Aga Khan University Examination Board
Notes from E-Marking Center on SSC II Biology Examination
May 2014

Introduction

This document has been produced for the teachers and candidates of SSC Part II (Class X) Biology. It contains comments on candidates' responses to the 2014 Secondary School Certificate (SSC-II) Examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

General Comments

This report includes overall comments on students' performance on every question and *some* specific examples of students' responses which support the mentioned comments. Please note that the descriptive comments represent an overall perception of the better and weaker responses as gathered from the e-marking session. Whereas, the candidates' responses shared in this document represent some specific example(s) of the mentioned comments.

Teachers and candidates should be aware that examiners may ask questions that address the Student Learning Outcomes (SLOs) in a manner that requires candidates to respond by integrating knowledge, understanding and application skills they have developed during the course of study. Candidates are advised to read and comprehend each question carefully before writing the response to fulfil the demand of the question.

Candidates need to be aware that the marks allocated to the questions are related to the answer space provided on the examination paper as a guide to the length of the required response. A longer response will not in itself lead to higher marks. Candidates need to be familiar with the command words in the Student Learning Outcomes which contain terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the command words. Words such as 'how?', 'why?' or 'what?' may also be used.

Detailed Comments:

Question 1a

Better responses quoted the correct percentages of oxygen and carbon dioxide in the exhaled air. .

Example:

	Inhaled Air	Exhaled Air
Oxygen	21%	16%
Carbon dioxide	0.03%	04 %.

Weaker responses gave incorrect values that ranged from 0 to 42%.

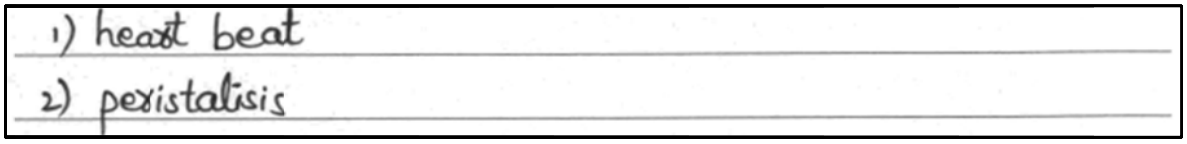
Example:

	Inhaled Air	Exhaled Air
Oxygen	21%	1%
Carbon dioxide	0.03%	0.01%

Question 1b

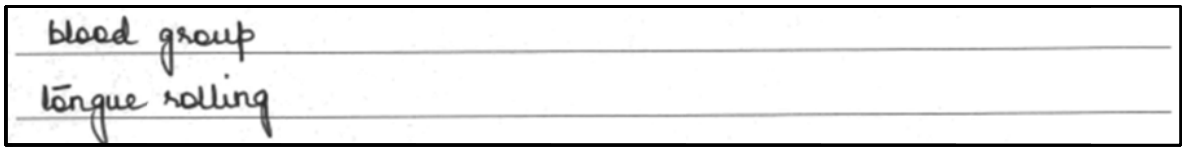
Better responses gave correct examples of involuntary actions like beating of heart/ peristalsis in digestive tract/ movement of diaphragm/ release of enzymes or hormones.

Example:



Weaker responses failed to give examples of the actions; they stated the name of the processes like respiration/ digestion. Such responses were considered as generalized where candidates failed to provide specific answer. Some of them described the process of reflex action with an example of knee jerk. One of the responses identified blood group and tongue rolling as examples of involuntary actions.

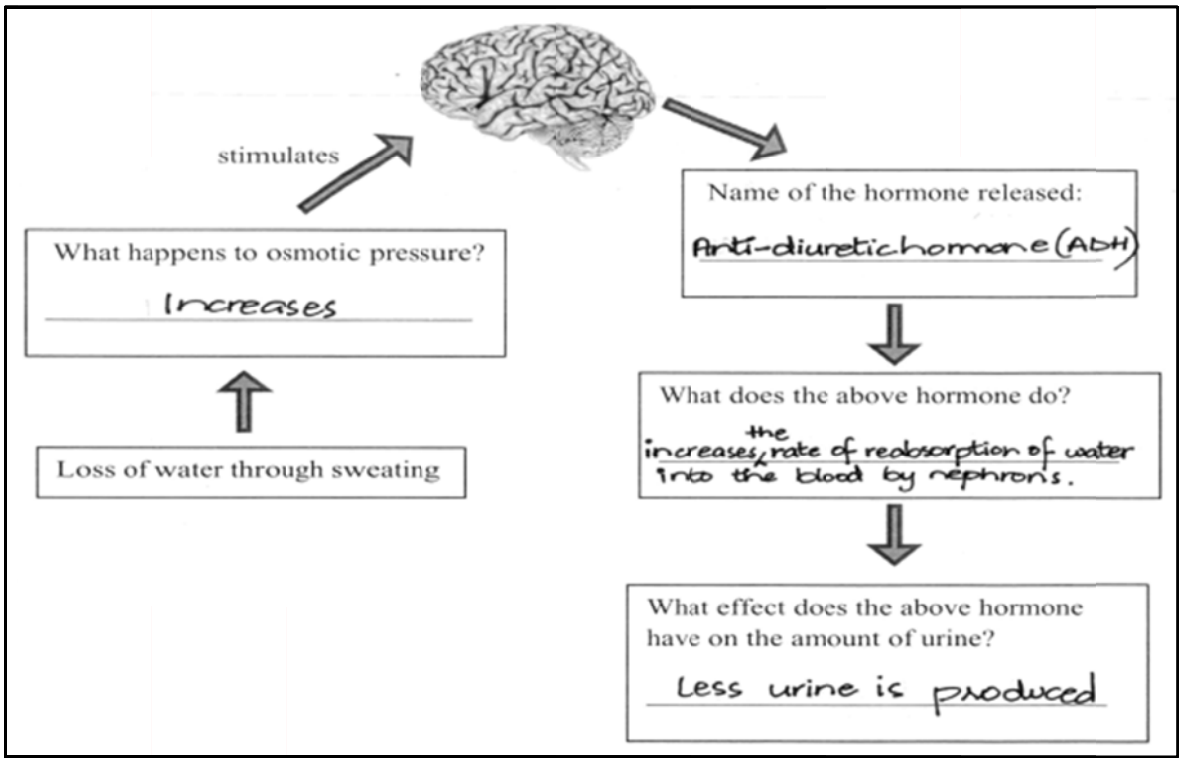
Example:



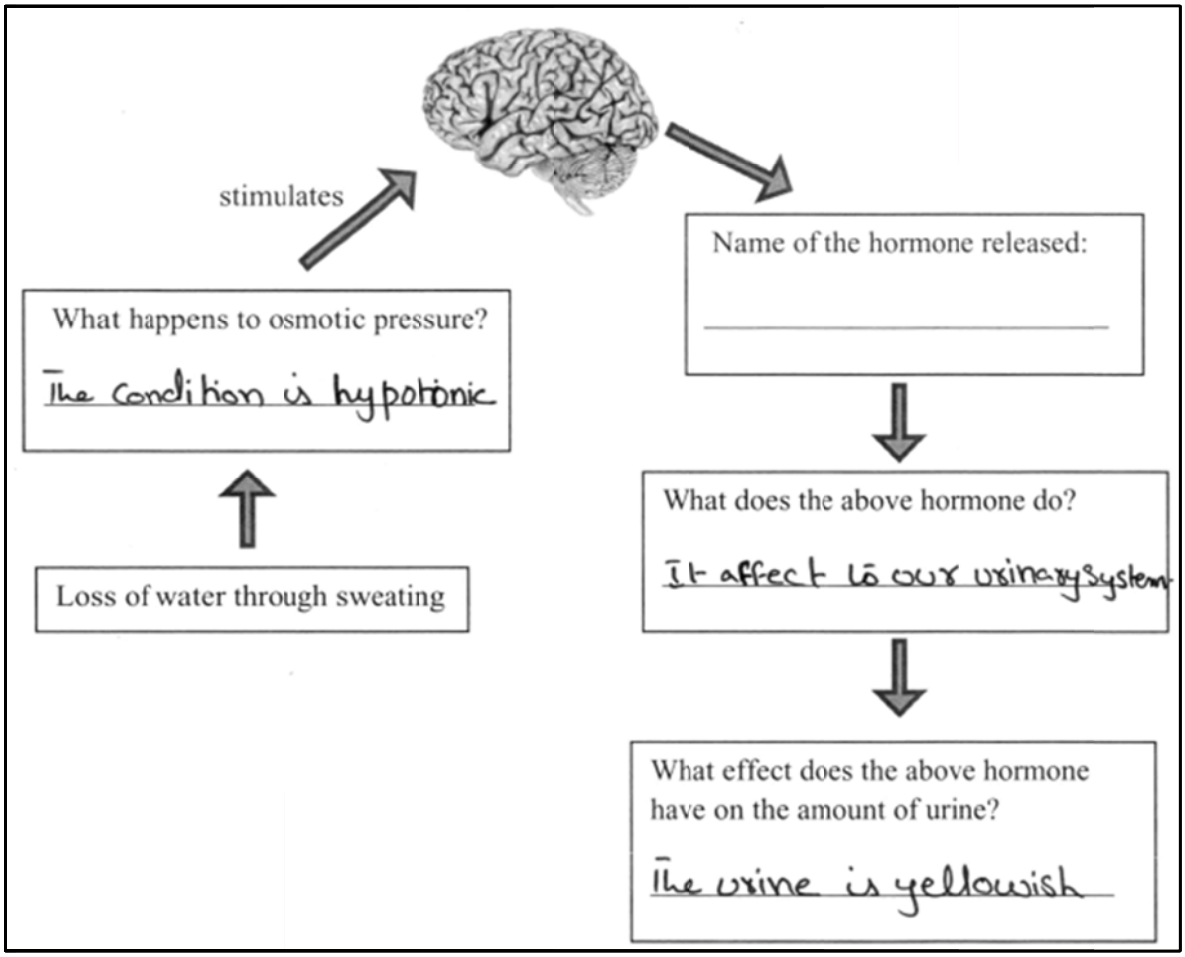
Question 2

Better responses displayed clear understanding of the concept of osmoregulation. Candidates were well informed about what happens to the osmotic pressure when there is loss of water in the body. Subsequently, they identified the hormone and stated its function with its effect on the amount of urine.

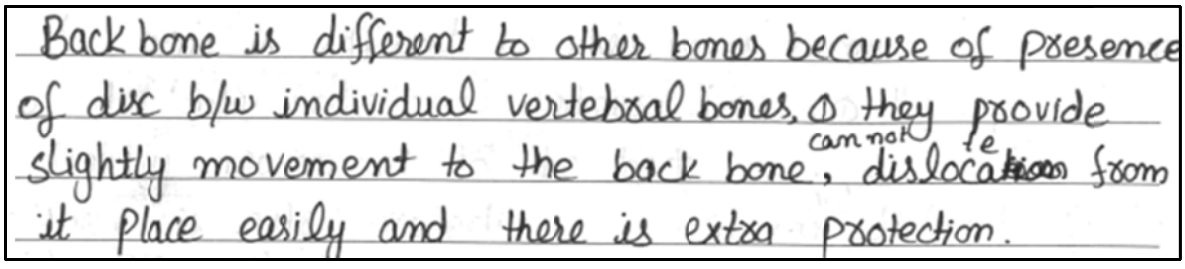
Example:



Weaker responses mixed up the concept of increased and decreased osmotic potential. Such responses wrote that osmotic pressure would decrease. Some of them identified the hormone as adrenaline/ RNA/ insulin/ aldosterone. As far as the role of ADH is concerned, more reabsorption of water from kidney tubules was accepted. Responses stating absorption of water were not awarded marks. In the last part of the question where the effect on amount of urine was asked, candidates wrote about hypotonic, hypertonic or isotonic solutions.
Example:

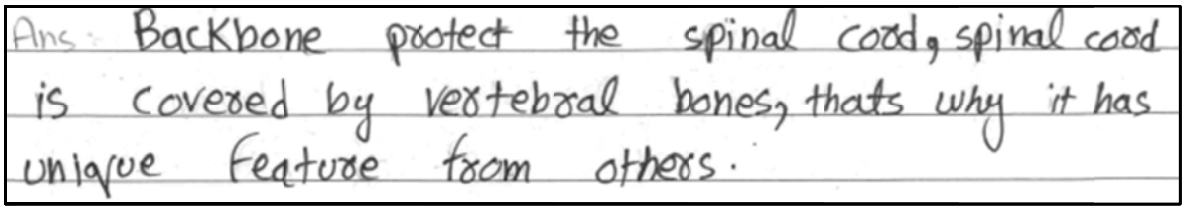


Question 3a
Better responses wrote about the distinguishing features of the backbone i.e. it allows the body to bend backward and forward and from side to side as the presence of discs of fibrous cartilage allows slight movement of individual bones.
Example:



Weaker responses wrote about the functions of skeleton e.g. backbone provides support to our body or help in the movement of the body. Some of them wrote that it protected the spinal cord. Here, it was observed that candidates do not focus on the key demand of the question which says 'what makes backbone different from other bones' and subsequently, gave generalized answers.

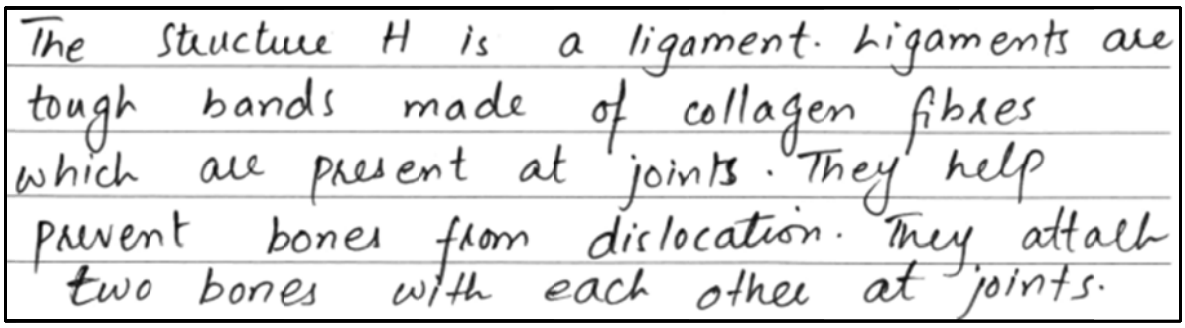
Example:



Question 3b

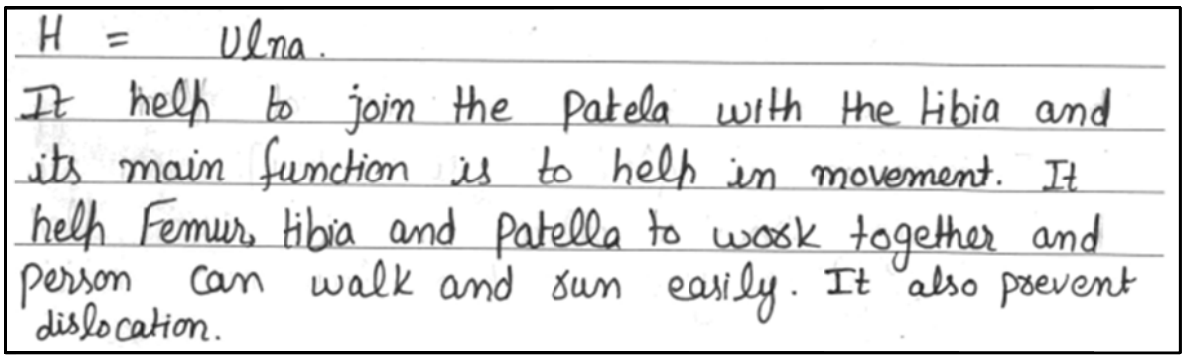
Better responses correctly identified structure H i.e. ligament and stated its function.

Example:

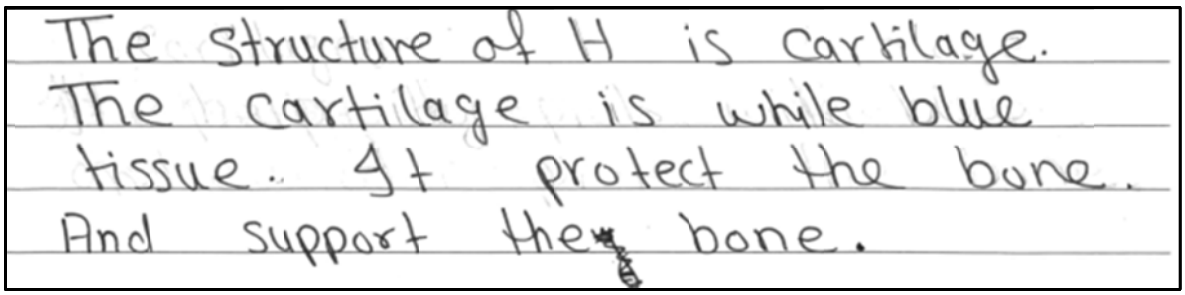


Weaker responses identified structure H as hinge joint/ ulna/ hyaline muscle/ cartilage and thus provided incorrect function.

Example:



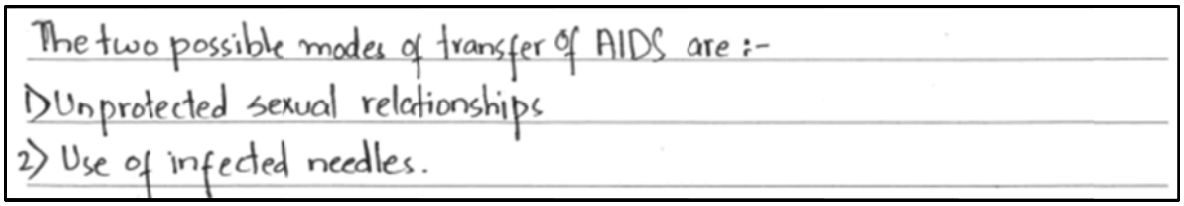
Example:



Question 4a

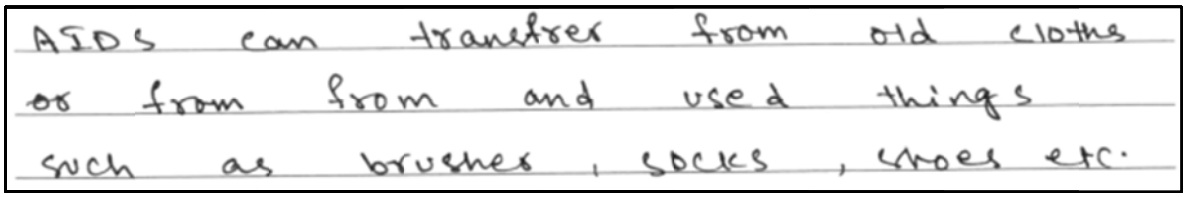
Better responses included the use of unsterilized syringes/ unsterilized equipment like scissors or blades/ unprotected sexual intercourse/ through placenta from infected mother to foetus/ transfusion of infected blood.

Example:


The two possible modes of transfer of AIDS are :-
1) Unprotected sexual relationships
2) Use of infected needles.

Weaker responses gave wrong modes of transfer of AIDS such as smoking/ carcinogens/ drinking in the glass of AIDS patient/ wearing used clothes, socks or shoes.

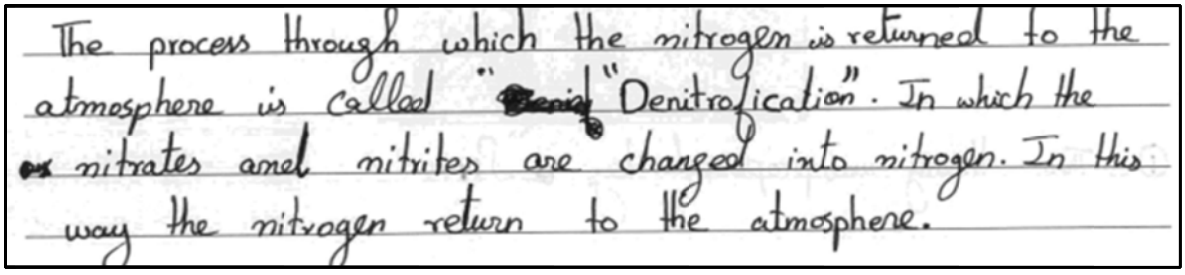
Example:


AIDS can transfrer from old clothes or from from and used things such as brushes, socks, shoes etc.

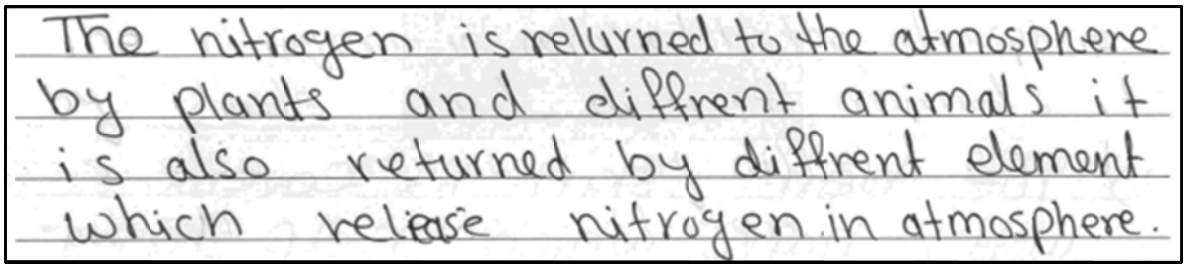
Question 4b

Better responses gave a brief description of the return of nitrogen to the atmosphere using specific terminologies like nitrogen fixation/ denitrification/ denitrifying bacteria/ atmospheric nitrogen.

Example:


The process through which the nitrogen is returned to the atmosphere is called "Denitrofication". In which the nitrates and nitrites are changed into nitrogen. In this way the nitrogen return to the atmosphere.

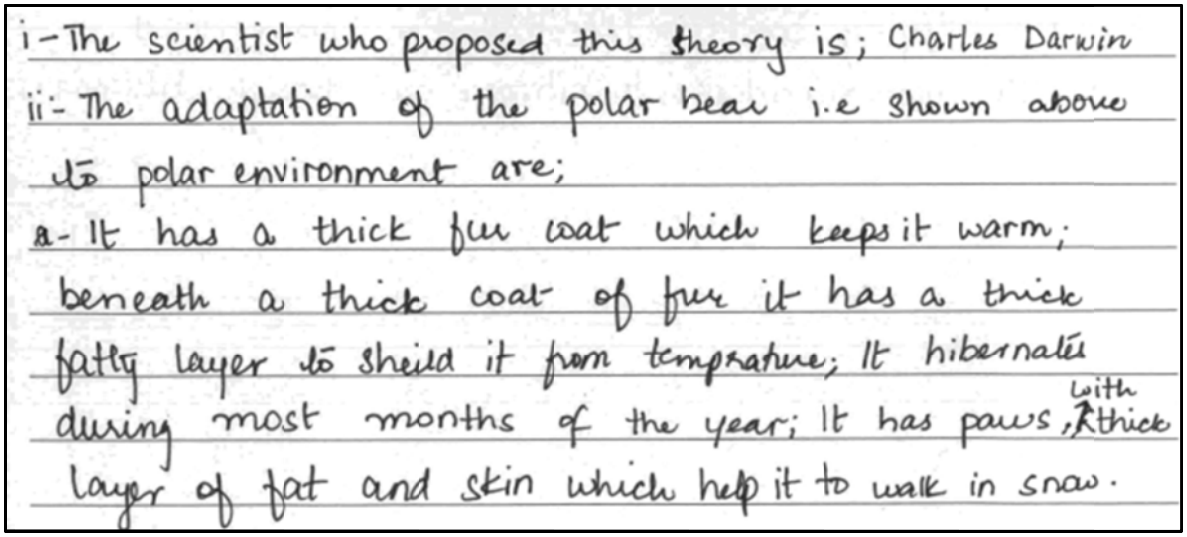
Weaker responses wrote about combustion of fossil fuels/ evaporation/ respiration. Some of them wrote that nitrogen is returned to the environment through the nitrogenous waste products excreted from our bodies.
Example:


The nitrogen is returned to the atmosphere by plants and diffrent animals it is also returned by diffrent element which release nitrogen in atmosphere.

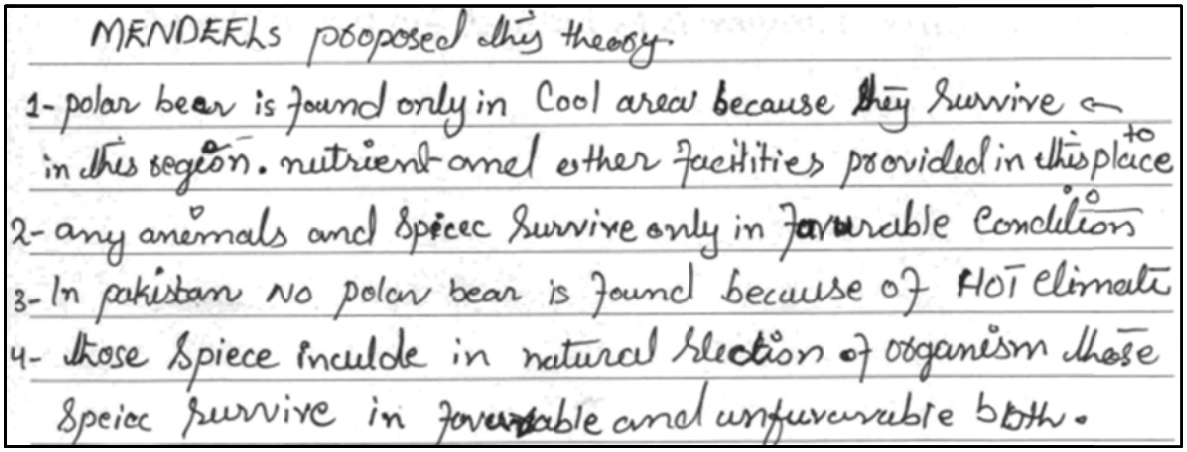
Question 5

Better responses correctly identified the name of the scientist i.e. Charles Darwin. They also mentioned three features of the animal which help it adapt easily in the polar environment. Such responses included presence of thick fur traps heat to keep warm/ thick skin/ presence of blubber (thick fat layer) prevent loss of heat/ white in colour to camouflage with ice to be protected from predator attack/ sharp claws to grip ice/ strong legs for swimming long distances/ hair on the soles of the feet to provide a grip on icy surfaces.

Example:


i- The scientist who proposed this theory is; Charles Darwin
ii- The adaptation of the polar bear i.e shown above to polar environment are;
a- It has a thick fur coat which keeps it warm; beneath a thick coat of fur it has a thick fatty layer to sheild it from temprature; It hibernates during most months of the year; It has paws, with thick layer of fat and skin which help it to walk in snow.

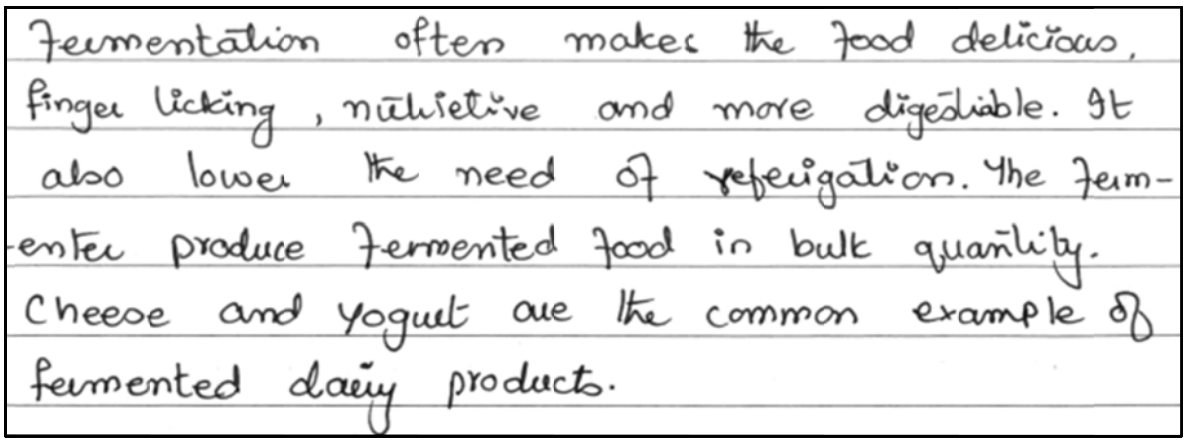
Weaker responses identified the scientist as Mendel/ Johan Marri/ Lamarck/ Sir Maxwell. Candidates wrote that the polar bears are cold blooded that is why they could survive in cold or could live/ survive in snow. A few of them described Darwin's theory of evolution.
Example:


MENDEELs pooposed this theory.
1- polar bear is found only in Cool area because they Survive in this region. nutrient and esther facilities provided in this place to
2- any animals and Spicec Survive only in favourable condition
3- In pakistan no polar bear is found because of HOT climate
4- those Spiece inculde in natural Slection of organism these Speiec Survive in favourable and unfavourable both.

Question 6a

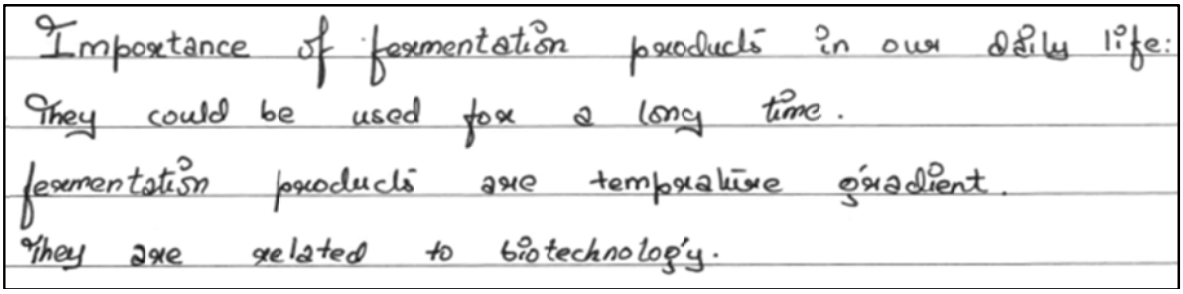
Better responses mentioned the significance of the fermented products in our daily life with reference to food products. They wrote that fermentation often makes the food more nutritious, more digestible and tastier. Along with this description they named some food products that are a part of our regular diet. Bread/ pizza dough, yogurt and cheese were the most common examples.

Example:


Fermentation often makes the food delicious, finger licking, nutrietive and more digestiable. It also lower the need of refrigation. The fermenter produce fermented food in bulk quantity. Cheese and yoguet are the common example of fermented dairy products.

Weaker responses described the process of fermentation or role of yeast in fermentation. Some of the responses wrote about transgenic animals. Candidates wrote about the significance of fermented products in terms of easy availability/ time saving/ readily cooked. A few responses wrote about insulin as a fermented product. Responses which listed the names of fermented products only were not awarded full marks as the question demands were not met.

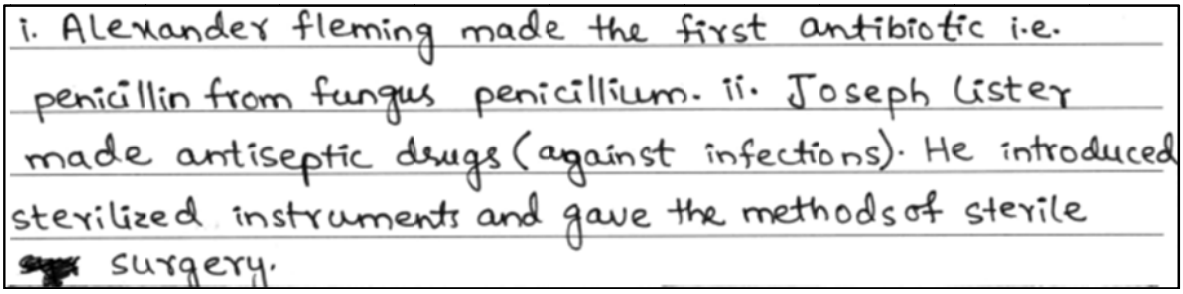
Example:


Importance of fermentation products in our daily life:
They could be used for a long time.
fermentation products are temprature gradient.
They are related to biotechnology.

Question 6b

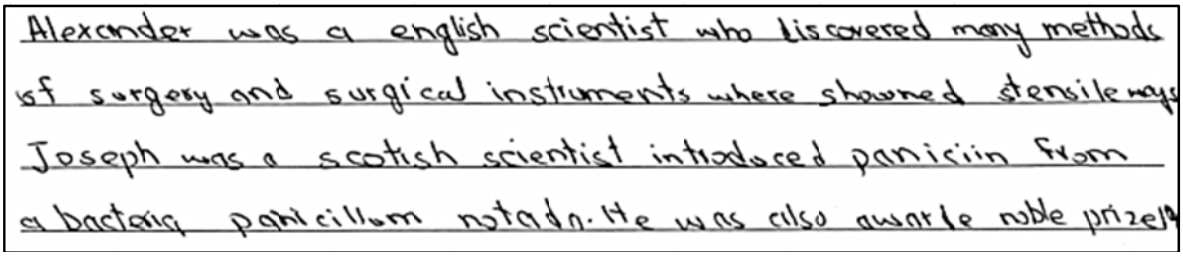
Better responses stated the role of both the scientists correctly.

Example:


i. Alexander fleming made the first antibiotic i.e. penicillin from fungus penicillium. ii. Joseph Lister made antiseptic drugs (against infections). He introduced sterilized instruments and gave the methods of sterile surgery.

Weaker responses interchanged the role of Alexander Fleming with Joseph Lister. Some of them just wrote that Alexander Fleming received a Nobel Prize without stating his achievement. A few of them related his contribution to insulin preparation.
Similarly, for Joseph Lister candidates wrote that he invented medicine for drug addicted people or he wrote a book on pharmacology.

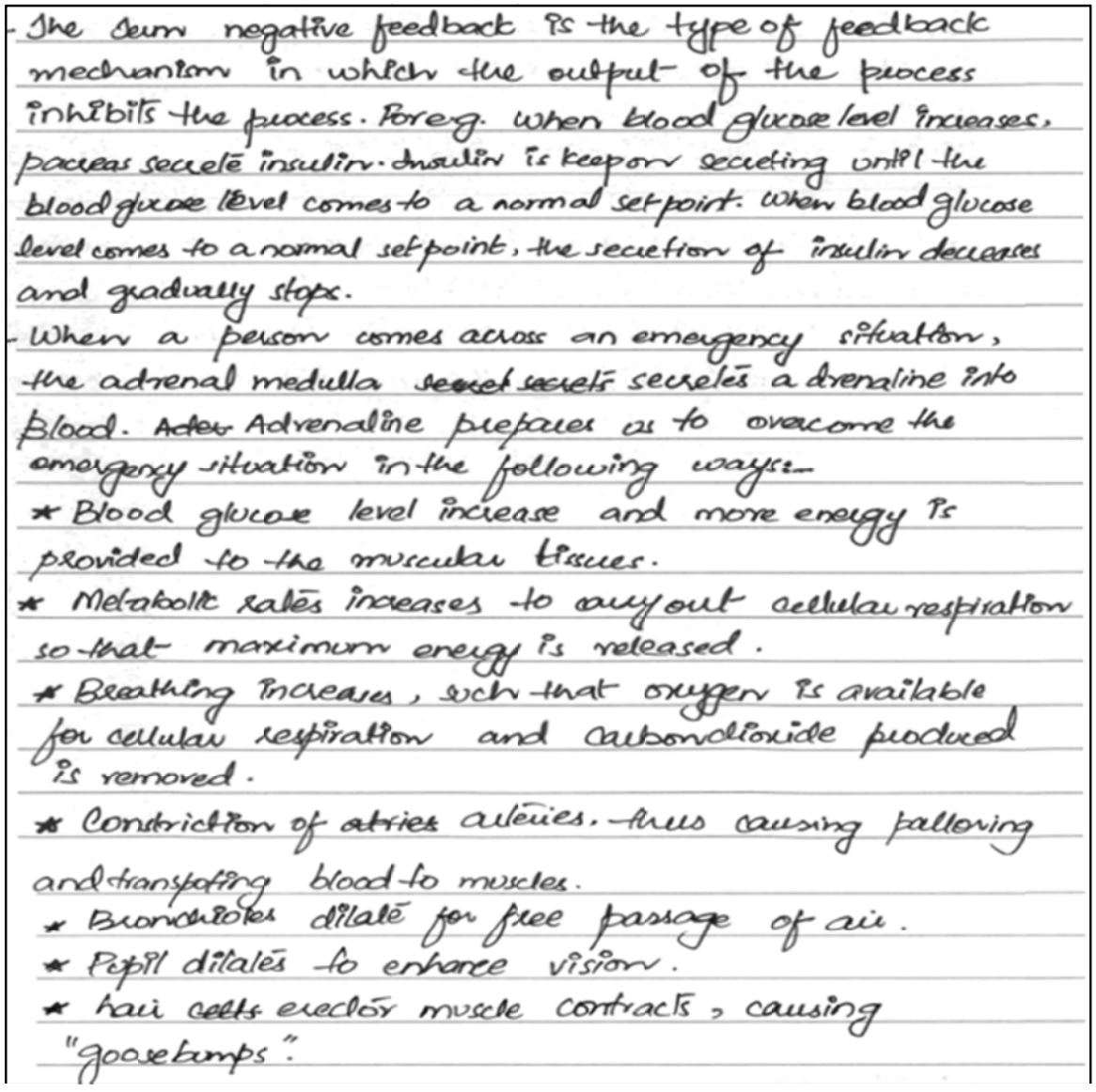
Example:



Question 7a

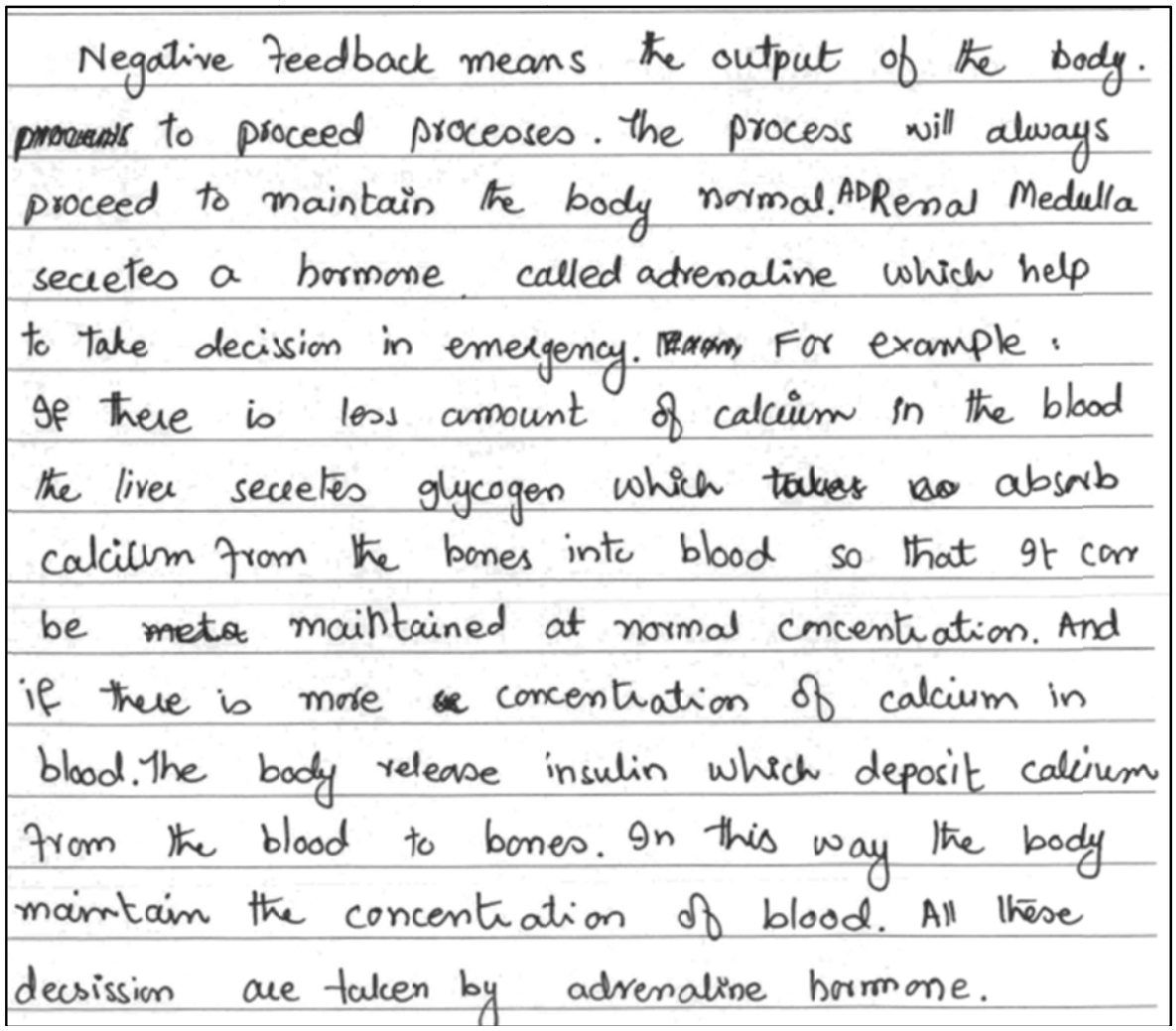
Better responses correctly defined the term negative feedback i.e. a natural mechanism the body employs in an attempt to keep the body's conditions close to the body's set point or when the body senses a change away from its normal set point, the body engages mechanisms to help reverse or counteract these changes. Candidates showed a sound understanding of the topic as they gave a comprehensive explanation of the changes that adrenaline make to the body to prepare it in an emergency situation.

Example:



Weaker responses wrote about adrenal gland and endocrine system. Some of the responses, instead of focusing on adrenaline, gave a detailed description of insulin and glucagon. In one case, example of 'touching a hot object' was considered as an emergency situation. A few wrote about negative feedback with reference to level of calcium in blood.

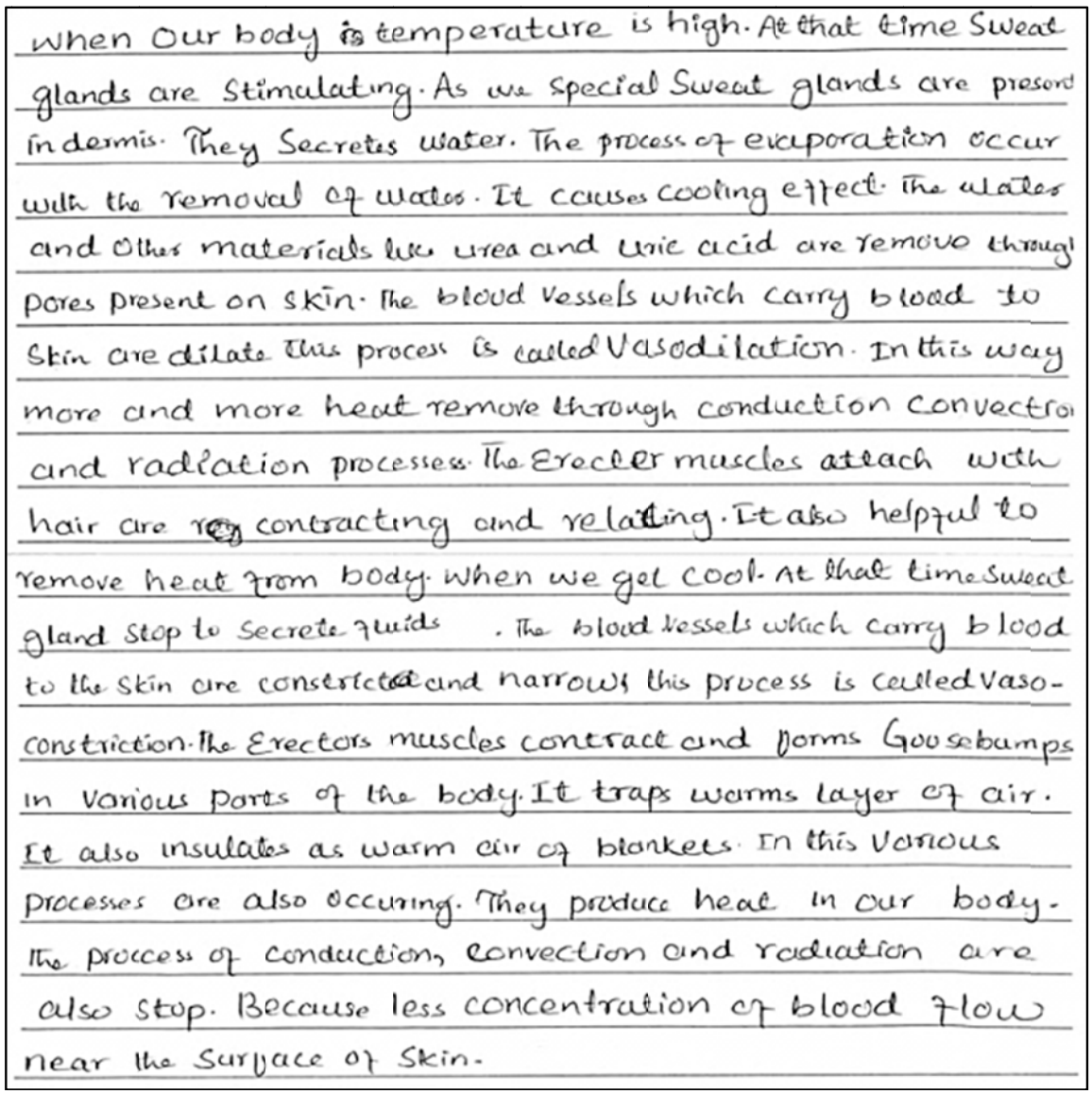
Example:


Negative feedback means the output of the body. to proceed proceses. the process will always proceed to maintain the body normal. ADRenal Medulla secretes a hormone called adrenaline which help to take decission in emergency. For example: If there is less amount of calcium in the blood the liver secretes glycogen which takes to absorb calcium from the bones into blood so that it can be maintained at normal concentration. And if there is more concentration of calcium in blood. the body release insulin which deposit calcium from the blood to bones. In this way the body maintain the concentration of blood. All these decission are taken by adrenaline hormone.

Question 7b

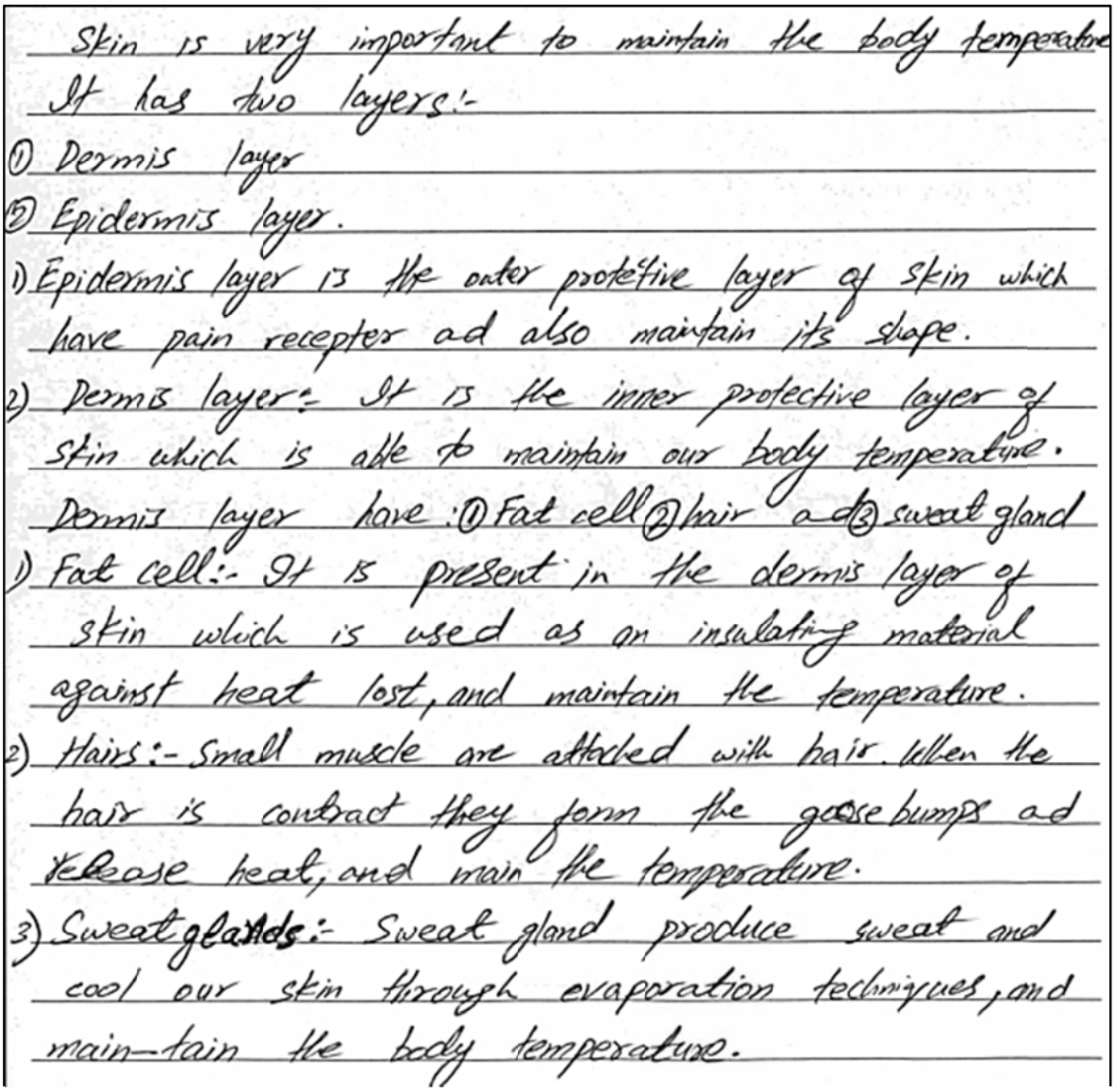
Better responses described the structural features with reference to their role in temperature maintenance. Candidates displayed the understanding of the key word in the question i.e. 'maintain' and wrote about both the conditions (on a hot day and on a cool day). Such responses wrote about increased or decreased body heat/ vasoconstriction or vasodilation/ increased or decreased blood flow/ loss or gain of heat/ role of sweat glands. Those who failed to comprehend that 'maintenance' includes both conditions, wrote about the changes that take place on a hot day only.

Example:


when our body is temperature is high. At that time Sweat glands are Stimulating. As we special Sweat glands are present in dermis. They Secretes water. The process of evaporation occur with the removal of water. It causes cooling effect. The waters and other materials like urea and uric acid are remove through pores present on skin. The blood vessels which carry blood to skin are dilate this process is called Vasodilation. In this way more and more heat remove through conduction convection and radiation processes. The Erecter muscles attach with hair are relaxing contracting and relating. It also helpful to remove heat from body. When we get cool. At that time Sweat gland stop to secrete fluids . The blood vessels which carry blood to the skin are constricted and narrows this process is called Vaso-constriction. The Erectors muscles contract and forms Goosebumps in various parts of the body. It traps warms layer of air. It also insulates as warm air of blankets. In this various processes are also occuring. They produce heat in our body. The process of conduction, convection and radiation are also stop. Because less concentration of blood flow near the surface of skin.

Weaker responses wrote the structure of skin in detail. That was really disappointing at the time of e-marking that candidates lack the ability to comprehend what is being asked in the question. They elaborated the structural features of skin describing its various layers (epidermis, dermis and endodermis) but failed to correlate it with the function of skin as a homeostatic organ. Some of them wrote about the role of skin in terms of protection.

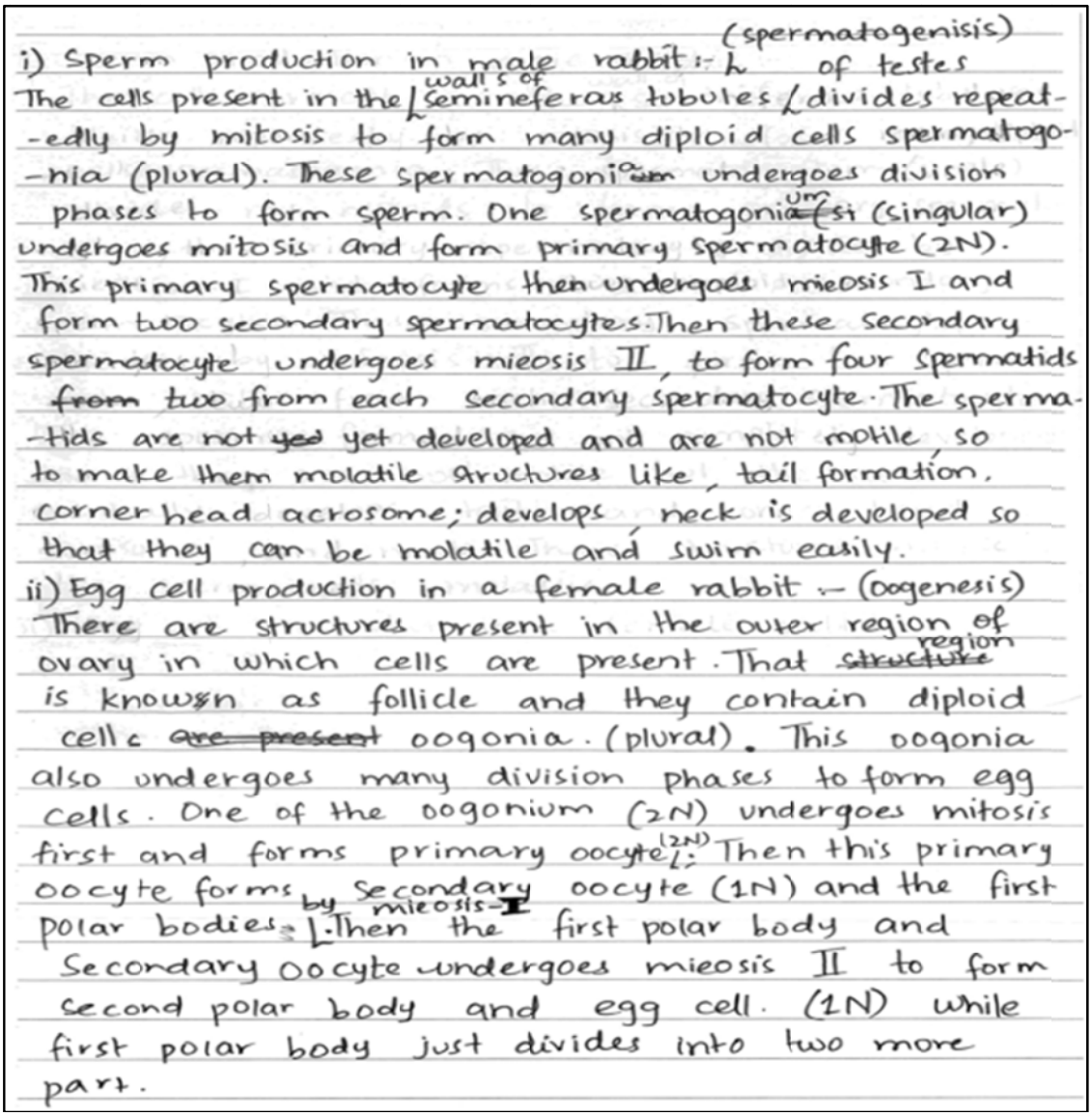
Example:


Skin is very important to maintain the body temperature
It has two layers:-
① Dermis layer
② Epidermis layer.
1) Epidermis layer is the outer protective layer of skin which have pain recepter and also maintain its shape.
2) Dermis layer:- It is the inner protective layer of skin which is able to maintain our body temperature.
Dermis layer have: ① Fat cell ② hair and ③ sweat gland
1) Fat cell:- It is present in the dermis layer of skin which is used as an insulating material against heat lost, and maintain the temperature.
2) Hairs:- Small muscle are attached with hair. When the hair is contract they form the goose bumps and release heat, and main the temperature.
3) Sweat glands:- Sweat gland produce sweat and cool our skin through evaporation techniques, and main-tain the body temperature.

Question 8a

Better responses provided a complete description of the process of gamete formation in a male and a female rabbit. Such responses included the key events of spermatogenesis i.e. process of mitosis taking place in the seminiferous tubules of testes, formation of spermatogonia and spermatocytes, meiosis I to produce two haploid daughter cells (secondary spermatocytes), meiosis II to produce four haploid spermatids, as well as of oogenesis i.e. role of follicles in ovary/ production of diploid primary oocytes/ meiosis I to produce two haploid cells, polar body and secondary oocyte, meiosis II to produce two haploid cells. Some of them presented their responses in the form of complete flow charts and thus, were awarded marks.

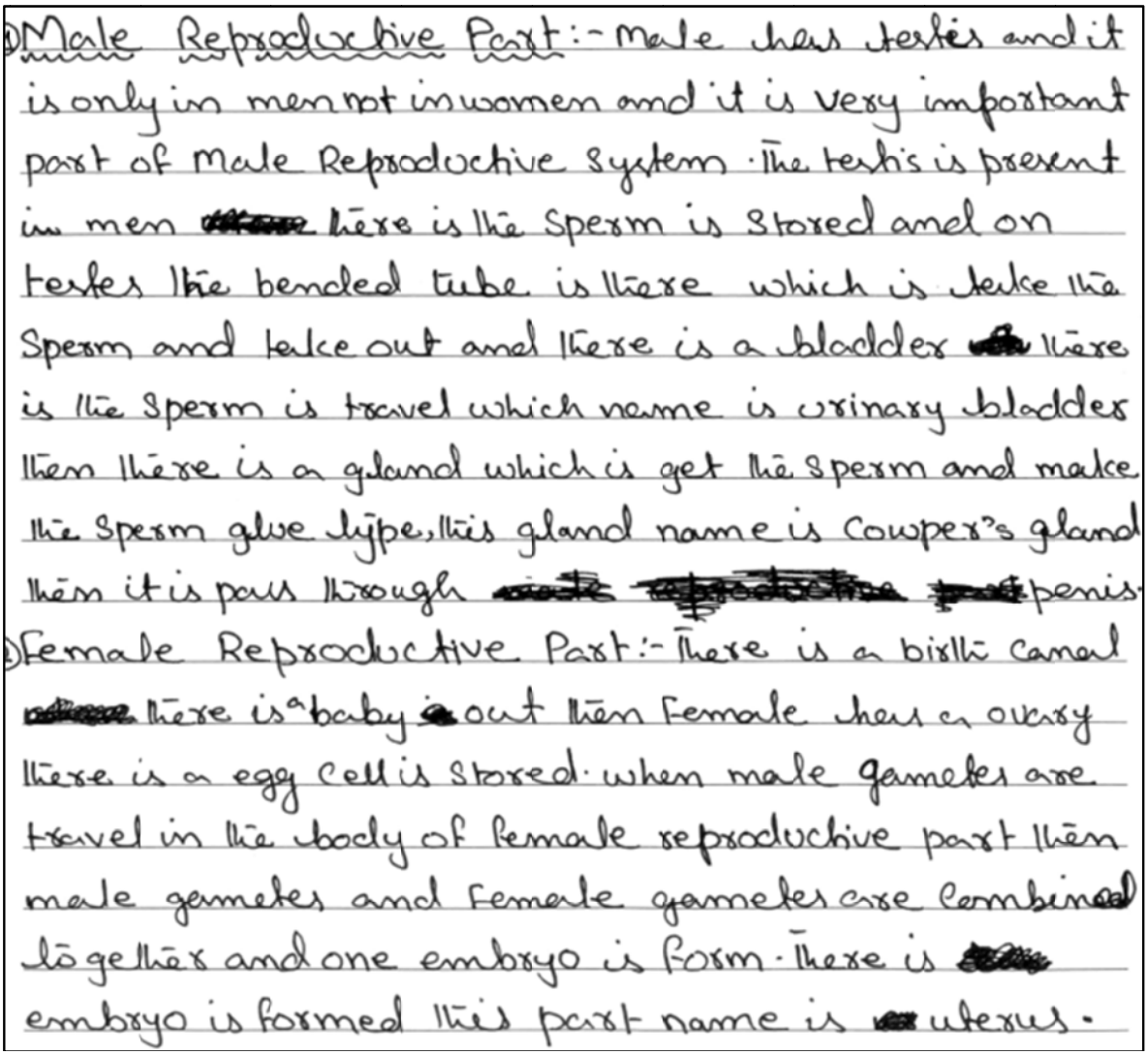
Example:



i) Sperm production in male rabbit :- (spermatogenisis) It of testes
The cells present in the walls of seminiferas tubules divides repeat-
-edly by mitosis to form many diploid cells spermatogo-
-nia (plural). These spermatogonium undergoes division
phases to form sperm. One spermatogonium (singular)
undergoes mitosis and form primary spermatocyte (2N).
This primary spermatocyte then undergoes mieosis I and
form two secondary spermatocytes. Then these secondary
spermatocyte undergoes mieosis II, to form four spermatids
from two from each secondary spermatocyte. The sperma-
-tids are not yet developed and are not motile, so
to make them motatile structures like, tail formation,
corner head acrosome; develops, neck is developed so
that they can be motatile and swim easily.
ii) Egg cell production in a female rabbit :- (oogenesis)
There are structures present in the outer region of
ovary in which cells are present. That region
is known as follicle and they contain diploid
cells oogonia. (plural). This oogonia
also undergoes many division phases to form egg
cells. One of the oogonium (2N) undergoes mitosis
first and forms primary oocyte (2N). Then this primary
oocyte forms by secondary mieosis-I oocyte (1N) and the first
polar bodies. Then the first polar body and
Secondary oocyte undergoes mieosis II to form
second polar body and egg cell. (1N) while
first polar body just divides into two more
part.

Weaker responses gave a vague description of male and female reproductive system. Some of the responses included the description of prostate gland and Cowper's gland (secretions and their functions). Candidates wrote about the process of fertilization and its outcome.

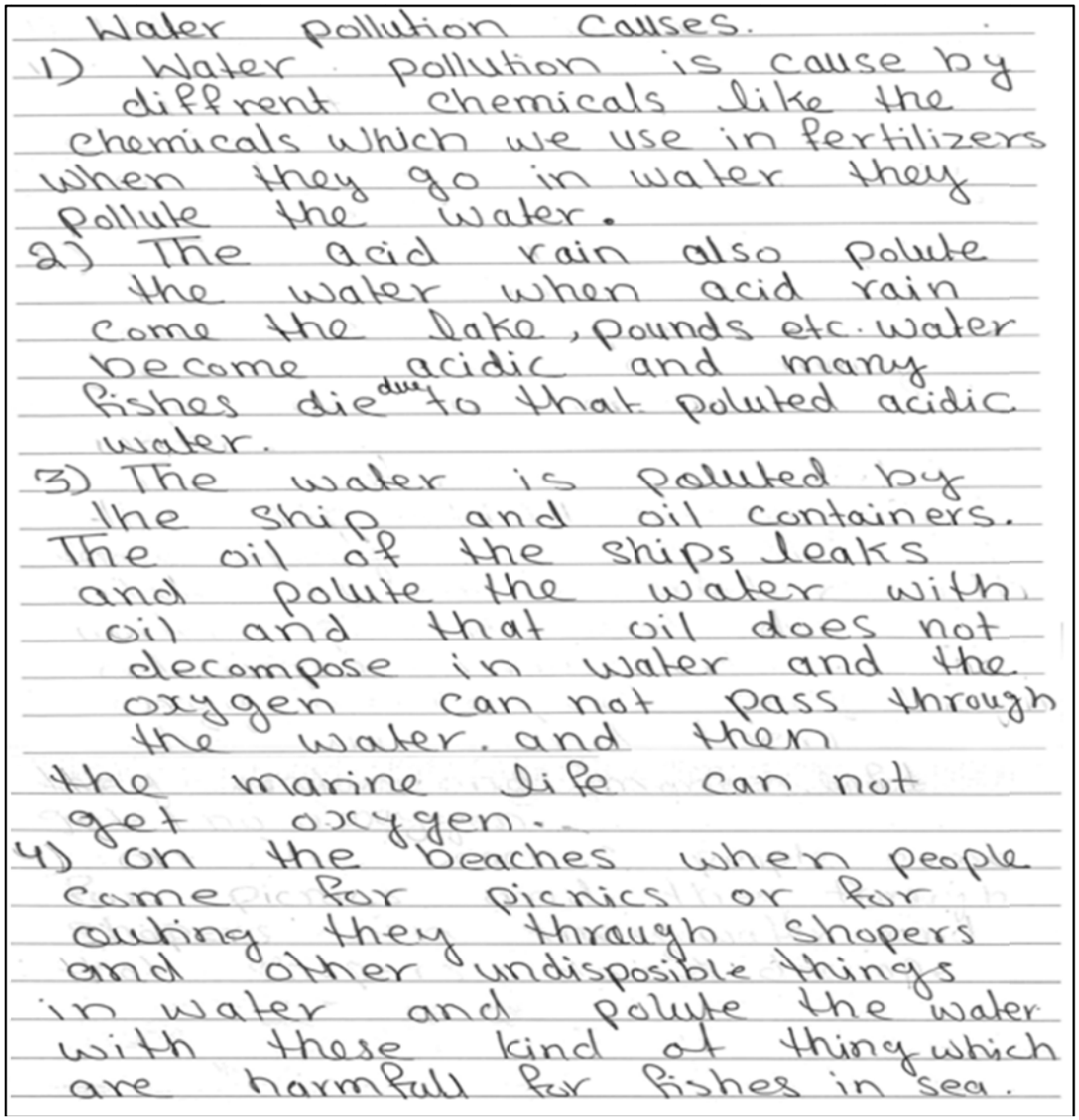
Example:



Question 8b

Better responses displayed the understanding of the key word in the question i.e. ‘causes’. Such responses focused only on the agents of water pollution and wrote about sewage from domestic households, factories and commercial buildings/ industrial waste from factories/ oil spills from ships/ acid rain. They described the microorganisms or harmful chemicals present in each type of pollutant and the way they could harm the environment.

Example:



Water pollution causes.

1) Water pollution is cause by diffrent chemicals like the chemicals which we use in fertilizers when they go in water they pollute the water.

2) The acid rain also polute the water when acid rain come the lake, pounds etc. water become acidic and many fishes die due to that poluted acidic water.

3) The water is poluted by the ship and oil containers. The oil of the ships leaks and polute the water with oil and that oil does not decompose in water and the oxygen can not pass through the water. and then the marine life can not get oxygen.

4) on the beaches when people come for picnics or for outing they through shopers and other undisposible things in water and polute the water with these kind of thing which are harmfull for fishes in sea.

Weaker responses did not focus on the demand of the question. Instead of writing causes, they wrote the effects of water pollution on our ecosystem. They wrote descriptions about effect of pollution on aquatic life, mosquito development in water, eutrophication or water borne diseases such as diarrhea/ dysentery/ typhoid.

Example:

Water pollution is very harmful for human beings as well as aquatic life. It causes number of negative impacts on ecosystem of which some are as under.

i) AQUATIC LIFE:

Due to water pollution the aquatic life could not get the suitable environment. For example The fishes may die due to presence of harmful metals in it. Hence water pollution is destroying aquatic life.

ii) MOSQUITO DEVELOPMENT:

Because of contamination of water terrified organisms are born. Such as mosquitos which cause malaria and due to water pollution it can now ~~spread~~ transmit dengue fever which may lead to death.

iii) WATERBORNE DISEASES:

Due to water pollution, the rural areas are facing great difficulties for finding fresh water and are pledge to drink marshy water which spread many gut diseases

CAUSES OF WATER POLLUTION:

There are four causes of water pollution in our ecosystem. are:

(1.) By water pollution people get deceases like malaria, Dangoa virus e.t.c.

(2.) By water pollution people get infection.

(3.) By water pollution there are increase of mosquito's

(4.) By water pollution there is ~~in atmosphere harmful gas~~ marine life get cause of it.