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Written Solution on YouTube:-

<https://physicsaholics.com/note/notesDetailis/58>

- Q 1. When reflection from a plane mirror incident ray, normal & reflected ray all are
- (a) In same plane (b) mutuallu perpendicular  
(c) Parallel (d) None of the above
- Q 2. A rays is incident at an angle  $38^\circ$  with the normal on a mirror. The angle between normal and reflected ray is
- (a)  $38^\circ$  (b)  $52^\circ$  (c)  $90^\circ$  (d)  $76^\circ$
- Q 3. The image of a real object formed by a plane mirror is:
- (a) Erect, real and of equal size  
(b) Erect, virtual and of equal size  
(c) Inverted, real and of equal size  
(d) Inverted, virtual and of equal size
- Q 4. Mark the correct options:
- (a) If the incident rays are converging, we have a real object.  
(b) If the final rays are converging, we have a real image.  
(c) The image of a virtual object is called a virtual image.  
(d) If the image is virtual, the corresponding object is called a virtual object.
- Q 5. A point source of light is placed in front of a plane mirror:
- (a) All the reflected rays meet at a point when produced backward.  
(b) Only the reflected rays close to the normal meet at a point when produced backward.  
(c) Only the reflected rays making a small angle with the mirror, meet at a point when produced backward.  
(d) Light of different colours make different images.
- Q 6. Which of the following is not the case with image formed by a plane mirror:
- (a) It is erect  
(b) It is virtual  
(c) It is diminished  
(d) It is at the same distance as the object



- Q 7. A small object is 10 cm in front of a plane mirror. A man stands 30 cm from the mirror, behind the object and looks at the object's image. He should focus his eyes to see the image at a distance:  
(a) 25 cm                      (b) 35 cm                      (c) 45 cm                      (d) 40 cm
- Q 8. An object is initially at a distance of 50 cm from a plane mirror. If the mirror approaches the object at a speed of 5 cm/s. Then after 5 s the distance between the object and its image will be :  
(a) 60 cm                      (b) 140 cm                      (c) 50 cm                      (d) 25 cm
- Q 9. A plane mirror is approaching you at 10 cm per second. You can see your image in it. At what speed will your image approach you:  
(a) 10 cm/s                      (b) 5 cm/s                      (c) 20 cm/s                      (d) 15 cm/s
- Q 10. A car is moving towards a plane mirror at a speed of 30 m/s. Then the relative speed of its image with respect to the car will be-  
(a) 30 m/s                      (b) 60 m/s                      (c) 15 m/s                      (d) 45 m/s
- Q 11. Calculate the velocity of image with respect to observer if an observer is walking away from the plane mirror with 6 m/s:  
(a) 6 m/s                      (b) -6 m/s                      (c) 12 m/s                      (d) 3m/s
- Q 12. A light ray is incident on a plane mirror at angle  $30^\circ$ . If mirror is rotated by  $10^\circ$  then reflected ray is rotated by angle  
(a)  $30^\circ$                       (b)  $10^\circ$                       (c)  $20^\circ$                       (d)  $60^\circ$
- Q 13. A light ray is incident on a horizontal plane mirror at an angle of  $30^\circ$  with horizontal. At what angle with horizontal must a plane mirror be placed in its path so that it becomes vertically upwards after reflection?  
(a)  $30^\circ$                       (b)  $10^\circ$                       (c)  $20^\circ$                       (d)  $60^\circ$

## Answer Key

<b>Q.1 a</b>	<b>Q.2 a</b>	<b>Q.3 b</b>	<b>Q.4 b</b>	<b>Q.5 a</b>
<b>Q.6 c</b>	<b>Q.7 d</b>	<b>Q.8 c</b>	<b>Q.9 c</b>	<b>Q.10 b</b>
<b>Q.11 c</b>	<b>Q.12 c</b>	<b>Q.13 a</b>		

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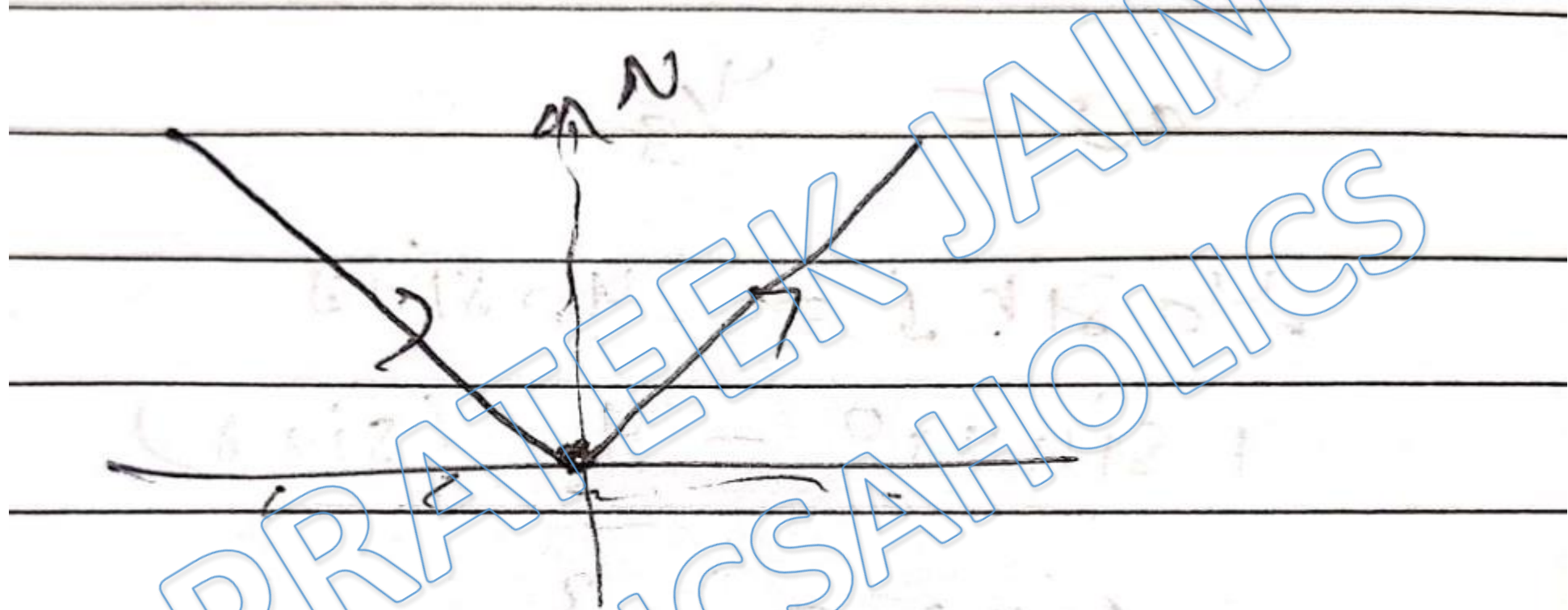
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# Written Solution

**DPP-1 Plane Mirror, Real, Virtual, Rotation of Image, Velocity of Image**

**By Physicsaholics Team**

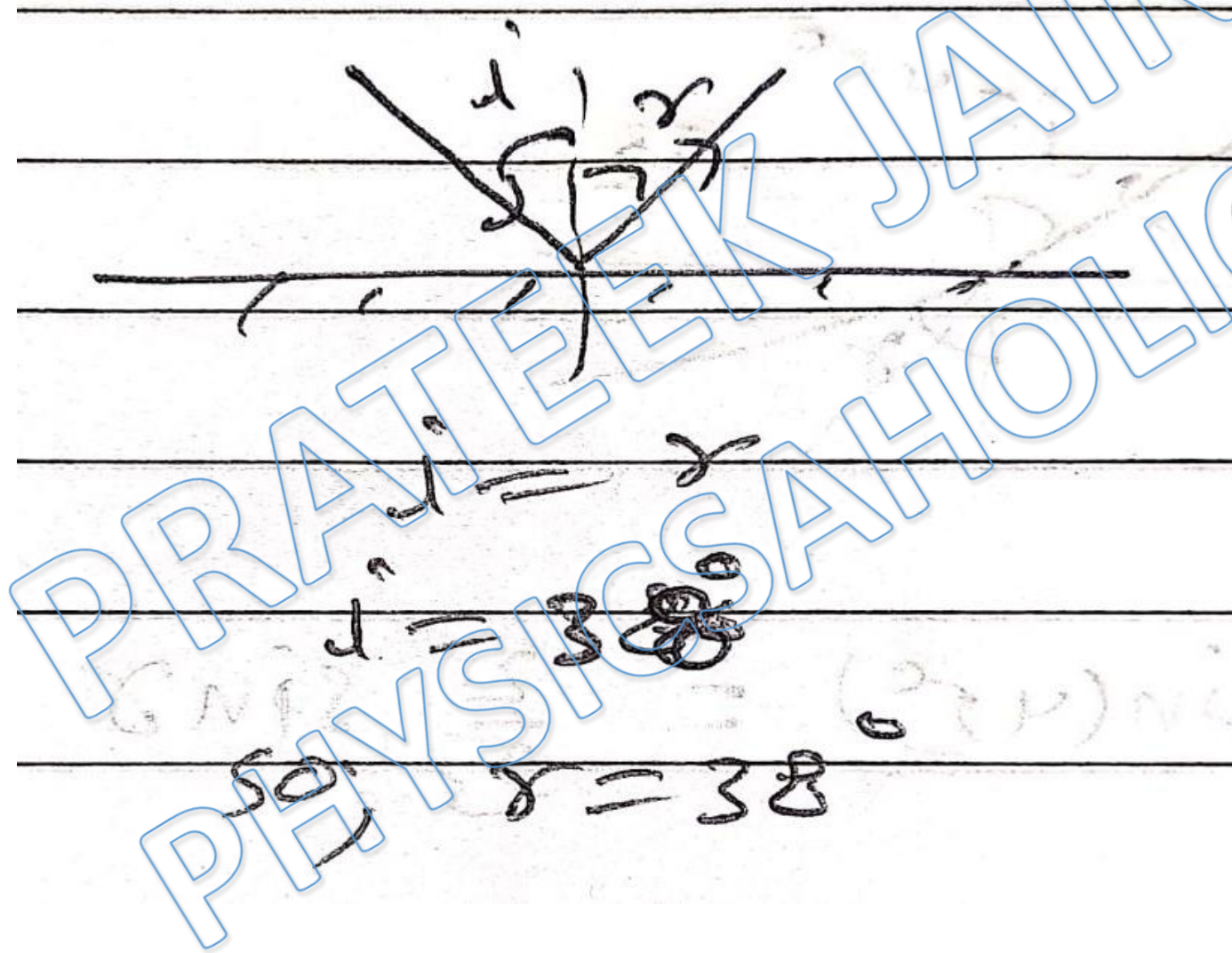
Solution: 1



all are Co-planer,

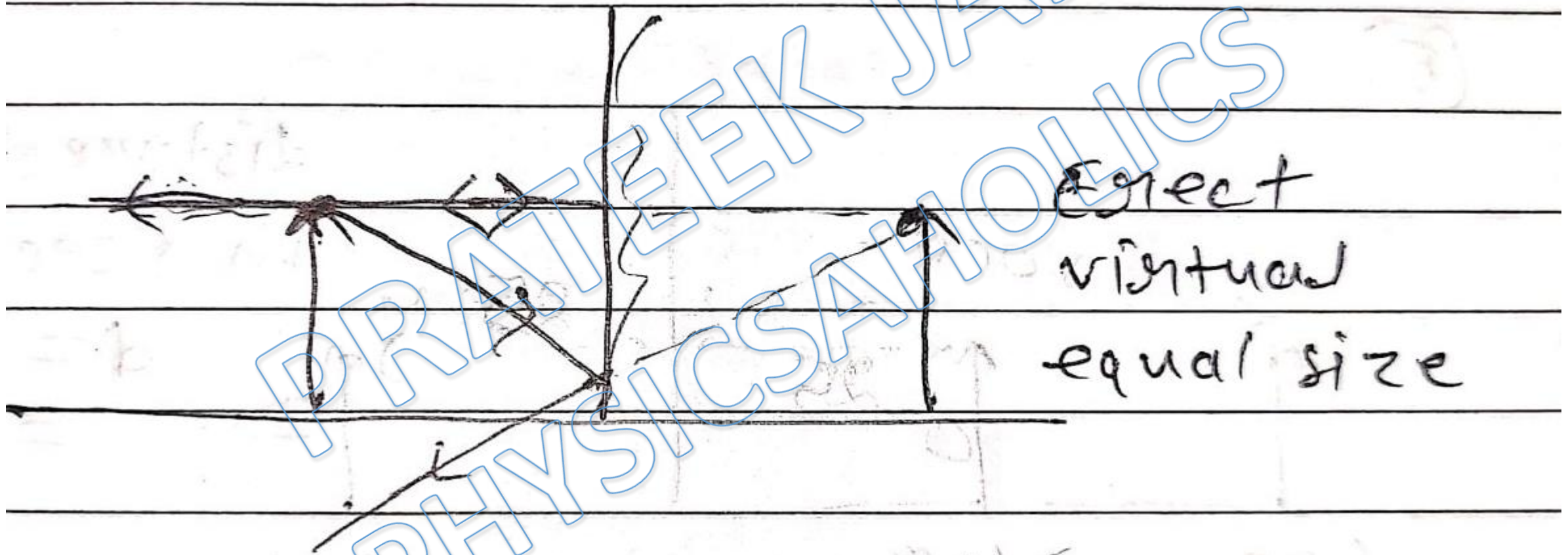
Ans. a

Solution: 2



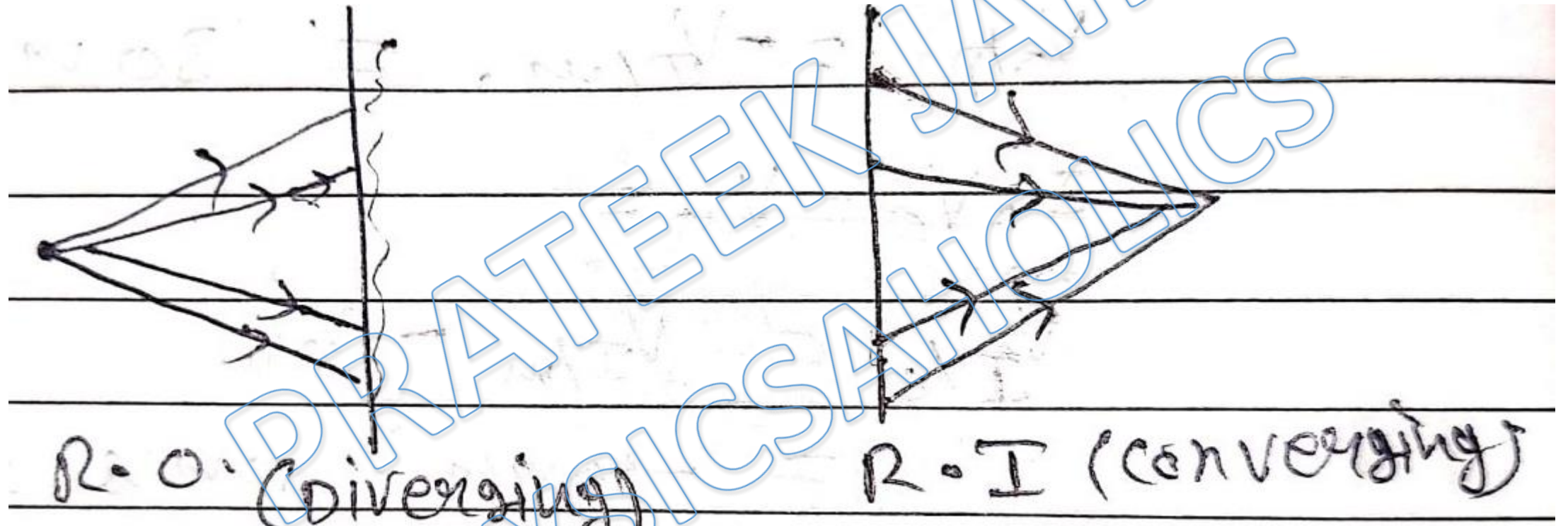
Ans. a

Solution: 3



Ans. b

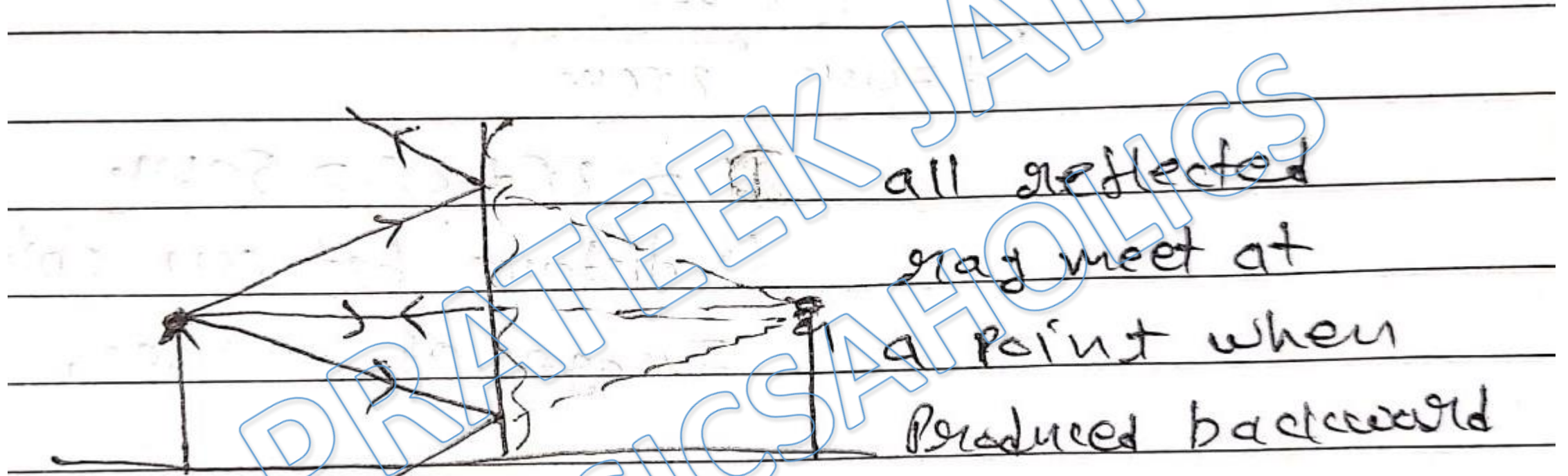
Solution: 4



Ans. b



Solution: 5



Ans. a

Solution: 6

Image formed by a

Plane Mirror:  $\rightarrow$  erect

$\rightarrow$  virtual

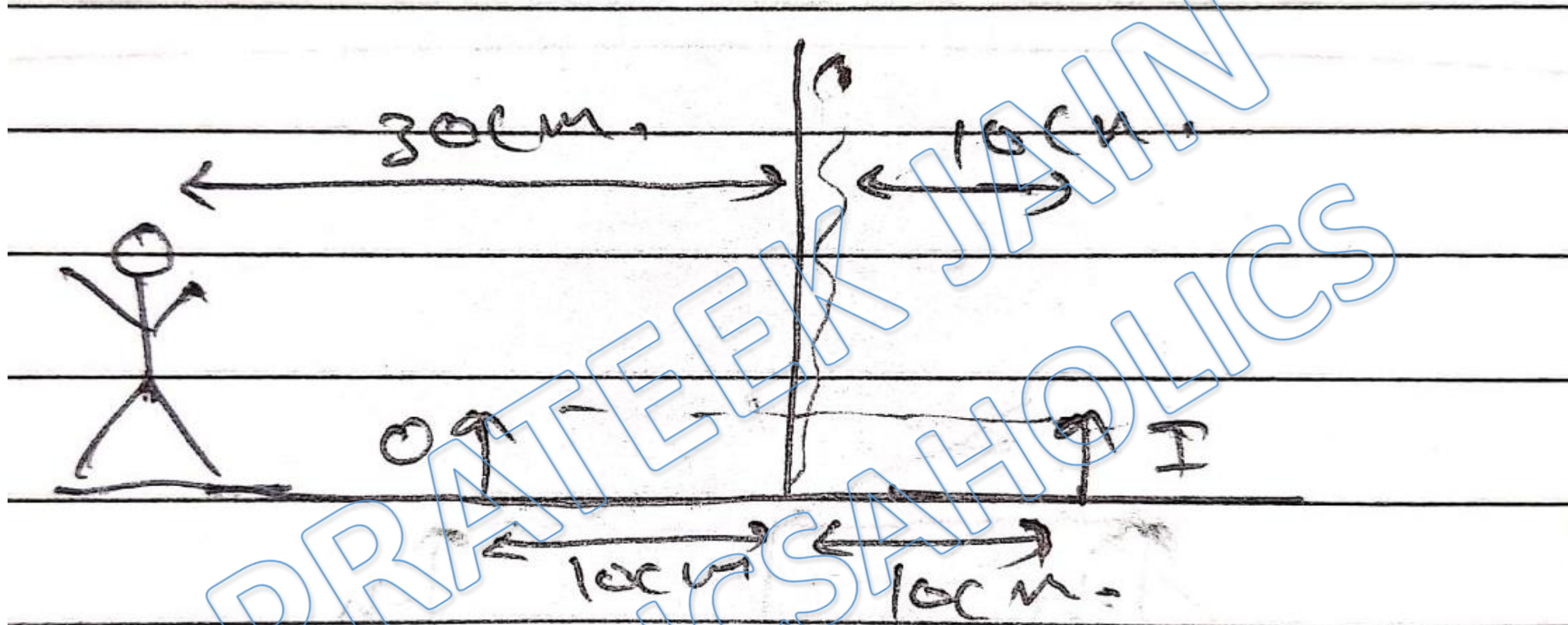
$\rightarrow$  at same distance

as object

$\rightarrow$  same size.

Ans. c

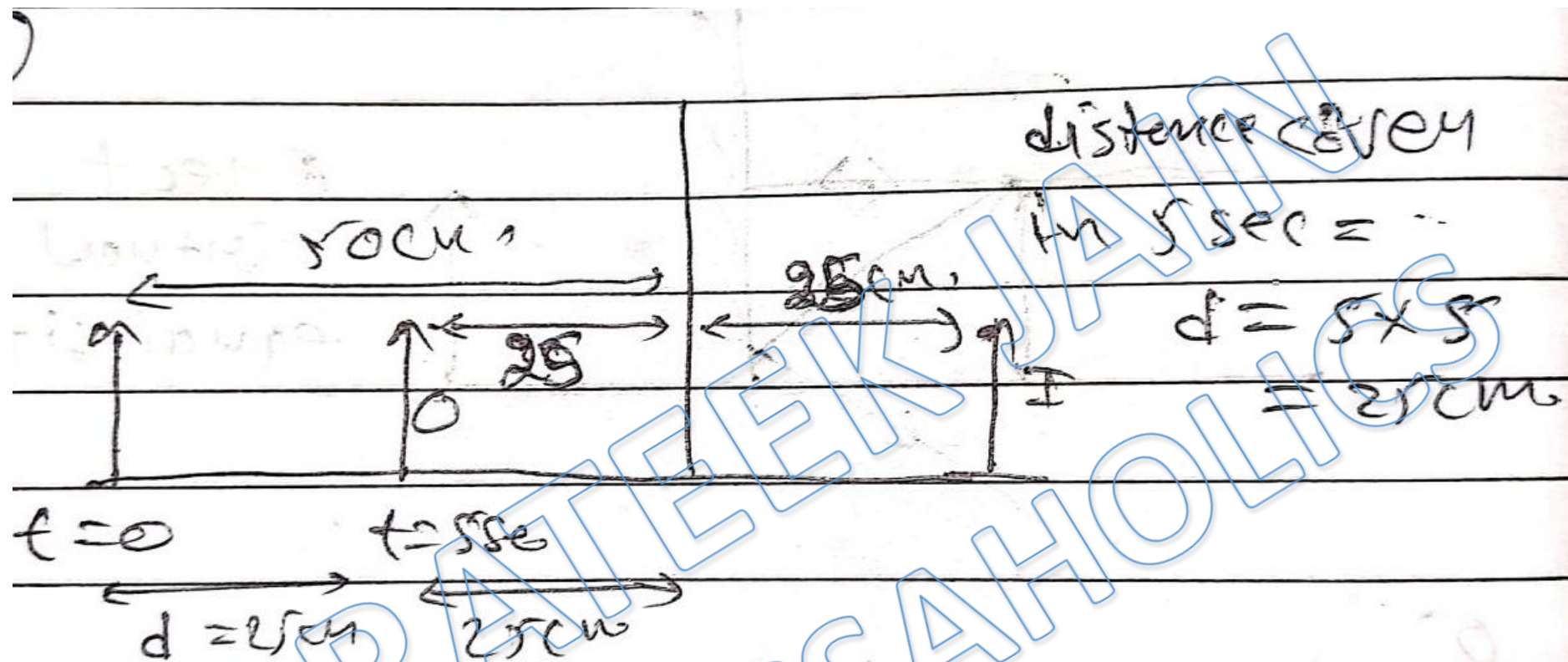
Solution: 7



$$d = 30 + 10 = 40 \text{ cm.}$$

Ans. d

Solution: 8



$$d = 25 + 25 = 50 \text{ cm}$$

↳ distance between object and

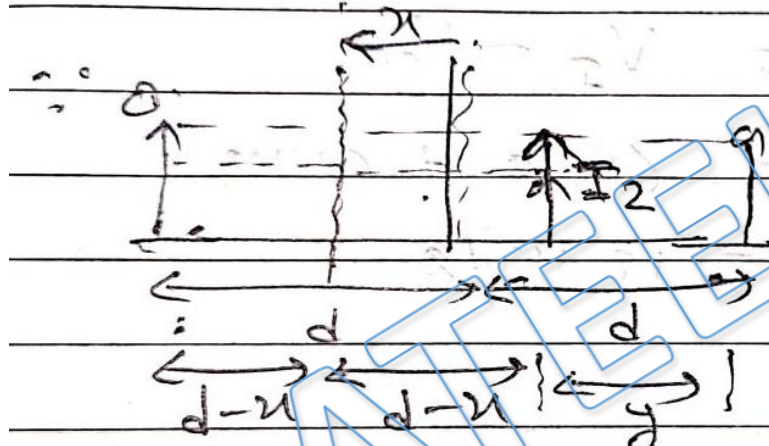
Image at  $t = 5 \text{ sec}$ ,

Ans. c

Solution: 9

$$V_{M/O} = 10 \text{ cm/sec.}$$

$$V_{I/O} = 2 V_{M/O} \\ = 20 \text{ cm/s}$$



$$r + (n-p) + (n-p) = p_2$$

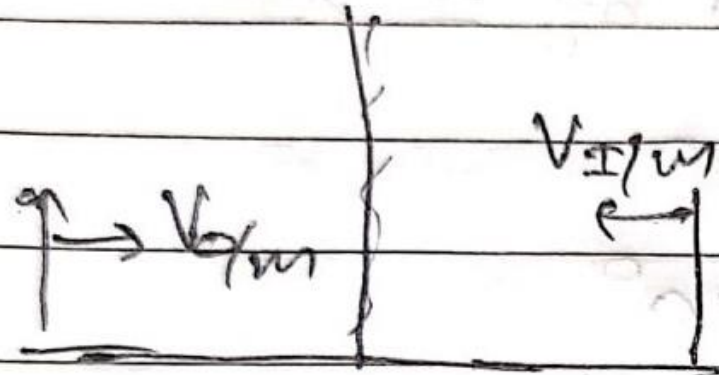
$$r = 2n = g$$

when mirror moves ( $x$ ) then  
image moves ( $2x$ )

∴ when mirror moves with speed  $v$   
the image moves with speed  $2v$

Ans. c

Solution: 10



$v_{o/m}$  = speed of object  
w.r.t. mirror

$v_{i/m}$  = speed of Image  
w.r.t. mirror

$$\vec{v}_{o/m} = -\vec{v}_{i/m}, = 30 \text{ m/s}$$

~~$$\vec{v}_{o/m} = \vec{v}_{i/m}$$~~

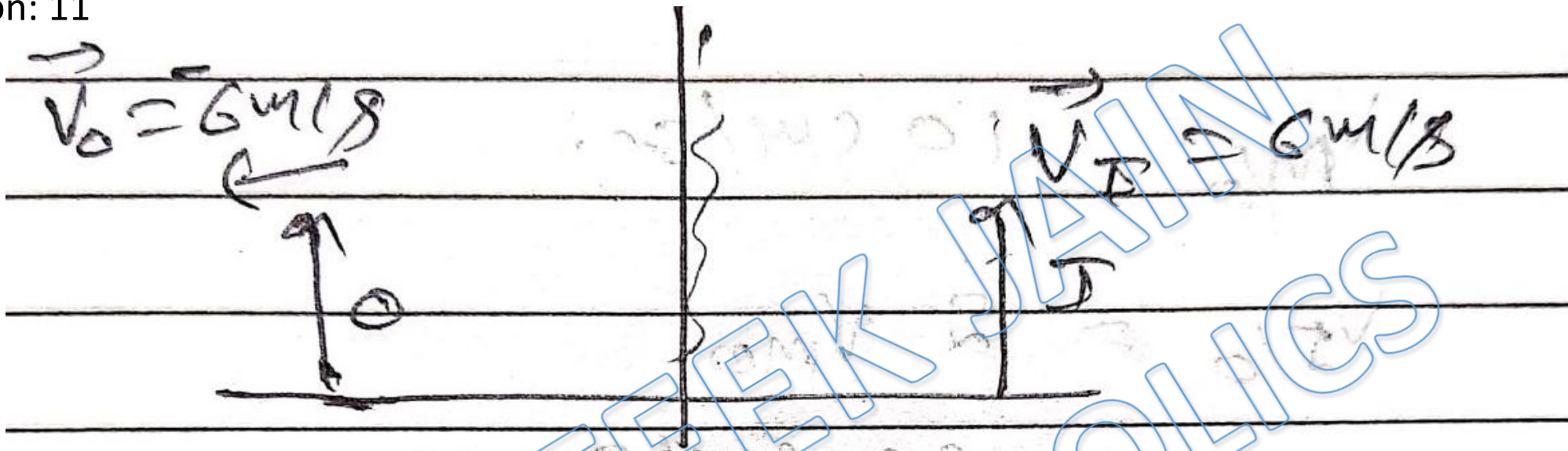
$$\vec{v}_{i/o} = \vec{v}_{i/m} - \vec{v}_{o/m}$$

$$= 30 \text{ m/s} - 30 \text{ m/s} = -60 \text{ m/s}$$

$$|\vec{v}_{i/o}| = 60 \text{ m/s}$$

Ans. b

Solution: 11



$$v_{I/O} = v_A + v_0$$

$$= 6 \text{ m/s} + 6 \text{ m/s}$$

$$= 12 \text{ m/s}$$

Ans. c

Solution: 12

when mirror is

rotated by angle =  $0$

then reflected Ray

is rotated by =  $20$

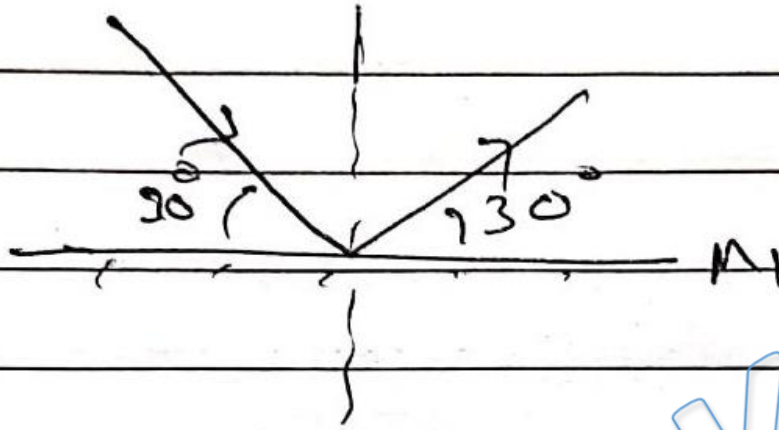
then  $0 = 10^{\circ}$

$20 = 20^{\circ}$

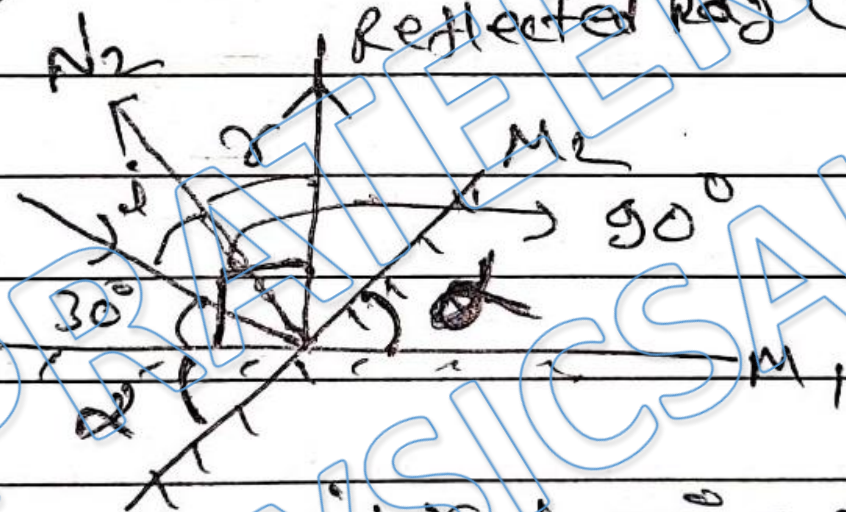
Ans. c



Solution: 13



⇒ Now Reflected Ray (vertical)



Mirrors

$$\begin{aligned} \alpha + \gamma + 30^\circ &= 90^\circ \\ \alpha + \gamma &= 60^\circ \\ \alpha &= \gamma = 30^\circ \end{aligned}$$

Now

$$\alpha + 30^\circ + \alpha = 90^\circ$$

$$\boxed{\alpha = 30^\circ}$$

Ans. a

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