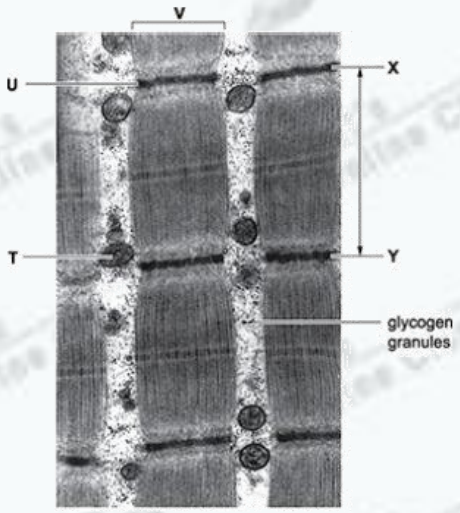
Animal Responses

Total mark – 23

Question: 1

1. The image below is a transmission electron micrograph of a section of skeletal muscle.



Which row, **A** to **D**, shows the correct labels?

	Organelle T	Region U	Region V	Region between X and Y
A	Golgi body	I-line	actin	Z-band
B	mitochondrion	Z-line	myofibril	sarcomere
C	sarcoplasmic reticulum	A-band	collagen	I-band
D	mitochondrion	I-band	myosin	sarcoplasmic reticulum

Your answer

[1]

Question: 2

6. Multiple sclerosis (is an autoimmune disease that damages the nervous system.

Guillain–Barré syndrome is another autoimmune condition in which neurones are damaged and the rate of nervous impulses is reduced.

affects the central nervous system.

Guillain–Barré syndrome affects the peripheral nervous system.

i. Suggest **two** symptoms of that might **not** be present in people with Guillain–Barré syndrome.

Explain your answers.

1 ---

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2 ---

---**[2]**

ii. Multiple sclerosis and Guillain–Barré syndrome both cause muscle weakness and loss of muscle function.

Suggest and describe how the function of neuromuscular junctions will be affected by multiple sclerosis and Guillain–Barré syndrome.

---**[2]**

Question: 3

7. Fig. 16.2 is a diagram of a section through the human brain.

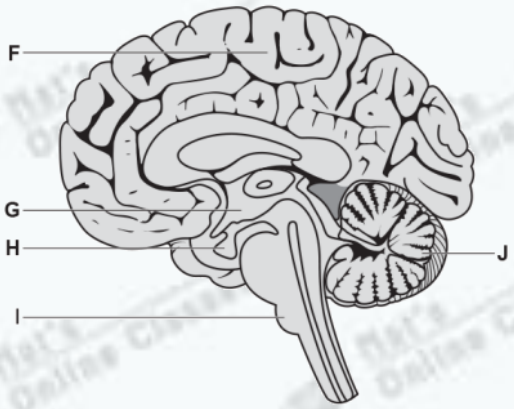

Fig. 16.2

i. Identify the letter and name of the structure in **Fig. 16.2** that is connected by nerves to structure **A** in **Fig. 16.1**.

Letter

Name

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[2]

ii. Normal human resting heart rate is approximately 70 beats per minute (bpm). Cutting the parasympathetic nerve to the heart increases this to approximately 100 bpm.

Suggest **two** conclusions that could be made from this observation about the control of resting heart rate in normal humans.

1

2

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[2]

iii. Injury to the parts of the brain labelled **G** and **H** in **Fig. 16.2** can lead to a range of symptoms including:

- fatigue
- weight gain
- menstrual irregularities
- low blood pressure or dizziness
- increased sensitivity to cold.

Outline how injury to **G** and **H** is able to cause such a wide range of symptoms.

---**[2]**

iv. Suggest why it can be difficult for a doctor to conclude that the symptoms described in part **(iii)** are definitely caused by damage to parts of the brain.

---**[1]**

Question: 4

8. Fig. 20.1 is a flow diagram that shows the sequence of events in the body once a threat is perceived. The response is often described as the 'fight or flight' response as it prepares the body to respond physically to the threat in the short-term.

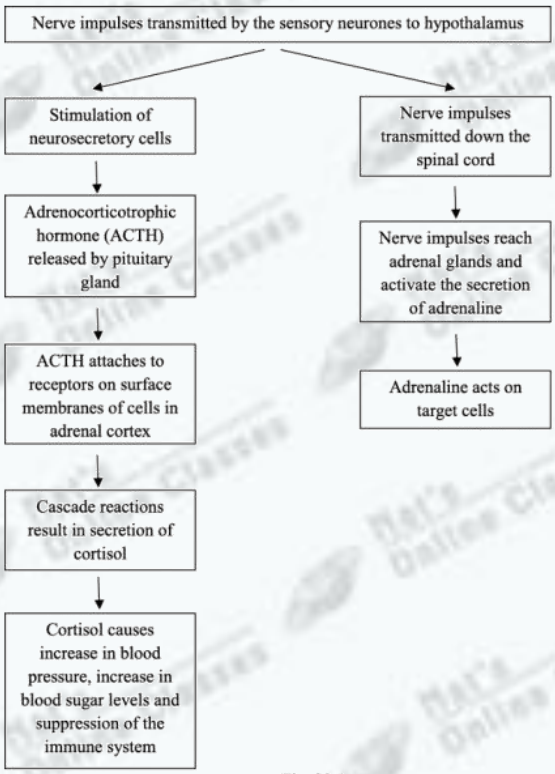

Fig. 20.1

i. Identify **two** signalling molecules named in **Fig. 20.1**.

1 _____

2 _____

[1]

ii. Adrenaline acts on a variety of cell types with a variety of responses.

Complete the table by stating the effects of stimulating each target cell. The first one has been completed for you.

Target cell	Response	Role in the 'fight or flight' response
Smooth muscle in bronchioles	Muscle relaxes	Bronchioles dilate and allow more oxygen to reach blood
Sino-atrial node		
Liver cell		
Erector muscle in skin		

[6]

iii. Describe the sequence of actions that occur once adenylyl cyclase is activated in the target liver cells.

_____

_____

_____

_____ **[2]**

iv. The response in **Fig. 20.1** also occurs when a person is subjected to stress. However, the body does not need to respond physically to the stimulus and so, for example, the bronchioles do not dilate.

From the information given and your own knowledge, suggest the long term adverse effects of continued exposure to stress on body function.

_____

_____

_____

_____ **[2]**