Q1. Ann shines a ray of white light at a glass prism.

(a) Tick one box in each row to show if each sentence is **true** or **false**.

<table>
<thead>
<tr>
<th>Sentence</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>The light refracts as it enters the prism.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The light refracts as it travels through the prism.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The light disperses as it leaves the prism.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The light forms a spectrum of colours on the screen.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 marks

(b) Ann places two mirrors at 90° and shines a ray of light at mirror 1.

(i) On the diagram above continue the ray of light to show how it is reflected by both mirrors. Use a ruler.

2 marks

(ii) On the diagram above label the incident ray (i) and the reflected ray (r) for the light striking **mirror 2**.

1 mark
(c) Ann shines the torch at a red book.

Explain why the object looks red in white light.

.........................................................................................................................................................
.........................................................................................................................................................
.........................................................................................................................................................

2 marks

(d) In a dark room, Ann puts different coloured filters in front of the torch. She records the colour the book appears.

Complete the table below to show the colour that the book would appear. Tick one box in each row. The first one has been done for you.

<table>
<thead>
<tr>
<th>colour of filter</th>
<th>What colour does the red book appear?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>red</td>
</tr>
<tr>
<td>no filter</td>
<td>✓</td>
</tr>
<tr>
<td>red filter</td>
<td></td>
</tr>
<tr>
<td>green filter</td>
<td></td>
</tr>
</tbody>
</table>

1 mark
maximum 8 marks
The human eye detects red light, blue light and green light. A combination of red, green and blue light is seen as white. We ‘see’ other colours when different combinations of red, blue and green enter the eye. This is shown in the table.

<table>
<thead>
<tr>
<th>light entering the eye</th>
<th>colour ‘seen’ by the eye</th>
</tr>
</thead>
<tbody>
<tr>
<td>no light</td>
<td>black</td>
</tr>
<tr>
<td>red</td>
<td>red</td>
</tr>
<tr>
<td>blue</td>
<td>blue</td>
</tr>
<tr>
<td>green</td>
<td>green</td>
</tr>
<tr>
<td>red + blue</td>
<td>magenta</td>
</tr>
<tr>
<td>blue + green</td>
<td>cyan</td>
</tr>
<tr>
<td>red + green</td>
<td>yellow</td>
</tr>
<tr>
<td>red + blue + green</td>
<td>white</td>
</tr>
</tbody>
</table>

(a) Some magenta paint is illuminated by a combination of red, green and blue light. Explain why the paint appears magenta.

......................................................................................................................
......................................................................................................................
......................................................................................................................

2 marks

(b) A mixture of cyan paint and yellow paint appears green in a combination of red + blue + green light. Explain what happens to:

(i) the red light? .................................................................................................

1 mark

(ii) the blue light? ..............................................................................................

1 mark

(iii) the green light? ............................................................................................

1 mark
(c) Most colours of paint can be obtained by mixing different combinations of cyan, magenta and yellow paints. What combination of these paints makes:

(i) blue paint?

........................................................................................................................................ 1 mark

(ii) red paint?

........................................................................................................................................ 1 mark

Maximum 7 marks
M1. (a) • true    false

for all four correct, award two marks
for any two or three correct, award one mark
for one correct answer, award no marks
if more than one box is ticked in any row, do not give credit for that row

2 (L6)

(b) (i) •

award one mark for approximately equal angles of incidence and reflection at mirror 1
award one mark for a continuous ray that is reflected off mirror 1 and mirror 2
both rays are required for the mark rays must been drawn as straight lines
ignore any arrows

2 (L7)

(ii) • rays ‘i’ and ‘r’ correctly labelled on diagram as shown above
both rays, correctly labelled, are required for the mark

1 (L7)

(c) any two from

• white light is a mixture of colours
• the red book absorbs all of the colours of light except red
   accept ‘the other colours are absorbed’
• only red light is reflected
   ‘red light is reflected’ is insufficient

2 (L7)
(d) •

<table>
<thead>
<tr>
<th></th>
<th>red</th>
<th>green</th>
<th>black</th>
</tr>
</thead>
<tbody>
<tr>
<td>red filter</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>green filter</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

**both ticks are required for the mark**

if more than one tick is placed in any row, award no mark

M2. **Answers may be in either order**

(a) it absorbs the green light

*accept 'the green light is not reflected'*

it scatters the red and the blue light

*both colours are required for the mark*

*accept 'it reflects the red and the blue light'*

*accept 'the eye receives only red and blue light'*

*accept 'it reflects only the red and the blue light'*

*or 'it absorbs only the green light' for both marks*

(b) (i) it is absorbed by the cyan paint

*do not accept 'it is absorbed'*

(ii) it is absorbed by the yellow paint

*do not accept 'it is absorbed'*

(iii) it is scattered or reflected by both paints

*accept 'it is scattered or reflected'*

(c) (i) cyan and magenta

*colours may be in either order*

(ii) magenta and yellow

*colours may be in either order*