



**CHEMISTRY ONLINE**  
— **TUITION** —

Phone: +442081445350

[www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)

Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)

# BIOLOGY

## ORGANISMS RESPOND TO CHANGES IN ENVIRONMENT

Level & Board	AQA (A-LEVEL)
TOPIC:	RECEPTOR
PAPER TYPE:	QUESTION PAPER - 1
TOTAL QUESTIONS	5
TOTAL MARKS	44

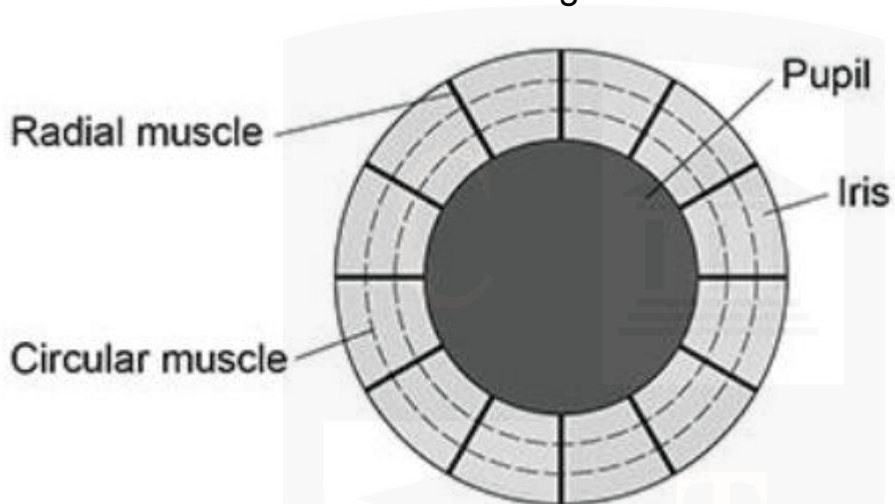
ChemistryOnlineTuition Ltd reserves the right to take legal action against any individual/ company/organization involved in copyright abuse.

## Receptors - 1

1.

In the human eye, the iris is a muscular tissue. The pupil size is altered by the iris.

The iris muscles are seen in the diagram below.



**(a)** Provide a hypothesis and an explanation for how the pupil could constrict (narrow) as a result of the interactions between the muscles indicated in the accompanying diagram. **(2)**

CHEMISTRY ONLINE  
— TUITION —

**(b)** An eagle fovea contains a high density of cones. An eagle fixes its prey image in the fovea.

Describe how an eagle fovea allows it to observe its prey in great detail.

In your response, do not mention color vision. **(3)**



**2.**

**(a)** The area of the retina in the human eye is roughly  $1.094 \times 10^3 \text{ mm}^2$ .

The diameter of the circular fovea in a human eye is  $3 \times 10^3 \mu\text{m}$ .

Determine the fovea area as a proportion of the retina total area.

A circle area is equal to  $\pi r^2$ . To compute  $\pi = 3.14$ , use this value.

Display your work. **(2)**

**(b)** The retina of an owl has a high density of rod cells.  
Explain how this enables an owl to hunt its prey at night.  
Do not refer to rhodopsin in your answer. **(3)**



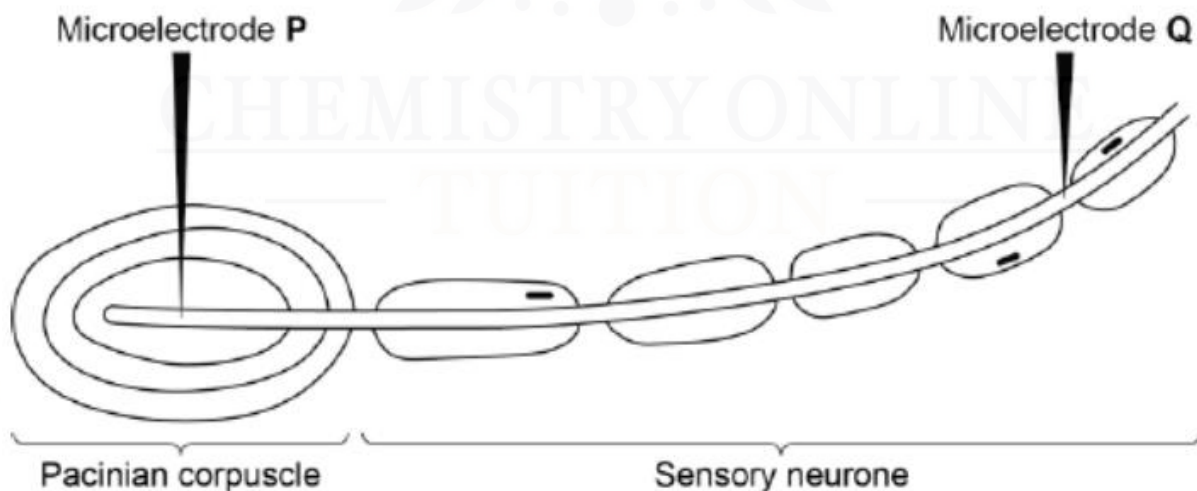
CHEMISTRY ONLINE  
— TUITION —

3.

The stimulation of a Pacinian corpuscle in the skin of a fingertip was studied by a scientist.

She measured a Pacinian corpuscle's maximal membrane potential and its sensory neuron's response to varying fingertip pressures using microelectrodes.

The Pacinian corpuscle, its sensory neuron, and the locations of the microelectrodes are depicted in the picture below.



Some of the biologist's findings are displayed in the table below.

<b>Pressure applied to the fingertip</b>	<b>Membrane potential at P / millivolts</b>	<b>Membrane potential at Q / millivolts</b>
None	-70	-70
Light	-50	-70
Medium	+30	+40
Heavy	+40	+40

**(a)** Describe how the sensory neuron maintains its resting potential of -70 mV in the absence of pressure. **(2)**

**(b)** Describe how the microelectrode P records changes in membrane potential when pressure is applied to the Pacinian corpuscle. **(3)**

**4.**

**(a)** Whether the fingertip was subjected to mild or high pressure, the membrane potential at Q remained constant. Describe your reasoning. **(2)**

CHEMISTRY ONLINE  
— TUITION —

**(b)** A disorder called multiple sclerosis causes partial destruction of the myelin sheaths that encase neurons. Describe how this causes a slower reaction to stimuli. **(2)**



I am Sorry !!!!! **5.**

**(a)** Write a paper discussing the significance of receptors in living things. **(25)**





**DR. ASHAR RANA**  
M.B.B.S / MS. CHEMISTRY



- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
- Tutoring students in UK and worldwide since 2008
- CIE & EDEXCEL Examiner since 2015
- Chemistry, Physics, Math's and Biology Tutor

## CONTACT INFORMATION FOR CHEMISTRY ONLINE TUITION

- UK Contact: 02081445350
  - International Phone/WhatsApp: 00442081445350
  - Website: [www.chemistryonlinetuition.com](http://www.chemistryonlinetuition.com)
  - Email: [asherrana@chemistryonlinetuition.com](mailto:asherrana@chemistryonlinetuition.com)
- Address: 210-Old Brompton Road, London SW5 OBS, UK