

## Module 11

**A1** Which of the following must happen in order to produce a sensation?

- (1) Receptors are stimulated.
- (2) Nerve impulses are generated.
- (3) Nerve impulses are interpreted in the brain.

- A.** (1) and (2) only
- B.** (1) and (3) only
- C.** (2) and (3) only
- D.** (1), (2) and (3)

**A2** When a person walks from a bright place into a dark room, which of the following activities of the iris muscles will take place?

	<u>Radial muscles</u>	<u>Circular muscles</u>
<b>A.</b>	contract	contract
<b>B.</b>	contract	relax
<b>C.</b>	relax	contract
<b>D.</b>	relax	relax

**A3** Which of the following are correct descriptions of the cones in the retina?

- (1) They can only be stimulated by strong light.
- (2) They are found only in the yellow spot (fovea).
- (3) There are three types of cones responding to red, blue and green lights.

- A.** (1) and (2) only
- B.** (1) and (3) only
- C.** (2) and (3) only
- D.** (1), (2) and (3)

**A4** Accommodation is the ability of the eye to adjust

- A.** the image distance from the lens.
- B.** the diameter of the pupil.
- C.** the thickness of the lens.
- D.** the internal pressure inside the eyeball.

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**A5** The image of an object on the retina is

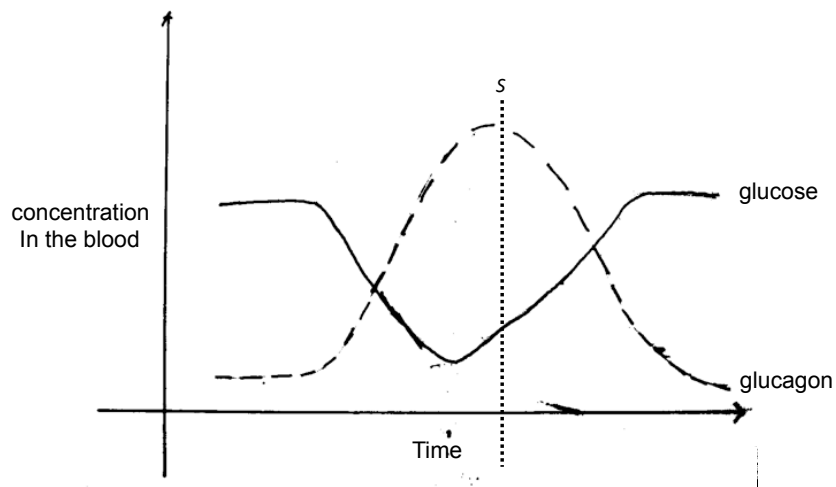
- (1) upside down.
- (2) laterally inverted.
- (3) reduced in size.

- A.** (1) and (2) only
- B.** (1) and (3) only
- C.** (2) and (3) only
- D.** (1), (2) and (3)

**A6** The table gives information about endocrine glands. Which information is correct?

	gland	hormone produced	target organ	effect
<b>A</b>	adrenal	adrenaline	liver	decreases blood glucose level
<b>B</b>	ovaries	progesterone	uterus	ovulation occurs
<b>C</b>	pancreas	insulin	liver	conversion of glucose to glycogen
<b>D</b>	testes	testosterone	penis	becomes erect to allow sexual intercourse

**B1** Fig. 1 shows how glucose and glucagon concentrations in the blood changes after starving for 15 hours.



**Fig. 1**

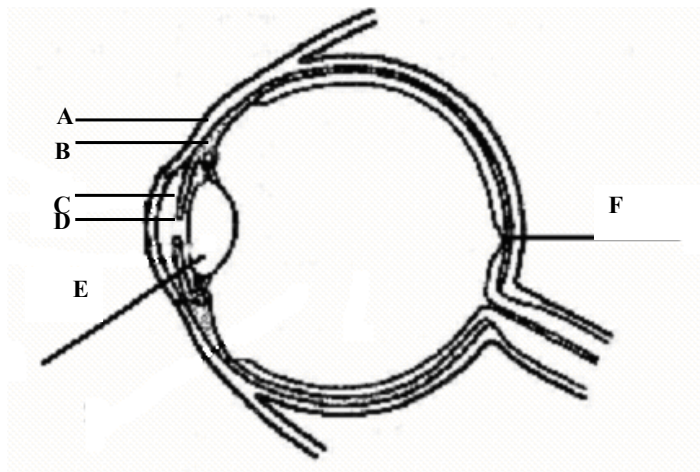
**(a)** Using the information from Fig. 3 to explain the production of glucagon and its effects in the body.

**(b)** Describe the change in the graph after point S.

**B2** Alice had a class-gathering and had a meal with her classmates. After a full meal, she decided to take a stroll. However, as she was walking in an isolated alley, a masked man came to her, snatched her purse and accessories and ran away. Fortunately, she was shaken and glad that she was not injured.

Identify the hormones secreted and discuss the effects of them in Alice in the series of situations that she had came by.

**B3** Fig 7.1 shows a section through the eye.



**Fig. 3**

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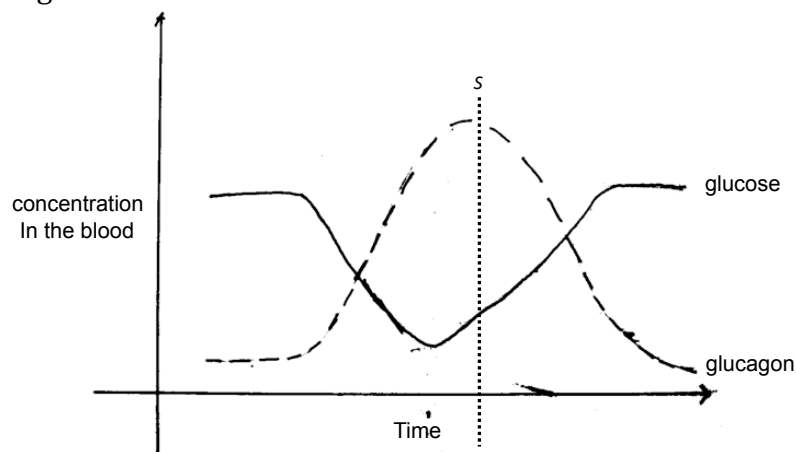
Luke is sitting in the shade reading a book when he looks at the bright sky to see an aeroplane flying past. Using **A** to **F**, explain the changes in

- (i) the lens, and
- (ii) the pupil.

Include in your answers the names of the parts **A** to **F** involved for each case.

## Module 11 (Solutions)

- A1 Which of the following must happen in order to produce a sensation? **D**
- A2 When a person walks from a bright place into a dark room, which of the following activities of the iris muscles will take place? **B**
- A3 Which of the following are correct descriptions of the cones in the retina? **B**
- A4 Accommodation is the ability of the eye to adjust **C**
- A5 The image of an object on the retina is **D**
- A6 The table gives information about endocrine glands. Which information is correct? **C**
- B1 Fig. 1 shows how glucose and glucagon concentrations in the blood changes after starving for 15 hours.



**Fig. 1**

- (a) Using the information from Fig. 3 to explain the production of glucagon and its effects in the body.  
Glucagon is produced when there is a lowering of blood glucose concentration which converts **glycogen to glucose** to provide body with energy required for activities.
- (b) Describe the change in the graph after point S.  
At point S, there is an **gradual decline** of glucagon as glucose had also been slowly synthesised (**gradually increasing**) in the body via conversion of glycogen.

**B2** Alice had a class-gathering and had a meal with her classmates. After a full meal, she decided to take a stroll. However, as she was walking in an isolated alley, a masked man came to her, snatched her purse and accessories and ran away. Fortunately, she was shaken and glad that she was not injured.

Identify the hormones secreted and discuss the effects of them in Alice in the series of situations that she had come by.

**Adrenaline** and **insulin** are secreted during the process

After a full meal, level of **blood glucose rises**, stimulating secretion of insulin from pancreas.

- Convert excess glucose to glycogen
- Increase permeability of glucose through cell membrane and uptake of glucose
- increases the oxidation of glucose by the cells.

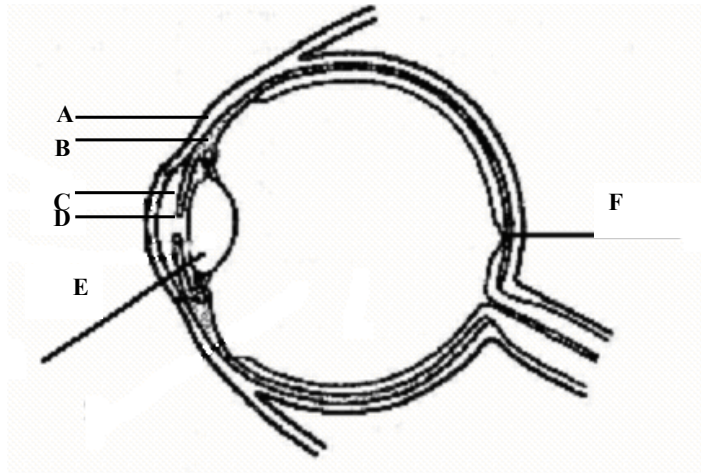
All these cause the overall decrease in the level of blood glucose.

Adrenaline is secreted when **triggered by states of emergency**.

- Increases heart rate : to allow more gaseous exchange allowing better supply of oxygen in body.
- Pupil dilates: for better vision
- Increase digestion: to provide body with energy for 'fight-or-flight' response
- Face turns pale: blood flow to important organs

When danger ended, excess glucose (that may be present) will be converted back to glycogen via insulin.

**B3** Fig 7.1 shows a section through the eye.



**Fig. 3**

Luke is sitting in the shade reading a book when he looks at the bright sky to see an aeroplane flying past. Using **A** to **F**, explain the changes in

(i) the lens, and

- Lens becomes thin and less convex with an increased focal length.
- This is done by ciliary muscle relaxes and makes the suspensory ligament becomes stretched.
- Image of the aeroplane will be focused at the Fovea centralis of the retina.
- As a result of these changes the person is able to focus on the distant object which is the aeroplane

(ii) the pupil.

- Pupil constricts to control the amount of light entering the eye.
- The circular muscle of the iris contracts and the radial muscle relaxes thus constricting the pupil.

Include in your answers the names of the parts **A** to **F** involved for each case.