Science Olympiad Test Answer Key

1. To focus light onto the specimen. The condenser improves clarity by concentrating light.

2. The objective lens or mirror. It collects light and focuses it to form an image.

3. With an adjustable aperture. The aperture limits the light entering the lens.

4. Concave lenses. These lenses diverge light rays to correct nearsightedness.

5. Retro reflectors reflect light back toward its source using three mutually perpendicular surfaces.

6. By using mirrors or prisms to bend light rays along the periscope's path.

7. Refracting telescopes use lenses, while reflecting telescopes use mirrors to collect and focus light.

8. Magnification is the ratio of the focal lengths of the objective lens to the eyepiece.

9. To control the depth of field and the amount of light reaching the camera sensor.

10. Plane mirrors. They reflect light along parallel paths for periscopes.

11. Absorption spectra show the wavelengths of light absorbed by a material.

12. Dyes absorb specific wavelengths of light, reflecting the remaining light as color.

13. The wavelength of maximum absorbance. It corresponds to a material's electronic transitions.

14. Absorbance is proportional to concentration. A = e * c * l (Beer's Law).

15. Electronic transitions. Light excites electrons to higher energy states.

16. Absorbed wavelengths are missing from the light transmitted through the material.

17. To zero the instrument and account for solvent effects in absorbance measurements.

18. The solvent affects absorbance by altering the environment of the solute molecules.

19. The ultraviolet and visible light regions.

20. Determining concentrations, purity, and structural information of chemicals.

21. Light reflects off the three surfaces of a retro reflector to return to its source.

22. Reflecting telescopes avoid chromatic aberration and can be made larger.

23. Using two lenses: the objective for magnification and the eyepiece to enlarge the image.

24. The aperture size and wavelength of light determine resolving power.

25. Filters isolate specific wavelengths for detailed absorption studies.