5. Human Physiology

Starter Quiz ·

University Medicine Name: _____ Score: _____

1. Positive feedback is how the body keeps blood glucose steady.

   ☐ True ☐ False

2. A stimulus twice as strong as threshold makes an action potential twice as tall.

   ☐ True ☐ False

3. Heart rate is 80 per minute and stroke volume 60 mL. What is the cardiac output, in L per minute?

   _____ L per minute

4. At sea level a patient's alveolar P_{CO_2} is 60 mmHg. With R = 0.8, what is the alveolar P_{O_2}, in mmHg?

   _____ mmHg

5. 180 L are filtered in a day and 1.8 L of urine are made. What percentage of the filtrate was taken back?

   _____ %

6. Which hormone mainly makes the pancreas release bicarbonate?

   ☐ Glucagon

   ☐ Secretin

   ☐ Insulin

   ☐ Gastrin

7. Low cortisol with a high ACTH points to failure where?

   ☐ The pituitary (secondary)

   ☐ The adrenal gland (primary)

   ☐ Nowhere; this is normal

   ☐ The hypothalamus

8. A patient drinks 3 L of pure water. How many litres end up outside the cells?

   _____ L

9. A fibre's absolute refractory period is 2 ms. What is its maximum firing rate, in spikes per second?

   _____ per second

10. A normal blood pressure after bleeding means organ blood flow is normal.

☐ True ☐ False

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Answers ·

University Medicine

1. **False**

   Steady control uses negative feedback. Positive feedback drives events to completion, as in clotting or labour.

2. **False**

   Above threshold the spike is all or none; stronger stimuli raise the firing rate, not the height.

3. **4.8 L per minute**

   $80 \times 60 = 4800$ mL per minute = 4.8 L per minute.

4. **75 mmHg**

   $150 - 60/0.8 = 150 - 75 = 75$ mmHg.

5. **99 %**

   $(180 - 1.8) \,/\, 180 = 0.99$, so 99% is reabsorbed.

6. **Secretin**

   Acid entering the duodenum releases secretin, which calls for bicarbonate; CCK calls for enzymes and bile.

7. **The adrenal gland (primary)**

   The pituitary is responding to the low cortisol by raising ACTH, so the gland it drives has failed.

8. **1 L**

   Water spreads in proportion to the tanks, one-third outside cells, so $3 \times 1/3 = 1$ L; the other 2 L goes inside cells.

9. **500 per second**

   $1 \,/\, 0.002$ s = 500 spikes per second.

10. **False**

    Vasoconstriction can hold MAP while cardiac output, and organ flow, are well below normal.