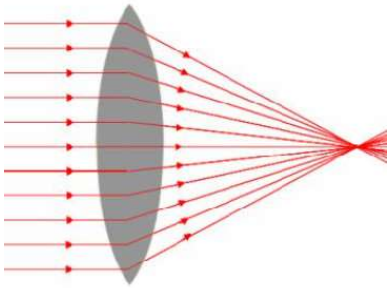
Name: Class:

Total Possible Marks: 30

# Lenses and Images



10

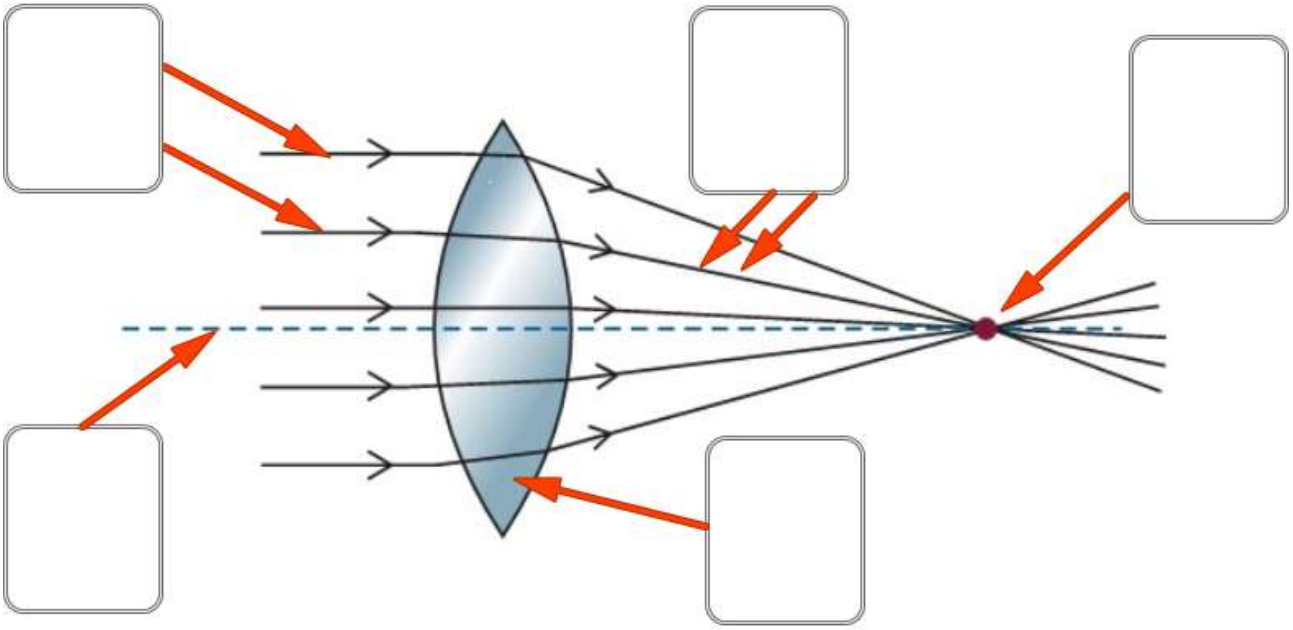
1. (a) Lenses form (b) images by (c) refracting light and (d) changing its (e) direction. There are 2 main types of lens - convex or (f) converging and (g) concave or diverging. They have different (h) shapes and have (i) opposite effects on (j) light rays.

| | | | | |
|---|---|---|---|---|
| *images* | *shapes* | *refracting* | *Lenses* | *opposite* |
| *changing* | *converging* | *direction* | *concave* | *light* |

5

2. Study the diagram below, in the boxes label the parts indicated by the red arrows.

* 1 mark for parallel rays, 1 mark for axis, 1 mark for converging rays, 1 mark for convex lens and 1 mark for principal focus or focal point



1

3. In a short paragraph, explain what is meant by a "real image"

* 1 mark for stating that the image is formed when the light rays come together, 1 mark for stating that the rays actually pass through the same point, 1 mark for stating that the real image can be captured on screen and 1 bonus mark for an example such as retina or projector screen

A real image is formed when the light rays from a point on an object come together to form an image. The light rays actually pass through the same point. A real image can be captured on a "screen" like the image formed on the retina of the eye or the image formed on a projector screen.

1

4. The virtual image is formed when the light rays from point on an object are diverging after they have left the lens. A virtual image cannot be projected onto a screen.

(A) True

(B) False

7

5. Look at the prompts below and enter the appropriate name for what is being described.

a. This is a type of lens which bulges outwards — Convex

b. This is a type of lens which caves inwards — Concave

c. This is a line which passes through the middle of the lens and is perpendicular to it — Axis

d. This is the distance from the centre of the lens to the principal focus — Focal length

e. This type of lens causes parallel rays of light to divert (that is spread out) — Concave

f. This type of lens causes rays of light which are parallel to the axis to converge together — Convex

g. In a convex lens this point is the point at which rays hitting the lens parallel to the axis will meet — Principal focus / focal point

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6. Look at the statements below concerning convex lenses and decide which are true and which are false

a. **T** F Another name for a convex lens is a diverging lens * No, a diverging lens is a concave lens, a convex lens is a converging lens

b. **T** F An incident ray passing through the principal focus before meeting the lens refracts through the lens and travels parallel to the axis * this is correct, rays which appear to have come from the focal point on one side of the lens will pass through the lens and continue to travel parallel to the axis on the other side

c. **T** F In a convex lens there is a principal focus on each side of the lens * This is correct

d. **T** F A convex lens is a lens in which one or both sides curves inwards * this is of course incorrect, this description is that of a concave lens

e. T **F** An incident ray travelling parallel to the axis reflects back through the lens and passes through the principal focus on the same side as the incident ray's origin. * No, the incident ray will travel through the lens and pass through the principal focus on the other side

f. **T** F An incident ray passing through the centre of the lens will carry on in the same direction * Correct as there will be no refraction