B3.1 The nervous system

B3.1 Summary questions

1 a to transmit electrical impulses around the body
   b Nucleus: B, Cell body: D, Axon: C, Dendrites: A
   c nucleus

2 motor neurone: carry electrical impulses from receptor cells to the CNS
   sensory neurone: carry electrical impulses from sensory neurones to motor neurones
   relay neurone: carry electrical impulses from the CNS to effectors

3 A: Receptor, B: Sensory (neurone), C: Motor (neurone), D: Effector

4 a

<table>
<thead>
<tr>
<th></th>
<th>Reflex action</th>
<th>Voluntary action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singing</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>Sneezing</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Pupil dilation in poor light</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>Waving</td>
<td>×</td>
<td>✓</td>
</tr>
</tbody>
</table>

b They occur without conscious thought, therefore the impulse only travels to the spinal cord. By
not travelling to the brain the impulse transmission distance is shorter, therefore the body reacts
more quickly.

5 a A: iris, B: retina, C: optic nerve, D: cornea, E: pupil
   b cornea, retina, ciliary muscle, fatter, distant, contracts, thinner
   c eyeball being too short, lens being too weak
   d Short sightedness is caused by the image forming in front of the retina. Light is required
to diverge before entering the eye to correct the vision, so a concave lens is used. This
causes light to focus on the retina, therefore giving a clear image.

6 a cerebellum
   b controlling temperature and water balance (or other correct examples)
   c Advantages:
      No surgical operation is required — so reduced risk of infection / brain damage.
      Allows 3D structures to be seen – enabling accurate identification of abnormalities.
      Other acceptable suggestions with explanation.
   d Active areas of the brain can be identified, due to increased blood flow to this region
      when a person is carrying out a specific activity.