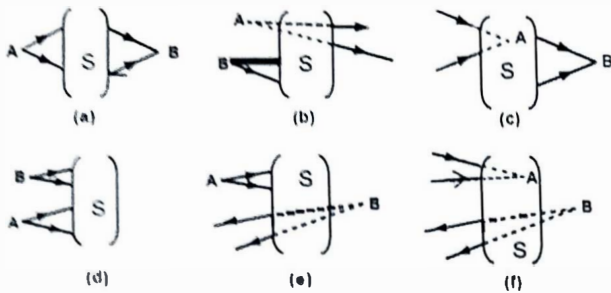


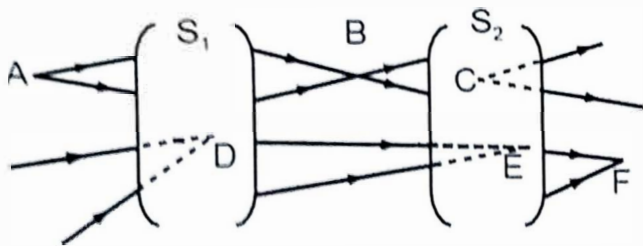
Exercise 1 **-----

In the configurations below, (S) represents an optical system, A and B are a pair of conjugated points through (S). Specify the nature: object or image, real or virtual of points A and B.



Exercise 2 **-----

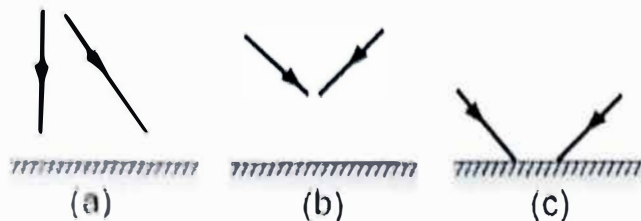
In the figure below, (S1) and (S2) are optical systems. Specify the object or image and real or virtual nature of points A, B, C, D, E and F.



Exercise 3 **-----

In the figures below, incident rays arrive on completely reflective surfaces (mirror).

1. Specify for each figure the position of object A and that of its image A'. The latter is obtained by taking the intersection of the reflected rays.
2. Specify the nature of A and A'.



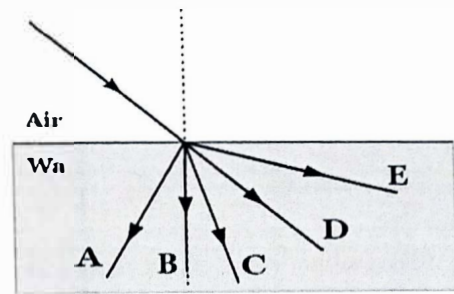
Exercise 4 **-----

A beam propagating in air is both reflected and refracted when it hits the surface of a block of glass whose refractive index is equal to 1,55.

1. For what angle of incidence the reflected ray and the refracted ray form an angle of 90°?

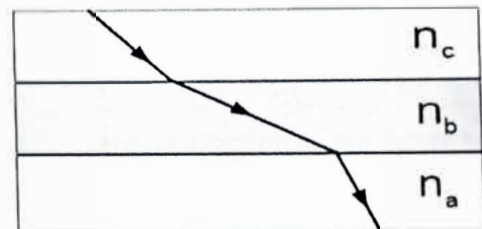
Exercise 5 **-----

Among rays A, B, C, D, E which is the refracted ray corresponding to the incident ray?



Exercise 6 -----

Write, in ascending order, the refractive indices of the media in the figure below.



Exercise 7 -----

A laser source emitting red light is located 1m at the bottom of a lake. The laser beam reaches the water surface at an incidence of 30°. The refractive index of water for red light is 1,331, and that of air is 1.

1. Calculate the angle of refraction of the laser beam.
2. Deduce its deviation when it crosses the water surface.
3. Calculate the difference in speed of light as it passes through the air.
4. At what angle of incidence does the beam no longer emerge from the water surface?