



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. Name the light-sensitive layer of the eye.
2. Explain the functions of iris and pupil.
3. What is the near point of a typical young adult eye?
4. What is the far point of a normal eye?
5. Name the eye's ability to adjust its focal length.
6. Explain the role of ciliary muscles in seeing near objects.
7. Which lens corrects myopia?
8. Draw a diagram of myopia and its correction.

B. Short answers / practice - 2 marks each

9. Which lens corrects hypermetropia?
10. Draw a diagram of hypermetropia and its correction.
11. A myopic eye has far point 2 m. Find correcting lens power for distant vision.
12. Find power for far point 50 cm.
13. A person's near point is 50 cm. Find the power needed to read at 25 cm, lens close to eye.
14. State the virtual image distance used in your calculation.
15. Which age-related defect reduces accommodation?
16. Explain why bifocal or progressive lenses may be prescribed.
17. Name the splitting of white light into component colours.
18. Why does a prism disperse white light?
19. Which visible colour is generally deviated least by a glass prism?
20. Which is deviated most?

C. Application / reasoning - 3 marks each

21. Is a rainbow formed only by dispersion?

22. Explain the roles of refraction, dispersion and internal reflection in a primary rainbow.

23. What causes stars to twinkle?

24. Explain why planets generally twinkle much less.

25. What optical effect makes the Sun visible slightly before geometric sunrise?

26. Draw a labelled ray path showing apparent and actual positions.

27. A myopic eye has far point 4 m. Find correcting lens power.

28. A person's near point is 1 m. Find lens power for reading at 25 cm, with lens close to eye.

29. Explain why red light is often used for danger signals.

30. Can a prism recombine a suitably separated spectrum using a second inverted prism?

31. Distinguish scattering, refraction and dispersion using one observed phenomenon for each.

D. Extended practice - 5 marks per pair

32. Which scatters more strongly in air: blue or red light?
33. Explain the blue sky and the reddish Sun near the horizon.
34. Would the sky appear blue to an astronaut outside the atmosphere?
35. Explain the Tyndall effect and give two examples; distinguish it from dispersion.

ANSWER KEY - Numerical / closed questions

- 1) Retina. 3) About 25 cm. 4) Infinity. 5) Accommodation. 7) Concave lens. 9) Convex lens.
11) -0.5 D. 12) -2 D. 13) $+2$ D. 14) -50 cm.
15) Presbyopia. 17) Dispersion. 19) Red. 20) Violet. 21) No. 23) Atmospheric refraction through changing air layers. 25) Atmospheric refraction.
27) -0.25 D. 28) $+3$ D. 30) Yes. 32) Blue. 34) No.