

1. List the 7 electromagnetic waves in order and give an example of each.

- R Radio - Radio
- M Microwave - microwave
- I infrared - Remote
- V Visible - camera
- U UV - blacklight
- X XRAY - XRAY
- G Gamma - Nuclear Power

2. What is the frequency of an electromagnetic wave if it has a wavelength of 2450 m? Speed = 3×10^8

Speed = frequency x wavelength

$$3 \times 10^8 = f \cdot 2450$$

$$f = 122448.98 \text{ Hz}$$

3. If the distance from a source of light is 9.34 m, how much less light falls on this area?

(1/distance) = light

$$\frac{1}{9.34} = \text{Light}$$

$$0.1$$

4. What are the two types of reflection? Define each one.

Diffuse - Bumpy
Specular - Smooth

5. Draw a reflected light using the law of reflection.



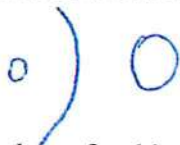
6. Draw a ray diagram for a flat mirror.



7. Define concave spherical mirror.

inwardly curved

8. Draw a ray diagram for a concave spherical mirror.



9. A concave mirror has a focal length of 23 cm. Calculate the image position of a bottle placed in front of the mirror at a distance of 87 cm. Calculate the magnification of the image.

$$(1 / \text{image position}) + (1 / \text{object distance}) = (1 / \text{focal length})$$

Magnification = image position / object distance

$$\frac{1}{\text{image}} + \frac{1}{87} = \frac{1}{23}$$

$$\frac{1}{\text{image}} + 0.011 = 0.04$$

$$\frac{1}{\text{image}} = 0.032$$

$$\text{image} = 31.25 \text{ m}$$

$$m = \frac{\text{image}}{\text{object}} = \frac{31.25}{87} = 0.36$$

10. A concave mirror is designed so that an object placed 34 cm in front of the mirror and the image is seen upright at a distance of 50 cm behind the mirror. What is the radius of the curvature of the mirror?

$(1 / \text{image position}) + (1 / \text{object distance}) = (2 / \text{radius})$

Magnification = image position / object distance

$$\frac{1}{50} + \frac{1}{34} = \frac{2}{R}$$

$$.02 + .03 = \frac{2}{R}$$

$$M = \frac{50}{34} = 1.47$$

$$.05 = \frac{2}{R}$$

$$R = 40\text{m}$$

11. Define convex spherical mirror.

Outwardly Curved

12. Draw a ray diagram for a convex spherical mirror.



13. What are the two types of telescopes? Define both.

reflecting - mirrors
refracting - lenses

14. If you see a green leaf, what colors are being absorbed and being reflected?

Absorbed ROYBIV Reflected - Green

15. What is refraction?

Bending of light

16. What is the speed of light in fluorite if the index of refraction for fluorite is 1.434?

Index of refraction = 3×10^8 / speed of light in ice

$$1.434 = \frac{3 \times 10^8}{\text{Speed}}$$

$$209205020.9 \frac{\text{m}}{\text{s}}$$

17. What 2 things does the angle of an existing light ray depend on when a ray of light is allowed to enter a pane of glass and then exists?

Angle material

18. What is a lens? Transparent object

19. What are some examples of optical instruments that use lenses to form images?

glasses, contacts, camera, telescopes

20. What are the two types of lenses? Sketch a drawing of each with light rays.



21. What type of lens is a magnifying glass?

Converging