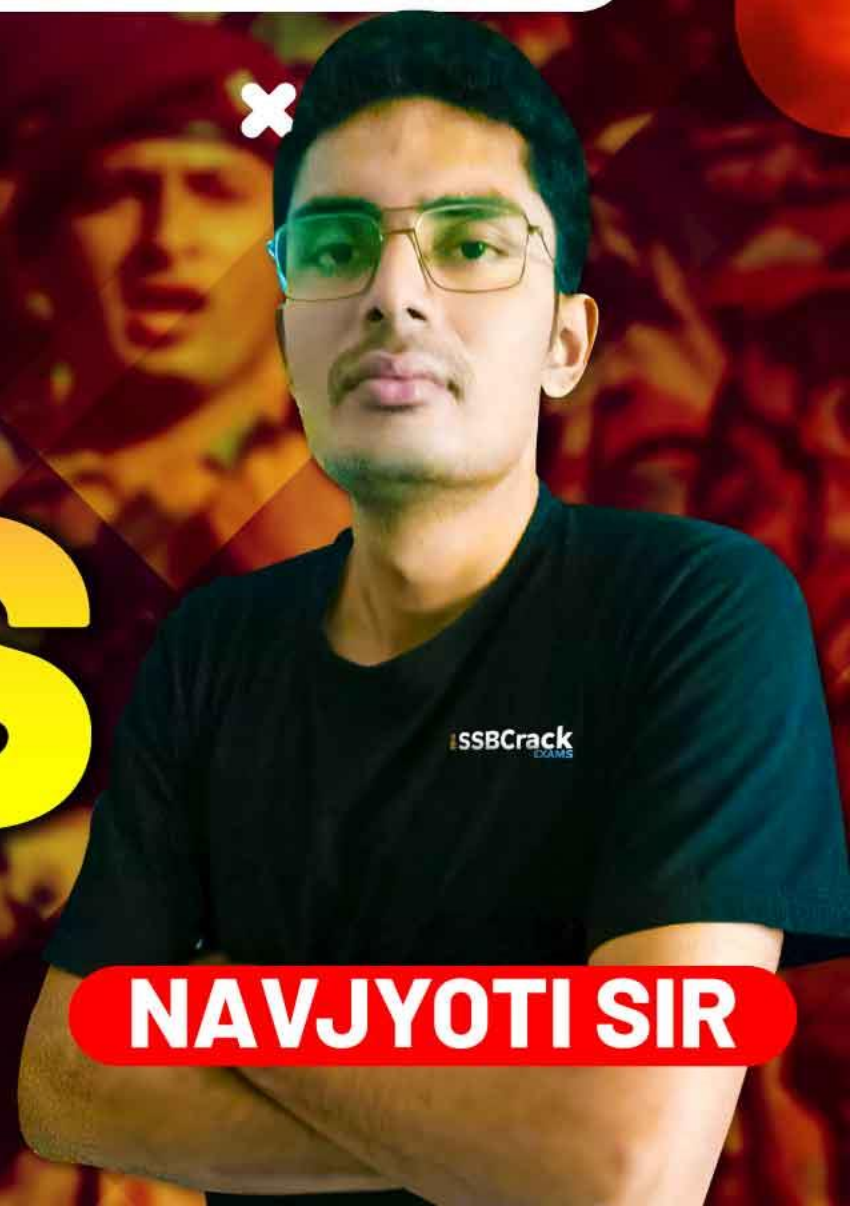
NDA-CDS 2 2024

GS

LIVE

PHYSICS

CLASS 2



NAVJYOTI SIR

SSBCrack EXAMS

02 July 2024 Live Classes Schedule

8:00AM	02 JULY 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	02 JULY 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

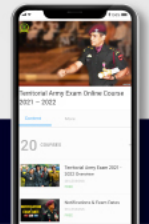
9:00AM	OVERVIEW OF GD & LECTURETTE	ANURADHA MA'AM

NDA 2 2024 LIVE CLASSES

11:30AM	GK - MODERN HISTORY - CLASS 4	RUBY MA'AM
1:00PM	GS - PHYSICS - CLASS 2	NAVJYOTI SIR
2:30PM	GS - CHEMISTRY MCQS - CLASS 7	SHIVANGI MA'AM
4:00PM	MATHS - AREA BOUNDED BY CURVES	NAVJYOTI SIR
5:30PM	ENGLISH - ORDERING OF SENTENCES - CLASS 2	ANURADHA MA'AM

CDS 2 2024 LIVE CLASSES

11:30AM	GK - MODERN HISTORY - CLASS 4	RUBY MA'AM
1:00PM	GS - PHYSICS - CLASS 2	NAVJYOTI SIR
2:30PM	GS - CHEMISTRY MCQS - CLASS 7	SHIVANGI MA'AM
5:30PM	ENGLISH - ORDERING OF SENTENCES - CLASS 2	ANURADHA MA'AM



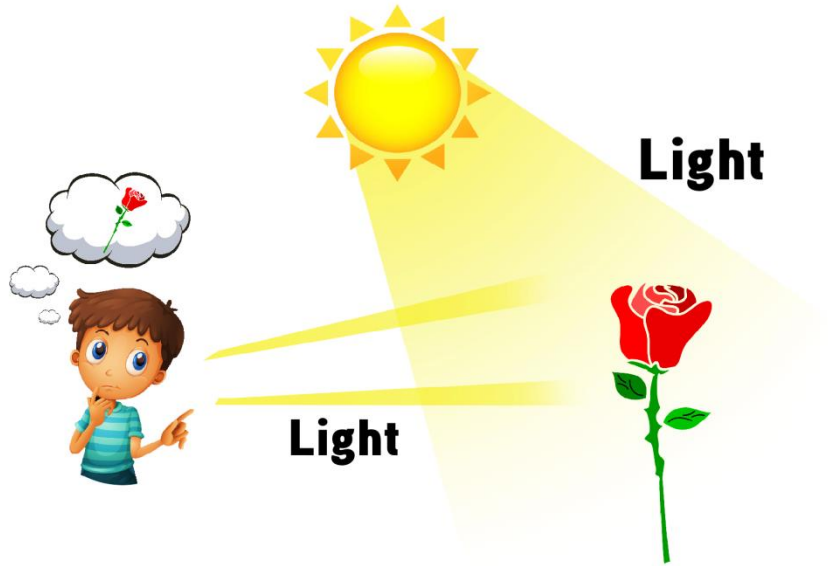
LIGHT - REFLECTION

WHAT WILL WE STUDY ?

- Light - Introduction
- Reflection
- Plane Mirror And Image Formed
- Spherical Mirrors - Concave And Convex Mirror
- Sign Convention And Mirror Formula

Light - Introduction

- A Form Of Energy Which Enables Human Beings And Creatures To ‘See’ Things.
- Light Rays Travel In A Straight Line.

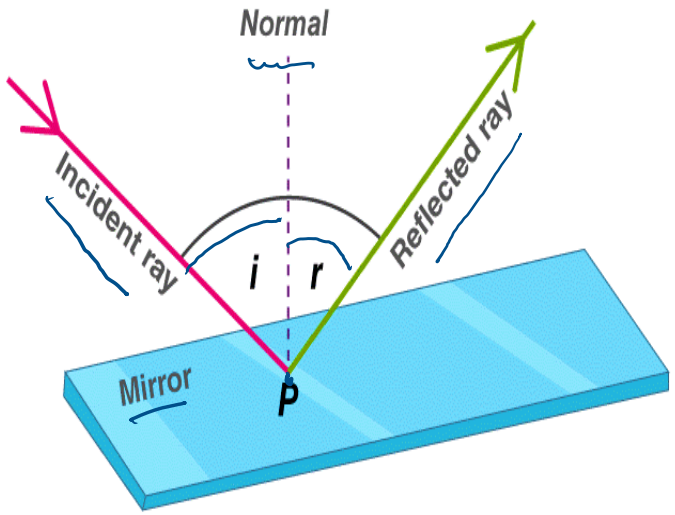


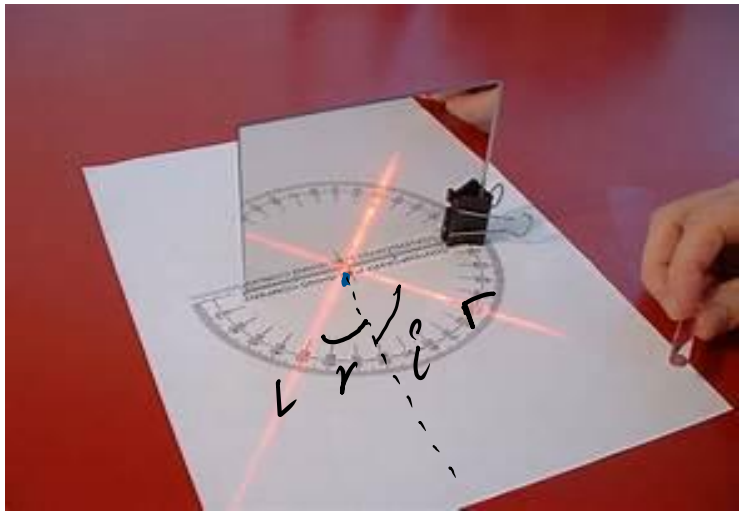
Reflection

- **Light Rays Bounce Off A Surface, Generally Shiny.**
- **It Happens In A Single Medium.**

LAWS OF REFLECTION

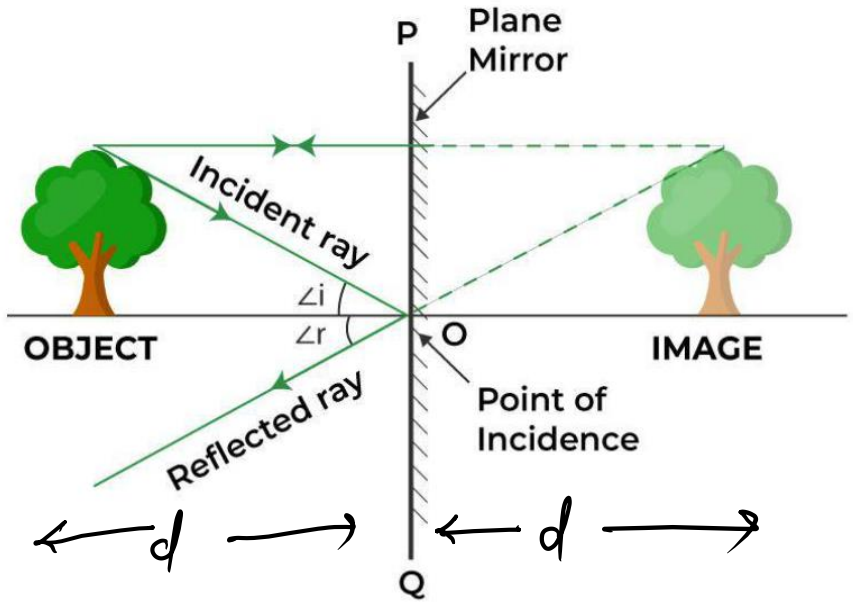
1. The incident ray, normal at the point of incidence , and reflected ray, all lie on the same plane.
2. angle of incidence = angle of reflection. $(\angle i = \angle r)$





Plane Mirror and Image Formed

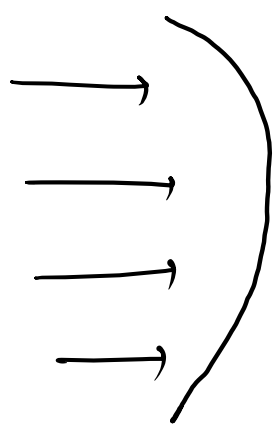
- Erect (Upright).
- the same size as the object.
- laterally inverted (Left side of object appears on right of image)
- the same distance behind the mirror as the object is in front of mirror.
- virtual (the image cannot be formed on a screen).



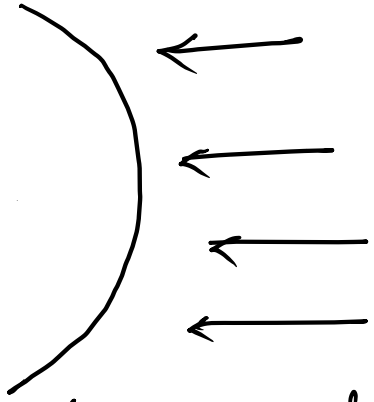
erect ⟷ virtual

SPHERICAL MIRRORS AND TERMS

- **Concave and Convex Mirrors**

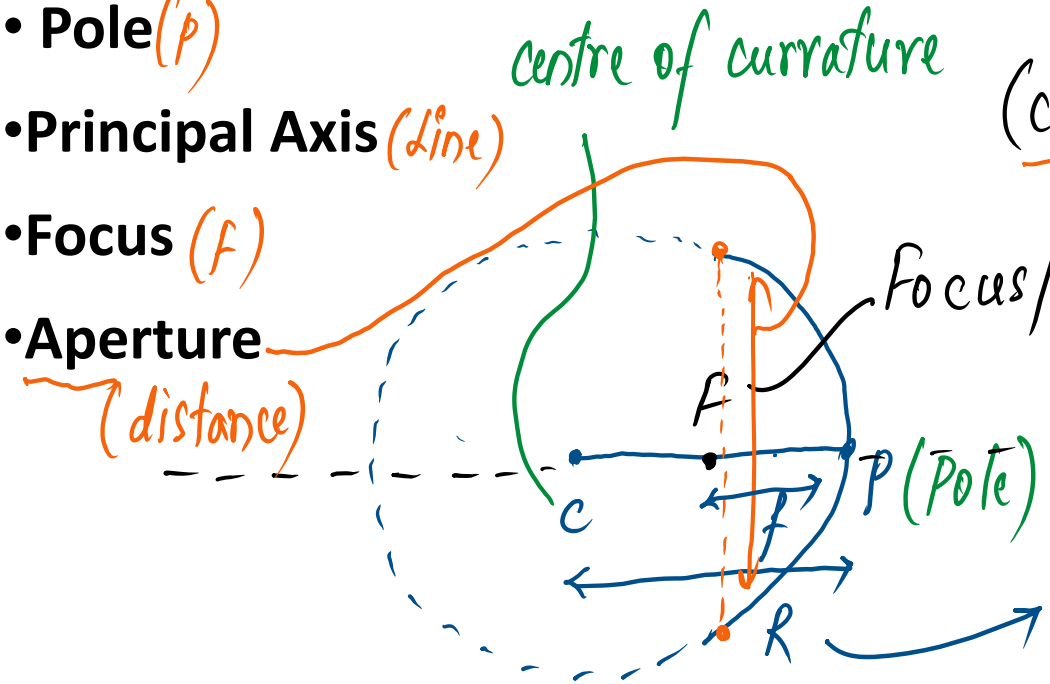


(concave mirror)



(Convex Mirror)

- **Centre of Curvature** (C)
- **Pole** (P)
- **Principal Axis** (line)
- **Focus** (F)
- **Aperture** (distance)



principal axis

(R = 2f)

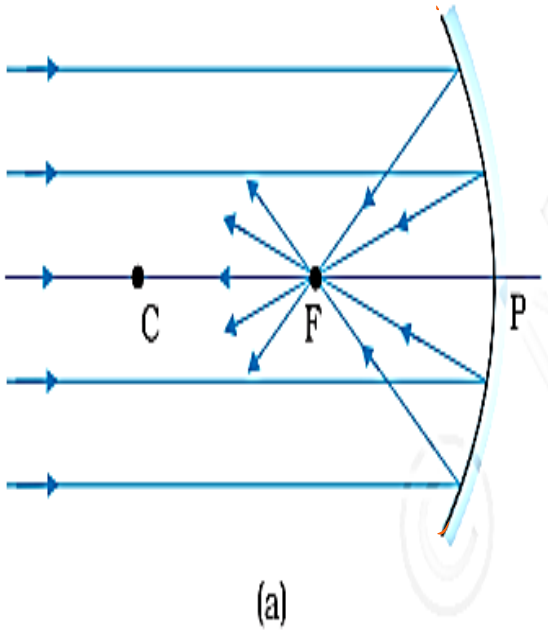
PC = R

(Radius of curvature)

PF = f (focal length)

IMAGE FORMED BY CONCAVE AND CONVEX MIRROR

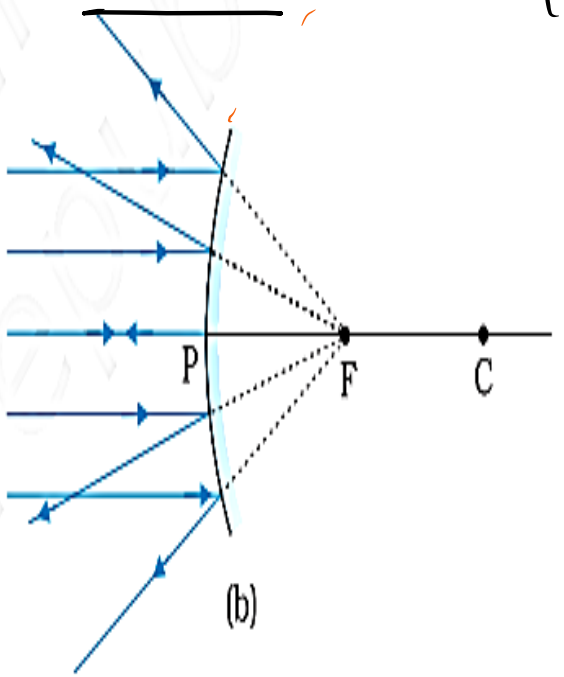
CONCAVE



parallel rays converge at F.

CONVEX

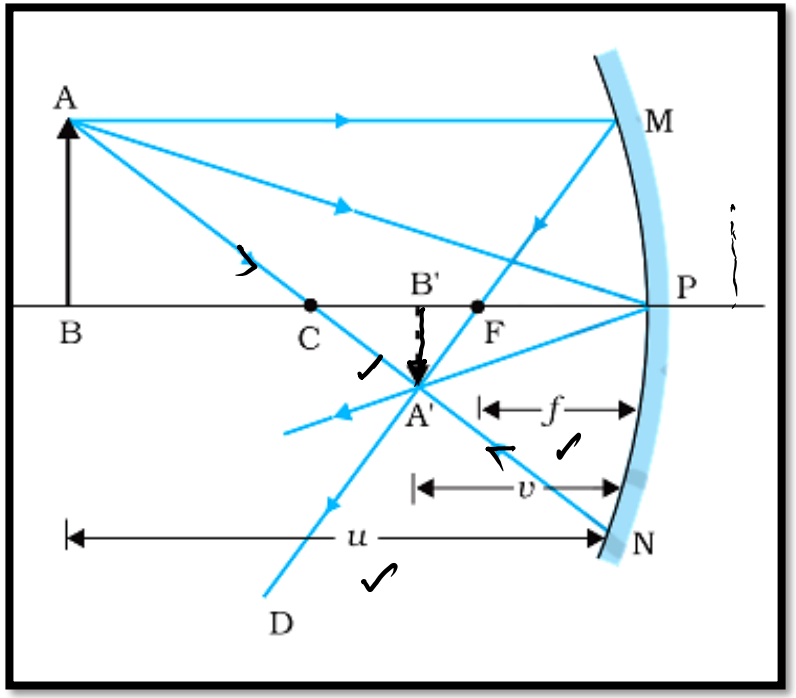
(object kept at infinity)

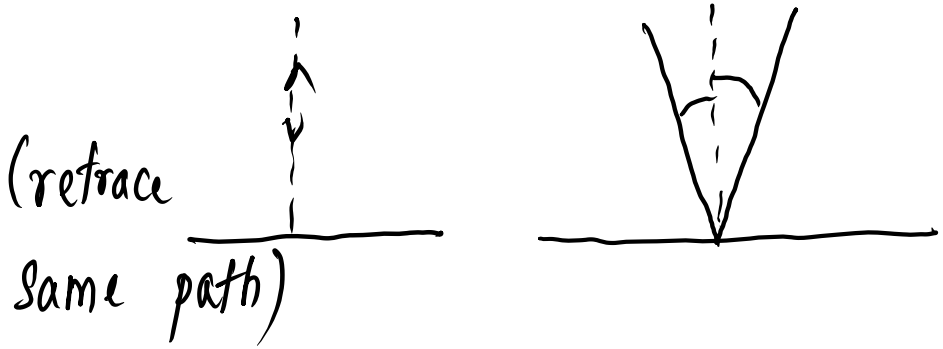


parallel rays are diverging

IMAGE FORMED DUE TO DIFFERENT POSITION OF OBJECTS

Position of object	Position of the image	Size of the image	Nature of the image
At infinity	At the focus F	Highly-diminished, point-sized	Real and inverted
Beyond C	Between F and C	Diminished	Real and inverted
At C	At C	Same size	Real and inverted
Between C and F	Beyond C	Enlarged	Real and inverted
At F	At in finity	Highly enlarged	Real and inverted
Between P and F	Behind the mirror	Enlarged	Virtual and erect

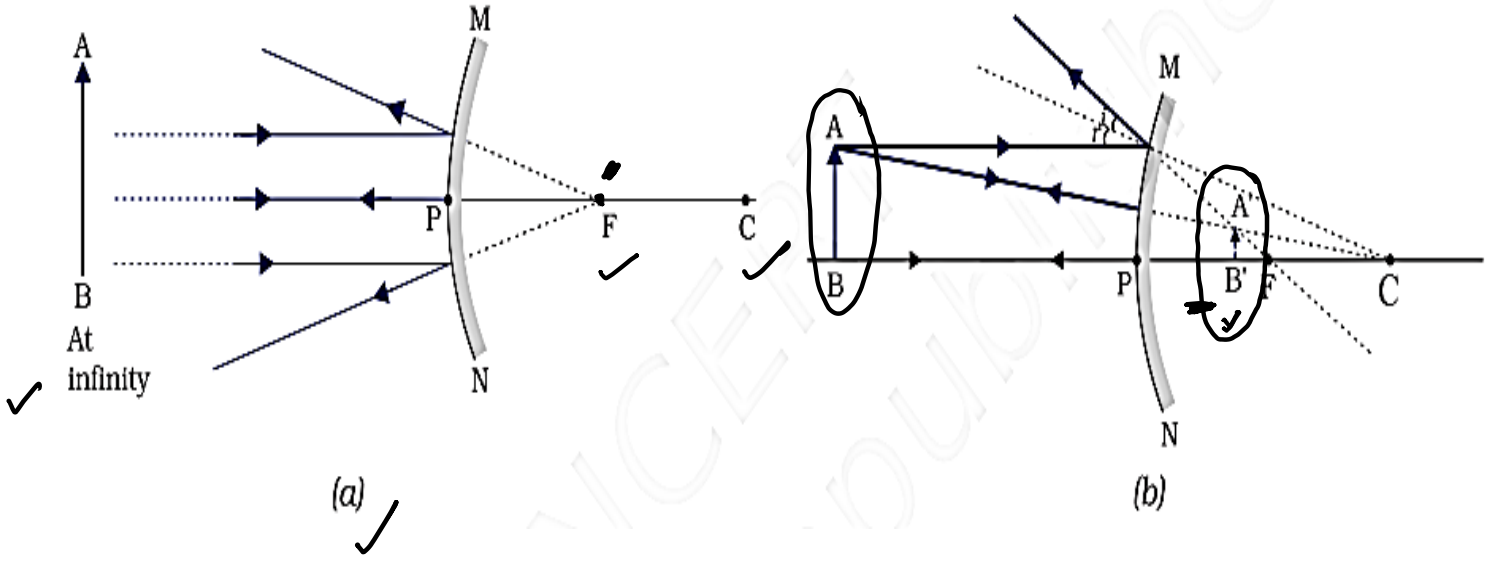




CONVEX MIRROR

	Position of the object	Position of the image	Size of the image	Nature of the image
(b)	Any where between pole (P) and in finity (∞)	Between P and F back of the mirror	Small	Virtual and erect
(a)	At in finity	At F	Very small in size	Virtual and erect

(object generally kept at left side of mirror)



USE OF CONCAVE AND CONVEX MIRRORS

Shaving Mirrors and Makeup Mirrors

last case (enlarged image)

Dentist mirrors

concave mirror

(object at F, image at ∞, parallel beams of light)

Used in Torches, Beam lights

Used in Solar Furnaces to Produce Heat

} object at ∞, image at F (converging)

[enlarged image, parallel beams of light massive heat]

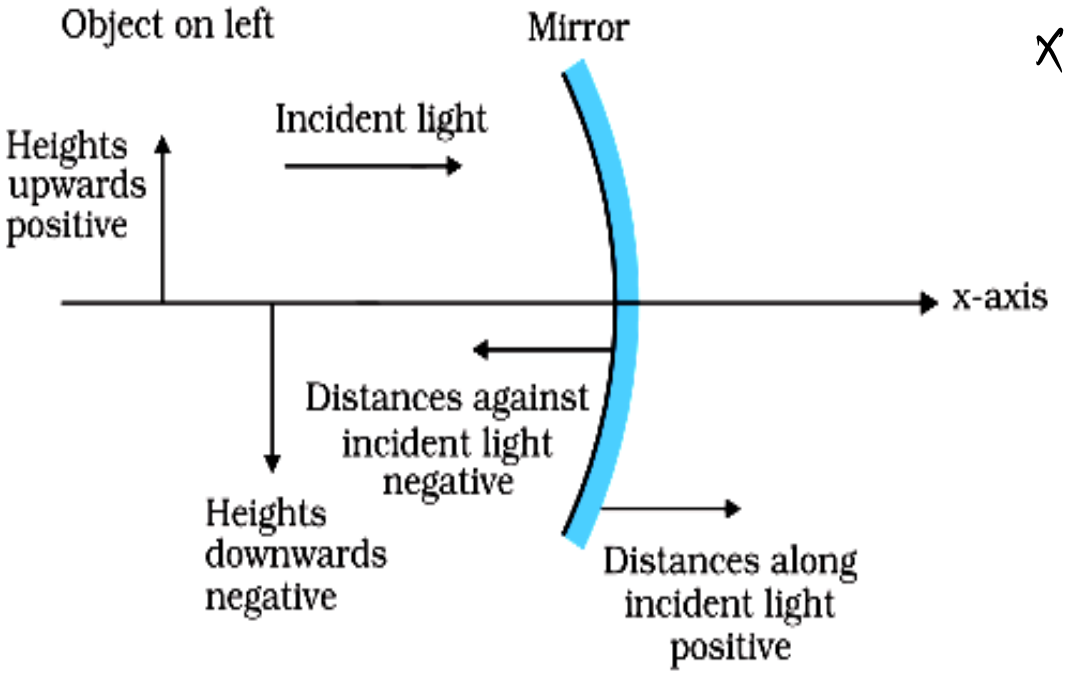
convex mirror

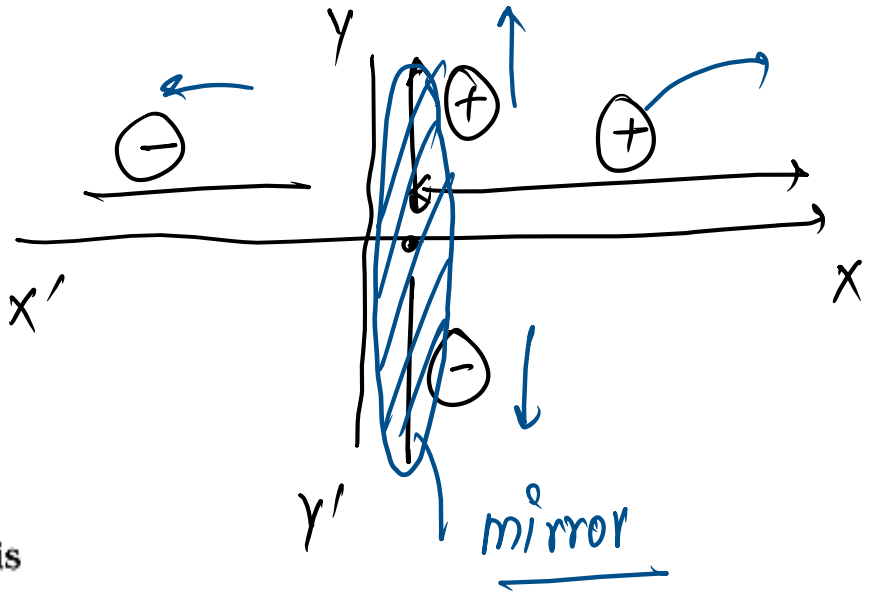
(rear-view mirror)

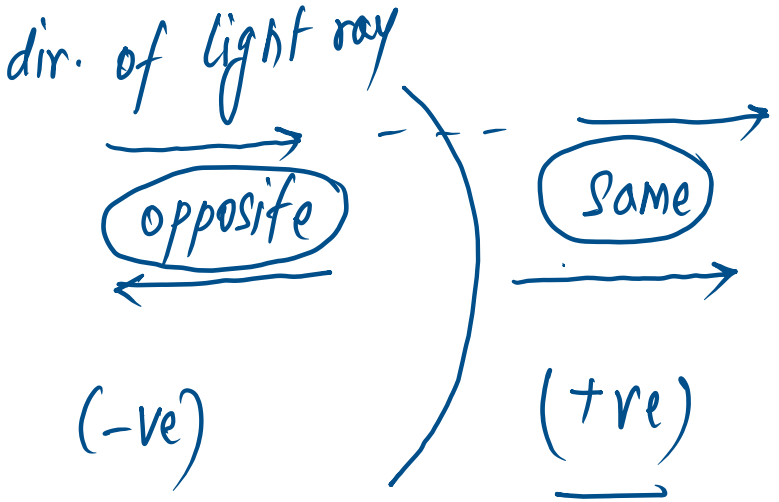
(wide area is shown)

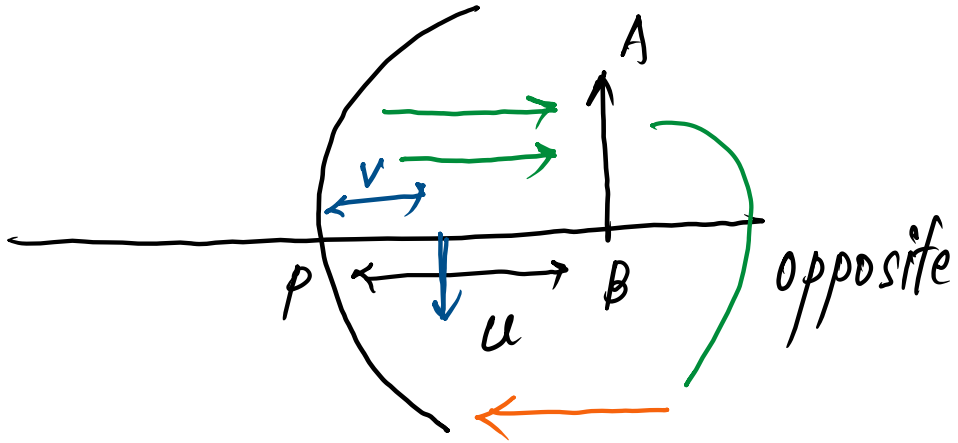
(erect image)

SIGN CONVENTION









Light ray direction
(from the object towards the mirror)

u = object distance — -ve

v = image distance — -ve

height of object — +ve

height of image — -ve

Q. object at 25 cm

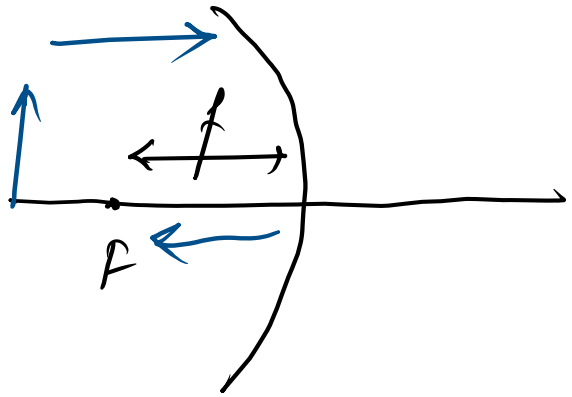
image formed at 12 cm.

u = -25 cm

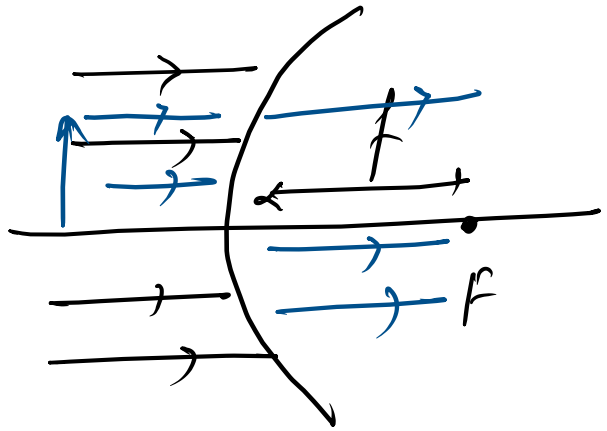
v = -12 cm

MIRROR FORMULA

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



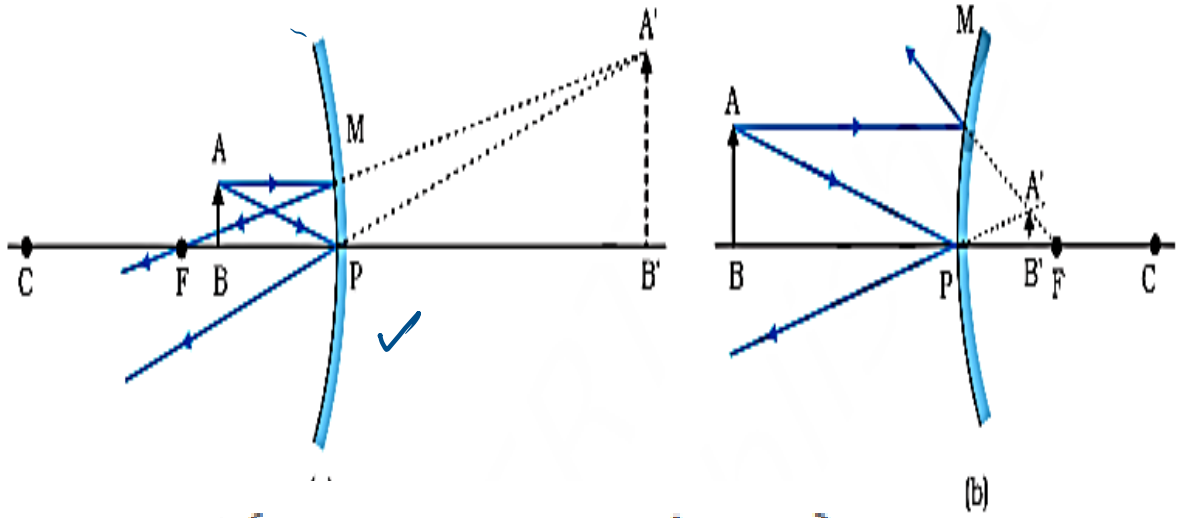
for concave mirror, f = -ve



for convex mirror, f = +ve

MAGNIFICATION

- **The ratio of the height of the image (h') to the height of the object (h).**



(object is kept erect)

$h \longrightarrow$ (+ve)

$\frac{h'}{h} > 1$

$h' > h$

→ (+ve means erect image)

→ (−ve means inverted image)

→ (|m| >1 means large image)

→ (|m| < 1 means small image)

Ignore '+' or '−', just see the number.

$$m = \frac{h'}{h} = -\frac{v}{u}$$

SUMMARY

- Reflection of Light
- Plane and Spherical Mirrors
- Image formed by Concave and Convex Mirrors
- Uses of Spherical Mirrors
- Mirror Formula and Magnification

1. Image Formed by a Plane Mirror is

A. Virtual, Behind The Mirror And Enlarged

B. Virtual, Behind The Mirror And Of The Same Size As The Object

C. Real, At The Surface Of The Mirror And Enlarged

D. More Than One Of The Above

1. Image Formed by a Plane Mirror is

A. Virtual, Behind The Mirror And Enlarged

B. Virtual, Behind The Mirror And Of The Same Size As The Object

C. Real, At The Surface Of The Mirror And Enlarged

D. More Than One Of The Above

2. The Angle Between The Incident Ray And Normal Is Called

A. Angle of reflection
B. Angle of refraction
C. Angle of incidence
D. None of the Above

2. The Angle Between The Incident Ray And Normal Is Called

A. Angle of reflection

B. Angle of refraction

C. Angle of incidence

D. None of the Above

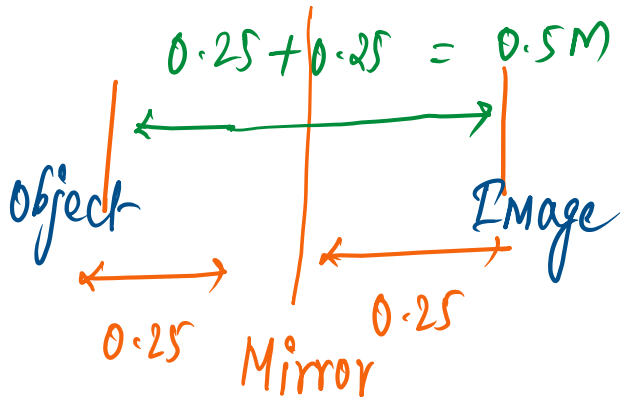
3. An Object Is Placed At A Distance Of 0.25 m In Front Of A Plane Mirror. The Distance Between The Object And Image Will Be

A. 0.25 m

B. 1.0 m

C. 0.5 m

D. 0.125 m



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A. 0.25 m

B. 1.0 m

C. 0.5 m

D. 0.125 m

4. Centre Of Sphere Of Which The Mirror Is A Part Is Called

A. Centre of Aperture

B. Radius of Curvature

C. Focus

D. Centre of Curvature

4. Centre Of Sphere Of Which The Mirror Is A Part Is Called

A. Centre of Aperture

B. Radius of Curvature

C. Focus

D. Centre of Curvature

5. Which Type Of Mirror Can Produce A Magnification Of +1.5 ?

A. Concave

B. Convex

C. Both (A) and (B)

D. None of the above

5. Which Type Of Mirror Can Produce A Magnification Of +1.5 ?

A. Concave

B. Convex

C. Both (A) and (B)

D. None of the above

6. Which Of The Following Is Correct For A Concave Mirror ?

A. Diverging Mirror

B. Converging Mirror

C. Both (A) and (B)

D. None of the above

6. Which Of The Following Is Correct For A Concave Mirror ?

A. Diverging Mirror

B. Converging Mirror

C. Both (A) and (B)

D. None of the above

7. Name The Mirror Used In The Design Of Solar Furnace

A. Concave

B. Convex

C. Plane

D. None of the above

7. Name The Mirror Used In The Design Of Solar Furnace

A. Concave

B. Convex

C. Plane

D. None of the above

8. Which One Is True For A Convex Mirror ?

A. u = -ve , v = +ve , f = -ve

B. u = -ve , v = +ve , f = +ve

C. u = +ve , v = +ve , f = -ve

D. u = +ve , v = -ve , f = -ve

8. Which One Is True For A Convex Mirror ?

A. u = -ve , v = +ve , f = -ve

B. u = -ve , v = +ve , f = +ve

C. u = +ve , v = +ve , f = -ve

D. u = +ve , v = -ve , f = -ve

9. The Radius Of Curvature Of A Spherical Mirror Is 14 cm. What Is Its Focal Length ?

A. 28 cm

B. 14 cm

C. 7 cm

D. 56 cm

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A. 28 cm

B. 14 cm

C. 7 cm

D. 56 cm

10. At What Position An Object Is To Be Kept In Front Of A Concave Mirror To Get An Enlarged Image?

A. At F
B. Between F and C
C. At C
D. Between F and P

10. At What Position An Object Is To Be Kept In Front Of A Concave Mirror To Get An Enlarged Image?

A. At F

B. Between F and C

C. At C

D. Between F and P

11. Which Mirror Is Used As A Rear-view Mirror In Vehicles ?

A. Convex

B. Plane

C. Concave

D. None of the above

11. Which Mirror Is Used As A Rear-view Mirror In Vehicles ?

A. Convex

B. Plane

C. Concave

D. None of the above

12. What Does A Positive And Less Than 1 Value Of Magnification Suggest ?

A. Enlarged and Erect Image.

B. Diminished and Erect image.

C. Enlarged and Inverted Image.

D. Diminished and Inverted Image.

12. What Does A Positive And Less Than 1 Value Of Magnification Suggest ?

A. Enlarged and Erect Image.

B. Diminished and Erect image.

C. Enlarged and Inverted Image.

D. Diminished and Inverted Image.

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

13. Which one of the following statements is correct for a plane mirror?

(a) Its focal length is zero.

(b) The size of the image of an object placed in front of the mirror is slightly less than that of the object.

(c) The image is virtual, erect and laterally inverted.

(d) Its focal length is 200 cm.

For a plane mirror,

focal length — approx. $-(\infty)$

(infinite)

14. The image we see in plane mirror is

(a) real and thus can be photographed.

(b) virtual and nearer than the object.

(c) virtual and is laterally inverted.

(d) real but cannot be photographed.

14. The image we see in plane mirror is

(a) real and thus can be photographed.

(b) virtual and nearer than the object.

(c) virtual and is laterally inverted.

(d) real but cannot be photographed.

Answer : C

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

15. Spherical mirror formula relating an object distance 'u', image distance 'v' and focal length of mirror 'f' may be applied to a plane mirror when

(a) focal length goes to infinity.

(b) focal length goes to zero.

(c) image distance goes to zero.

(d) image distance goes to infinity.

15. Spherical mirror formula relating an object distance 'u', image distance 'v' and focal length of mirror 'f' may be applied to a plane mirror when

(a) focal length goes to infinity.

(b) focal length goes to zero.

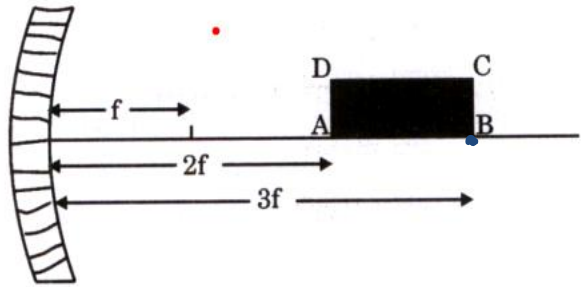
(c) image distance goes to zero.

(d) image distance goes to infinity.

Answer : A

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

16. A rectangle ABCD is kept in front of a concave mirror of focal length f with its corners A and B being, respectively, at distances 2f and 3f from the mirror with AB along the principal axis as shown in the figure. It forms an image A′B′C′D′ in front of the mirror. What is the ratio of B′C′ to A′D′ ?



(a) 1

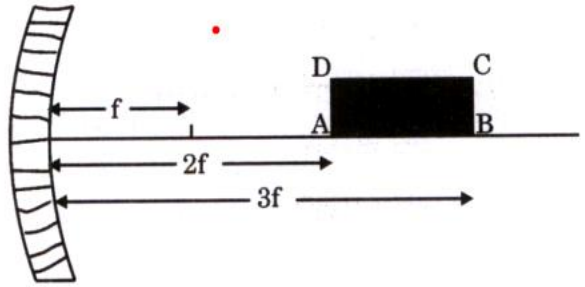
(b) 2

(c) $\frac{1}{2}$

(d) $\frac{2}{3}$

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

16. A rectangle ABCD is kept in front of a concave mirror of focal length f with its corners A and B being, respectively, at distances 2f and 3f from the mirror with AB along the principal axis as shown in the figure. It forms an image A′B′C′D′ in front of the mirror. What is the ratio of B′C′ to A′D′ ?



(a) 1

(b) 2

(c) $\frac{1}{2}$

(d) $\frac{2}{3}$

Answer : C

17. Sita, 1·5 m high, stands before a plane mirror fixed on a wall to view her full image. What should be the minimum height of the plane mirror so that Sita can view her image fully ?

(a) 0·50 m

(b) 0·35 m

(c) 0·75 m

(d) 0·25 m

17. Sita, 1·5 m high, stands before a plane mirror fixed on a wall to view her full image. What should be the minimum height of the plane mirror so that Sita can view her image fully ?

(a) 0·50 m

(b) 0·35 m

(c) 0·75 m

(d) 0·25 m

Answer: C

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18. An object is placed in front of a convex mirror. Which one of the following statements is correct?

(a) It will never form an inverted image.

(b) The image moves towards the focus when the object moves towards the mirror.

(c) Depending on the position of the object with respect to the mirror, the image can be inverted and real.

(d) The size of the image becomes larger than that of the object when the object is placed at a distance equal to half the focal length.

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

18. An object is placed in front of a convex mirror. Which one of the following statements is correct?

(a) It will never form an inverted image.

(b) The image moves towards the focus when the object moves towards the mirror.

(c) Depending on the position of the object with respect to the mirror, the image can be inverted and real.

(d) The size of the image becomes larger than that of the object when the object is placed at a distance equal to half the focal length.

Answer: A

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19. In case of a concave mirror, if an object is kept between principal focus F and pole P of the mirror, then which one of the following statements about the image is NOT correct ?

(a) The image will be virtual

(b) The image will be enlarged or magnified

(c) The image will be formed at infinity

(d) The image will be erect

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

19. In case of a concave mirror, if an object is kept between principal focus F and pole P of the mirror, then which one of the following statements about the image is NOT correct ?

(a) The image will be virtual

(b) The image will be enlarged or magnified

(c) The image will be formed at infinity

(d) The image will be erect

Answer : C

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

20. The correct relation between the radius of curvature R and focal length f of a spherical mirror is

(a) $R = f$

(b) $R = 2f$

(c) $R = 3f$

(d) $R = 4f$

NDA & CDS 2 2024 LIVE - PHYSICS - CLASS 2

20. The correct relation between the radius of curvature R and focal length f of a spherical mirror is

(a) $R = f$

(b) $R = 2f$

(c) $R = 3f$

(d) $R = 4f$

Answer: B