1. A ray of monochromatic light traveling in air is incident on a plane mirror at an angle of $30^\circ$, as shown in the diagram below.

![Diagram of light ray incident on plane mirror]

The angle of reflection for the light ray is:
1) $15^\circ$  
2) $30^\circ$  
3) $60^\circ$  
4) $90^\circ$

2. The diagram below shows parallel rays of light incident on an irregular surface.

![Diagram of light rays on irregular surface]

Which phenomenon of light is illustrated by the diagram?
1) diffraction  
2) refraction  
3) diffuse reflection  
4) regular reflection

3. What is the frequency of a light wave with a wavelength of $6.0 \times 10^{-7}$ meter traveling through space?
1) $2.0 \times 10^{-15}$ Hz  
2) $1.8 \times 10^{14}$ Hz  
3) $5.0 \times 10^1$ Hz  
4) $5.0 \times 10^{14}$ Hz

4. The diagram below shows a light ray in air incident on a crown glass block.

![Diagram of light ray incident on crown glass block]

As the light ray enters the crown glass block, it will:
1) slow down and bend toward the normal  
2) slow down and bend away from the normal  
3) speed up and bend toward the normal  
4) speed up and bend away from the normal

5. A ray of light ($f = 5.09 \times 10^{14}$ Hz) traveling in air is incident at an angle of $40^\circ$ on an air-crown glass interface as shown below.

![Diagram of light ray incident on air-crown glass interface]

What is the angle of refraction for this light ray?
1) $25^\circ$  
2) $37^\circ$  
3) $40^\circ$  
4) $78^\circ$

6. What is the speed of light ($f = 5.09 \times 10^{14}$ Hz) in ethyl alcohol?
1) $4.53 \times 10^{-9}$ m/s  
2) $2.43 \times 10^5$ m/s  
3) $1.24 \times 10^8$ m/s  
4) $2.21 \times 10^8$ m/s

7. Total internal reflection can occur as light waves pass from
1) air to crown glass  
2) water to air  
3) alcohol to glycerol  
4) Lucite to crown glass

8. A ray of monochromatic light is traveling in flint glass. The ray strikes the flint glass-air interface at an angle of incidence greater than the critical angle for flint glass. Which diagram best represents the path of this light ray?

![Diagrams of light rays through flint glass interface]

9. The speed of light in a piece of plastic is $2.00 \times 10^8$ meters per second. What is the absolute index of refraction of this plastic?
1) 0.670  
2) 1.33  
3) 1.50  
4) 1.00
Behavior Of Light

10. Which diagram best represents the behavior of a ray of monochromatic light in air incident on a block of crown glass?

1) Incident ray
   Normal
   Air
   Crown glass

2) Incident ray
   Normal
   Air
   Crown glass

3) Incident ray
   Normal
   Air
   Crown glass

4) Incident ray
   Normal
   Air
   Crown glass

11. The diagram below shows sunglasses being used to eliminate glare.

Which phenomenon of light is represented in the diagram?
1) polarization  2) diffraction  3) internal reflection  4) dispersion

12. As represented in the diagram below, the speed of a wave increases as it passes from medium 1 into medium 2. Which arrow best represents the direction of the wave in medium 2?

13. The diagram below shows light rays in air about to strike a glass window.

When the rays reach the boundary between the air and the glass, the light is
1) totally reflected  2) partially reflected and partially refracted  3) totally refracted  4) partially reflected and partially diffracted

14. As yellow light \( f = 5.09 \times 10^{14} \text{ Hz} \) travels from zircon into diamond, the speed of the light
1) decreases  3) increases  2) remains the same

15. Electromagnetic radiation having a wavelength of \( 1.3 \times 10^{-7} \text{ meter} \) would be classified as
1) ultraviolet  2) orange  3) blue  4) infrared

16. Electromagnetic waves can be generated by accelerating
1) a hydrogen atom  2) an electron  3) photon  4) a neutron
Behavior Of Light

Which diagram best represents the path of light rays passing through a glass prism?

1)  
![Diagram 1](image1)

2)  
![Diagram 2](image2)

3)  
![Diagram 3](image3)

4)  
![Diagram 4](image4)

18. In the diagram below, a ray of monochromatic light \((\lambda = 5.9 \times 10^{-7}\) meter\) reaches the boundary between medium X and air and follows the path shown.

![Diagram](image5)

Which medium is most likely medium X?

1) diamond  
2) water  
3) flint glass  
4) Lucite