

# HBS2HPA TEST 1

## TRUE/FALSE QUESTIONS

Please indicate whether or not each of the following statements is **TRUE** or **FALSE**.

Justify your answer with one or two sentences.

Time for exam is 25 minutes (including 4 minutes reading time).

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1. Only molecules that are lipid soluble are able to diffuse across the plasma membrane.
2. If the sodium-potassium-ATP pumps of the nerve cell membrane were to stop functioning, there would be little change to the resting membrane potential.
3. During the relative refractory period it is more difficult to generate another action potential.
4. Receptor potentials are not conducted along the entire length of the axon.
5. A single EPSP is not capable of generating an action potential.
6. Disabling the active transport calcium pumps at the presynaptic axon terminal may disrupt synaptic transmission.
7. Sympathetic and parasympathetic pre-ganglionic fibres have the same neurotransmitter substance.

# HBS2HPA TEST 2

## TRUE/FALSE QUESTIONS

Please indicate whether or not each of the following statements is **TRUE** or **FALSE**.

Justify your answer with one or two sentences.

Time for exam is 25 minutes (including 4 minutes reading time).

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1. Large motor units contain more motor neurones than small motor units.
2. Passive tension in skeletal muscle results from shortening of the contractile elements.

3. Myosin heads can bind to the active sites on actin when calcium ions are bound to troponin.
4. Single unit types of smooth muscle generally have many gap junctions.
5. It is normal for a person's haematocrit to vary (eg. by 5%) from one day to the next.
6. If a person is a purplish-blue colour, it is likely that the person has abnormal haemoglobin.
7. An efflux of potassium ( $K^+$ ) ions from SA node cells would be expected upon sympathetic stimulation.

## HBS2HPA TEST 3

### TRUE/FALSE QUESTIONS

Please indicate whether or not each of the following statements is **TRUE** or **FALSE**.

Justify your answer with one or two sentences.

Time for exam is 25 minutes (including 4 minutes reading time).

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1. If blood flow in the systemic circulation was 5 l/min and the blood flow in the pulmonary circulation was 5 L/min, then the cardiac output (CO) would equal 10 L/min.
  2. The main source of resistance to blood flow is the length of the vessels.
  3. The baroreceptors are primarily concerned with the maintenance of a constant heart rate.
  4. At rest, the cardiac output is shared equally among the organs.
  5. Receptors for steroid hormones are found on the plasma membrane.
  6. The posterior pituitary does not synthesize any hormones.
  7. 1,25 dihydroxyvitamin  $D_3$  is predominantly formed in the skin.

## SECTION B

### EXTENDED RESPONSE QUESTIONS

Listed below are five (5) extended response questions. Please complete **all five** questions. All five questions are of equal value.

Suggested time allocation: 60 minutes for this section.

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1. Describe the normal sequence of events that occurs at a typical excitatory synapse between two nerve cells from the arrival of an action potential at the presynaptic terminal to excitation of the postsynaptic cell.

(6 marks)

Explain very briefly how each of the following conditions might affect synaptic transmission:

- i) increased extracellular calcium;
- ii) increased activity of a presynaptic inhibitor neurone;
- ii) decreased activity of the enzyme associated with the neurotransmitter's receptor on the postsynaptic cell.

(6 marks)

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2. After an action potential arrives at the axon terminal of a motor neurone, a series of events occurs which ultimately results in sarcomere shortening in a skeletal muscle.

Describe these events in the order in which they occur.

(12 marks)

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3. Describe the changes in ventricular pressure within both the left and right ventricles during a cardiac cycle and relate these changes to the production of both heart sounds.

(12 marks)

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4. A relatively unfit person decided to go for a long run on a hot day. Some distance into the run they started to feel faint and had to stop. Describe probable cardiovascular changes occurring during the run which might have contributed to the person feeling dizzy and discuss how the body might have responded in an effort to correct this.

(12 marks)

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5. Discuss the structural and functional relationships between the hypothalamus and the anterior and posterior pituitary glands. Give an example of how secretion of the anterior pituitary gland is controlled by the hypothalamus. Give an example of how secretion of the posterior pituitary gland is controlled by the hypothalamus.

(12 marks)