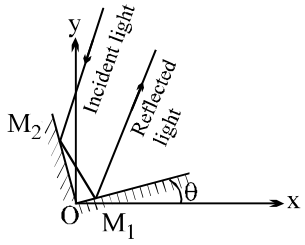
CLASS TEST

SECTION-I

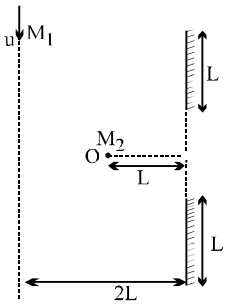
Single Correct Answer Type **7 Q. [3 M (–1)]**

1. A light ray gets reflected from a pair of mutually perpendicular mirrors, not necessarily along axes. The intersection point of mirrors is at origin. The incident light is along $y = x + 2$. If the light ray strikes both mirrors in succession, then it may get reflected finally along the line:



(A) $y = 2x - 2$ (B) $y = -x + 2$ (C) $y = -x - 2$ (D) $y = x - 4$

2. 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 total time:



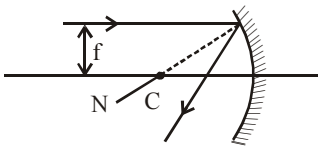
(A) $\frac{4L}{u}$ (B) $\frac{3L}{u}$

(C) $\frac{6L}{u}$ (D) $\frac{9L}{u}$

3. A student holds a hand plane mirror to observe the back of her head while standing in front of and looking into a wall plane mirror. If she is standing 4 ft away from wall mirror in front of the wall mirror and she holds the hand mirror vertically 1 ft behind her head, she will see the back of her head approximately how far behind the wall mirror?

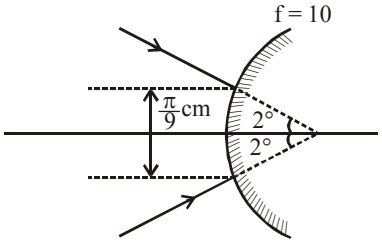
(A) 6 ft (B) 5 ft (C) 4 ft (D) 3 ft

4. A light ray is coming parallel to principal axis, the distance between ray and axis is equal to focal length (as shown). Find the angle of deviation after reflection :-



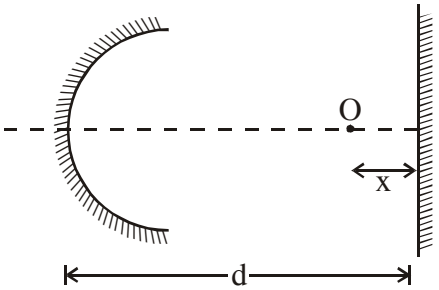
(A) 60° (B) 90° (C) 120° (D) small devitation

5. A converging beam of light having angle of convergence 4° is incident upon a convex mirror as shown. Find the angle of convergence after reflection. Focal length of mirror is 10 cm.



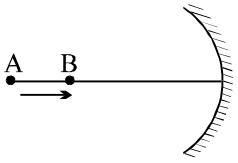
(A) 0.5° (B) 1° (C) 1.5° (D) 2°

6. A plane mirror and a spherical mirror of focal length f is arranged as given. A point object O is placed between them, the value of x so that final image coincide the object (d > 2f) is :



(A) $\frac{d}{2}$ (B) $\sqrt{d(d-2f)}$ (C) $\sqrt{2d(d-2f)}$ (D) $\sqrt{3d(d-2f)}$

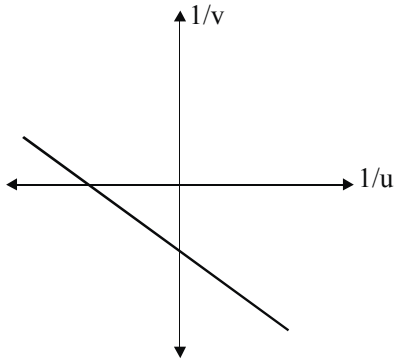
7. A linear object AB is placed along the axis of a concave mirror. The object is moving towards the mirror with speed U. The speed of the image of the point A is 4U and the speed of the image of B is also 4U. If the center of the line AB is at a distance L from the mirror then find out the length of the object.



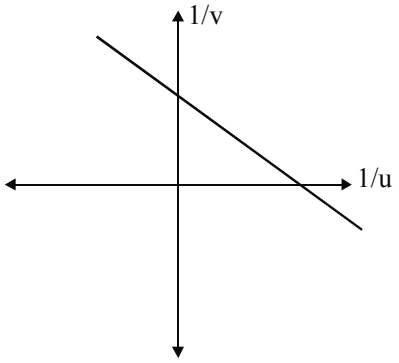
(A) 3L/2 (B) 5L/3 (C) L (D) None

Multiple Correct Answer Type **4 Q. [4 M (–1)]**

8. Choose the **CORRECT** statement(s).



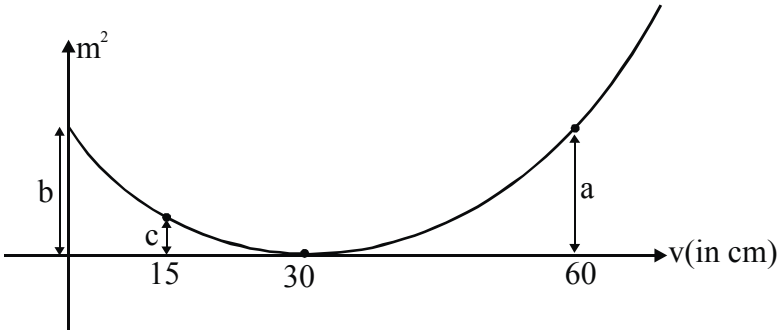
concave mirror



convex mirror

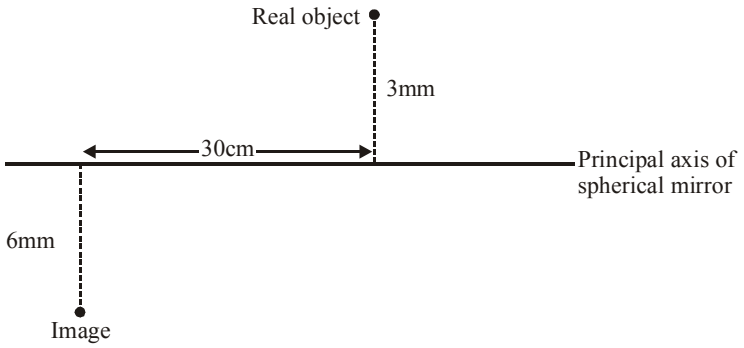
(A) Concave mirror can not form erect magnified image of an object placed in front of it.
(B) Concave mirror can form inverted magnified image of an object placed in front of it.
(C) Convex mirror can not form real image of an object placed in front of it.
(D) Convex mirror can not form magnified image of an object placed in front of it.

9. For a concave mirror, graph of square of magnification and image distance from pole is given for real object. Choose the correct statement(s).



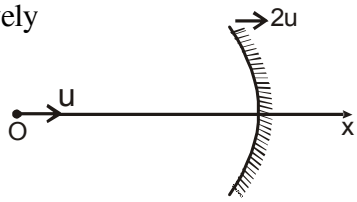
(A) This graph is hyperbola.
(B) length a must be equal to length b.
(C) radius of concave mirror is 60 cm
(D) the length c will be half of length a.

10. A spherical mirror forms image of a real object as shown, choose the **CORRECT** option(s) :-



(A) Mirror is concave of radius 40 cm
(B) Mirror of convex of radius 40 cm
(C) Mirror is 30 cm from object along principal axis
(D) Mirror is 60 cm from image along principal axis

11. An object & a concave mirror is moving with velocities $u\hat{i}$ & $2u\hat{i}$ respectively as shown in figure. The image formed by the concave mirror :-

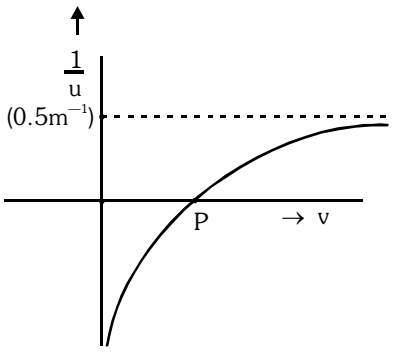


(A) will have speed greater than the speed of the object
(B) may have speed greater than the speed of the object
(C) will have speed greater than the speed of the mirror
(D) must move away from the mirror.

Linked Comprehension Type (1 Para × 3Q.) [3 M (-1)]
(Single Correct Answer Type)

Paragraph for Questions no. 12 to 14

Sign convention is taken as +ve direction in the direction of light ray and the graph is drawn between $\frac{1}{u}$ and v for a spherical mirror.



12. What is the focal length of the mirror?
(A) –50cm (B) –200 cm (C) +200 cm (D) +50 cm

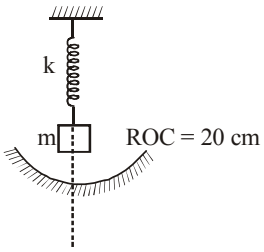
13. The coordinates of point P are
(A) (50cm, 0 cm) (B) (100cm, 0 cm) (C) (200cm,0cm) (D) data insufficient

14. Magnitude of slope of curve at point P
(A) 1 m^{-2} (B) 0.25 m^{-2} (C) 2 m^{-2} (D) data insufficient

SECTION-II

Numerical Answer Type Question **2Q. [3(0)]**

(upto second decimal place)



1. A block of mass 'm' is attached to a spring. Block is released from rest, when spring is in natural length. Block is along the principal axis of concave mirror and size of block is very small. When spring is in natural length then block is at a distance of 20 cm from the mirror, distance (in cm) in which the image formed by mirror oscillates is (mass of the block = 5×10^{-2} kg, spring constant k = 20 N/m.)

2. A plane mirror is placed 25 cm away from a concave spherical mirror perpendicularly to the principal axis of the concave mirror. What should be the distance (in cm) in front of concave mirror, where we place a candle if its images formed by the two mirror independently are at the same distances from the candle? The radius of the concave mirror is 40 cm. (Consider images formed by single reflection only.)

SECTION-III

Numerical Grid Type (Ranging from 0 to 9) **3 Q. [4 M (0)]**

1. When an object is placed at a distance of 25 cm from a concave mirror the magnification is m. The object is moved 15 cm further away from the mirror with respect to the earlier position, and the magnification becomes m_2. If $m_1/m_2 = 4$, then find the focal length (in dm) of the mirror (Assume image is real and m_1, m_2 are numerical values of transverse magnification of the image).

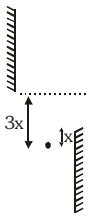
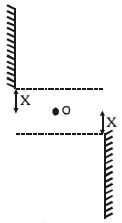
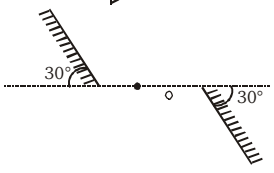
2. The distance between object and its erect but diminished image formed due to a spherical mirror is 3 times the distance between image and the focus while distance between object and focus is 4 x. The distance of object from mirror is nx. Find the value of n.

3. A handheld mirror contains a plane mirror on one of its side and a concave mirror of radius of curvature of 30 cm on its other side. You hold the plane mirror 10 cm from your face and notice a spot. By what factor will the image of the spot be enlarged if you turn the mirror, but still keep it at a distance of 10 cm from your face?

SECTION-IV

Matrix Match Type (4 × 5) **1 Q. [8 M (for each entry +2(0))]**

1. Plane mirror are arranged parallel to each other as shown in column 'I and the number of images formed by the combination is in column II.

Column I		**Column II**	
(A)		(P)	3
(B)		(Q)	2
(C)		(R)	∞
(D)		(S)	0

CLASS TEST # 04 (TNAS) **ANSWER KEY**

SECTION-I

Single Correct Answer Type **7 Q. [3 M (–1)]**

1. Ans. (D) **2. Ans. (C)** **3. Ans. (A)** **4. Ans. (C)**

5. Ans. (D) **6. Ans. (B)** **7. Ans. (C)**

Multiple Correct Answer Type **4 Q. [4 M (–1)]**

8. Ans. (B,C,D) **9. Ans. (B,C)** **10. Ans. (A, C, D)** **11. Ans. (A,C)**

Linked Comprehension Type **(1 Para × 3Q.) [3 M (-1)]**
(Single Correct Answer Type)

12. Ans. (C) **13. Ans. (C)** **14. Ans. (B)**

SECTION-II

Numerical Answer Type Question **2Q. [3(0)]**
(upto second decimal place)

1. Ans. 10.00 **2. Ans. 10.00**

SECTION-III

Numerical Grid Type (Ranging from 0 to 9) **3 Q. [4 M (0)]**

1. Ans. 2 **2. Ans. 2** **3. Ans. 3**

SECTION-IV

Matrix Match Type (4 × 5) **1 Q. [8 M (for each entry +2(0)]**

1. Ans. (A) R; (B) P; (C) Q; (D) Q