

BIOLOGY PAPER 231/1 K.C.S.E. 1995
MARKING SCHEME

1. They produce, they grow
Respond to stimuli/ irritability
2. Protein synthesis – Ribosomes
Transport of cell secretions – Endoplasmic reticulum
3. Food Spoilage
Poisoning / cause disease
4. Water in RBC moves out by osmosis and the RBC shrinks
5. Provide energy required for splitting water molecules/ photosynthesis.
6. A - Scrus – acc. Sori
B- Rhizome
7. Nitrogen
Making cell walls
Magnesium / mg
8. Evidence does not support Larmacks theory
Acquired characteristics are not inherited characteristics are found in reproductive cells only
9. Sickle cell anaemia (Rej. Bleeders disease)

SECTION B

10. (a) K-Enzymes/ Sucrose/ Invertase/ Saccharise
L- Inhibitor Acceptance any example e.g. any acid
 - (b) – Addition of sucrose/ substrate
- Optimum/ suitable/ correct / right pH
- Removal of products
 - (c) - Competed with substance: for active site (of K)
- Acc. L made the medium acidic; unsuitable for K
- L occupies active sites
11. (a) A – Epidermis
B – Pith
 - (b) C – Transport manufactured food / translation; Rej. Digested food
D – Produces new cells/ divides to give new cells. Accept secondary
Thickening/ growth/ produces phloem & xylem.
E- transport minerals salts/ minerals/ salts alone
 - (c) - Xylem in central/ Star shaped
- Phloem in arms of xylem

- Root hairs present in root / has piliferous layer
 - No pith in root
12. (a) To absorb CO₂; reacts with CO₂
- (b) To provide moisture to germinating seeds. Accept water for moisture
- (c) (i)
- (ii) Oxygen in the tube is taken up for germination CO absorbed by higher pressure outside tube
13. (a) - Green plants – Grasshoppers – Lizards – snakes
- Green plants – Grasshoppers – Lizards – Cats
- Green plants – Mice – Snakes – Hawks
- Green plants – Mice – Snakes – cats
- (b) – Mice
- (c) Lizards eat Hawk snakes, Rej. If any primary, tertiary consumer is given
- (d) (i) Most plants will die / dry
- (ii) (same) organisms may starve to death
- (iii) (same) organisms may migrate
14. (a) (i) P – will tend/ grow towards light
- Q – will remain straight/ little/ no growth
- R – will remain/ grow straight / Acc. Grow upwards
- (ii) P – Growth substances or hormones/ auxins/IAA are produced by the stem tip. They move downwards and get disturbed to the side away from the side of light. Where they cause more rapid growth/ cell division/ elongation (that results in bending)
- The source of auxin has been removed and the auxins are not affected by light because the area has been covered.
- (b) Tip will bend towards the light
- (c) All the seedlings will grow upwards.

SECTION C

15. (a) - Sigmoid of the curve shown
- (b) - 92 acc. 93
- (c) $\frac{110 - 78}{4} = 8.0$ (cells/ min)
- (d) 31.5 (mins)
- (e) (i) A to B Lag phase / slow growth phase
- (ii) B to C Exponential /log/rapid growth phase
- (f) Slow/ reduced growth due to limiting environmental factors (Accept any example) rate of multiplication is almost the same as the death rate, Acc: few cells are still dying Rej. Growth for multiplication but acc. Reproduction.
- (g) – Low death rate/ low mortality;
- Rej. Decrease in death rate/ reduced death rate
 - High birth rate/ high fertility acc. Increased birth rate
 - Improved medical services: Acc. Increased medical facilities

- Enough food/ availability of food
 - Absence of war/ political stability/ peace
 - Improved standard of living
- (h) Measure the total area of the habitat, throw or mark out the quadrat in the area for the study; at random. Identify label the various species of the plants in the quadrat; count plants of each species; record the numbers, repeat the process (ovtte) work out the average per quadrat for each species in the area/ calculate the population for the total area in Nairobi.
16. (a) (i) Large; brightly coloured corolla/ inflorescence/ florets/ bracts to attract Insect
- (ii) Scented to attract insects
- (iii) Have nectary guides/ nectarines/ that directs insects/ secrete nectar to attract insects.
- (iv) Pollen grains rough/ spikey/ sticky/ surface; to stick on insects body
- (v) Special shaped corolla tube; to enable insects to land
- (vi) Anthers are situated inside the flowers to ensure that they are in contact with the insect
- (vii) Sticky stigma; for pollen to stick or to adhere
- (b) (i) Oestrogen
Repair/ heal endometrium/ wall of uterus; which is destroyed in menstruation
- (ii) Progesterone
Stimulates the thickening of the uterus; increases the blood supply to the endometrium. Inhibits the production of follicle stimulating Hormone.
- (iii) Luteinising hormone
Responsible for maturation of the graafian follicles/ causes ovulation/ stimulates corpus luteum; to secrete progesterone.
17. (i) Mammalian Kidney
Blood reaches the kidney from the renal/ renal artery enters the kidney; then branches into capillaries/ glomeruli/ in the Bowman's capsule, blood vessels leaving the capsule/ efferent are those entering it/ afferent causing high pressure to develop in the glomeruli. This forces the plasma/ causes ultra filtration into the capsule. The filtrate contains waste products (acc. One example) The filtrate moves into the proximal/ first convoluted tubule; where selective reabsorption of glucose amino acids, some water and vitamins take through the loop of henle; excretory products/ urea, excess water and salts acc, one example) pass into the distal tubule, where the remaining useful substance (acc. One example e.g salts and water) are reabsorbed; The filtrate passes into the collecting tubule; where more reabsorption of water takes place: Excess water, urea and salts (all three must appear)/Urine are removed through the ureter.
- (ii) Green plants
 CO_2 / O_2 / H_2O diffuse through the stomata lentils/ hydrathods some toxic wastes are converted into non – toxic substances; these are deposited in certain tissues

of the plant/ stored in ageing structures. Resins/ tannins – are exuded through the bark of the stem; or lost during leaf fall.

for more free past papers visit: www.freekcepastpapers.com

BIOLOGY PAPER 231/1 K.C.S.E 1996
MARKING SCHEME

1. - Controls/regulates/ enzymes/ synthesis is the material for inheritance
2. - Sexual transmitted
- Blood transfusion
- Sharing needle/syringes/ razors
3. After vigorous activity when blood fall below normal
4. scurvy
5. Arthropoda
6. Capable of interbreeding; to produce viable offsprings
7. (a) To split water/ Photosynthesis/hydrous
(b) Glucose/carbohydrate/ starch/ sugar.
8. Store chemical salts/sugar/blood/; maintain shape of cell. Osmotic gradient the bring about movement of water.
9. Presence of special structure that attract agent of pollination protandry; protogyny; monoecism; self – sterility.
10. (a) O₂ is necessary for germination
(b) Germination in B; no fermentation
11. Gametes form new offspring
12. To increase the chances of fertilization and survival of species

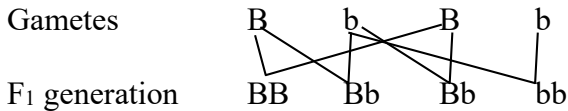
SECTION B

13. (a) Drive out oxygen / air
(b) Avoid killing yeast cells/ denaturing enzymes in yeast
(c) To prevent air from getting into the glucose and yeast Suspension
(d) Limewater turns milky
(e) Used boiled yeast on glucose
14. CO₂ diffuses into tracheoles follows the trachea; not through spiracles
Stomata pores / stomata; cuticle
Acc. Lenticels.
15. (a) $\frac{374 \times 400}{80}$
(b) - There was even distribution of crabs
- No movement in and out of regions; no migration
- There was random distribution of errors after the first capture.
(c) – Capture/ recapture; capture release recapture.
16. (a) – Phototropism
(b) Auxins / hormones; move diffuse to the demised/ away from the light side; causing elongation/ growth on the dark sides hence bending
17. (a) Anaemia/ low blood volume/ loss of iron/ low red blood cells/ low haemoglobin; leading to low oxygen; loss of nutrients and dehydrations.

(b) Blood clotting

(c) Transfusion; taking fluids) eating iron rich food stuff/ taking iron tablets.

18. Parents $Bb \times Bb$



(b) 3 black 1 brown

19. (a) K- Root hair

L- Xylem vessel

(b) Water moves from the soil into the root hair by osmosis; because concentration of cell sap is higher than water in the soil; the cell sap in the root hair is diluted, thus making it less concentrated than neighboring cell; therefore water moves into the neighboring cell; it is actively secreted into structure L.

(c) Active transport/ diffusion

SECTION C

20. (a) 10 HRC and 31 HRC

(b) (i) A and B

The number of bacteria dividing are few; bacteria are adjusting conditions; few are dying therefore high increase in population

(ii) B and C

More cells are dividing due to suitable environment/ favorable conditions; few are dying; therefore high increase in population

(iii) C and D

No population change; number produced is equal to number dying.

(c) Accumulation of toxic wastes; that kills bacteria; depletion of nutrients leading to competition of space.

(d) (i) The population will remain the same

(ii) Temperature not conclusive for division

(g) – Food to be sufficient for population

- Social amenities/ education; health services

21. The cornified layer is made up of dead cells, that prevent entry of bacteria and prevent physical damage; melanin protects the body against U-V variation; sebaceous glands produce a chemical/ ring substance which is of blood vessel; which when the body temperature is high dilate and heat is lost or when body temp is low blood vessels constrict. And heat is retained. Hair when it is called, stands and traps air between themselves; to retain heat/ stop heat loss or when it is hot hair lies flat close on the skin;

so does not trap air, and therefore heat is retained and sweat is lost; the skin has sweat glands which produces sweat; sweat evaporates thus cooling the body.

22. Lower plants/example Bryophyta/pterophyta; produces spores which develops to new plants; budding an overgrowth arises from plant drop off; and develops into a new plant; common in lower plants yeast.
- Fragmentation – e.g Spirogyra; breaks off and grows into a new plant
 - Vegetative propagation: common in higher plants involves growth of new plants from buds/bubils
 - Root stem/ tubers/ leaves: possesses buds; which develops to new plants
 - Corns; have terminal buds that grows vertically and produce a new plant
 - Runners; have lateral buds that produce new plants

for more free past papers visit: www.freeksepastpapers.com

BIOLOGY PAPER 231/1 K.C.S.E 1997
MARKING SCHEME

1. (a) Golgi apparatus
Packaging of synthesized materials; Accept correctly named materials e.g glycoproteins
- (b) Ribosomes
Transport of the packed materials, secretion of packed materials;
Manufacture synthesis of proteins.
2. The animal belongs to the class – Arachnida;
3. Alcohol, carbon dioxide and energy;
- accept Ethanol, C₂H₅OH/CH₃H₂OH.
4. – Lignified thickened to prevent collapsing (Acc. Strengthened add strength)
- Narrow to facilitate capillary:
5. Cerebrum cerebral hemisphere/ cerebral cortex;
6. (a) Mosquito larvae/ Pupae are killed; Accept suffocation/ Breaking life cycle of Mosquitoes
- (b) Pollution of environment/ oil expensive, other aquatic are killed, accept Contamination.

7.

Biceps	Gut Muscles
Striated	Unstriated
Multinucleated	Uninucleated
Long Fibres	Short fibres
Cylindrical	Spindle Shaped

- 8 (a) Disease the person was suffering from
Diabetes insipidus ref. Diuresis/ water diabetes
- (b) Hormone that was deficient
Antidiuretic hormone/ ADH/Vasopressin
9. Fossil (records) paleontology; geographical distribution
Comparative anatomy/taxonomy; cell biology
Comparative serology; comparative embryology
Comparative immunology
10. Vitamin D- Rickets/Osteoporosis
Iodine- Goitre

SECTION B (40 MARKS)

11. (a) Grass → Grasshoppers → Guinea fowls
Grass → Termites → Guinea fowls
- (b) Lions would compete with leopards
Gazelle numbers would reduce
Grass would increase
- (c) Grass; rej. Plants
12. (a) Long sighted ness/ hypermetropia

- (b) Eye ball too short/ eye lens are unable to focus because they are flat/weak, unable to focus the image on the retina; eyes are unable to accommodate/ change their focal length
- (c) By wearing convex / biconvex lenses; accept converging lenses
13. (a) strong air/ winds
High temperature
Low humidity; accept dry conditions/ sunlight
- (b) Absence of leaves/ stomata absent
Transpiration; / little transpiration
- (c) Arid/dry/ desert/ accept semi- desert
Reason
Low rate of water loss; accept more/ a lot of water loss
Wet/Moist/aquatic
Reason
High rate of water/ high rate of transpiration /acc. A lot of water loss
14. (a) E- Denitrifying bacteria; e.g pseudomonas denitrifications
J- Nitrifying bacteria; Nitrobacteria reject nitrosamines
- (b) H- Death decay/ decomposition; excretion/ Aminonification putrefaction
egestion.
F- Nitrogen fixation
- (c) Plants
15. (a) Deamination
- (b) Removal of excess amino acids availing energy in the body formation glycogen/ fat for storage.
- (c) Proteins
- (d) Essentials amino acids are acquired from food
Non- essential are synthesized in the body
16. (a) White
Give a reason – Fewer numbers/ lower ratio; lower in numbers/ absence of white in parents & absence in offspring.
- (b) Heterozygous Rr. Accept appropriate letters
Rejects R.w appropriate/ letters (o-dominance)
- (c) Double recessive /rr/ homozygous (recessive)
17. (a) Figure 1 R:
Figure 2 T: Accept growth
- (b) Development of the foetus/zygote/fertilized/ova/egg/embryo
- (c) Style
- (d) R;P;
- (e) X

SECTION C: (40 MARKS)

18. (a) (i) Bamboo plants
4 and 6
- (ii) Maize plants
12 and 14

- (b) (i) Bamboo
(ii) It had accumulated more weight and therefore greater dry weight
- (c) Maize plants have reached maturity/maximum height food being manufactured (in green parts); is utilized for growth storage primary in the cob.
- (d) Increase in weight – bamboo reject both increase/ decrease accept bamboo and maize increase/ decrease.
- (e) (i) Dry weight instead of fresh weight
Fresh weight is dependant on the amount of water present in the plants and this fluctuates depending on environmental factors.
- (ii) Weight and height
Both given a better measure of growth
- (f) Average height
At every 2 weeks measure the height of samples of plants in each plot:
Divide the total height by the number of plants in each of plot.
- Average dry weight
Harvest the sample measure of the plants in each plot; dry to constant weight:
And divide by the number of plants
- (g) Being monocots/ lack (Inter) fascicular cambium:
- 19 (a) An association between two organism; where one benefits; and the other is adversely affected. Or an association where an organism lives in or on another living or organism: obtaining from it and causing harm without necessary killing it.
- (b) Has hooks/suckers: for attachment to wall of intestines: long; to increase surface area for absorption of food: award increase in S.A for absorption once. Secretes enzymes/to neutralize digestive enzymes; (mucus inhibitor substance/anti enzymes)
Hermaphroditic: to ensure reproductive/ self fertilization.
Production of many eggs: to ensure survival
Segment for egg dispersal:
More than one host; for transmission: e.g T solium – pig (Intermediate host) T. Saginata. Long to fit in the intestine/ increase surface area for (flatten)
Absorption of food;
Anaerobic survive in the gut with low O₂.
20. (a) Breakdown of (complex) food substances by enzymes; to simpler compounds (which can be absorbed)
- (b) Small intestines are long/coiled: to offer large surface area for digestion and absorption:
The walls are muscular: for peristalsis/ inner walls posses mucus glands/ accept goblet cells that secretes mucus; for lubrication; and protection of wall from digestive enzymes:
The inner walls have digestive glands: that secret (digestive) enzyme:

The inner walls have villi: to increase surface area, absorption/ diffusion; accept 'epithelium is one cell thick'

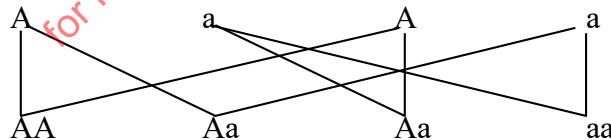
The Villi have numerous blood vessels: for transport of the end products of digestion; accept at least two correctly named examples/ end products of glucose amino acids/ mineral salts vitamins.

The villi also have vessels for transport of fats/lipids
Accept illustrations of cell are thick epithelium

for more free past papers visit: www.freekcepastpapers.com

BIOLOGY PAPER 231/1 K.C.S.E 1998
MARKING SCHEME

1. Blood has no antigens and does not cause agglutination (with other types)
2. Yellowing of leaves/stunted/ growth/chlorosis/ lack chlorophyll
3. Skeletal muscle cell
Mitochondria
Palisade cell
Chloroplasts
4. To facilitate transportation of gases/ Exchange of gases; if gases are mentioned (both must be O₂ and CO₂)
5. Symbiotic/ both benefit/ mutual benefit; correct description of mutual benefit
6. (a) Phototaxis
(b) To avoid desiccation/ drying/ dehydration
Escape from predators;
7. (a) Femur
(b) Ball and socket
8. (a) wind
(b) To enable it trap pollen grains in the air; reject catch/ attach for trap
9. Turgidity
Presence of collenchymas (in the cortex)
10. –Light intensity decreases with depth light limiting
- Temperature decreases with depth
11. – Use of unsterilized instrument;
- Temperature decreases depth
- blood transfusion
- Mother to the foetus/ mother to baby infant/ breast milk/ sharing of instruments e.g needles syringes, razor blade e.t.c
- Mixing of infected blood through cuts
12. (a) Aa, Aa, Acc, both are Aa
(b) Normal children AA, Aa,
Genotype of the albino child
Albino child aa,



(c) 25% $\frac{1}{4}$

13. (a)

Meiosis	Mitosis
(i) Reduction/ having chromosomes/ haploid no. of chromosomes cells.	Maintenance of chromosomes number/ diploid no. of chromosomes/ cells
(ii) Takes place in reproductive cells/ glands gamete formation	In somatic cells/ body cells/ for growth
(iii) Crossing over takes place/ variation	No crossing over no variation

(iv) 4 daughter cells 2 division processes	2 daughter cells 1 division processes
---	--

- (b) X or / x and Y; Rej XY, X alone, XX
Ova?
X/XX
14. (a) Light; Rej: light intensity
(b) Test for starch
(c) (i) The covered part of the leaf remain brown/yellow/ retain color
Of iodine, and the uncovered parts turned blue/ black; rej blue alone black alone.
(ii) Starch was formed in the covered part of the leaf (because of the presence); while starch was not formed in the covered part of the leaf (because of lack light)
(d) To destarch the leaf; OWETT
15. (a) (i) Species A;
(ii) The rate of multiplication/ growth in A is faster than of species B
(b) (i) One year and three years
1-3 years shortage of resources more suitable environmental
Conditions/ such as food space e.t.c resource were not limiting hence the population increased exponentially rapidly; acc correctly named resource e.g food space.
(iii) Three years and seven years
3-7 years shortage of resources/ limiting/ birth rate equals death rate; hence the population had become stagnant/ constant; acc;
Environmental resistance has set in rej. Incorrect resources e.g PT and T.
(c) Species A would decrease (because of there is less competition with species A/ More resources available.
16. (a) (i) Protozoa
(ii) Unicellular/ single celled
(b) N- Contractile vacuole
P – Cilia, Acc cilium
Q – Gullet/cytopharynx
(c) Cilia
Streamlined body.
17. (a) (i) Sensory neurone/sensory nerve cell; reject sensory nerve
(ii) Cell body on a branch/ at the side of axon/off the axon/cell body unipolar both axon and dendron are long.
(b) T- myelin sheath; Acc Neurilema
(c) Direction of impulse from receptor towards cell body.
18. (a) If axes reversed allow marks for identification of curves only max 2
Correct scales
Correctly leveled axes
Curves reject broken lines for curves
(b) 0-1 hour.

- i) Acc constant/low/below normal levels in blood; No/little digested foods/glucose from the intestines/gut/alimentary canal/absorption.
 - ii) 1-2 hours
Sharp increase in concentration of glucose in blood; (more) absorption of glucose; after digestion of the meal.
 - iii) 2-4 hours.
Glucose concentration declining/decreasing; less glucose being absorbed; (more) glucose being converted to glycogen in the liver/tissue/used for (tissue) respiration.
 - iv) 5-7 hours.
Concentration of glucose stabilizes/constant/ this is the normal glucose level concentration in the blood.
- (c) The concentration of glucose in the iliac vein is lower than in the hepatic portal vein because it hasn't been stored in the liver to be used respiration. Portal vein because most of it was stored/used up by the liver/other tissues/respiration.
- (d) Proteins take longer to digest.

19. Comparative anatomy/taxonomy.

Members of a phylum group show similarities; organisms have similar structures/similar organs performing similar functions e.g. digestive system/urinary system, nervous system. Any correct example i.e. vertebrate heart.

The pentadactyle limbs/ any correct example; these are homologous organs/structures. Homologous – same origin structure different functions. Analogous structures – different structures performing the same function e.g. wings of insects, bats and birds. Analogous different origin structure, same function convergent.

Fossil records/palaeontology

These are remains of organisms preserved in naturally occurring materials for many years show morphological changes of organisms over a long period of time.

Comparative embryology.

Acc. Any 2 names embryos > vertebrate embryos the morphologically similar; suggesting the organisms have a common origin/ancestry.

Geographical distribution.

Present conditions are thought to have been a large land mass joined together, as a result of continental drift; isolation occurred bringing about different patterns of evolution i.e. The llamas in the Amazon resemble the Camel. Any other example e.g. Kangaroos in Australia, Jaguar in South America, Camel in Africa.

Comparative serology/physiology.

Antigen/antibody reactions/Rh factor/blood group/haemoglobin structure; reveal some phylogenetic structure. Relationship among organism/common ancestry.

20. The mammalian intestines are relatively long/coiled/folded. This allows food enough (enough) time/increases surface area for digestion and absorption of products of digestion. The intestinal surface area for absorption. The glands have enzymes which secrete enzymes for digesting e.g. of correct enzyme, maltase, sucrase, lactase, enterokinase and peptidases. Some glands/goblets cells also produce mucus which protects the intestinal wall from being digested, reduce friction. Intestines have opening of ducts which allows bile/pancreatic juice into the lumen. The intestines have circular and longitudinal muscles whose contraction/relaxation/peristalsis leads to the mixing of food with acc. At least enzymes/juices facilitating rapid digestion and helps push food along the gut. Intestines are well supplied with blood vessels to supply oxygen/remove digested food. Presence of lacteal vessels for transport of fats/lipids. Have thin epithelia to facilitate fast/rapid absorption/diffusion. Allow increase in surface area for absorption only.
- Cell biology/cytology. Occurrence of cell e.g. mitochondria, ribosome's, nucleus, cytochromes organelle point to a common ancestry.

for more free past papers visit: www.freekcepastpapers.com

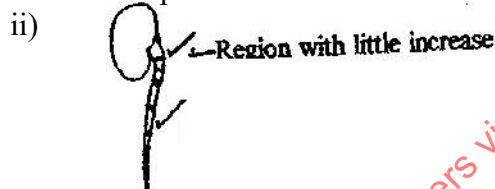
10.

Classes	Organisms	Reasons
Insecta	Praying Mantis	3 body parts
	Tsetse fly	3 pairs of legs
Myriapoda	Centipede	Many segments
	Millipede	Many legs
Arachnida	Tick	2 body parts
	Spider,	4 parts.

Rej; if mixed Acc; it its one and correct.

11. a) Most enzymes in the body function within a narrow range of temperature;
High temperature denature enzymes
Low temperature inactive /inhibit enzymes
- b) Sugar in a raw material for respiration, hence less energy, available to body/low/rate of metabolism.

- 12.a) i) -Region of elongation (rapid) growth in a root.
-Region with more increase ink mark
-To provide moisture/water for growth (germination)



Region with more increase ink (mark)

- iii) To provide moisture/water for growth (germination)
- b) i) Oxygen
Oxidation of stored food; to provide energy (for germination)
- ii) Cotyledons
Store food necessary for germination; protecting the plumule.

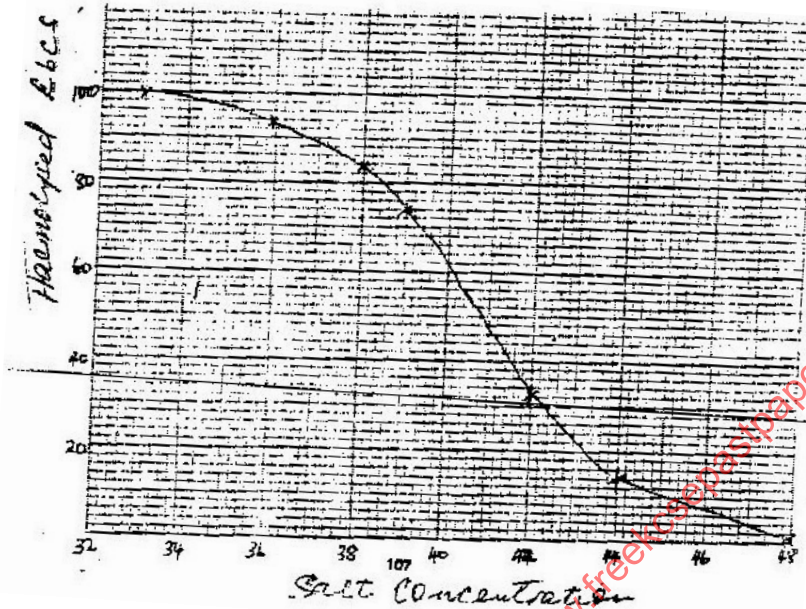
- 13 a) A community consists of all plants and animals (organisms of different species in a habitat interacting with each other.
- b) Use the capture and recapture methods; Catch the grasshoppers count and mark using permanent ink; record and release; and allow time 1 to 2 hours; recapture and count the marked and the unmarked; total population is equal to the number of marked and unmarked grasshoppers in the second sample multiplied by number marked grasshoppers in the first sample; divided by the number of grasshoppers marked in the second sample that were recaptured.

14. a) Trypanosome
- b) i) Locomotion
ii)
- c) Sleeping sickness/trypanosomiasis

- d) -Orally ingested including boring through bites
 -Sexually; cuts and wounds (contaminated) needles syringes/surgical instruments; contaminated blood transfusion.

SECTION C 40 MARKS)

15. a) (i)



ii) 0.402; 0.403; 0.404; ± 0.002

iii) 9-10-11%

b) Account for the results obtained at:

(i) 0.33 percent salt contraction.

Less concentration // hypotonic // dilute than blood cells cytoplasm/ red blood cells; water is drawn in by osmosis the cells swells and eventually burst.

(ii) 0.48

(ii) 0.48 percent salt concentration.

Concentration of cytoplasm same as concentration of salt solution/isotonic; therefore no net movement of water; hence no hemolysis.

c) Percentage of cells haemolysed would still be zero? Becomes turgid; but does not burst; due to the cell wall.

d) The cells would absorb water due to osmosis, swell and become turgid.

The cell sap move conc. than surrounding water gate into the cell by osmosis; the cell swells/becomes turgid; but does not burst due to the cell wall

16. Muscles of diaphragm contract; causing the diaphragm to flatten (from dome position). The external intercostals muscles contract internal intercostals muscles relax pulling the ribcage upward/forward and outward in man.

These movements increase the volume of the thoracic cavity; reducing the pressure; of the thoracic cavity; compared to atmospheric pressure; this causes the atmospheric air to rush into the lungs.

(Through the nostrils, trachea bronchioles and alveoli).

b) Theory- photosynthesis

Guard cells have chloroplasts; in the presence of light; photosynthesis occurs in guard cells, producing sugar in guard cells; osmotic pressure increases/osmotic potential lowers; water from neighboring /adjacent cells enter into guard cells; causing turgidity of guard cells; causing turgidity of guard cells.

Theory 1.

Guard cells have chloroplasts; in the presence of light photosynthesis occurs in the guard cells of stomata; producing in the guard cells; osmotic pressure increases/lowers osmotic potential water from the neighboring /adjacent cells, enter into guard cells; causing turgidity of guard cells .

The inner walls of the guard cells are thicker than outer walls; so during turgidity the inner walls stretch more; causing the guard cells to bulge outward; stomata opens.

Theory 2.

Guard cells have chloroplasts (Day) in light; photosynthesis occurs in the leaf/guard cells lowering the CO₂ concentrations; this increases PH/alkalinity which triggers of enzymatic conversion of starch to sugar (glucose); leading to low osmotic potential/ increased osmotic pressure in guard cells; guard cells absorb water from epidermal cells; thus becoming turgid; the inner walls are thicker than the outer walls; outer walls stretch more than inner walls; causing guard cells to bulge outwards, stomata opens;

In the absence of light (night); no photosynthesis; CO₂ concentration increases due to respiration; PH lowered/ acidity increases; sugar converted to starch; osmotic pressure lowered/ osmotic potential increases; guard cells lose water to adjacent epidermal cell becoming flaccid; stomata close.

Day low H⁺ high PH opens stomata.

Starch glucose.

Theory 3

Guard cells have chloroplasts; in light ATP produced; the energy drives K⁺ ions from adjacent epidermal cells into guard cells; accumulation of K⁺ raises osmotic pressure (lower osmotic potential) of guard cells; guard cells absorb water from adjacent epidermal cells; becoming turgid; the inner walls are thicker than the outer walls so outer walls stretch more than inner walls causing guard cells to bulge outward. Stomata opens.

In the absence of light (night) ATP rapidly decreases; no energy of potassium +ions pump ion; migrate by diffusion from guard cells to adjacent epidermal cells; become flaccid; the thinner outer walls of guard cells shrink (OWWTE; thicker inner walls reduces their curvature/OWTTE; thus closing the stomata.

17. Sulphur based chemicals e.g. sulphure dioxide gas H_2S Cl_2 HCl_2 produced by (food preventing) industries /sewages matter, Affect gaseous exchange/makes acid rain /damages plants leaves.

Acc. Pesticides, Herbicides, Insecticides, Acaricides, paint sprays, Aerosols

CFCs sprayed to control (plant) disease and pests, also affect respiratory organs of animals; the chemicals are residuals and persistent (not easily) broken down deplete.

Ozone layers; smoke/fumes produced in areas with (heavy) industries and (high density of motor vehicles / fire which burn fuel/oils wood coal; These visibility; fumes also settle on leaves and stop photosynthesis (excessive) production of carbon dioxide causes the green house effect/Temp. inversion as a result of heating in lower layers of atmosphere; sound /noise produced incessantly b machines/ heavy vehicles/aircraft; affects hearing in animals; Dust, industrial production of (cement) generates dust; which finally settles on plants leaves limiting photosynthesis; removal of vegetation/cutting of trees; interferes with.

The carbon cycle; radioactive emissions; from nuclear reactors/mines/ x-rays machines bombs cause mutation/cancer/death.

for more free past papers visit: www.freeksmpastpapers.com

for more free past papers visit: www.freekcepastpapers.com