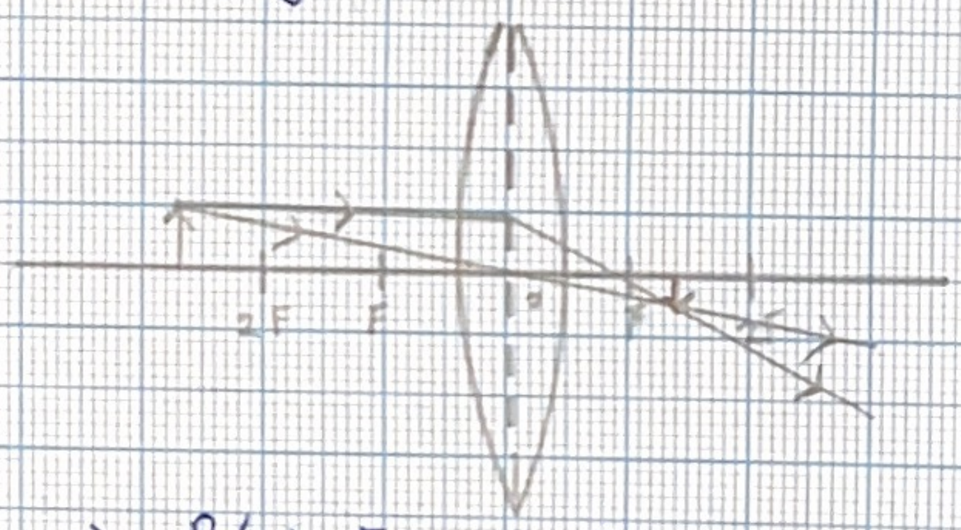
b) Object at 2F



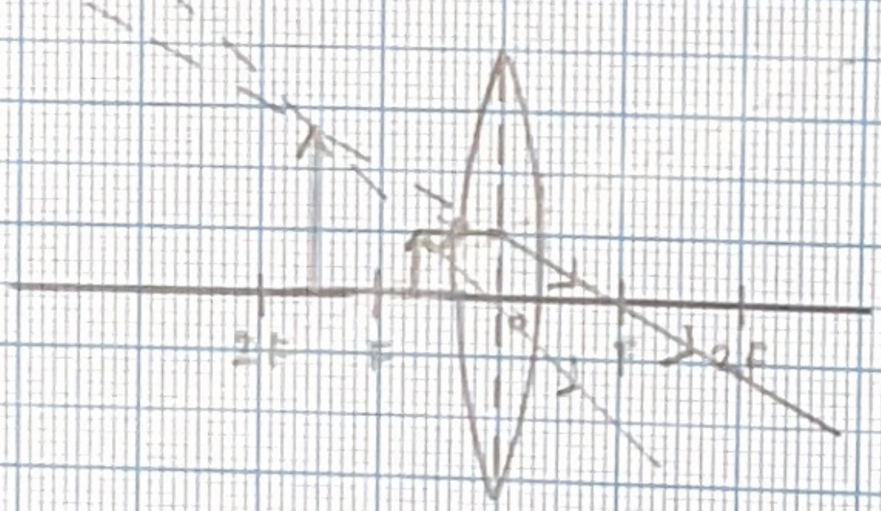
c) Object b/w F and 2F



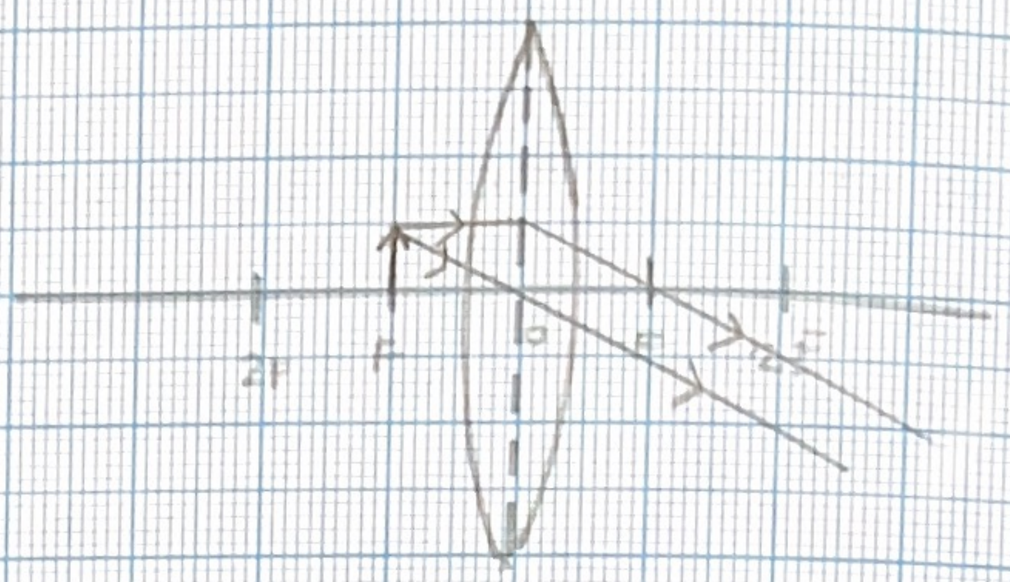
d) Beyond 2F



e) B/w F and O



f) At F



Concave Mirror

Sl. no.	Position of object	Position of image	Nature of image
1.	At ∞	At F	Real, inverted, diminished
2.	At C	At C	Real, inverted, same size
3.	B/w F & C	Beyond C	Real, inverted, magnified
4.	Beyond C	B/w F & C	Real, inverted, diminished
5.	B/w F & P	Behind the mirror	Virtual, erect, magnified
6.	At F	At ∞	Real, inverted, magnified

Convex lens

Sl. no.	Position of object	Position of image	Nature of image
1.	At ∞	At Focus	Real, inverted, diminished
2.	At 2F	At 2F	Real, inverted, same size
3.	Beyond 2F	B/w F and 2F	Real, inverted, diminished
4.	B/w F & 2F	Beyond 2F	Real, inverted, magnified
5.	At F	At ∞	Real, inverted, magnified
6.	B/w F & O	Same side as object	Virtual, erect, magnified

of the lens.
Size of image gradually increases.
Beyond 2F image is formed between F and 2F.
At 2F, image is also formed at 2F.
Between F and 2F image is formed beyond 2F.

When the object is at ∞, the image is formed at the principal focus and between F and 2F are small, at 2F is equal and beyond 2F is large.

Concave Mirror

A similar trend in image formation is noticed. When kept at ∞, a highly diminished image is formed at the focus.
Beyond 2F image is slightly diminished and formed between F and 2F. At 2F, an image of the same size is formed at 2F.
Between F and 2F, a magnified, large image is formed beyond 2F.
At F, a highly magnified image is formed at infinity.

Mon 18/12