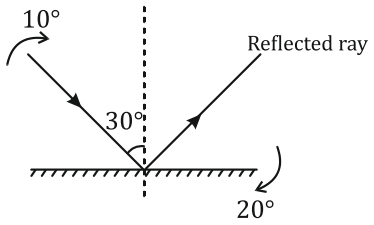
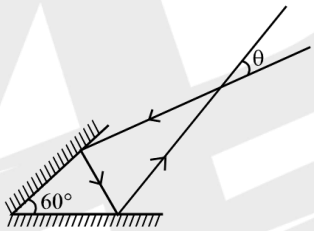
DPP 01

1. Figure shows a plane mirror on which a light ray is incident. If the incident light ray is turned by 10° and the mirror by 20°, as shown, the angle turned by the reflected ray is 2x . then the value of x is _ _ _ _ _ _ _ _

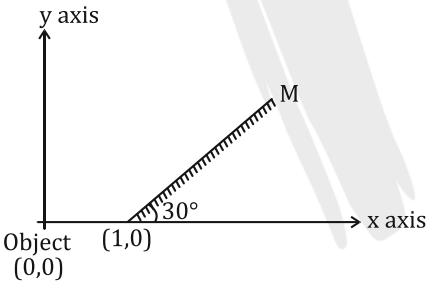


2. A light ray is incident on a plane mirror, which after getting reflected strikes another plane mirror, as shown in figure. The angle between the two mirrors is 60°. the angle 'θ' shown in figure is equal to _ _ _ _ _ _ _



3. A point object is placed at (0, 0) and a plane mirror 'M' is placed, inclined 30° with the x axis.

If the object starts moving with velocity 1 î m/s and the mirror is fixed find the velocity of image.



4. Two plane mirrors are inclined to each other at an angle 60°. If a ray of light incident on the first mirror is parallel to the second mirror, it is reflected from the second mirror

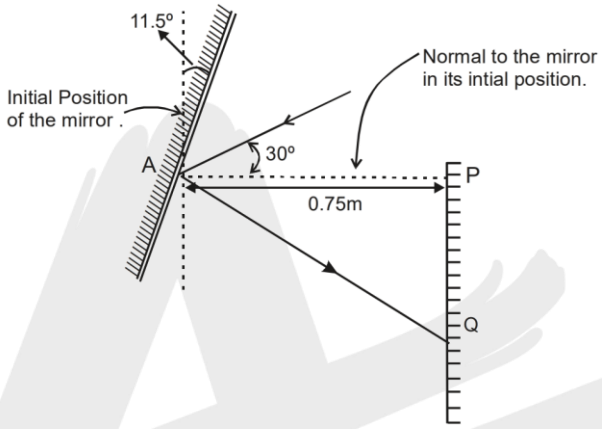
(A) Perpendicular to the first mirror

(B) Parallel to the first mirror

(C) Parallel to the second mirror

(D) Perpendicular to the second mirror

5. The view in the figure is from above a plane mirror suspended by a thread connected to the centre of the mirror at point A. A scale is located 0.75 m (the distance from point A to point P) to the right of the centre of the mirror. Initially, the plane of the mirror is parallel to the side of the scale; and the angle of incidence of a light ray which is directed at the centre of the mirror is 30°. A small torque applied to the thread causes the mirror to turn 11.5° away from its initial position. The reflected ray then intersects the scale at point Q.



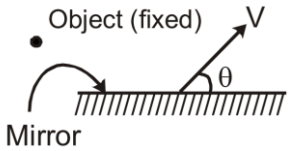
The distance from point P to point Q on the scale is

(A) 1.00 m (B) 0.56 m (C) 1.02 m (D) 0.86 m.

6. An unnumbered wall clock shows time 04: 25: 37, where 1st term represents hours, 2nd represents minutes and the last term represents seconds. What time will its image in a plane mirror show.

(A) 08: 35: 23 (B) 07: 35: 23 (C) 07: 34: 23 (D) none of these

7. An object and a plane mirror are as shown in figure. Mirror is moved with velocity V as shown. The velocity of image is:



(A) 2 V sinθ (B) 2 V (C) 2V cosθ (D) none of these

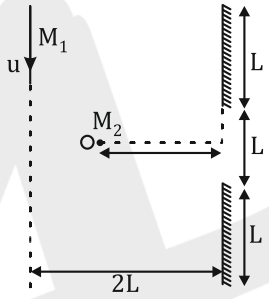
8. A plane mirror is moving with velocity $4\hat{i} + 5\hat{j} + 8\hat{k}$. A point object in front of the mirror moves with a velocity $3\hat{i} + 4\hat{j} + 5\hat{k}$. Here $\hat{k}$ is along the normal to the plane mirror and facing towards the object. The velocity of the image is:

(A) $-3\hat{i}-4\hat{j}+5\hat{k}$ (B) $3\hat{i}+4\hat{j}+11\hat{k}$ (C) $-3\hat{i}-4\hat{j}+11\hat{k}$ (D) $7\hat{i}+9\hat{j}+11\hat{k}$

9. Two plane mirrors are parallel to each other and spaced 20 cm apart. An object is kept in between them at 15 cm from A. Out of the following at which point(s) image(s) is/are not formed in mirror A (distance measured from mirror A):

(A) 15 cm (B) 25 cm (C) 45 cm (D) 55 cm

10. Two plane mirrors of length L are separated by distance L and a man M_2 is standing at distance L from the connecting line of mirrors as shown in figure. A man M_1 is walking in a straight line at distance 2 L parallel to mirrors at speed u, then man M_2 at O will be able to see image of M_1 for time:



(A) $\frac{4L}{u}$ (B) $\frac{3L}{u}$ (C) $\frac{6L}{u}$ (D) $\frac{9L}{u}$

ANSWER KEY

1. 15° **2.** 60°

3. Velocity of image = (1 cos 60°, + 1 sin 60°) m/s.

4. (B) **5.** (A) **6.** (C) **7.** (A) **8.** (B)

9. (C) **10.** (C)