Answers to end-of-chapter questions Chapter 13: Coordination and response

1 a motor neurone

b receptor

c cornea

d retina

e synaptic cleft

f contraction

g circular

h cones

2 a The cornea is a transparent tissue that covers the front of the eye over the pupil and iris; it refracts light rays as they enter the eye. The conjunctiva is a thinner layer which covers the cornea; it protects the front surface of the eye.

b The choroid is a layer of darkly pigmented cells that lies just underneath the retina. The sclera is a tough, white tissue that lies outside the choroid.

c A receptor is a cell that responds to a stimulus by generating a nerve impulse, which then travels along a sensory neurone to the central nervous system. An effector is a part of the body that responds to a stimulus, such as muscle or gland.

d A sensory neurone carries a nerve impulse from a receptor to the CNS. A motor neurone carries a nerve impulse from the CNS to an effector.

e Negative gravitropism is a growth response away from the direction in which gravity is pulling. Shoots show negative gravitropism. Positive gravitropism is a growth response towards the direction in which gravity is pulling. Roots show positive gravitropism.

3 a A reflex action;

b The stimulus from the sharp object is detected by a receptor in the foot. This sends an electrical impulse along a sensory neurone to the brain or spinal cord. The impulse is passed along a relay neurone and then to a motor neurone. This transmits the impulse to an effector, the muscles in your leg, and makes them contract;

4 a motor and relay

b sensory

c sensory

d motor, relay

e relay

f motor

5 a From left to right, as the vesicles of transmitter substance are all on the left; [1]

b A are vesicles containing transmitter substance;
when a nerve impulse arrives they move to the membrane;
and release the transmitter;
which diffuses across the cleft;
and slots into the receptors B;
which triggers a nerve impulse in the right hand neurone; [max 5]

c provide energy;
released by aerobic respiration;
for the movement of the vesicles / for the synthesis of transmitter substance; [3]

6 **a** cell membrane;
cytoplasm;
nucleus; [3]

b **i** retina; [1]

ii fovea; [1]

iii blind spot; [1]

c ref. to receptor cells;
respond to light;
by generating nerve impulses / action potentials;
in the optic nerve;
rods sensitive to low light intensity and cones to high light intensity;
rods not colour sensitive and cones sensitive to colour; [**max 4**]