

# Practice Quiz 7

These are Q's from old quizzes. I do not guarantee that the Q's on this year's quiz will be the same, or even similar.

A camera's zoom lens covers the focal length range from 38mm to 110 mm. You point the camera at a distant object and photograph it first at 50mm and then at 75mm. What's the ratio of the images on the two photos?

A) 2.9

B) 4.0

C) 2.0

D) 1.5

A double convex lens with equal curvature radii of 38cm is made from glass with refractive index ranging from 1.51 to 1.54 across the visible spectrum of light (i.e. from red to blue). A white light is placed on the lens axis at a place 95cm away from the lens. Over what range will its visible image be smeared?

A) 2.9cm

B) 5.5cm

C) 8.3cm

D) 9.4cm

E) 11.2cm

You are wearing a corrective lens because you are short sighted. Which of the following describes best the lens that you need?

C A) double concave

B) double convex

C) concave meniscus

Which of the following statements is incorrect?

A) Virtual images can not be projected.

B) A slide projector produces real images which are upside down on the projection screen.

C) Chromatic aberration is a limitation of lenses due to their geometry.

C D) Spherical aberration is a limitation of lenses due to their geometry.

E) A microscope based on two lenses only will produce an upside down picture.

To the unaided eye, the planet jupiter has an angular diameter of 50 arc seconds. What will be its angular size when viewed through a 1m focal length refracting telescope with an eye piece

A whose focal length is 40mm?

A) 1250 arc seconds

B) 500 arc seconds

C) 100 arc seconds

D) <1 arc seconds

What is the focal length of a concave mirror if an object placed 50cm in front of the mirror has a real image 75cm from the mirror?

B A) 15cm

B) 30cm

C) 45cm

D) 60cm

How can you use a telescope as a microscope?

A) You adjust the eye piece to focus on a close object instead of a distant object.

C B) You adjust the objective to focus on a close object instead of a distant object.

C) It's fundamentally not possible because the focal length for the objective is too large as compared to the distance between objective and eye piece.

Where on the axis of a concave mirror would you place an object in order to produce an image the same size as the original?

A) put the object at twice the focal length from the mirror

A B) half way between the focal length and the center of curvature of the mirror.

C) between focal length and mirror

D) further away from the mirror than the center of curvature of the mirror.

E) halfway between the center of curvature and the mirror.

What is the focal length of a concave mirror if an object placed 50cm in front of the mirror has a real image 200cm from the mirror?

- C
- A) 20cm                      B) 30cm                      C) 40cm                      D) 50cm                      E) 60cm

Which of the following statements is incorrect?

- A) Virtual images can not be projected.  
B) A slide projector produces real images which are upside down on the projection screen.  
C) Chromatic aberation is a limitation of lenses due to their geometry.  
C D) Spherical aberation is a limitation of lenses due to their geometry.  
E) A microscope based on two lenses only will produce an upside down picture.

Where on the axis of a concave mirror would you place an object in order to produce an image the same size as the original?

- A) put the object at twice the focal length from the mirror  
B) half way between the focal length and the center of curvature of the mirror.  
A C) between focal length and mirror  
D) further away from the mirror than the center of curvature of the mirror.  
E) halfway between the center of curvature and the mirror.

You are projecting 35mm slides onto a wall 2.6m from the projector whose single lens has focal length 12.0cm.

(a) How far should the slides be from the lens?

(b) How big will the image be?

- A
- A) (a)12.6cm (b) -72cm                      B) (a) -12.6cm (b) 72cm  
C) (a) 25cm (b) 36cm                      D) (a) 25cm (b) -36cm

A converging lens has surfaces with radii  $R_1=80\text{cm}$  and  $R_2=-36\text{cm}$ , and an index of refraction of  $n=1.63$ . An emerald that is  $2\text{cm}$  tall is placed  $15\text{cm}$  to the left of the lens. Where will the image be located?

- A
- A) Same side as the emerald at a distance  $25\text{cm}$  away from the lens.
  - B) Opposite side of the lens from the emerald at a distance  $25\text{cm}$  away from the lens.
  - C) Same side as the emerald at a distance  $20\text{cm}$  away from the lens.
  - D) Opposite side of the lens from the emerald at a distance  $20\text{cm}$  away from the lens.
  - E) Same side as the emerald at a distance  $15\text{cm}$  away from the lens.