



Dr. Blossa Science

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NAME:..... STREAM.....

SENIOR FOUR

553/1

BIOLOGY

PAPER 1

EXAM 14

TIME: 2.30 HOURS

Instructions:

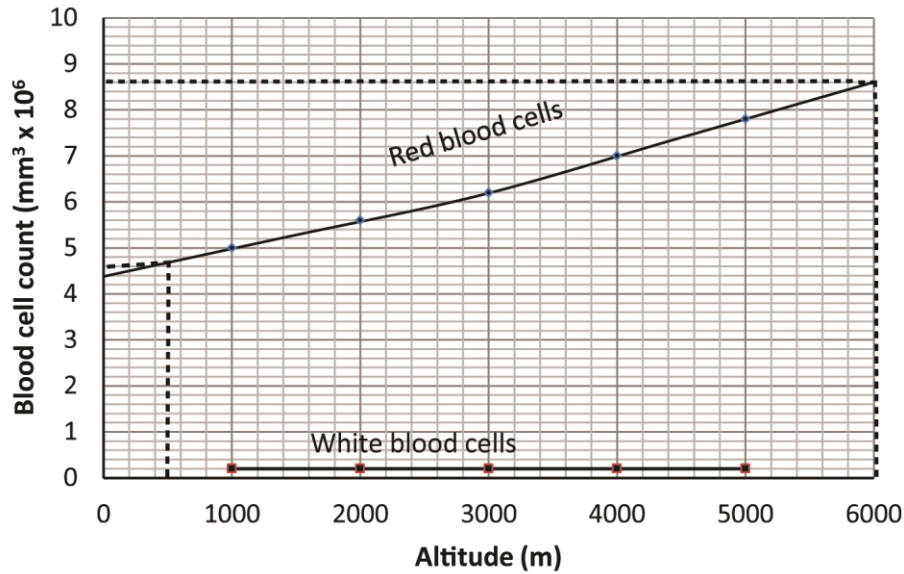
- Answer **all** questions
- Answers to section A and B must be put in the spaces provided only
- Answers to section C be put on the answer sheets provided

	A	B	C	D		A	B	C	D
1					16				
2					17				
3					18				
4					19				
5					20				
6					21				
7					22				
8					23				
9					24				
10					25				
11					26				
12					27				
13					28				
14					29				
15					30				

- C: it is relatively slow
D: Does not involve any growth

14. Which one of the following substances accumulates in muscles during vigorous exercise?
 A: water **B:** lactic acid C: carbon dioxide D: oxygen
15. In what part of the green flowering plant does meiosis occur?
 A: seed **B:** flower C: Fruit D: shoot apex
16. Which of the following pairs of cells does not have nuclei when mature?
 A: sieve tube cells and companion cells B: Erythrocytes and leucocytes
C: sieve tube cells and erythrocytes C: companion cells and leucocytes
17. Which one of the following processes needs energy?
 A: Absorption of water by root hairs B: gaseous exchange in the alveoli
 C: loss of turgidity by a plant cell **D:** Absorption of mineral salts by root hairs
- Mineral salts are absorbed by active transport
18. Enzymes are said to be specific in nature because they are
 A: proteins
 B: act in a particular pH medium
C: act on one kind of substrate
 D: remain unchanged at the end of the reaction
19. In body temperature regulation, Vasoconstriction
A: allows less blood to enter the skin capillary network
 B: allows less urine to be secreted into the bladder
 C: allows more sweat to be secreted by the sweat glands
 D: increases heat loss by radiation
20. Which one of the following is characteristic of monocotyledons?
A: leaf sheath B: net venation
 C: prominent taproot D: cork layer.
21. The living together of a fungus and an algae as a lichen is called
A: symbiosis B: parasitism
 C: saprophytism D: commensalism
22. Which of the following substances are secreted in mammalian sweat?
 A: urea, ammonia, water B: urea, carbon dioxide, sodium chloride
C: urea, water, sodium chloride D: urea, carbon dioxide, water
23. Nerves, the spinal cord and the brain make up
 A: a tissue **B:** a system C: an organ D: an organism
24. During inspiration the
A: pressure in the thoracic cavity is reduced
 B: external intercostal muscles relax

A graph of Blood cell count against altitude



- (b) Describe the relationship between altitude and
- red blood cell count
Red blood cells count increase as altitude increase
 - white blood cell count
White blood cells count remain unchanged when the altitude increase
- (c) Give an explanation for the above relationships
- red blood cell count
Red blood cell count increases with increase in altitude because an increase in altitude reduced the partial pressure of oxygen.
 - white blood cell count
White blood cell count remain unchanged because change in altitude does not directly affect change in infectious microorganism
- (d) What were the red blood cell counts at:
- 500m
 $4.6 \times 10^6 \text{ mm}^{-3}$
 - 6000m
 $8.6 \times 10^6 \text{ mm}^{-3}$
- (e) (i) How are red blood cells adapted to carry out their function?
- They have a biconcave disc shape to increase the surface area for absorption of oxygen.
 - 2. They lack a nucleus, which permits haemoglobin to be packed into the cell.
 - 3. They are small therefore able to squeeze between capillaries

- 4. They have a thin membrane permitting efficient diffusion of gases (short distance for diffusion)
- 5. They contain haemoglobin, which has a high affinity for oxygen.
- 6. They do not carry out any metabolism so they do not utilize the oxygen being transported.

(ii) What happens to old red blood cells in the body?

Old or damaged RBCs are **removed from the circulation by macrophages in the spleen and liver**, and the hemoglobin they contain is broken down into heme and globin. The globin protein may be recycled, or broken down further to its constituent amino acids, which may be recycled or metabolized

32. (a) What do you **understand** by the terms:

(i) mitosis?

This type of cell division; leads to the formation of two daughter cells each with exactly the same number of chromosomes as the parent cells.

(ii) Meiosis?

This is a type of cell division where each parent cell divides into four haploid cells. It leads to formation of gametes

(b) Where does each of the above occur?

Mitosis occurs in all somatic cells

Meiosis occurs in ovary, testis, anthers of flowers, sporangium

(c) Give the importance of mitosis to a living organism.

- Genetic stability: It ensures that the daughter cells carry the exact genetic material as the parent cells
- Growth: growth results in increase in the number of cells by mitosis.
- Body repair: worn out cells are replaced by the cells produced by mitosis
- Asexual reproduction

33. (a) In the space below, make a labeled diagram of a motor nerve

(b) Give the function(s) of any four (4) parts indicated on your diagram.

- Nerve fibre or axon transmits impulses
- The myelin sheath protects the axon; it also insulates the axon and speeds up transmission of impulse.
- Nucleus controls cellular activity
- Dendrites or make contacts with other nerve cells or effector
- Nodes of Ranvier are microscopic gaps found within myelinated axons. Their function is to speed up propagation of action potentials along the axon via saltatory conduction
- The cell body preserves the structural integrity of the neuron, houses the genetic material, and supplies energy to drive activities.
-

(c) State any 3 structural differences between motor and sensory nerve fibres

Differences between effector and sensory neuron

	Effector neurons	Sensory neuron
1.	Transmit impulse from CNS to the effector	Transmit impulse from sense organ or receptor to the CNS cell body in the middle of axon
2.	Cell body at the end of the axon	Cell body in the middle of axon
3.	Cell body located in grey matter of spinal cord	Cell body located in dorsal root ganglion of the spinal chord

SECTION C

34. (a) Give the different types of skeletons and explain what is meant by each

(a) **Hydrostatic skeleton**

Here support is provided by a fluid under pressure and it is found in round worms, earthworm.

(b) Exoskeleton

It is made of a hard cuticle protecting inner delicate tissues and also provides attachment for muscles

(c) Endoskeleton

It occurs in vertebrates, made of bone and cartilages.

It is internal and the muscles are attached to it

(b) Explain the importance of a skeleton to an organism

(i) Hydrostatic skeleton provides support form movement

(ii) **Exoskeleton**

- minimizes water loss by evaporation
- protects the internal soft tissue
- determines maximum size of the organism

(iii) Endoskeleton

- Give body shape for easy identification and a streamline shape reduce resistance during movement.
- Provide support
- Protect delicate organs
- Store Minerals Ca,
- Make blood cells

35. (a) Give the adaptations of

(i) Insects pollinated flowers

- (a) brightly colored petals to attract pollinators
- (b) scented to attract pollinators
- (c) Have nectar to attract pollinators
- (d) Flowers have nectar to attract pollinators
- (e) Have sticky stigmas to pick pollen from pollinators
- (f) Flower have sticky pollen grains to stick on pollinators and the stigma

(ii) Wind pollinated flowers

- a. Large production of pollen grains to to increase chance of pollination.
- b. Feathery and sticky stigma to increase chance of receiving pollen
- c. Produce light pollen grains that can be transported by wind.
- d. Anthers is well exposed e.g. maize flower to scatter pollen

(b) Describe the various mechanisms by which self-pollination may be prevented.

- Dichogamy: anthers mature and stigma become receptive at different times
 - (i) Protandry: anther mature before the stigma
 - (ii) Protogyny: stigma mature before the anther
- Self-incompatibility: the pollen grain fails to develop on the stigma of the same flower.
- Special floral structure: most hermaphrodite flowers have structural features that favour cross pollination; e.g. stigma may be above the anthers thus removing the possibility of pollen falling on the stigma of the same flower. Other have nectar and good scent to attract pollinator.
- Inflorescence: having many flowers in close proximity on the same stalk favours cross pollination.
- Some plants have monoecious flower, i.e. separate male and female flowers on the same plant. e.g. maize and coconut.
- Some plants are **dioecious**, separate male and female flower of different plants. Despite the advantage of cross fertilization, dioecious plants are not many because only half of the plants are able to produce seeds and there is waste of pollen grains in wind dispersal.

END