

Answers to Option A test yourself questions

- 1 A type of cell modification, which removes synapses as the nervous system develops and becomes more sophisticated, so that useful connections are retained.
- 2 Plasticity is the ability of the nervous system to change in both structure and function over a person's life, in response to the changes in the environment. This enables the person to learn new skills and respond in different ways.
- 3 The neural groove deepens and invaginates. It forms a tube below the ectoderm, which then closes over to cover it.
- 4 The medulla oblongata (brain stem) controls automatic and homeostatic activities such as breathing, swallowing, digestion and heart rate.
- 5 High order functions such as learning, memory, speech, logic and decision making involve several inputs to the brain.
- 6 Broca's area is the part of the brain concerned with speaking and writing.
- 7 ganglion cells
- 8 Bipolar cells connect ganglion cells to either rod or cone cells.
- 9 Any three of the following differences: rods are rod-shaped, cones are cone-shaped; rods are very sensitive to light and work in dim light, cones are less sensitive and work in bright light; one type of rod responds to all wavelengths of light but there are three types of cone cell, each of which responds to a different wavelength; groups of rods are connected to a single bipolar cell, each cone is connected to one bipolar cell.
- 10 Each eye receives a slightly different view of the world, which is detected by different areas of the retina. Information from the left visual field goes to the right visual cortex in the brain and information from the right visual field goes to the left visual cortex. The visual cortex assembles the information so we recognise what we see.
- 11 optic chiasma
- 12 a This is an example of phototaxis – the *Euglena* move towards light and are therefore able to photosynthesise and produce food.
 - b This is chemotaxis, and means the moths have a better chance of mating and producing offspring.
 - c In this example of negative geotaxis, the snails move away from gravity, thereby improving their chances of finding food, which helps them to survive.
 - d This is kinesis. The temperature of the surface of human skin is about 30 °C. At other temperatures, the lice change their rate of movement until they are in more suitable conditions.
 - e *Planaria* move away from light, in a negative phototaxis. In their natural habitat, this behaviour moves them to concealed areas under stones away from predators. The response to food is a positive chemotaxis so they can obtain food and survive. The experiment with food should be conducted either in a constant source of light or in darkness so that only one variable is investigated.
- 13 Any two of: to learn new skills for catching food; to avoid harmful foods; to find new places to nest or hide.
- 14 Taxis: woodlice move away from light; male moths move towards pheromones released by female moths. Kinesis: response of woodlice to humidity.
- 15 Innate behaviour is the same in all members of a species and is genetically determined. Learned behaviour varies among members of a species and comes from experience.
- 16 THC causes hyperpolarisation of post-synaptic membranes so that they are more difficult to stimulate.
- 17 social pressures; genetic predisposition; feelings of pleasure influenced by the release of dopamine
- 18 Inhibitory drugs increase transmission of impulses at inhibitory synapses or suppress transmission at excitatory synapses.
- 19 blue tits feeding from milk bottles; chimpanzees using tools; Japanese apes bathing in warm springs; or any other suitable example
- 20 Young can be protected by a group of mothers; one male parent (lion) will defend the group; young that mature together may leave the group and rely on each other for mutual support.