MR SULLY UNFOLDS PHYSICS ANSWERS

Lenses and visible light

AQA 4.6.2.5–4.6.2.6
Waves · Paper 2
Physics only

Name _____ Class _____ Date _____

Lenses form images by refracting light. The colour of an object depends on which wavelengths of light it reflects.

KEY EQUATION

magnification = image height ÷ object height

Magnification is a ratio, so it has no units.
Convex lens: parallel rays meet at the principal focus.
Focal length: distance from the lens to the principal focus.

Section A · Recall

Grade 4–5

1 What is the difference between a real image and a virtual image? [2]

Real: light rays actually meet; can be shown on a screen.

Virtual: rays only appear to come from it; can't be projected.

2 State the type of image that a concave lens always forms. [1]

Virtual

3 Why does a red apple look red in white light? [2]

It reflects red light most strongly,

and absorbs the other colours.

Section B · Apply

Grade 5–6

4 An object 2 cm tall forms an image 6 cm tall. Calculate the magnification. [2]

Magnification = 6 ÷ 2 = 3

5 Draw a ray diagram to show how a convex lens focuses parallel rays of light. Label the principal focus and focal length. [3]

Parallel rays refracted (1); meet at a point labelled principal focus (1); focal length marked from lens centre to F (1).

6 Explain the difference between specular and diffuse reflection. [2]

Specular: reflection from a smooth surface in a single direction (e.g. a mirror).

Diffuse: reflection from a rough surface, scattered in many directions.

Section C · Stretch

Grade 7+

7 White light is shone through a blue filter onto a red object. Explain what colour the object appears. [3]

The filter only transmits blue light.

The red object absorbs blue light (it only reflects red),

so no light is reflected and it appears black.

Exam-style question

AQA style

8 A student uses a convex lens to make an image of a window on a screen.

a State whether the image is real or virtual. Explain how you know. [2]

Real,

because it can be formed on a screen.

b The window is 1.5 m tall and the image is 3 cm tall. Calculate the magnification. [2]

Convert: 1.5 m = 150 cm

Magnification = 3 ÷ 150 = 0.02

c Explain why white objects look white. [1]

They reflect all wavelengths of visible light equally.

Total: _____ / 20

How confident am I?	Not yet	Nearly	Got it
I can describe real and virtual images	☐	☐	☐
I can use the magnification equation	☐	☐	☐
I can explain the colour of objects and filters	☐	☐	☐