Biology 12
Resource Exam A
Scoring Guide

1. Describe the events of the process of transcription in the correct order. **(3 marks)**

KEY

- **Weak hydrogen bonds are broken exposing the nitrogenous bases in a segment of DNA.**
- **Complementary RNA nucleotides are attached to DNA sequence.**
- **Sugar–phosphate backbone is formed.**
- **The newly-formed mRNA molecule is released.**
- **Hydrogen bonds reform between the complementary base pairs and DNA twists back into a double helix.**

any three for 1 mark each

Note to markers: The steps have to be in the correct order.

2. Describe how gastric secretions contribute to the breakdown of proteins. Explain why the stomach tissues are not digested by this process. **(5**

KEY

- **The stomach secretes HCl which denatures proteins to increase surface area.**
- **The stomach secretes hydrochloric acid which breaks down connective tissues in meat.**
- **The stomach secretes pepsinogen which is converted to pepsin in the presence of hydrochloric acid.**

any four for 1 mark each

- **Pepsin digests protein molecules into smaller peptide chains.**
- **HCl and pepsin are only present when food is in the stomach.**
- **Pepsinogen is in an inactive state until mixed with HCl, so it cannot hydrolyze cells of the stomach lining.**

- **The stomach wall secretes mucus by mucous cells which protect the wall of the stomach from HCl and pepsin.**

1 mark

Note to markers: Students must explain how the stomach is not digested for full marks

3. Explain the importance and the role of the placenta, the arterial duct and the oval opening in fetal circulation. **(5**

KEY

- **The placenta allows exchange of gases and wastes between the blood of the fetus and the mother. (1 mark)**
- **The placenta allows the growing fetus to be nourished. (1 mark)**
- **The oval opening allows blood to pass through the septum between the right and left atria. (1 mark)**
- **The oval opening allows blood to bypass the non-functioning fetal lungs. (1 mark)**
- **The arterial duct allows blood to move from the pulmonary artery to the aorta. (1 mark)**
- **The arterial duct reduces blood flow to the fetal lungs. (1 mark)**

4. Describe how an action potential reaching the axon bulb (terminal) of one neuron can trigger an action potential in the dendrite of another neuron. **(5**

KEY

- **The action potential in the axon results in the opening of calcium gates in the presynaptic membrane of the axon.**
- **Calcium ions flow into the axon bulb.**
- **The calcium ions cause vesicles containing neurotransmitters to fuse with the presynaptic membrane by shortening contractile fibres.**
- **Neurotransmitters are released by exocytosis.**
- **The neurotransmitters diffuse across the synaptic cleft.**
- **The neurotransmitters bind with receptor sites on the postsynaptic membrane.**
- **The receptors cause the sodium gates to open and initiate an action potential in the dendrite of the neuron.**

any five for 1 mark each

5. Describe how the functions of the ovaries are controlled by the hypothalamus.

KEY

- **The hypothalamus secretes GnRH.**
- **GnRH causes the anterior pituitary to secrete LH (1 mark) and FSH.**
- **FSH causes the follicle to develop (1 mark) and secrete estrogen.**
- **LH causes the follicle to erupt and release the egg.**
- **This structure is now the corpus luteum and releases progesterone.**
- **When estrogen and progesterone levels rise, negative feedback on the hypothalamus causes a decrease in the secretion of GnRH.**

any five for 1 mark each