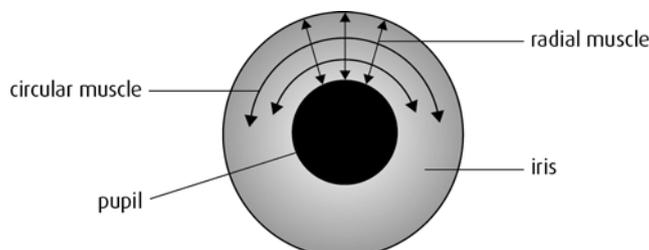


## Extension worksheet – Option E

- 1 The image below shows the pupil and iris of the eye, and associated muscles.



- a What type of action controls the diameter of the pupil? (1)
- b Copy and complete the following table, which compares the effects of sympathetic and parasympathetic nerve stimulation on the eye. (6)

	Stimulation by parasympathetic nerves	Stimulation by sympathetic nerves
<b>Radial muscles of the iris</b>		
<b>Circular muscles of the iris</b>		
<b>Pupil diameter</b>		

- c The parasympathetic and sympathetic nerves also affect other parts of the body. Copy and complete this table by writing 'yes' or 'no' in each box, as appropriate. (4)

Effect	Stimulation by sympathetic nerves
increase in output of the heart	
increase in sweat production	
increase in blood flow to the gut	
vasoconstriction of arterioles in the skin	

- d Suggest circumstances when stimulation by sympathetic nerves might occur and explain your answer. (2)
- 2 a Different areas of the brain are responsible for different functions. Suggest which of the body's functions might be affected by damage to:
- i the cerebellum
- ii the medulla oblongata. (2)
- b The size of the cerebellum in relation to the rest of the brain is different in different animals. Reptiles have a relatively small cerebellum whereas in fish and birds it tends to be large. Suggest why this is the case by referring to the animals' lifestyles and the functions of the cerebellum. (3)

- c** Name the area of the brain responsible for perception of pain. (1)
- d** Suggest **three** responses that might occur if a person sprained an ankle. (3)
- e** What is the role of endorphins in the body's response to pain and where in the nervous system do they act? (2)
- 3 a** Copy and complete the table below by indicating with a tick (✓) which behaviours are innate and which are learned. In some cases, both may apply. (6)

<b>Behaviour</b>	<b>Innate</b>	<b>Learned</b>
emerging dragonfly nymphs climbing upwards		
male birds singing to attract mates		
flatworms moving towards a source of food		
a herd of cows avoiding touching an electric fence		
alarm calls of vervet monkeys		
woodlice avoiding dry conditions		

- b** What are the advantages to an animal of having innate rather than learned behaviours? (2)
- c** As well as inheritance of genes, in what other ways can behaviour patterns be passed from one generation to the next? (1)
- d** Reflex actions require far fewer neurons than actions that require thought. What are the advantages of reflex actions? (1)
- e** When are reflex actions most useful? (1)