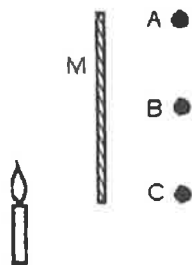


Ch 16-Reflection

16.1 Conceptual Questions

- _____ 1) Which one of the following sets of characteristics describes the image formed by a plane mirror?
- A) real and inverted
 - B) real and upright
 - C) virtual and upright
 - D) virtual and inverted
 - E) virtual and larger than the object
- _____ 2) The image formed in a plane mirror is
- A) at the same distance in front of the mirror as the object is in front of the mirror.
 - B) a real image behind the mirror.
 - C) at the same distance behind the mirror as the object is in front of the mirror.
 - D) at a shorter distance behind the mirror than the distance the object is in front of the mirror.
 - E) at a larger distance behind the mirror than the distance the object is in front of the mirror.
- _____ 3) A lighted candle is placed a short distance from a plane mirror, as shown in the figure. At which location will the image of the flame appear to be located?



- A) at A
 - B) at B
 - C) at C
 - D) at M (at the mirror)
- _____ 4) As you walk away from a plane mirror on a wall, the height of your image
- A) gets smaller.
 - B) may or may not get smaller, depending on where the observer is positioned.
 - C) is always a real image, no matter how far you are from the mirror.
 - D) changes from being a virtual image to a real image as you pass the focal point.
 - E) is always the same size.

- _____ 5) Suppose you place an object in front of a concave mirror. Which of the following statements *must* be true? (There could be more than one correct choice.)
- A) The image of the object will always be smaller than the object.
 - B) No matter where you place the object, a real image of the object will be formed.
 - C) The image of the object will always be inverted.
 - D) If you position the object between the mirror and the focal point of the mirror, its image must be upright and virtual.
 - E) No matter where you place the object, the image of the object will always be virtual and upright.
- _____ 6) Which statements about images are correct? (There could be more than one correct choice.)
- A) A virtual image cannot be formed on a screen.
 - B) A virtual image cannot be viewed by the unaided eye.
 - C) A virtual image cannot be photographed.
 - D) A real image must be erect.
 - E) Mirrors always produce real images because they reflect light.
- _____ 7) The focal length of a concave mirror has a magnitude of 20 cm. What is its radius of curvature?
- A) 10 cm
 - B) 40 cm
 - C) -40 cm
 - D) 20 cm
 - E) -20 cm
- _____ 8) The focal length of a convex mirror is has a magnitude of 20 cm. What is its radius of curvature?
- A) -10 cm
 - B) 40 cm
 - C) -40 cm
 - D) -20 cm
 - E) 20 cm
- _____ 9) If a spherical concave mirror has a radius of curvature R , its focal length is
- A) $R/4$.
 - B) $R/2$.
 - C) R .
 - D) $2R$.
 - E) $4R$.
- _____ 10) If a spherical convex mirror has a radius of curvature R , the magnitude of its focal length is
- A) $R/2$.
 - B) $R/4$.
 - C) R .
 - D) $2R$.
 - E) $4R$.

- ___ 11) Which of the following statements about spherical mirrors is correct? (There could be more than one correct choice.)
- A) A concave mirror always produces a real image.
 - B) A convex mirror always produces a virtual image.
 - C) A concave mirror always produces a virtual image.
 - D) A convex mirror always produces a real image.
 - E) A convex mirror always produces an upright image.
- ___ 12) If an object is placed at the center of curvature of concave mirror, the image formed by the mirror is located
- A) out beyond the center of curvature.
 - B) at the center of curvature.
 - C) between the center of curvature and the focal point.
 - D) at the focal point.
 - E) at infinity.
- ___ 13) Sometimes when you look into a curved mirror you see a magnified image (a great big you) and sometimes you see a diminished image (a little you). If you look at the bottom (convex) side of a shiny spoon, what will you see?
- A) You won't see an image of yourself because no image will be formed.
 - B) You will see a little you, upside down.
 - C) You will see a little you, right side up.
 - D) You will see a little you, but whether you are right side up or upside down depends on how near you are to the spoon.
 - E) You will either see a little you or a great big you, depending on how near you are to the spoon.
- ___ 14) Single concave spherical mirrors produce images that
- A) are always smaller than the actual object.
 - B) are always larger than the actual object.
 - C) are always the same size as the actual object.
 - D) could be smaller than, larger than, or the same size as the actual object, depending on the placement of the object.
 - E) are always real.
- ___ 15) A beam of light that is parallel to the principal axis strikes a concave mirror. What happens to the reflected beam of light?
- A) It also is parallel to the principal axis.
 - B) It is perpendicular to the principal axis.
 - C) It passes through the center of curvature of the mirror.
 - D) It passes through the focal point of the mirror.
 - E) It passes between the focal point and the center of curvature of the mirror.

- ____ 16) Suppose you wanted to start a fire using a mirror to focus sunlight. Which of the following statements is most accurate?
- A) It would be best to use a plane mirror.
 - B) It would be best to use a convex mirror.
 - C) It would be best to use a concave mirror, with the object to be ignited positioned at the center of curvature of the mirror.
 - D) It would be best to use a concave mirror, with the object to be ignited positioned halfway between the mirror and its center of curvature.
 - E) One cannot start a fire using a mirror, since mirrors form only virtual images.

16.2 Problems

- 17) David stands 2.5 m in front of a plane mirror.
- (a) How far from David is his image in the mirror?
 - (b) If David moves away from the mirror at 1.5 m/s, how fast are David and his image moving apart from each other?
 - (c) If David is 180 cm tall, how tall is his image in the mirror?
- ____ 18) An object that is 75 cm tall is located 3.8 m in front of a plane mirror. The image formed by the mirror appears to be
- A) 1.9 m in front of the mirror.
 - B) on the mirror's surface.
 - C) 1.9 m behind the mirror's surface.
 - D) 3.8 m in front of the mirror.
 - E) 3.8 m behind the mirror's surface.
- ____ 19) A laser beam strikes a plane mirror's reflecting surface with an angle of incidence of 43° . What is the angle between the incident ray and the reflected ray?
- A) 43°
 - B) 86°
 - C) 45°
 - D) 90°
 - E) 0°
- ____ 20) A person jogs toward a plane mirror at a speed of 3 m/s. How fast is he approaching his image in the mirror?
- A) 1.5 m/s
 - B) 3 m/s
 - C) 4 m/s
 - D) 5 m/s
 - E) 6 m/s

**Ch 16-Reflection
Answer Section**

- 1) ANS: C PTS: 1 REF: Var: 1
2) ANS: C PTS: 1 REF: Var: 1
3) ANS: C PTS: 1 REF: Var: 1
4) ANS: E PTS: 1 REF: Var: 1
5) ANS: D PTS: 1 REF: Var: 1
6) ANS: A PTS: 1 REF: Var: 1
7) ANS: B PTS: 1 REF: Var: 1
8) ANS: C PTS: 1 REF: Var: 1
9) ANS: B PTS: 1 REF: Var: 1
10) ANS: A PTS: 1 REF: Var: 1
11) ANS: B, E PTS: 1 REF: Var: 1
12) ANS: B PTS: 1 REF: Var: 1
13) ANS: C PTS: 1 REF: Var: 1
14) ANS: D PTS: 1 REF: Var: 1
15) ANS: D PTS: 1 REF: Var: 1
16) ANS: D PTS: 1 REF: Var: 1
17) ANS:
 (a) 5.0 cm (b) 3.0 m/s (c) 180 cm

 PTS: 1 REF: Var: 6
18) ANS: E PTS: 1 REF: Var: 3
19) ANS: B PTS: 1 REF: Var: 3
20) ANS: E PTS: 1 REF: Var: 5