



Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

1 Key words**[4]**

Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

concave lens convex lens diopters dispersion optical center power principal focus
red spectrum violet

The splitting of white light into its seven colors is called _____, and the band of colors it makes is the visible _____. In glass, _____ light travels the slowest and is bent the most. A lens that is thicker in the middle than at its edges is a _____, also called a converging lens. Rays parallel to the principal axis meet at its _____ after passing through it. A ray passing through the _____ of a lens goes straight on without bending. The ability of a lens to converge or diverge light is its _____, which is measured in _____ (D).

2 Label the diagram**[3]**

The diagram shows six shapes of lens. Write the name of each lens numbered 1 to 6. Each carries 0.5 mark.

Converging lenses (convex): thicker in the middle



①

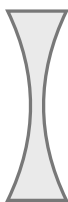


③



⑤

Diverging lenses (concave): thinner in the middle



②



④



⑥

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____



3 Multiple choice

[5]

Choose the correct option for each of the following questions.

- i. In a glass prism, which color of light is slowest and bent the most? [1]
a. red b. yellow
c. green d. violet
- ii. An object AB stands on the principal axis between a convex lens and its focus. What is its image like? [1]
a. virtual, erect, magnified b. real, inverted, diminished
c. real, erect, magnified d. virtual, inverted, diminished
- iii. Which statement about the images formed by concave and convex lenses is correct? [1]
a. A convex lens forms a real, inverted and diminished image of an object.
b. A concave lens forms a virtual, erect and diminished image of an object.
c. A convex lens forms a real, inverted and magnified image of an object.
d. A concave lens forms a virtual, erect and magnified image of an object.
- iv. Lens A has a power of -2 D and lens B a power of $+5\text{ D}$. Which is right? [1]
a. A is convex with $f = 50\text{ cm}$
b. B is concave with $f = 20\text{ cm}$
c. A is concave with $f = -50\text{ cm}$, and B is convex with $f = +20\text{ cm}$
d. both are convex, because power is always positive
- v. You see a rainbow in the evening. Where is the Sun? [1]
a. in front of you, above the rainbow b. behind you, low in the west
c. directly overhead d. it doesn't matter where the Sun is

4 Very short answers

[3]

Write very short answers to the following questions.

- a. Write the SI unit of the power of a lens. [1]

- b. Where must an object be placed in front of a convex lens to form a real, inverted image of the same size? [1]

- c. Find the focal length of a lens of power $+2\text{ D}$. [1]



5 Short answers

[6]

Write short answers to the following questions.

a. Give the reason for the dispersion of light.

[2]

b. Write any two differences between a concave lens and a convex lens.

[2]

c. White light is dispersed by a triangular prism onto a screen, with the color X lowest and Y highest.

[2]

a. Which colors are X and Y?

b. Why is Y bent less than X as the light comes out of the prism?

6 Long answer

[4]

Write a long answer to the following question.

A person wonders why a rainbow always looks like a semicircle and is always the same size. Explain, including where the Sun is, where the water drops are, and the dispersion of light.



[6]

a. The lenses of a student's spectacles have a power of -6 D . Calculate their focal length, and say what kind of lens they are.

Answer:

- b. The powers of two convex lenses are +2 D and +4 D.
- Which is thicker? Give a reason.
 - Calculate the focal length of each lens.

[illegible]

Answer:

[2]

A rectangular glass slab also slows violet light more than red light. Yet white light that passes through a slab comes out white, not as a band of colors. Why?

(not marked)

What I did	What I saw	Why?
held a glass prism in a narrow beam of sunlight, in front of a white wall		
spun a Newton's disc slowly		
spun the Newton's disc fast		
sprayed a fine mist of water with the Sun behind me		

