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**CEKENAS END OF TERM TWO EXAM-2022**

**FORM FOUR EXAM**

*Kenya Certificate of Secondary Education. (K.C.S.E)*

***Biology paper 2***

***231/2***

***Marking scheme***

1.a)

A – Hypertonic solution/ highly concentrated solution

B – Hypotonic solution/ lowly concentrated solution

b) Osmosis

c) Plasmolysis;

d) It will gain water by osmosis; swell and eventually burst;

e) Form contractile vacuoles; which get rid of excess water to the surrounding.

2. i) Increased rate of heart beat/ increased rate of blood circulation

- Increased rate of breathing/ deep inspiration and expiration

ii) During hot weather surficial blood vessels dilate; (thus) more blood flows through the skin;

iii) Organ R – Pancreas

- Substance S – Insulin

iv) – Transport of hormones

- Transport of nitrogenous waste **Mark first 2**

- Transport of dissolved nutrients

3. a) People with sickle cell trait have less than half of their red blood cells being sickle shaped; plasmodium do not survive in sickle shaped red blood cells.

b)

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Probability = $\frac{1}{2}$

c) – Early maturity; rej. Faster maturity.

- High yields;

- Resistance to pests and diseases; **Mark first 1**

- Resistance to drought

4. a) Bryophyta; Rej. Bryophyte **Should start with a capital letter.**

b) Q- Capsule;

c) Absorption of water/ mineral salts;

Anchorage; OWTTE.

d) Arachnida; should start with a capital letter

Reason – 4 pairs of legs; OWTTE

 - 2 body parts (cephalo thorax and abdomen)

**Reason and class tied**

e) – Source of food;

- Production of antibiotics; **Mark any 2**

- Cause diseases;

- Causes decomposition

Any 2

5. a) Population is the number of organisms of the same species occupying a particular habitat at a given time; community is the total number of different species;

b) – Recycle nutrients

- Predators – regulation of prey;

c) Lead to (stiff) competition for available resources; leading to elimination of one of them;

d) i) Rhizobium

ii) Symbiosis

6.a)

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b) Amount of sweat increases with increase in temperature; high temperature stimulates the sweat glands; to secrete sweat;

c) 

d) An increase in temperature leads to a decrease in the amount of urine produced; high temperature stimulates sweating leading to water loss; this leads to increase in osmotic pressure of the body fluids; thus release of ADH; which increases reabsorption of water;

**Total 5 mks max 4**

e) i) Hair (stand) erect/ upright; trapping a layer of air insulating the body against heat loss;

ii) Vasoconstriction; reducing the amount of blood flowing through the skin surface thus heat loss;

7. a) Position of scrotal sac out of abdominal cavity provide cooler temperature for sperm development/ spermatogenesis; Has seminiferous tubules, highly coiled whose lining consist of actively dividing cells; between them are interstitial cells which produce androgens; Seminiferous tubules unite to form epididymis; a coiled tube; which provide surface for sperm storage; Seminal vesicles provide alkaline fluid which nourishes spermatozoa; prostate gland secretes alkaline fluid to neutralize the vaginal fluids; it also activates sperms; Cowper’ s gland secretes an alkaline fluid that neutralize acidity along the urethra; penis which projects from the body, made of spongy tissue, muscle and blood vessel; erects by having spaces in its spongy tissue filled with blood enabling it to penetrate vagina during coitus, to deposit sperms in the female reproductive tract;

**(Total 12 marks; max 10 marks)**

b) (i) Cervical Vertebra.

• Has vertebraterial canal for passage of vertebral artery and nerves;

• It has branched and broad transverse process to provide surface for attachment of neck muscles;

• Short neutral spine for attachment of neck muscles;

• Wide neural canal for passage of spinal cord;

• Centrum and a neural arch for protection of the spinal cord;

• Prezygapophysis and postzygapophysis for articulation with the vertebrae in front and behind;

• Atlas has broad surface for articulation with condyles of the skull and this allows the nodding movement of the heard;

• Axis has a projection of the centrum, the odontoid process that fits into atlas and allows for the rotatory / turning movement of the head;

**(Total 8marks; max 5 marks)**

(ii) Thoracic Vertebra.

• Long neural spine for muscles attachment;

• Short transverse process for muscle attachment and for articulation with the ribs;

• Neural arch and centrum protect the spinal cord;

• Large centrum to support the body weight;

• Facets for articulation with other vertebrae adjacent to it:

• Turbercular and capitular demi facets for articulation with the rib:

**(Total 6 marks; max 5 marks)**

**NB. Structure and function 1 mark. `**

8. - Broad leaves; to increase the surface area; for maximum trapping of sunlight; for photosynthesis;

- Thin; to reduce diffusion distance of carbon (IV) oxide; (for photosynthesis)

- Transparent cuticle; and epidermis; for easy penetration of light;

- Extensive veins; with vascular bundles; for transport of water and mineral salts; and translocation of food;

- Numerous stomata; for gaseous exchange; and transpiration;

- Leaf mosaic arrangement; prevent overlapping; for maximum absorption of light;--

- Numerous chloroplasts; for maximum trapping of light; for photosynthesis