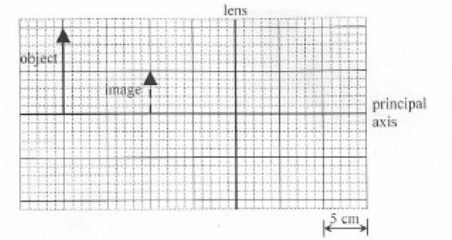
56. 2005/II/12

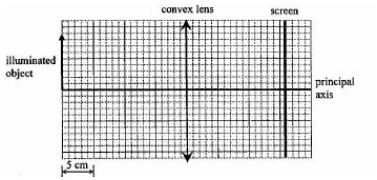


An object is placed near a lens and an image is formed as shown. Which of the following statements are correct?

(1) The height of the image is half that of the object
(2) The lens is a concave lens
(3) The focal length of the lens is 20 cm

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

57. 2006/II/13



As shown above, an illuminated object is placed at a distance 20 cm in front of a convex lens and a sharp images formed on a screen at a distance of 16 cm from the lens. The focal length of the convex lens is

A. less than 8 cm B. between 8 cm and 10 cm
C. between 10 cm and 16 cm D. between 16 cm and 20 cm

58. 2006/II/14

Which of the following examples illustrate(s) a real image?

(1) a fish in a pond being observed from above water
(2) a fingerprint left at a crime scene being observed through a magnifying glass
(3) a motion picture on the screen being watched in a camera

A. (1) only B. (2) only C. (3) only D. (1), (2) and (3)

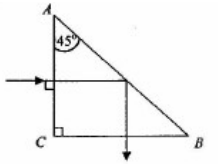
59. 2006/II/19

Which of the following surfaces produce diffuse reflection when parallel light rays fall on them?

(1) a blackboard in the classroom
(2) a polished metal surface
(3) a page in this question book

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

60. 2006/II/32



A light ray enters normally from the air onto a right-angled prism and is totally internally reflected at face *AB* as shown above. Based on this optical phenomenon, which of the following is/are possible value(s) for the refractive index of the material of the prism?

(1) 1.33 (2) 1.45 (3) 1.55

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

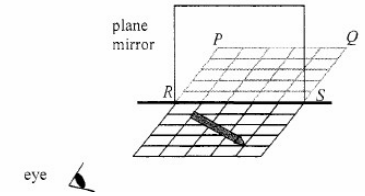
61. 2006/II/33

Flash lamps used by professional photographers can find object distances by using infrared waves so as to adjust the flash output. Which of the following is/are the reason(s) of using infrared waves instead of ultrasonic waves in such flash lamps?

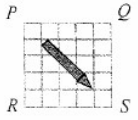
(1) Speed of infrared waves is much faster than that of ultrasonic waves making the time for finding distance shorter
(2) Objects to be photographed will usually emit infrared waves
(3) The sound produced by ultrasonic waves makes photographers feel annoyed

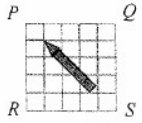
A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

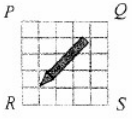
62. 2007/II/11

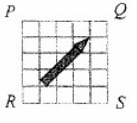


A pencil is placed in front of a vertical plane mirror as shown in the figure above. Which of the following shows the correct position of the images?

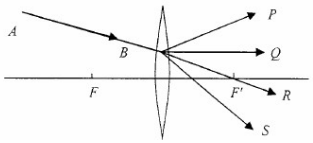
A.


B.


C.


D.


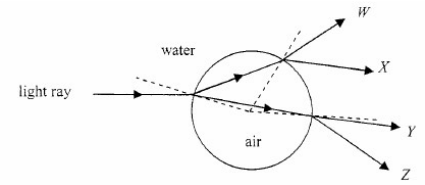
63. 2007/II/12



F and *F'* are the foci of the above lens and *AB* is an incident ray. Which light ray best represents the emergent ray?

A. *P* B. *Q* C. *R* D. *S*

64. 2007/II/13

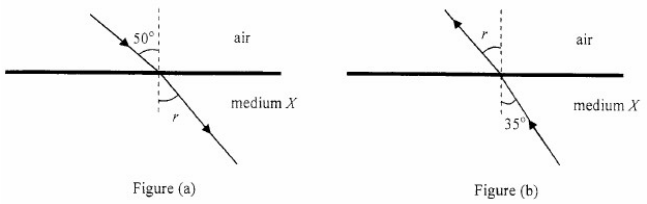


A light ray is incident from water onto an air bubbles as shown above. Which light ray best represents the emergent ray?

A. *W* B. *X* C. *Y* D. *Z*

65. 2007/II/14

Figure (a) shows a light ray traveling from air into medium *X*. The angle of incidence is 50º and the angel of refraction is *r*. Another light ray traveling from medium *X* to air is shown in Figure (b). The angle of incidence is 35º and the angle of refraction is also equal to *r*. What is angle *r*?



A. 26.1º B. 41.5º C. 42.5º D. 48.5º

66. 2007/II/15

The figure below shows a web cam.

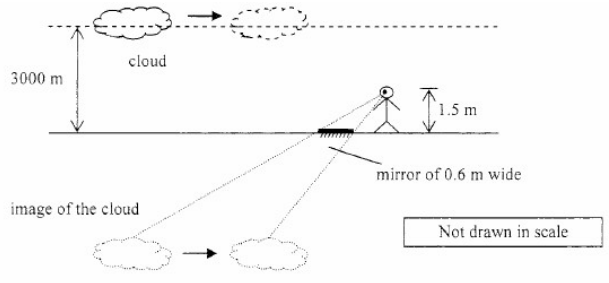
A web cam typically includes a lens and an image sensor. The function of the image sensor is similar to that of a film in a convectional camera. The image is formed on the sensor and is then digitized. Which of the following statements is/are correct?

(1) The lens is a convex lens
(2) The lens is a concave lens
(3) Image formed on the image sensor is real

A. A. (1) only B. (2) only C. (1) and (3) only D. (2) and (3) only

67. 2007/II/35

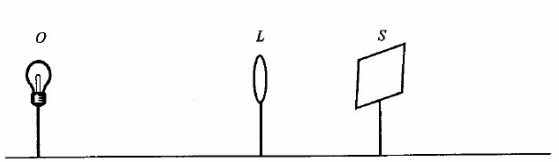
John wants to estimate the speed of a cloud in the following experiment. The cloud is moving horizontally at a height of 3000 m above the ground. He looks at the image of the cloud in a mirror of 0.6 m wide placed on the horizontal ground 1.5 m below his eye level. He finds that the image of the cloud takes 20 s to move across the mirror.



What is the approximate speed of the cloud?

A. 0.3 ms^{-1} B. 0.06 ms^{-1} C. 60 ms^{-1} D. 150 ms^{-1}

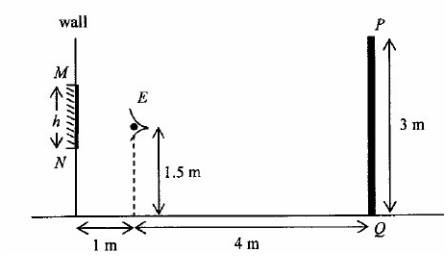
68. 2008/II/12



A light bulb O is placed in front of a lens L as shown above. A sharp and diminished image is formed on the screen S. With the position L fixed, in order to form a sharp and magnified image on the screen, which of the following methods is possible?

A. Move O and S towards L
B. Move O and S away from L
C. Move O towards L and move S away from L
D. Move O away form L and move S towards L

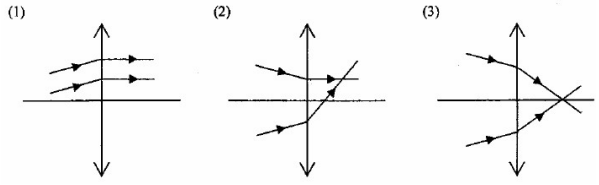
69. 2008/II/13



In the figure, a plane mirror MN of height h is mounted in an adjustable vertical position of a vertical wall. E is an observer's eye which is 1 m from the wall and 1.5 m above the ground. PQ is a vertical post of height 3 m and is 4 m behind the observer. Looking into the mirror the observer can see the whole image of the post. What is the minimum value of h?

A. 0.5 m B. 0.6 m C. 1.6 m D. 2 m

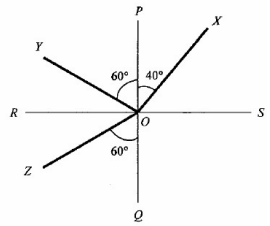
70. 2008/II/15



Which of the above ray diagrams concerning the refraction of two light rays by a converging lens is/are possible?

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

71. 2008/II/16

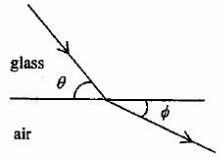


A light ray undergoes reflection and refraction at an air-glass boundary as shown above. PQ is perpendicular to RS. OX, OY and OZ are the paths of the light rays. Which of the following deductions is/are correct?

(1) OX is the path of the incident ray
(2) RS is the air-glass boundary
(3) The light ray travels from glass to air

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

72. 2008/II/17



A ray of light is traveling from glass to air as shown above. Which of the following ratios is the refractive index of glass?

A. $\frac{\sin\theta}{\sin\phi}$ B. $\frac{\sin\phi}{\sin\theta}$ C. $\frac{\sin(90°-\theta)}{\sin(90°-\phi)}$ D. $\frac{\sin(90°-\phi)}{\sin(90°-\theta)}$

73. 2008/II/38

Which of the following statements about total internal reflection is/are correct?

(1) The angle of incidence is less than the critical angle
(2) Both reflected and refracted rays appear
(3) The ray is traveling from an optically denser to an optically less dense medium

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only