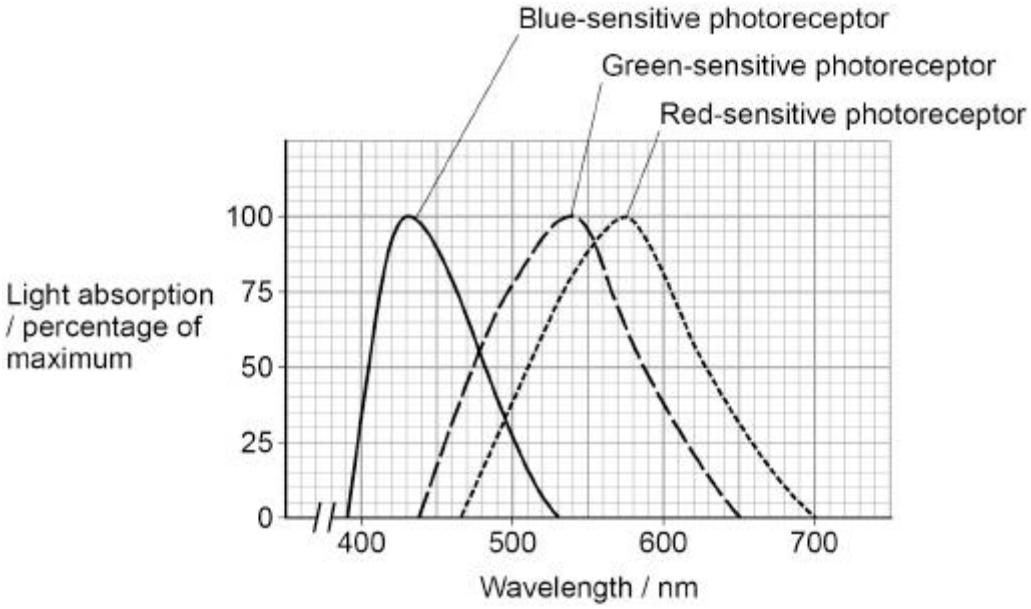
Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

(a) The figure below shows the wavelengths of light absorbed by three types of photoreceptor found in the human retina.



Use the figure and your knowledge of colour vision to explain how an orange colour is seen at 600 nm

_____

_____

_____

_____

_____

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_____

_____

_____

(3)

(b) Which of the following statements is associated with high sensitivity to light in the retina?

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Tick ✓ **one** box.

A single photoreceptor connecting to one neurone and spatial summation	☐
A single photoreceptor connecting to one neurone and temporal summation	☐
Several photoreceptors connecting to one neurone and spatial summation	☐
Several photoreceptors connecting to one neurone and temporal summation	☐

(1)

(c) Variation in flower colour is considered one of the factors involved in the evolution of the following two species of monkeyflower.

- *Erythranthe lewisii* (Great Purple Monkeyflower), which has pink flowers, is mostly found at higher altitudes (1600 to 3000 metres) and attracts bumblebees.
- *Erythranthe cardinalis* (Scarlet Monkeyflower), which has red flowers, is mostly found at lower altitudes (up to 2000 metres) and attracts hummingbirds.

Bumblebees and hummingbirds are important in the pollination of flowers. Pollination involves the transfer of male gametes to female gametes.

Explain the different processes that may have been involved in the evolution of these two species of monkeyflower. Use the information provided to justify your answer.

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_____

(5)
(Total 9 marks)

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Q2.

(a) Describe and explain how **three** features of the cells in the proximal convoluted tubule allow the rapid reabsorption of glucose into the blood.

1 _____

_____

2 _____

_____

3 _____

_____

(3)

(b) Antidiuretic hormone (ADH) binds to **V** receptors found in cell-surface membranes in two parts of a nephron.

Name the **two** parts of a nephron where **V** receptors are found.

_____

_____

(1)

(c) **V** receptors only bind with ADH.

Suggest and explain why.

_____

_____

_____

_____

(2)

(d) A decrease in blood pressure stimulates the release of ADH.

Give the location of the receptors that detect a decrease in blood pressure and explain how the release of ADH will affect blood pressure.

Location _____

Explanation _____

_____

_____

_____

_____

(3)

(Total 9 marks)

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