

Unit 7 - Week 5

Course outline

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Week 5

● Lecture 21 : Basic discussion on spectrometer and prism (contd.)

● Lecture 22 : Basic discussion on spectrometer and prism (contd.)

● Lecture 23 : Schuster's method

○ Lecture 24 : Discussion on angle of the prism, angular dispersion and dispersive power of given prism

● Lecture 25: Determination of the angle of prism

● Lecture 26: Determination of the angle of minimum deviation for a given prism and hence to determine the refractive index of the given prism.

○ Quiz : Assignment 5

○ Feedback for Week 5

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Assignment Solution

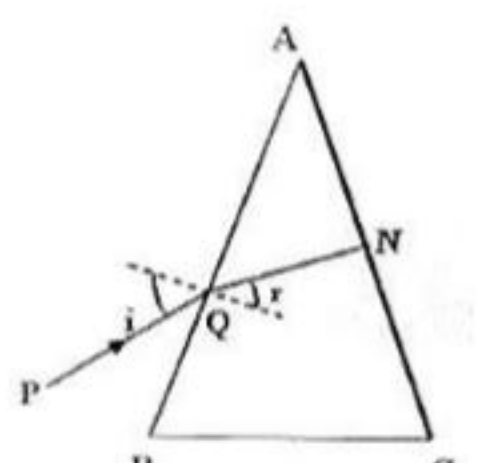
Text Transcripts

Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-04, 23:59 IST.

- 1) One of the refracting surfaces of a prism of refractive index $\sqrt{2}$ is silvered. The angle of the prism is equal to the critical angle of a medium of refractive index 2. A ray of light incident on the unsilvered surface passes through the prism and retraces its path after reflection at the silvered face. Then the angle of incidence on the unsilvered surface is



- (a) 0°
(b) 30°
(c) 45°
(d) 60°

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

- 2) A ray of light incident at an angle θ on a refracting face of a prism emerges from the other face normally. If the angle of the prism is 5° and the prism is made of a material of refractive index 1.5, the angle of incidence is [treat the prism as a thin prism]

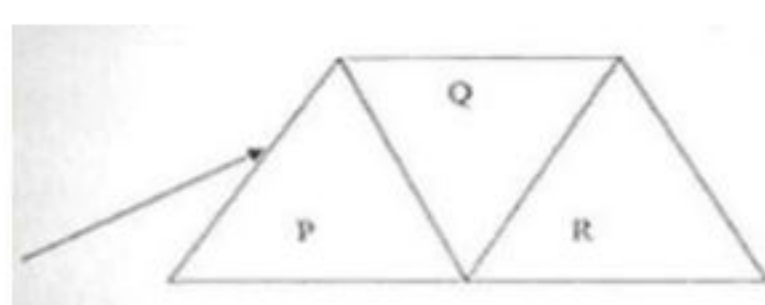
- (a) 7.5°
(b) 5°
(c) 15°
(d) 2.5°

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a

- 3) A ray of light suffers minimum deviation in equilateral prism P. Additional prisms Q and R of identical shape and of same material as that of P are now combined as shown in figure. The ray will now suffer



- (a) greater deviation
(b) no deviation
(c) same deviation as before
(d) total internal reflection

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

- 4) At minimum deviation the angle of emergent is:

- (a) equal to the angle of incidence
(b) depends upon angle of incidence and angle of the prism
(c) depends upon the angle of the prism and the refractive index of the material of the prism
(d) greater than the angle of incidence

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a

- 5) In the measurement of the angle of a prism using a spectrometer, the readings of first reflected image are Vernier I: $320^\circ 40'$ Vernier II: $140^\circ 30'$ and those of the second reflected image are Vernier I: $80^\circ 38'$; Vernier II: $260^\circ 24'$. Then the angle of the prism is

- (a) $59^\circ 58'$
(b) $59^\circ 36'$
(c) $60^\circ 2'$
(d) $60^\circ 4'$

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a

- 6) A prism of refractive index μ and angle A is placed in the minimum deviation position. If the angle of minimum deviation is A, then the value of A in terms of μ is

- (a) $\sin^{-1}(\mu/2)$
(b) $\sin^{-1} \sqrt{[(\mu-1)/2]}$
(c) $2\cos^{-1}(\mu/2)$
(d) $\cos^{-1}(\mu/2)$

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

- 7) A biconvex lens of focal length 15 cm is in front of a plane mirror. The distance between the lens and the mirror is 10 cm. A small object is kept at a distance of 30 cm from the lens. The final image is

- (a) virtual and at a distance of 16 cm from the mirror
(b) real and at distance of 16 cm from the mirror
(c) virtual and at a distance of 20 cm from the mirror
(d) real and at a distance of 20 cm from the mirror

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b

- 8) How is the power of lens change w.r.t. to wavelength of light?

- (a) It is independent of the wavelength
(b) It is maximum for violet and minimum for red
(c) It is maximum for red and minimum for violet
(d) It increases with increase in wavelength

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b

- 9) How does the deviation of ray by a prism change with the colour of light?

- (a) It is maximum for violet and gradually decreases towards red.
(b) It is maximum for red and gradually decreases towards violet.
(c) It is same for all colour of light.
(d) None of the above statements is correct.

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
a

- 10) In telescope of spectrometer:

- (a) The objective produces real, magnified image and eyepiece produces virtual diminished image.
(b) The objective produces real, diminished image and eyepiece produces virtual magnified image.
(c) The objective produces virtual, magnified image and eyepiece produces real diminished image.
(d) The objective produces virtual, diminished image and eyepiece produces real magnified image.

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b

- 11) Can you get emergent ray for any value of the angle of the prism?

- (a) Yes
(b) No, if the angle of the prism exceeds the critical angle of the material of the prism, there will be no emergent ray
(c) No, if the angle of the prism exceeds twice the critical angle of the material of the prism, there will be no emergent ray
(d) No, if the angle of the prism exceeds thrice the critical angle of the material of the prism, there will be no emergent ray

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
c

1 point

1 point

1 point

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