C3.1 Integration of body systems

What the Cell · DP Biology · worksheet · statements C3.1.1–16

Name _____ **Date** _____ **Total** _____ / 55

About 55 minutes, or one section at a time. A calculator is allowed. The number of marks shows how many separate points to make.

Section A: Recall

10 marks

1 **Define** emergent property. C3.1.2 **[1]**

2 **State** the gland that secretes melatonin. C3.1.11 **[1]**

3 **State** the gland that secretes epinephrine. C3.1.12 **[1]**

4 **Distinguish** between a neuron and a nerve. C3.1.8 **[2]**

5 **State** two roles of the cerebellum. C3.1.10 **[2]**

6 **State** what baroreceptors monitor, and one place where they are found. C3.1.14 **[2]**

7 **Identify** the part of the nervous system that coordinates peristalsis in the small intestine. C3.1.16 **[1]**

Section B: Understanding

21 marks

8 **Compare and contrast** nervous and hormonal signalling. C3.1.3 **[4]**

Nervous	Hormonal

9 **Outline** how the brain acts as a central integrating organ. C3.1.4 [3]

10 **Outline** how a message passes from a touch receptor in the skin to the cerebral hemispheres, and then to a muscle. C3.1.6, 7 [3]

11 **Draw** a labelled diagram of a pain reflex arc, including the spinal cord. C3.1.9 [5]

12 **Explain** how the effects of epinephrine prepare the body for intense muscle contraction. C3.1.12 [3]

13 **Outline** how the hypothalamus controls the endocrine system. C3.1.13 [3]

Section C: Working with data

16 marks

All data in this section are invented for practice. The patterns are realistic.

14 C3.1.14, C3.1.15

A student's heart rate and ventilation rate were measured before, during and after 10 minutes of running.

Time / minutes	0	5	10	12	15	20
Heart rate / beats per minute	70	140	155	120	95	75
Ventilation rate / breaths per minute	14	28	34	26	18	15

a **Calculate** the percentage increase in heart rate from 0 to 10 minutes. **[2]**

b **Describe** the changes in ventilation rate during and after exercise. **[2]**

c **Explain** how the increase in ventilation rate is brought about. **[4]**

d **Explain** why heart rate falls after exercise ends. **[3]**

15 C3.1.11

The table shows typical blood melatonin concentration over one day, in a person sleeping from 23:00 to 07:00.

Time	12:00	18:00	22:00	02:00	06:00	09:00
Melatonin / pg cm^{-3}	5	8	30	70	40	8

a **State** the time at which melatonin concentration was highest. **[1]**

b **Explain** the pattern shown. **[2]**

c **Suggest** why flying across several time zones disturbs sleep for a few days. **[2]**

Section D: Longer answers

8 marks

16 **Describe** how heart rate is regulated in response to changes in blood pressure and blood chemistry. C3.1.14 **[6]**

17 **Distinguish** between voluntary and involuntary control of movement of food through the gut. C3.1.16 **[2]**