

## 9 Thirteen points with at least six in each section.

Photoreceptor pigments in the mammalian eye:

- rods contain the photosensitive pigment rhodopsin
- when it absorbs light it breaks down into its constituent parts (opsin and retinine – to the trans-form)
- this results in a generator potential in the rod/(if this reaches a sufficient level) an impulse is fired in the sensory neurone (of the optic nerve) leading to the brain
- rhodopsin absorbs light of all colours/is responsible for black-and-white vision
- and is sensitive to light of low intensity/iodopsin requires a greater amount of light to break down
- cones contain the pigment iodopsin
- there are three different types of cone
- each with its unique form of iodopsin
- each type of iodopsin is mainly sensitive to one of the three primary colours of light/red, green or blue
- stimulation of the different cones, to different degrees (and so producing a different array of impulses to the brain) produces the variety of colours possible

Photoreceptor pigments in the control of flowering in plants:

- the pigment involved is phytochrome which is found in leaves
- two forms of inter-changeable phytochromes ( $P_{660}$  or  $P_R$  and  $P_{730}$  or  $P_{FR}$ ) occur
- $P_{660}$  is converted to  $P_{730}$  during the day/red light
- while  $P_{730}$  converts slowly to  $P_{660}$  during the night/far-red light
- a critical amount of  $P_{730}$  controls flowering/influences the production of “florigen”
- the accumulated level of  $P_{730}$  is determined by the period of darkness
- in long-day plants  $P_{730}$  promotes flowering/in short-day plants  $P_{730}$  inhibits flowering
- a long night allows conversion of  $P_{730}$  to  $P_{660}$ /long night triggers flowering in SDP
- a short night prevents complete conversion of  $P_{730}$  to  $P_{660}$  and so triggers flowering in LDP
- breaking the period of darkness with a period of light will reverse the above effects

[13]

Consider QWC:

**2 marks:** The candidate expresses ideas clearly and fluently, through well-linked sentences and paragraphs. Arguments are generally relevant and well-structured. There are few errors of grammar, punctuation and spelling.

**1 mark:** The candidate expresses ideas clearly, if not always fluently. Arguments may sometimes stray from the point. There are some errors of grammar, punctuation and spelling, but not such as to suggest a weakness in these areas.

**0 marks:** The candidate expresses ideas satisfactorily, but without precision. Arguments may be of doubtful relevance or obscurely presented. Errors in grammar, punctuation and spelling are sufficiently intrusive to disrupt the understanding of the passage.

AVAILABLE  
MARKS

[2]

15