

UPDAAN



2025

LIGHT

- Reflection & Refraction

PHYSICS

Lecture - 06

By - ER. RAKSHAK SIR



Topics to be covered



- 1 Refraction through Spherical Lenses ✓
- 2 Rules of Image Formation : Ray Diagrams ✓
- 3 Uses of Spherical Lenses ✓
- 4 PYQs on Ray Diagrams ✓

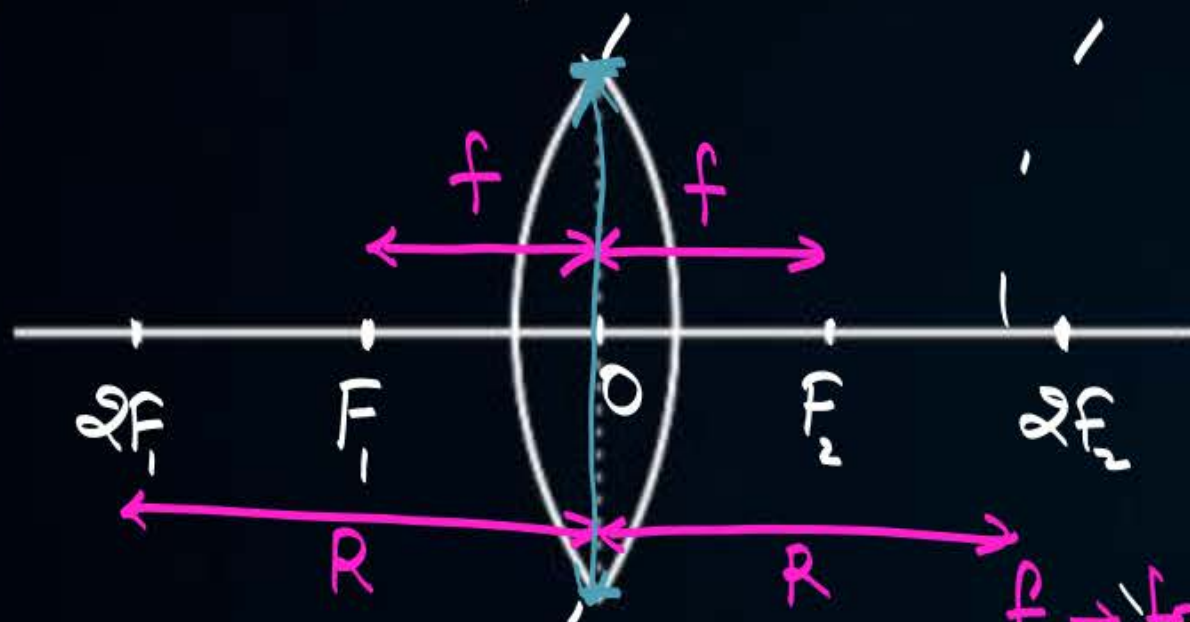




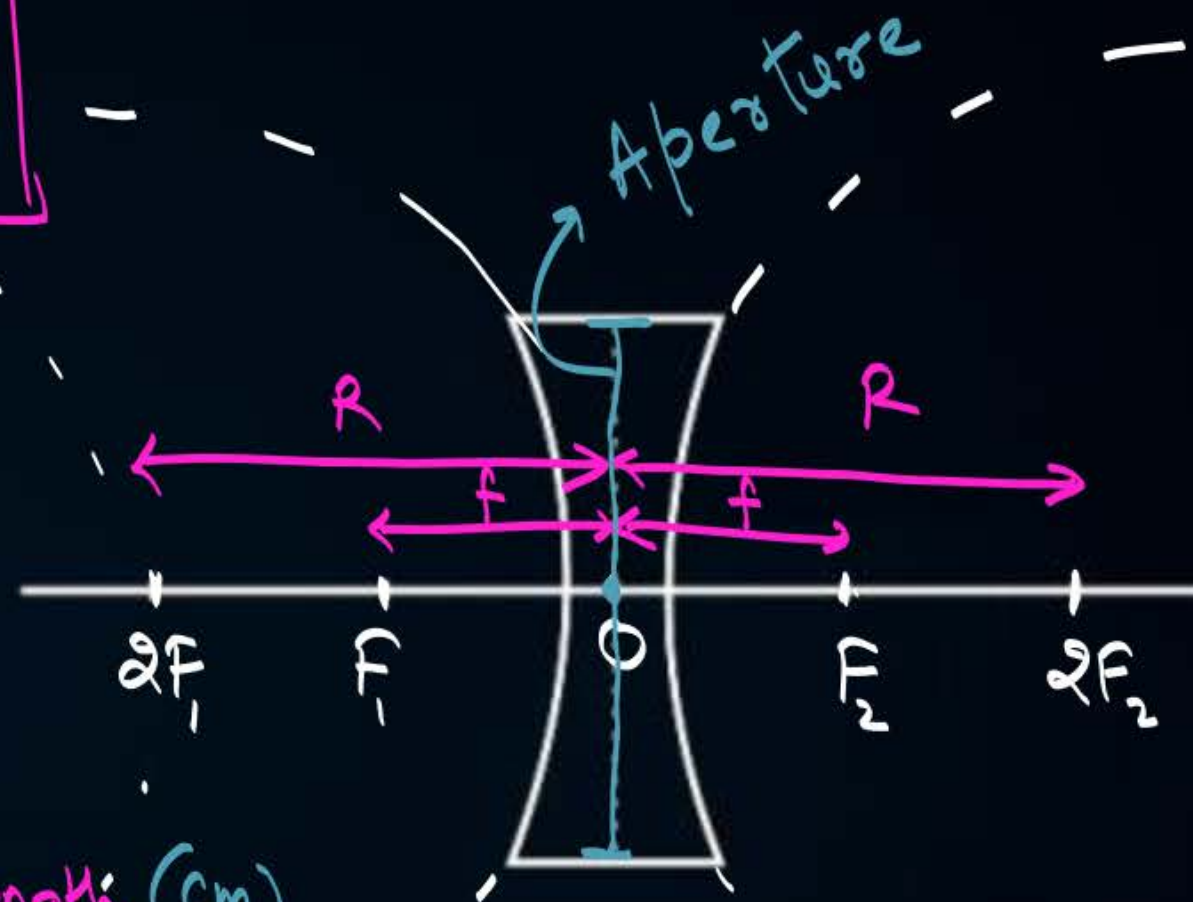
REFRACTION THROUGH SPHERICAL LENSES



$$f = \frac{R}{2}$$



Convex
lens



Concave
lens

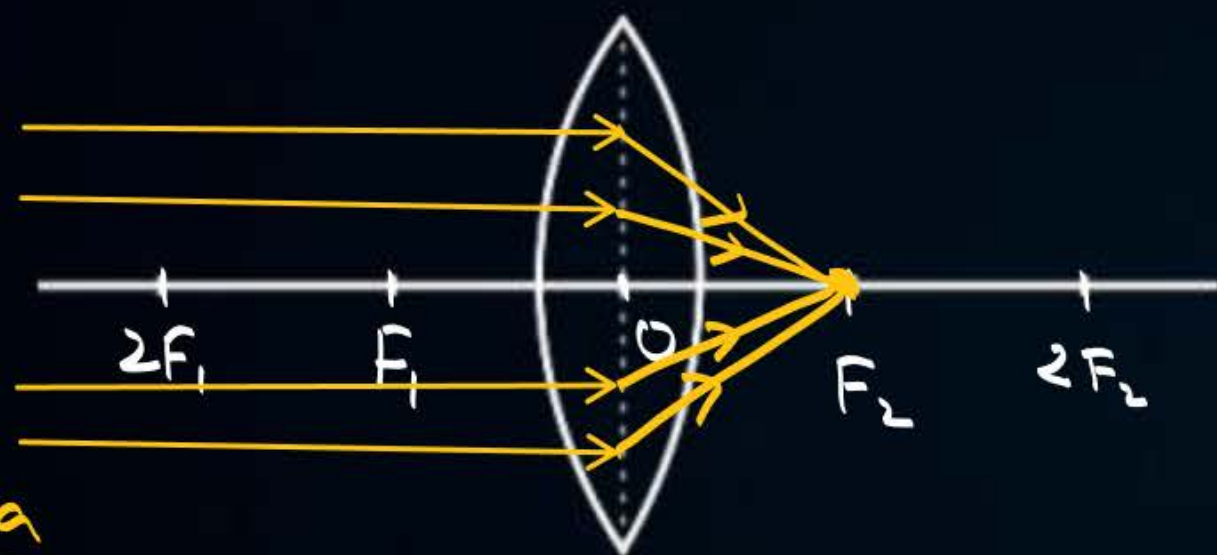
$f \rightarrow$ focal length (cm)
 $R \rightarrow$ Radius of Curvature
 $O \rightarrow$ optical centre (cm)
 $F \rightarrow$ Principal Focus
 $2F \rightarrow$ Double of Focus



REFRACTION THROUGH SPHERICAL LENSES



Nature of the lens



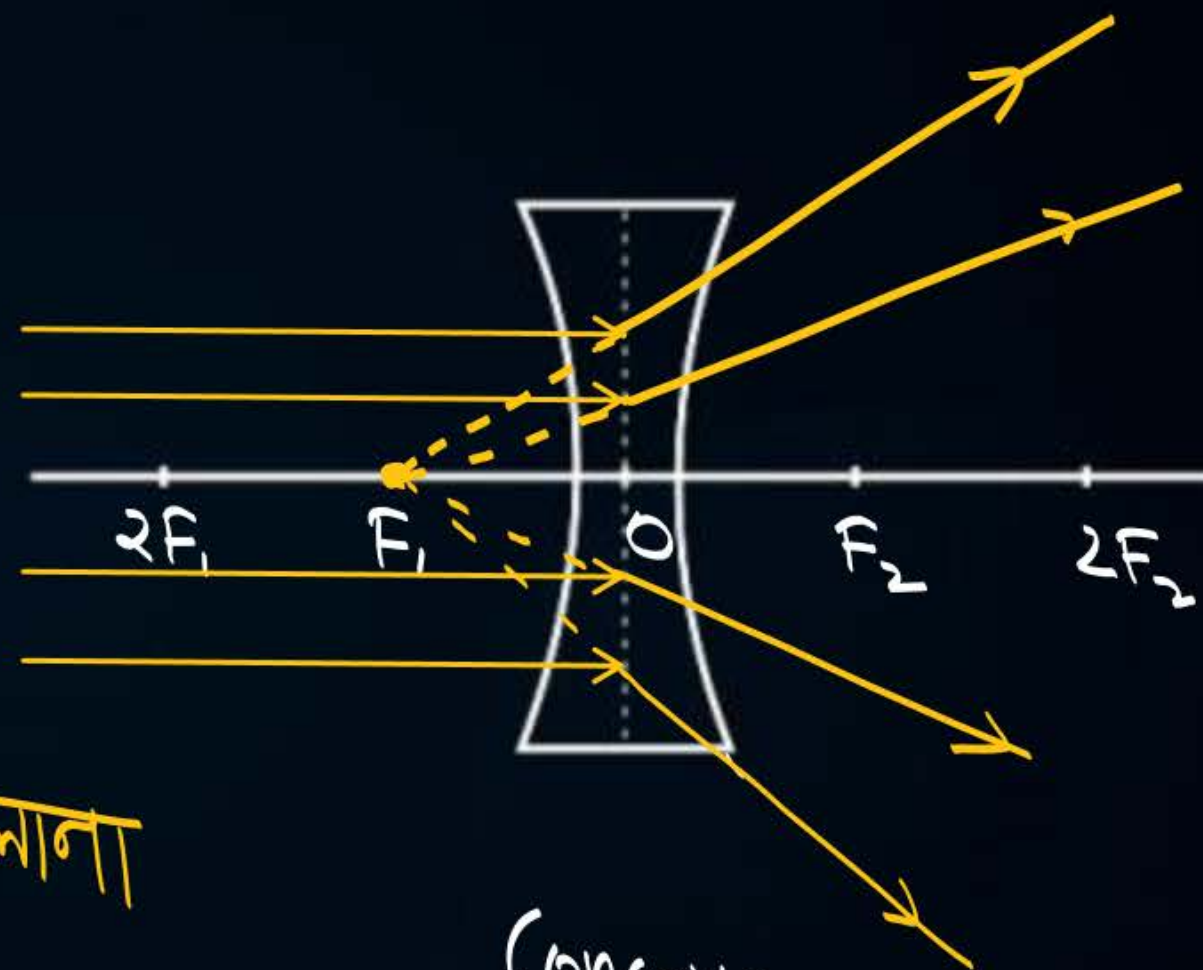
Convex

(Converging lens)

Ikathha



Sadig
Kid



Concave

(Spread) (Diverging lens)

Simitt



RULES TO OBTAIN IMAGE



① \rightarrow \parallel to P. Axis \rightarrow F

\rightarrow F \rightarrow \parallel to P. Axis

\rightarrow O \rightarrow Undeviated
(Seedhi Niki legi)

Convex

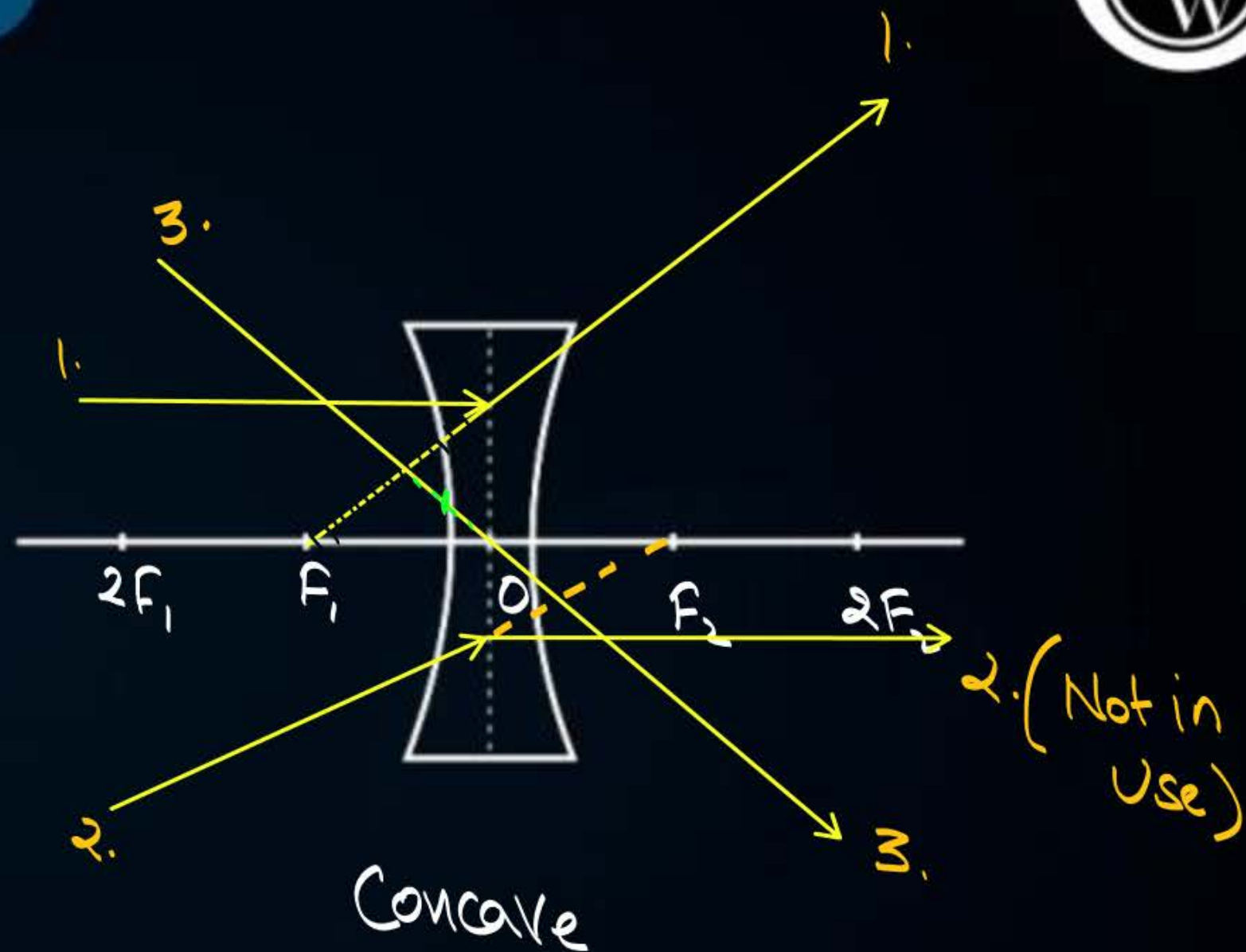
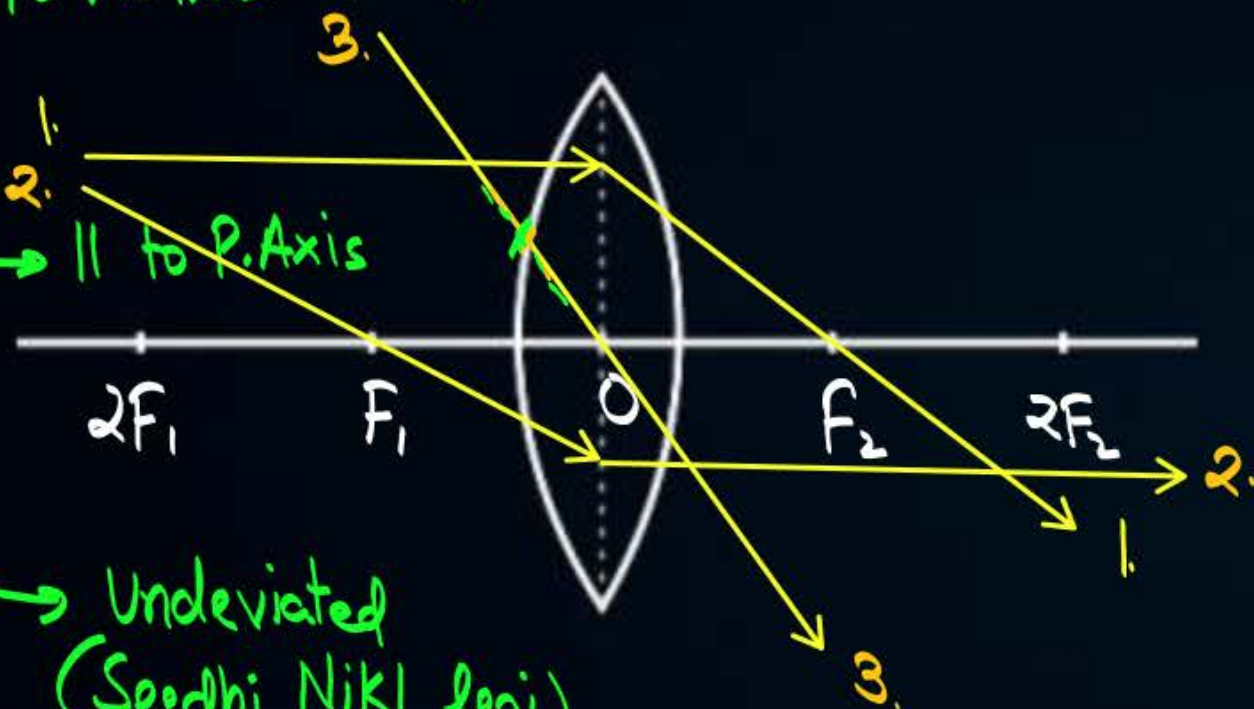
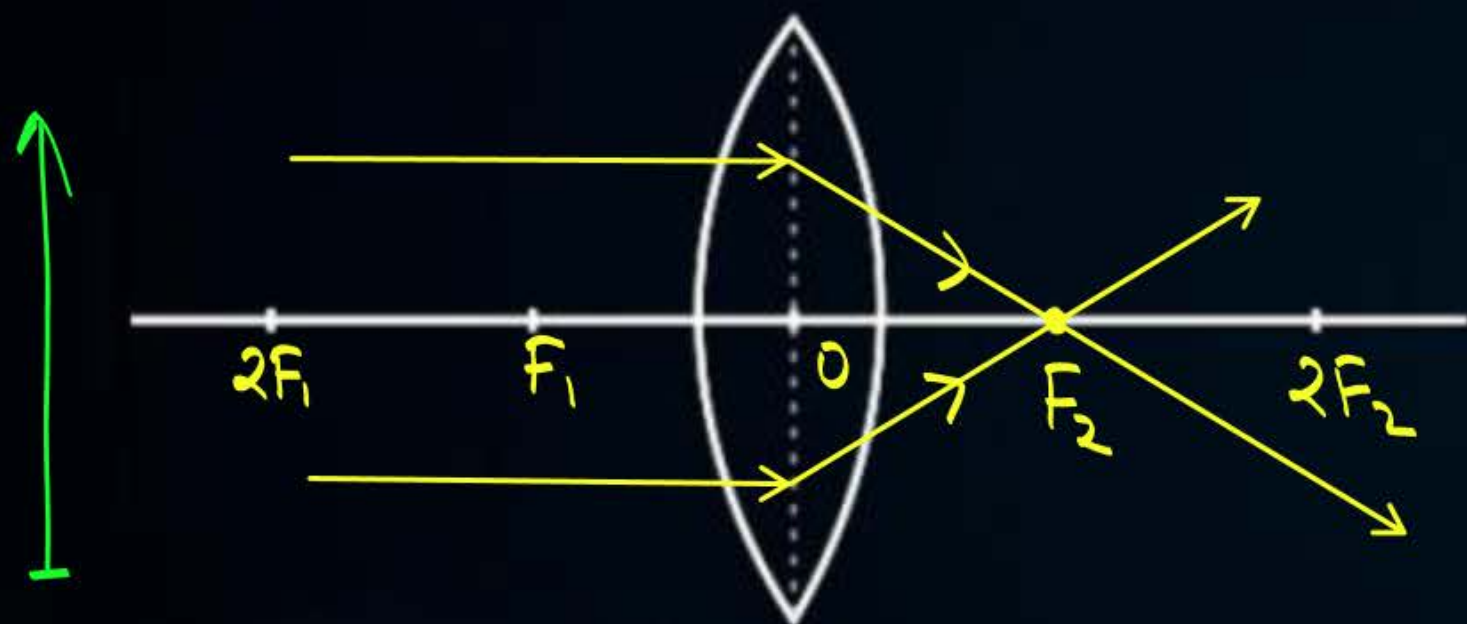




IMAGE FORMATION : CONVEX LENS (1)



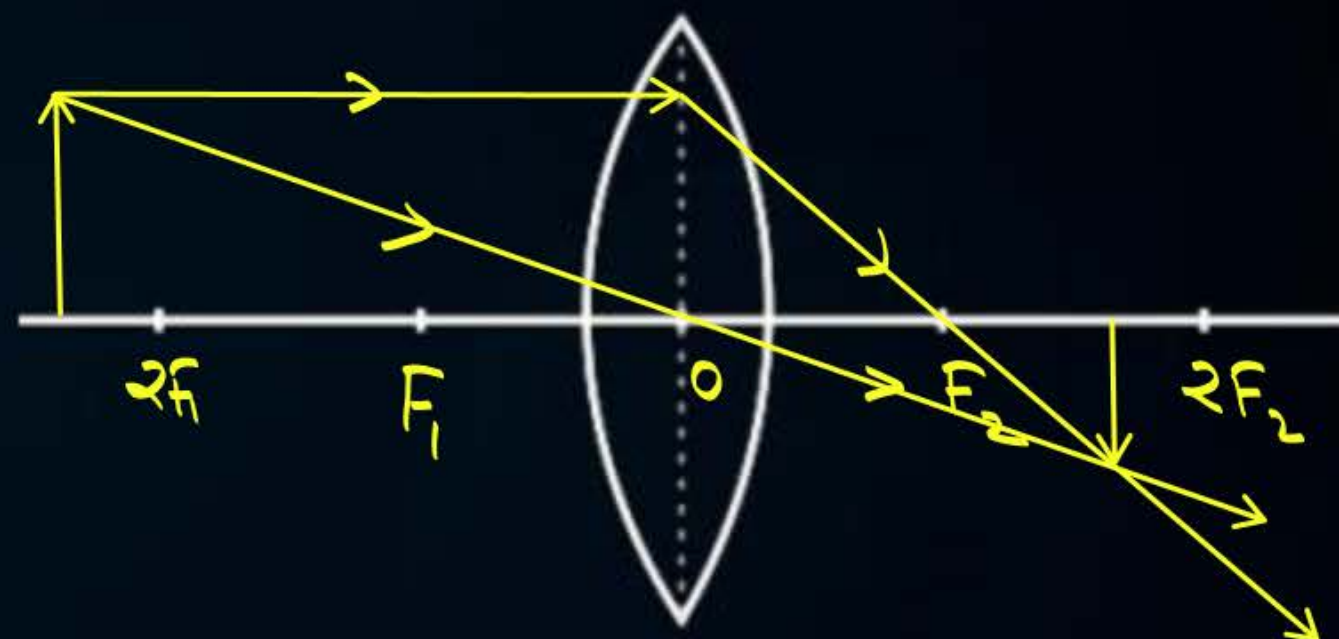
1. Object at Infinity



Nature of Image

- 1) At F_2
- 2) Highly diminished
- 3) Real
- 4) Inverted

2. Object beyond $2F_1$



Nature of Image

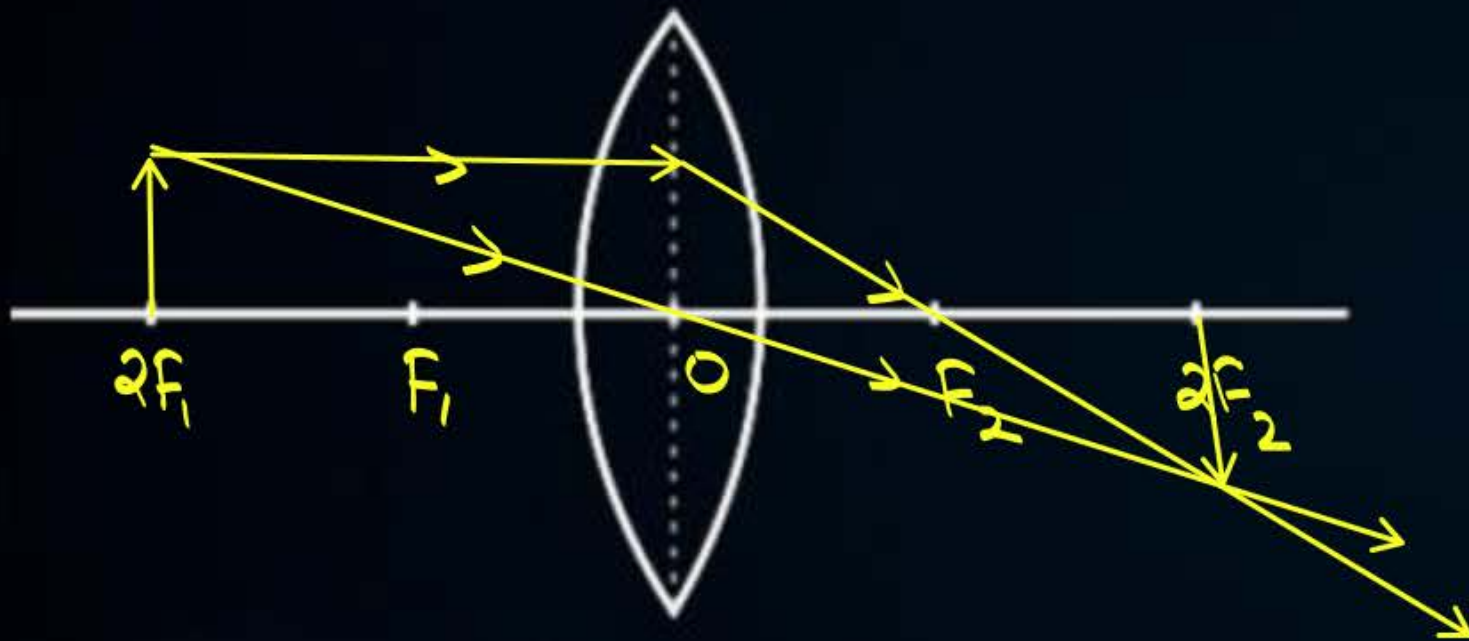
- 1) B/w F_2 and $2F_2$
- 2) Diminished
- 3) Real
- 4) Inverted



IMAGE FORMATION : CONVEX LENS (2)



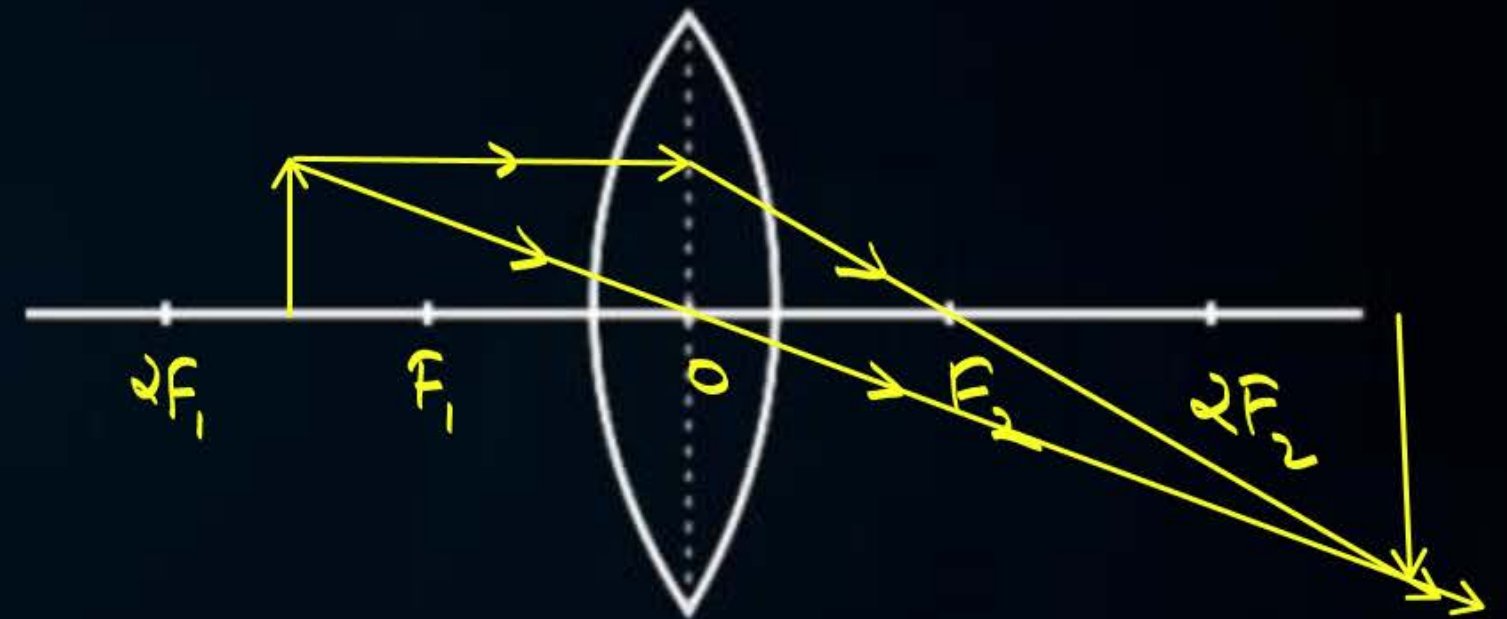
3. Object at $2F_1$



Nature of Image

- 1) At $2F_2$
- 2) Same Size
- 3) Real
- 4) Inverted

4. Object between $2F_1$ and F_1



Nature of Image

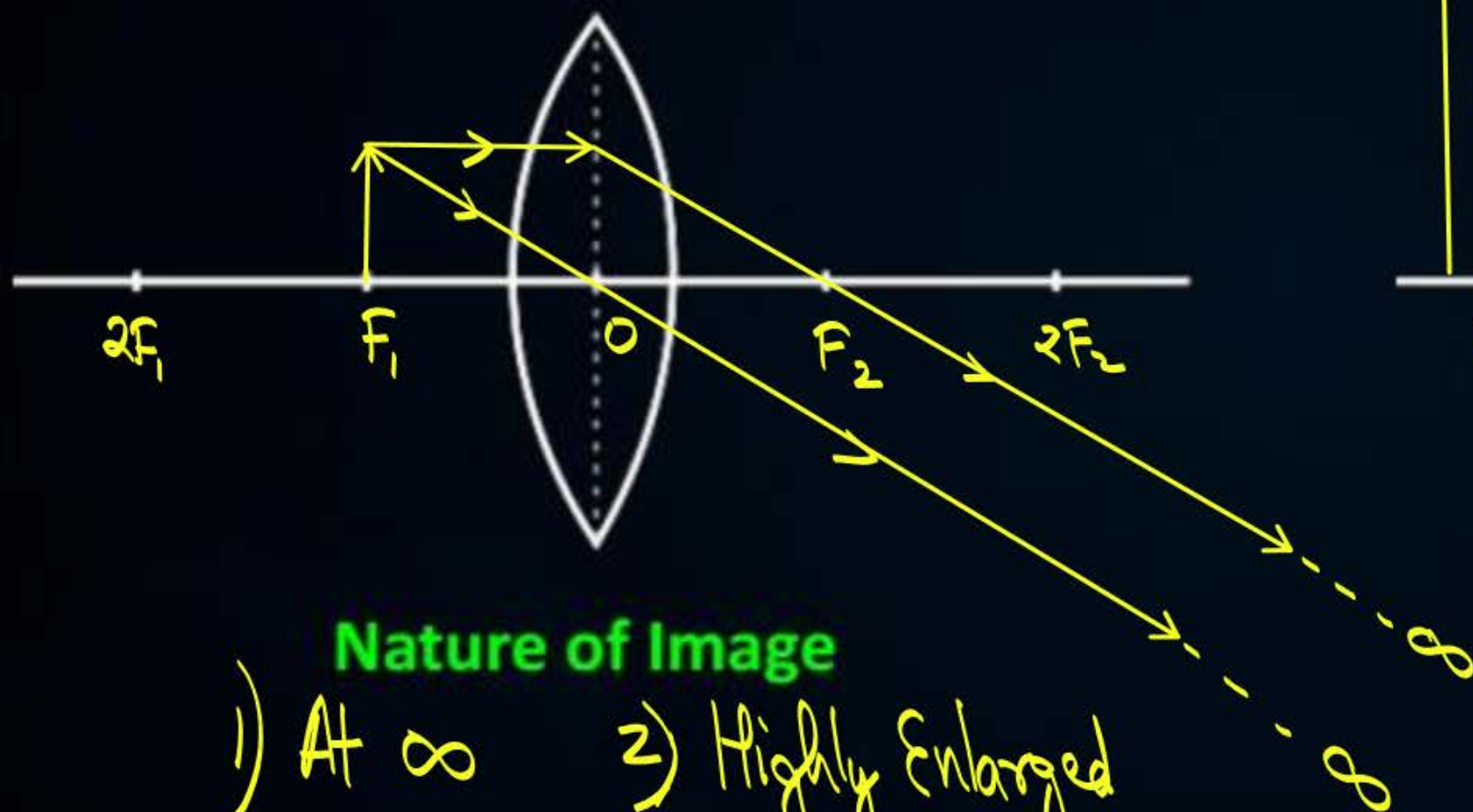
- 1) Beyond $2F_2$
- 2) Enlarged
- 3) Real
- 4) Inverted



IMAGE FORMATION : CONVEX LENS (3)



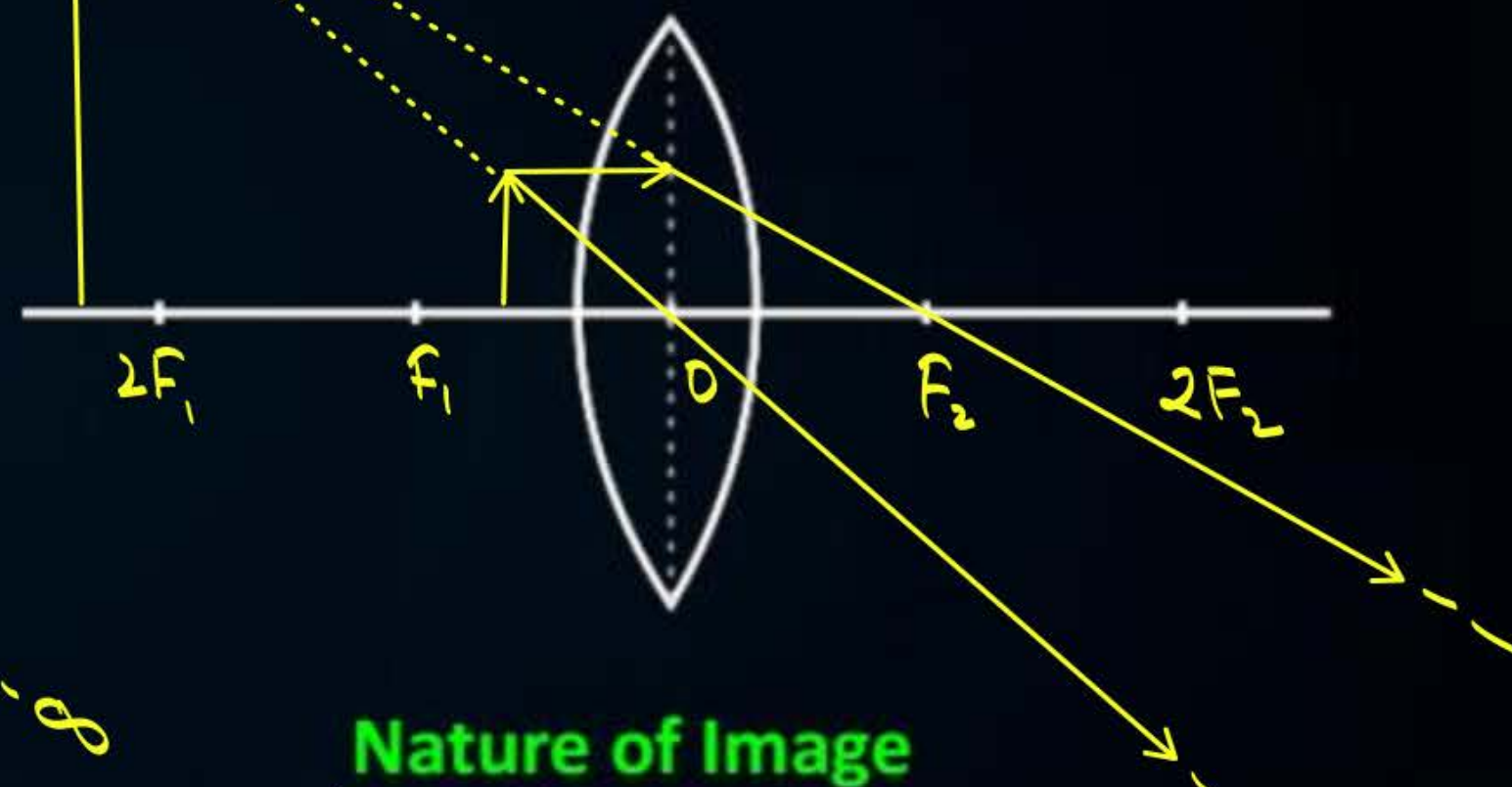
5. Object at F_1



Nature of Image

- 1) At ∞
- 2) Highly Enlarged
- 3) Real
- 4) Inverted

6. Object between F_1 and O



Nature of Image

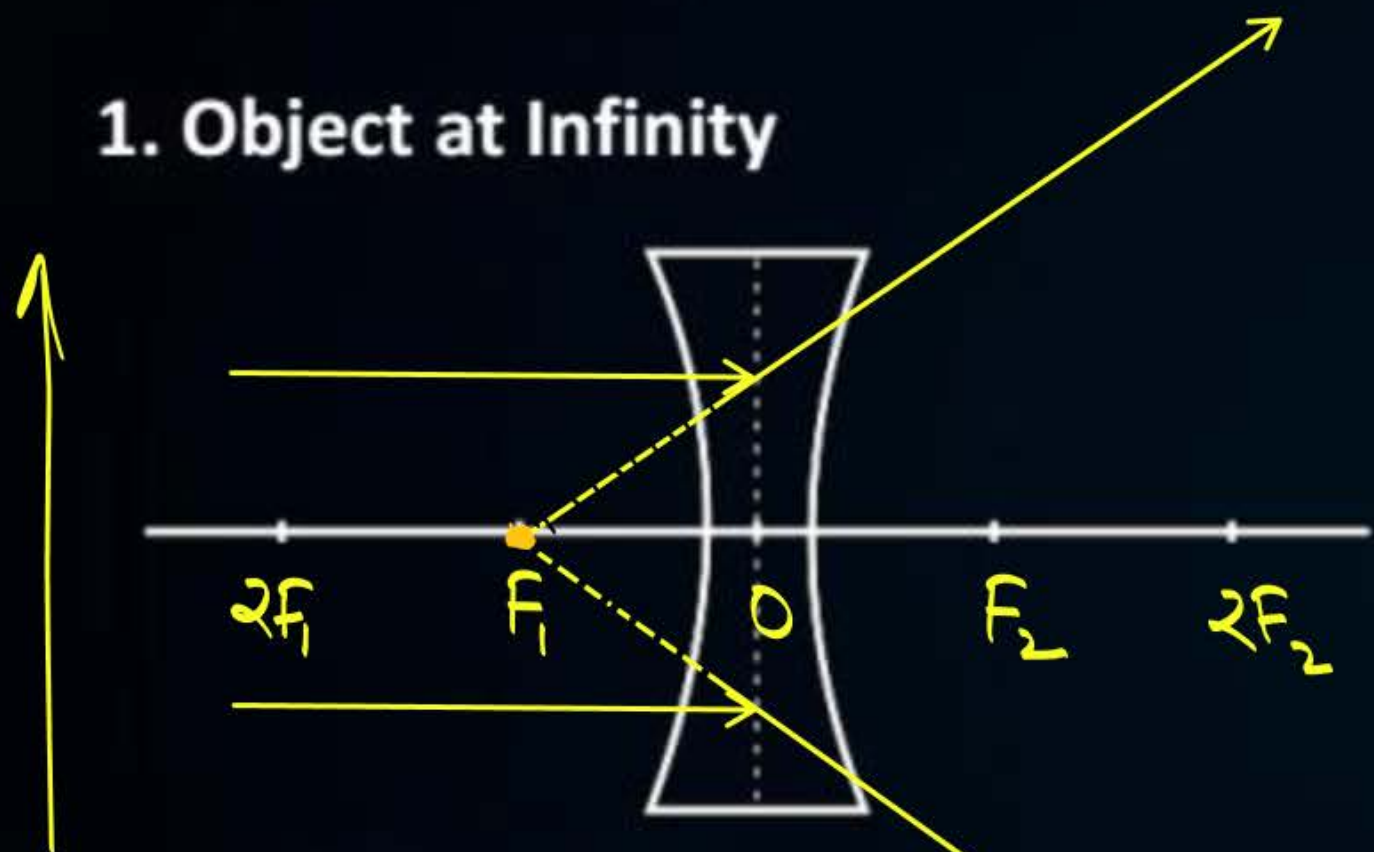
- 1) Behind the lens
- 2) Enlarged
- 3) Virtual
- 4) Erect



IMAGE FORMATION : CONCAVE LENS



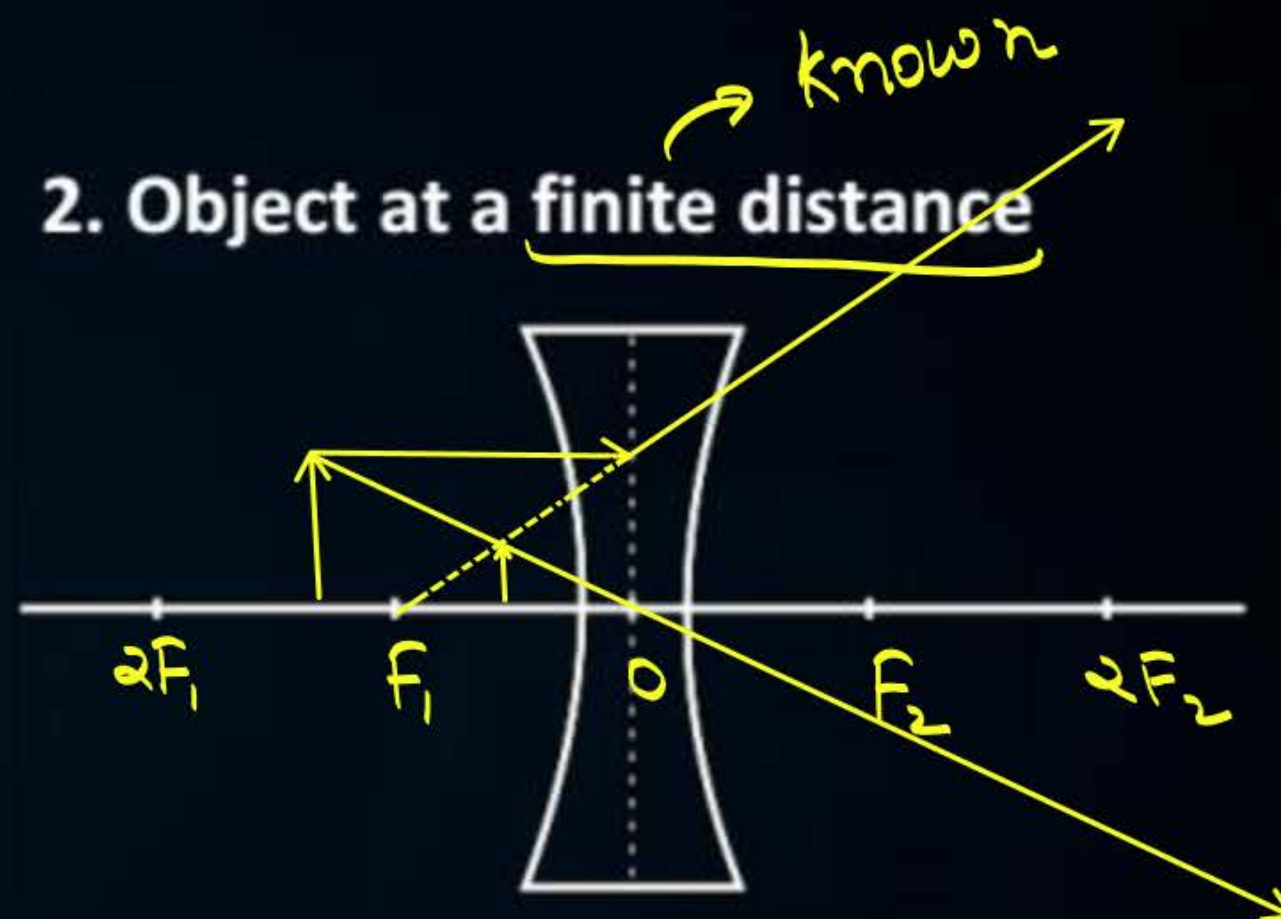
1. Object at Infinity



Nature of Image

- 1) At F_1
- 2) Highly diminished
- 3) Virtual
- 4) Erect

2. Object at a finite distance

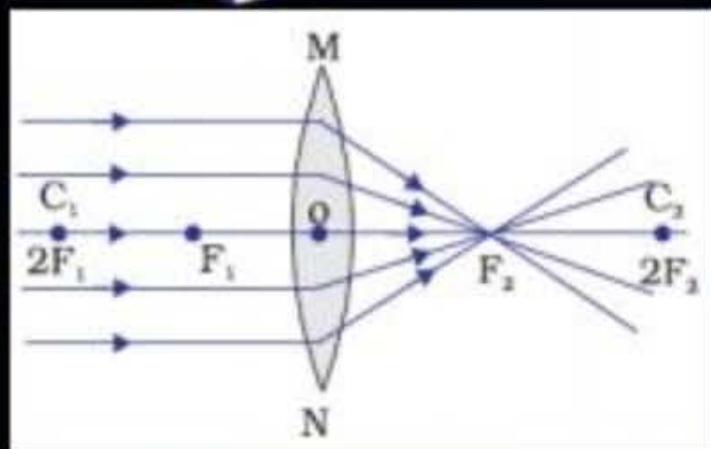


Nature of Image

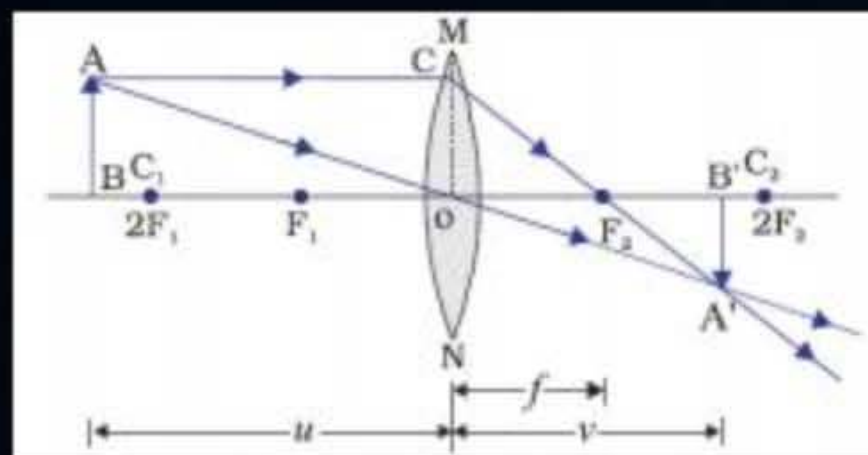
- 1) B/w O and F_1
- 2) Diminished
- 3) Virtual
- 4) Erect



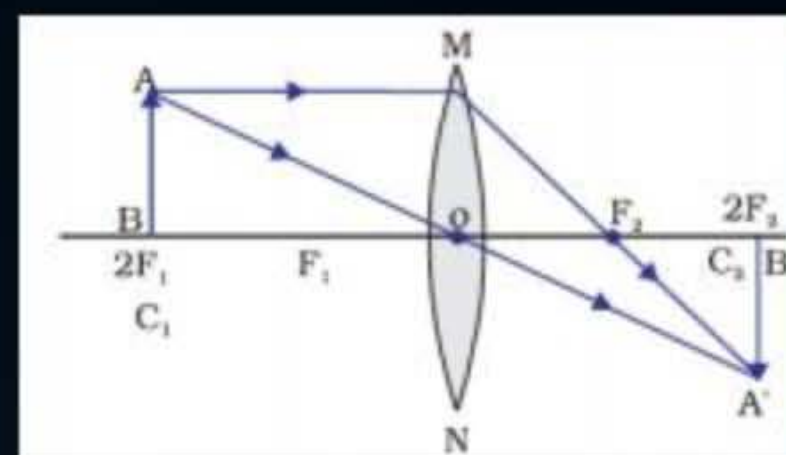
ALL RAY DIAGRAMS : SPHERICAL LENSES



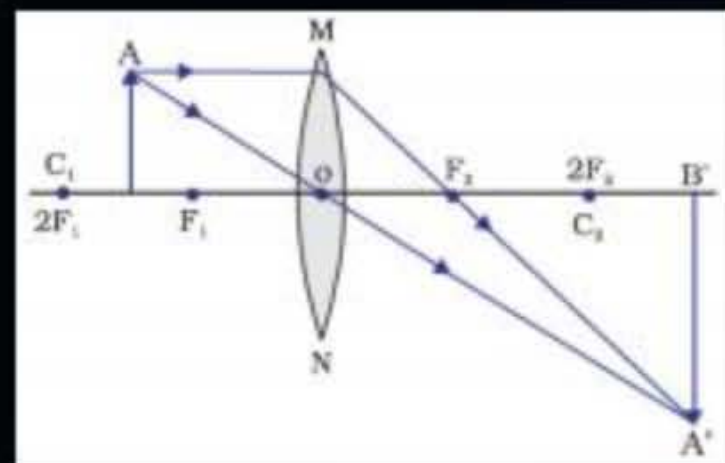
1. Object at Infinity



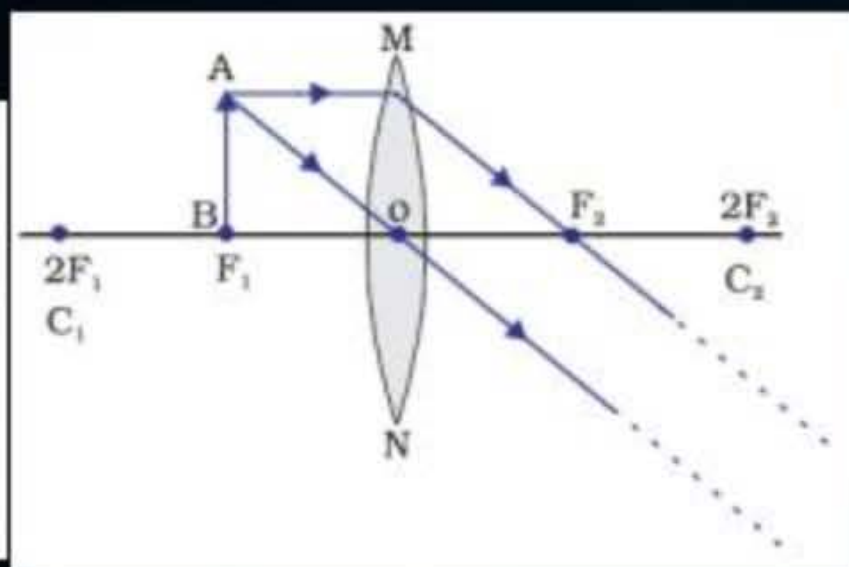
2. Object beyond $2F_1$



3. Object at $2F_1$

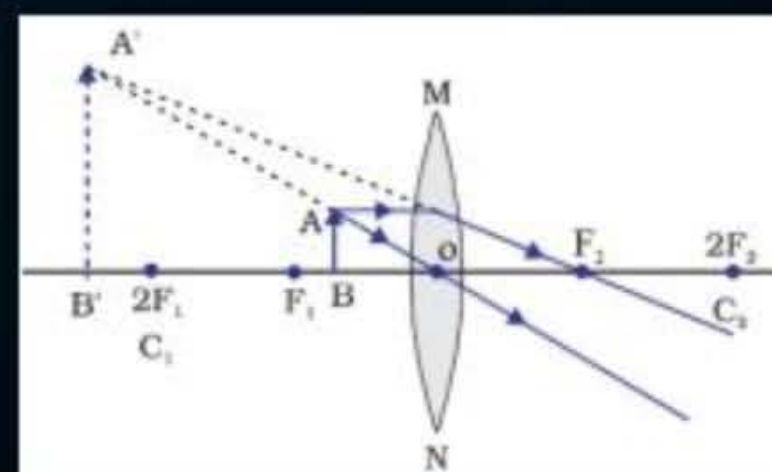


4. Object between $2F_1$ and F_1

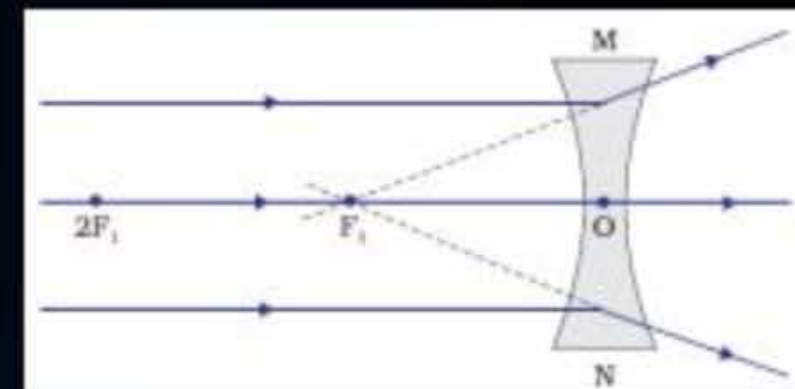


5. Object at F_1

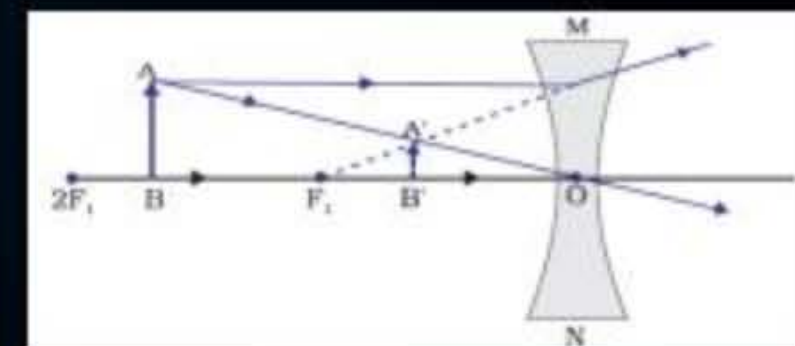
Convex Lens



6. Object between F_1 and O



1. Object at Infinity



2. Object at a finite distance

Concave Lens



USES OF LENSES

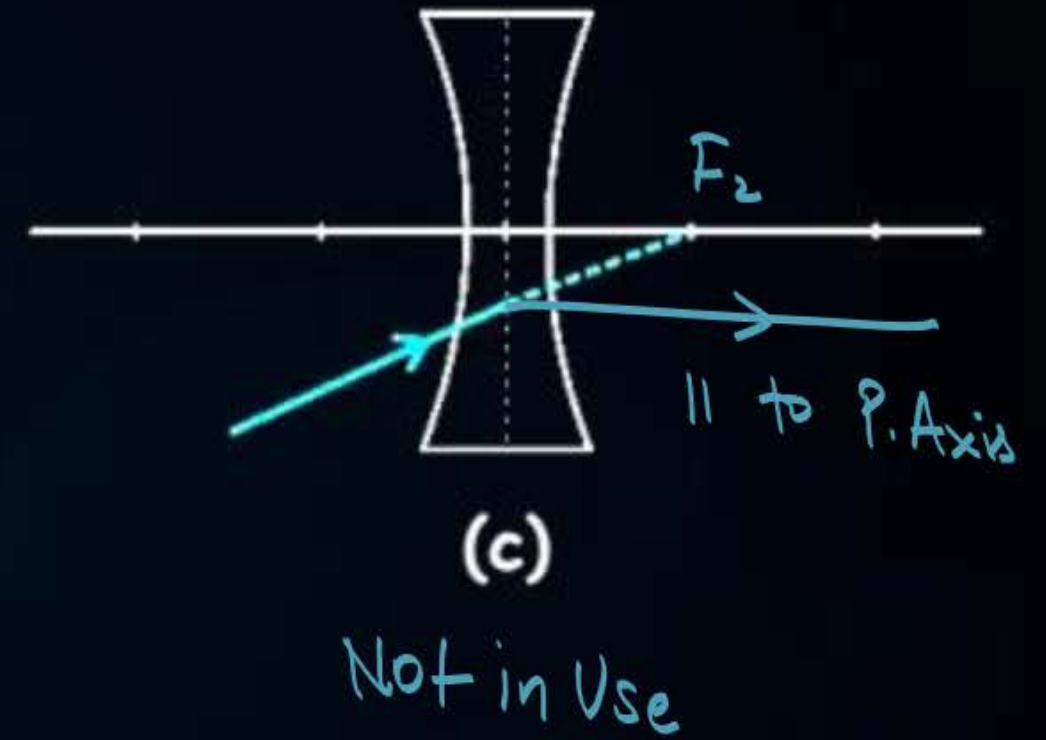
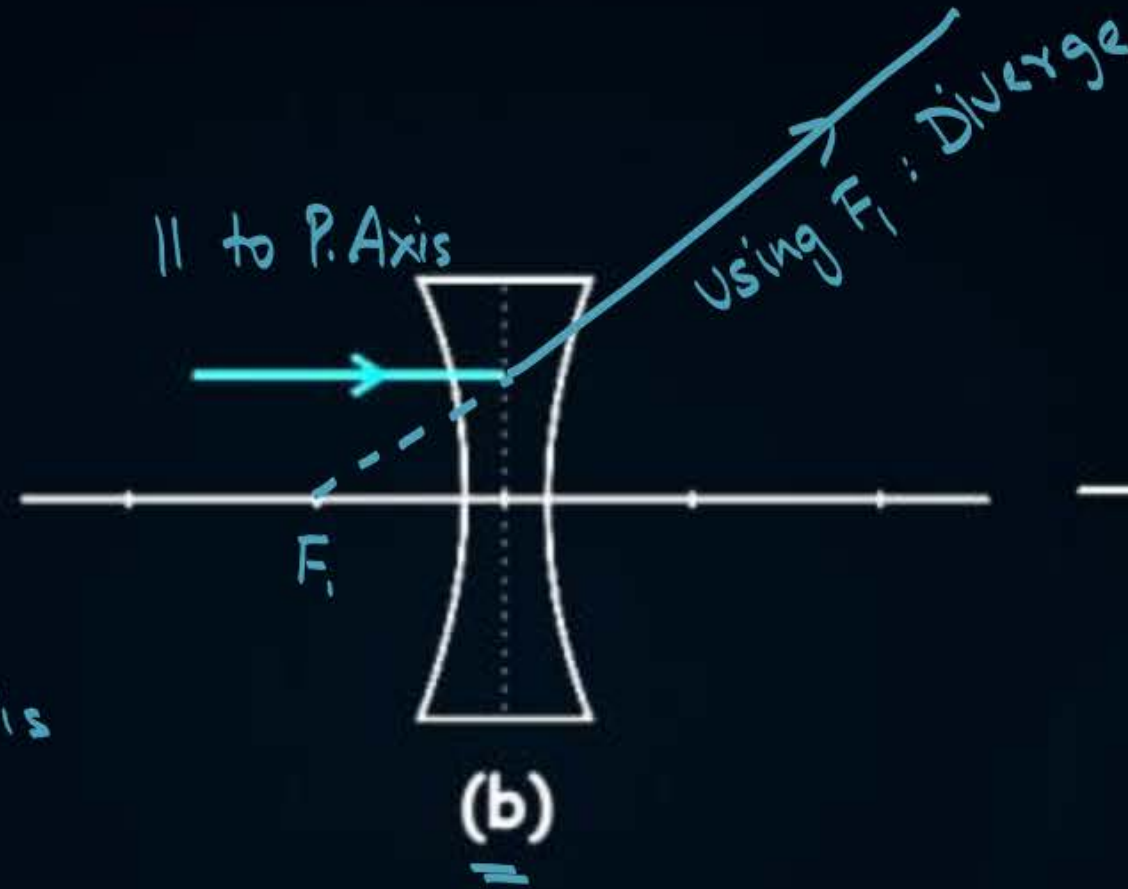
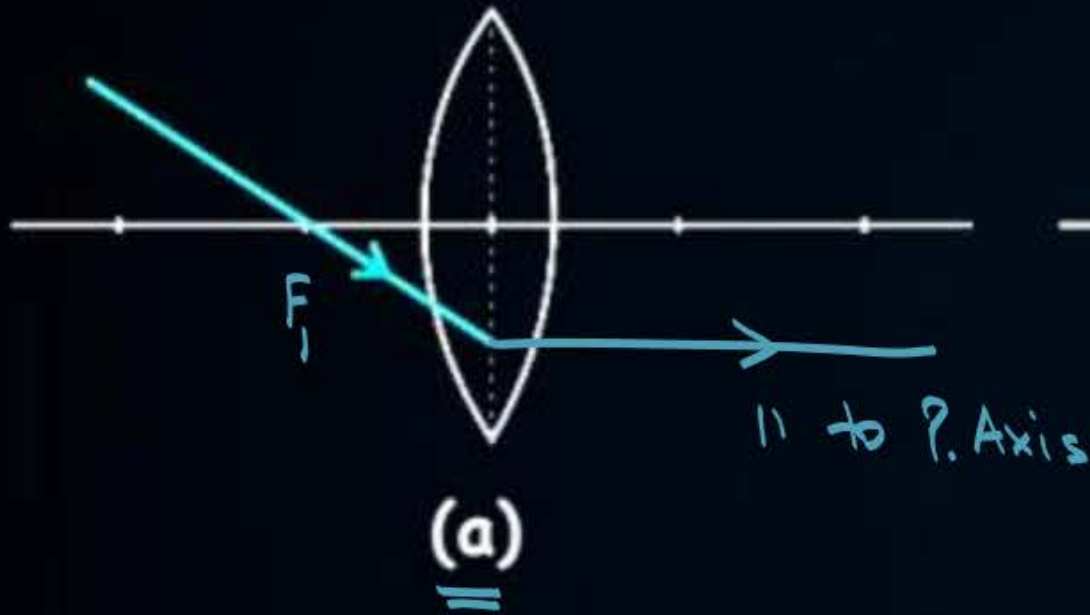


QUESTION

P.Y.Q. (1 Marker)

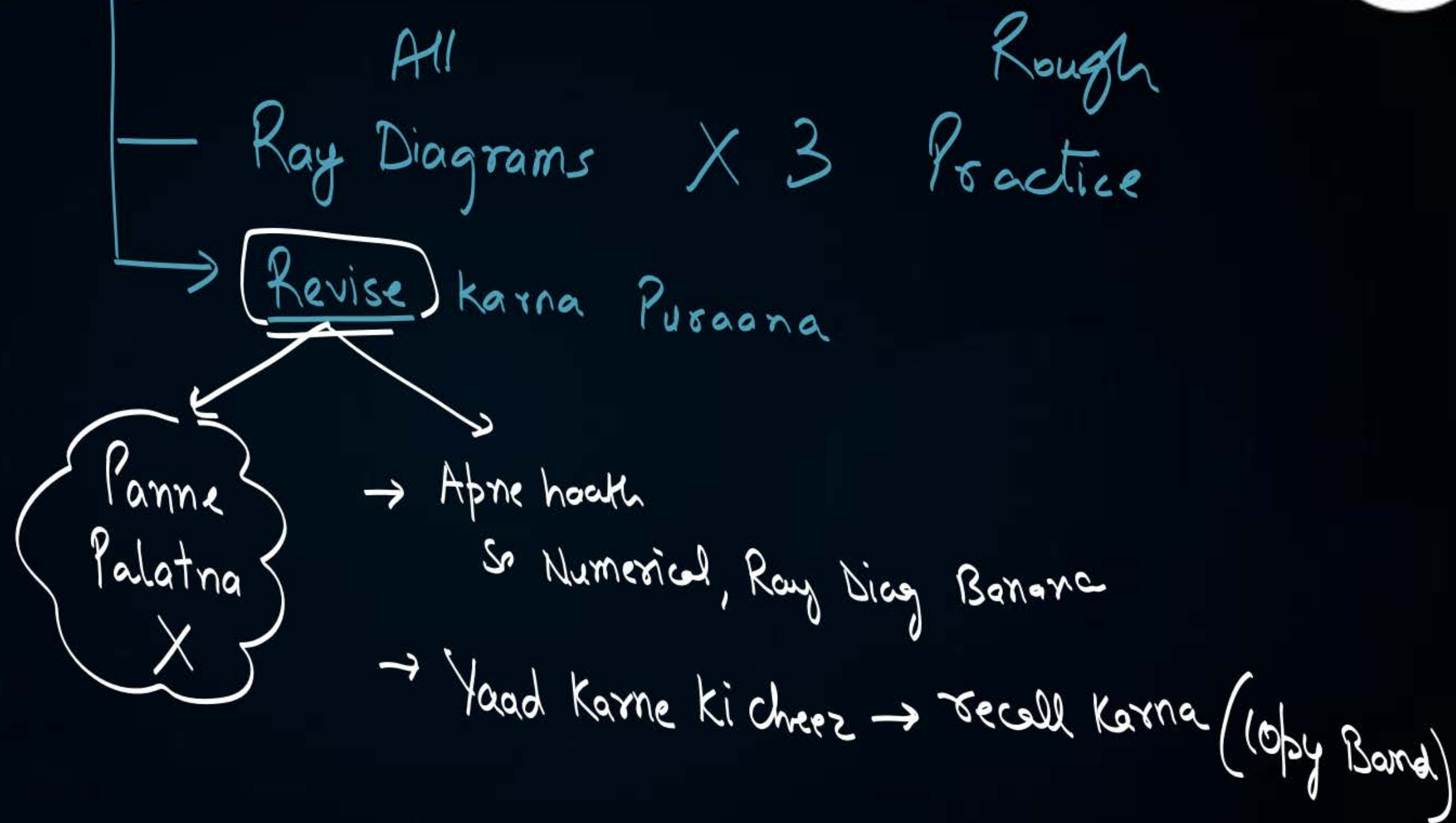


Complete the Ray Diagram.





HOMEWORK





THANK
YOU

