2012 -001
231/1
BIOLOGY
PAPER I

MARKING SCHEME

1. Cell sap: -. Offers turgidity of the cell contributing to mechanical support;
   -. Regulates the osmotic pressure of the cell, of the plant;
   -. Contains sugars ions and waste products;.

2. Pinna, 1. It collects and direct/concentrates; sound waves into the auditory meatus;

3. (i)Homologous structures.
   Are structures of same embryonic origin that become modified in the course of evolution (due to exploitation of different ecological niches) to perform different functions. (hence structurally look different leading to divergent evolution. e.g. pentadactry limb structure in vertebrates, beaks structure in birds.

   (ii) Analogous structures
   are structures of different embryonic origin that become modified in the course of
   evolution (due to exploitation of same ecological niches) to perform similar
   functions (hence structurally look similar), e.g. wings in insects, and bird/bats
   flippers in whales and fins of fish.

4. 1MM = 1000ųm = 2000ųm –: 4000
   2mm = 2 x 1000ųm = $\frac{2000ųm}{4000}$
   = 2000ųm

   = ½ or 0.5ųm
   = 0.5ųm

5. a) Pectoral fin
   (i) Control pitching
   (ii) Slow down movements/brakes
   (iii) Maintain balance

   b) Caudal (tall)fin

   - proper and steers the fish in motion.
   - Prevent rolling

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(ii) Swim bladder functions

- stores air which regulates density
- enables fish to change depth

6.

Millipede	Centipede
Body divided into three head, thorax and trunk	Body divided into two head and trunk (has fifteen segment)
Have two pairs of wimps on each segment hence diplopoda	Have one pair of limbs in each segment.
Two pairs of simple eyes	One pair of simple eyes
Have cylindrical bodies	Have elongated dorso-ventrally flattened bodies
Feed on dead organic matter detritivorers	carnivorous

7.Ethylene

8. Sweating decrease; Hair is raised; blood kept from the surface and metabolic rate
increases. body temperature raises shivering to generate heat by contraction of muscles.

9. COOH – Carboxyl group
NH_2 - Amino group

10. Vascular bundles: xylem transport water and mineral salts in plants.
Phloem: transport manufactured food (dissolved food) from leaves various parts in plant
Placentation: It's the arrangement of the ovules in ovary

A – free central placentation
B – parental placentation

11. (i) Petrification: changing into rocks
(ii) Preservation of the entire organism or it's parts in ambers, plants resins or ice.

12. – Allowing the seed grow to maturity.
- Increases the concentration of hormones e.g. cytokins and gibberlins to stimulation germination
- Presence of light of certain wavelength

- Providing favourable conditions like water, air and warmth
- Mechanical rapture of seed coat scarification
    - Exposure to heat

13. (i) Habitat refers to the specific place (locality) where an organism lives in an ecosystem
(ii) Population: Refers to members of one species occupying a particular habitat at a given time.
Community: It constitutes two or more populations i.e. (Many species) occupying and
interacting in the same habitat.

14. (i) Importance of DNA molecule
    - stores genetic information in a coded form.
    - Enables transfer of genetic information unchanged to daughter cells through replication.
    - Translates the genetic information into the characteristics of an organism through protein synthesis.
    -

(ii) DNA duplication making exact copies of itself.

(iv) AUGCGA

15. a) Hermaphrodites and monoeciaus plant
b) Protandy and protogyny
c) Self – sterility or incompatibility
d) Heterostyly

16. Tube nucleus: help in growth of pollen tube and assist in piercing the embryo sac-generative
nucleus: divides mitotically to give rise to two male nuclei

- One male nuclei fuses with ovum = to form diploid zygote the other nuclei fuses two polar nuclei to form triploid nucleus or primary endosperm.

17. Aerotaxis: This is response to variation in oxygen concentration.
Rheotaxis: this is response to variation in direction of water or air currents

18. (i) Tympanic membrane (ear drum)
(ii) Semi-circular canals

19. Light amount
- Circular muscles of the iris contract; while radial muscles relaxes; and the pupil becomes smaller, This prevent damage of the retina by excessive light.

20. A – Tuberculum

B – Capitulum

(ii) Sternum

21. Gains water by osmosis process coils and becomes turgid

22. To keep the hair and epidermis flexible; and water proof.
- It contains antiseptic substances for protection against bacteria

23. Pancrease secretes insulin which causes the liver; to convert
(i) Sugar to glycogen
(ii) Sugar to $C0_2$ + H_20

24. a) Anaerobic respiration/fermentation process

b) $$RQ = \frac{\text{Volume of } CO_2 \text{ (Removed)}}{\text{Volume of } O_2 \text{ (consumed)}}$$

$$= \frac{2}{0} = \text{infinity}(\quad)$$

c) Economic importance
- Brewing
- Bread baking
- Production of fermentated mil products
- Production of citric acid
- Vinegar
- Sour porridge alcohol to drive engine

25. a) Convergent evolution
b) Fossils records
- geographical distribution
- comparative anatomy
- cell biology
- cell serology

26. In adults its manufacture in bone marrow of short bones; in kids the spleen;.

27. Irresponsible sexual behaviour
Domestic problems
Health problems or disorders
Death
Blindness
Accidents

28. Have stomata on the upper leaf surface large leaf surface to increase surface area for light
absorption.
Presence of arenchyma tissue that allows them to float on water. Hence accessing sunlight.

29. Failure of production of ADH (Autidiuretic hormone)

30. Tendon – Tissue that join a bone to another bone
Ligament – tissue that join a muscle to a bone.

BIOLOGY
231/1
PAPER I
2012 -002
MARKING SCHEME

1. Turgidity of cells / parenchyma cells provides support in herbaceous stem (1mk)
2. Stores salts / sugar/: creates osmotic gradient that bring about movement of water in and out of the cell
   (2mks)
3. The pond lacked iodine, required for synthesis of thyroxine which control metamorphosis in the flogs
4. (i) salt – removes / absorbs water by osmosis from the microorganism cells which then die due to dehydration
   (1mk)
   (ii) Refrigeration – low temperature reduce the microorganism inactive (enzyme do not work at low temperature)
   (1mk)
5. 1 – X^cY
   2 – X^CY
   6 – X^CX^c
6. One male nucleus fuses with the egg cell nucleus to form a zygote, the other male nucleus fuses with the two polar nuclei to form a triploid endosperm nucleus
   (2mks)
7. Sensory neurons transmit impulses from receptors to CNS while motor neurones transmit lipids from CNS to effectors
8. – ability to fly
   - inhibit all types f habitat
9. –black jack has xylem vessels and phloem has companion cell
   - fern has tracheids and phloem lack companion cell
10. merit
    - environment can produce phenotypic changes in an individual
    Demerit
    - acquired characteristics can not be inherited
11. low energy losses by respiratory, excretory, defectory hence the end consumer receive a lot of energy
12. – urea is les toxic hence does not require a lot of water for elimination
    - urea has small molecules that can be easily ultra filtered in the glomerulus
13. so that heat energy is released in small quantities and in stages to avoid bursting of the cell
14. (a) – passage for air
    - warms the air

- moistens the air
- traps solid / microorganism

(b) (i) thin – reduce diffusion distance

(ii) moist – to dissolve respiratory regulate gases

15. (a) Lymphatic system

(b) Natural acquired immunity – results from infection by diseases e.g. measles after recovering develops resistance to any subsequent infections Artificial acquired immunity – occurs when a mild form of a disease carrying organism is injected into the body of a healthy person stimulating production of the corresponding antibodies and keeps ready

16. (a) – prevent blood loss

- prevent entry of pathogen

(b) undamaged blood vessels contain heparin, which prevent conversion of prothrombin to thrombin. The enzymes that convert fibrinogen to fibrin:

17. (a) open and close stoma

(b)

Q	R
Has chloplast	No chroplast
Thicker inner walls	walls are of uniform thickness
Bean shaped	rectangular shape like

18. (a) plasmolysis

(b) (i) strong salt solution

(ii) the salt solution passed through the cell wall because it is fully permeable: but cannot pass through the cell membrane which is semipermiable

19. (a) Diaphragm – regulates amount of light passing through the condenser

(b) condenser – concentrates light on the object on the stage

20. (i) scurvy

(ii) rickets

21. – protection against microbes due to presence of cork tissue

- prevents excessive loss of water due to presence of cork tissue
- transport by phloem
- gaseous exchange through lenticels
- storage due to presence of parenchyma cells of cortex

22. (a) skeletal muscles – attached to bones

Smooth muscles – walls of almentary canal, bladder, birth canal, arteries e.t.c

(b)

Skeletal	smooth
- striated	non - striated
- multi nucleated	uni nucleated
- long fibre	spindle shaped cell

23. (a) – mutation

- crossing over
- fertilization

(b) RNA

Reson presence of Uracil

24. (a) lipids are quite inert
(b) lipid molecules are formed by condensation of 3 fatty acid molecule and one molecule of glycerol
Glycerol is the same in all lipids: but fatty acids are of different type hence the nature of the oil depends on the type of fatty acids it contains.

25. (a) Insulin and glucagon for controlling blood glucose secreted directly into the blood, pancreatic juice contain digestive enzymes conveyed to the duodem by pancreatic duct stopped;
(b) (i) cuticle cannot allow iodine to penetrate
(ii) light is required to split to split water molecule for photolysis

26. (a) – protect the seeds; its a storage organ
- Aids seed dispersal;
(b)(i) – ripe is sweet unripe is not sweet
(ii) – complex carbohydrates hydrolysed into fructose which is sweet

27. (a) Q- malleus (hammer)
S- stapes (stirrup)
(b) Hearing impaired since the pressure on both sides of the eardrum would not be equalized, hence the eardrum would not vibrate / distorted

28. (a) (i) Ecological niche – specific place where an organ is found in a habitat and its role there, its totality of life
(ii) Community all plants and animals lit together and interacting between themselves and environment
(b) (i) Bacteria and fungi – decomposer / recyling of nutrient
(ii) Predators – regulator of population / harbours

29. – reabsorption of salts and sugar in kidney nephrons
- Absorption of digested food
- Excretion of water product for body cells

30. (a) – catalyses breakdown of toxic H_2O_2 to harmless O_2 water in active tissues
(b) `Low temperature

231/1
BIOLOGY
THEORY
2012 -003
BIOLOGY
PAPER 1
THEORY

MARKING SCHEME

1. - Semi permeable/semi permeability;
- Sensitive to change in temperature; and pH;
- Possession of electric charges;

2. - Collect only the required specimen;
- Immobilize highly mobile animals
- Do not harm specimen during collection;
- Handle dangerous specimen with care;
- Return the live specimen back to the habitat after use;

3. (a) Magnification = eye piece lens magnification x objective lens magnification
(b) –Cell division;
- Formation of cilia and flagella;

4. – the greater the diffusion between two points the faster the rate of diffusion;
- Increasing concentration of molecules increases the diffusion gradient;

5. - Specialised bean shaped cells; mostly found on the lower leaf surface lying close to
epidermal cells and contain chloroplasts;

6. - Grana/granum/thylakoid/membrane of chloroplast;
- Stroma (of chloroplasts ;)

7. - Waste products are less toxic;
- Waste products are re used; (in plants)

This paper consists of 3 printed pages

Please Turn Over

8. (a) – Diastema
(b) – Water;
- Alcohol;

9. (a) Large surface area to volume ratio; hence most surface of body is in contact with
environment;
(b) – Increases surface area over which diffusion occurs;
- Increases the volume of gases that diffuse;

10. - During drought some plants shed their leaves; to reduce the surface area; for water loss

11. - Buccal cavity;
- Lungs;
- Skin;

12. - Allergy to gaseous exchange structure to pollen grains, atmospheric dust; Animal fur, scents from certain drugs, foods and flowers;
- Lung or Bronchial infection by Bacteria and viruses.

13. -Oxygen concentration; substrate concentration; Hormones; surface area; ratio of volume to body size;

14. (a) Aerenchyma – fresh water;
Pneumastophases – salty water/saline/marine water;
(b) Gaseous exchange/breathing;

15. - Carbon (iv) oxide;
- Water

16. Eukaryotic – nuclei/organelles are membrane bound;
Prokaryotic – nuclear material is not enclosed within a nuclear membrane;

17. ADH – increases the nephrons membrane permeability to water; hence retention of water in the body; OWTTE.

18. -Aves;
- Mammalia; rej Birds and mammals.

19. - Drinking contaminated water by cercarie larvae;
- Penetration of skin by parasite when bathing or wading/walking through water containing cercarie larva;

20. (a) Telophase;
(b) Feeding/passage of nutrients from mothers' blood to foetus/passage of waste products from foetus to mother's circulatory system;
- Secretion of hormones;

21. - Fruit is capsule shaped; capsule is usually attached to a long stalk; when swayed by wind
the seeds are released and scattered;

22. (a) A – Plumule;
B – Radicle;
(b) Store food required during germination;

23. (a) – Development in some insects involving the egg, nymph and adult;
(b) Juvenile Hormone:-formation of larval cuticle;
- Retention of juvenile characteristics
Ecdysone:- Moulting in insects;

24. Blood group – discontinuous;
Skin pigmentation – continuous;

25. Heterozygosity: - a condition in which an individual has two different alleles in its genotype,
while Homozygosity is a condition in which individual has similar alleles in its genotype;

26. Struggle for existence
- Environmental pressure; on the population causes competition within the population in an
effort to survive;
- Survival of the fittest:-
- Individuals with advantageous variations survive; poorly adapted individuals perish and do not transmit their characteristics; OWTTE,

27.

Endocrine	Nervous
- Chemical substance to evoke a re response;	- Nerve impulse to evoke a response;
- Chemical transmitted through blood;	- Impulse transmitted through a nerve fibre;
- Slow response but affect several parts of the body;	- Response quick, specific and localized;
- Effects long lasting;	- Effects rapid and short lived;
- Response takes place involuntarily;	- Takes place voluntarily and involuntarily;

28. - Presbyopia/old age sight'
- Crystalline lens/weak suspensory and ciliary muscles;

29. - To withstand forces in the environment e.g. gravity/ wind/air current;
- Uphold their weight;
- To be able to place leaves in such a position so as to increase efficiency of photosynthesis;
OWTTE

30. (a) – Smooth muscle;
(b)– Iris; Alimentary canal walls;

31. (a) -Cartilage; and bone;
(b) – Hard and rigid doesn't increase in size; Has to be shed for growth to occur;

32. - Provides the fish with buoyancy;
- Helps fish to adjust its vertical position in relation to depth of water;

2012 -004
MARKING SCHEME
BIOLOGY
PAPER 1

1. Have ability to destroy certain organelles within the cell / can destroy the whole cell

2. Osmosis – movement of water molecules / solvent molecules from a lowly concentrated solution to highly concentrated solution across a semi permeable membrane.

Active transport- movement of particles / ions from a region of low concentration to a region of high concentration.

3. (a) DNA strand due to the base thyamine (s)
(b) C-A-A-T-C-G-A-C-T

4.

Biceps muscles	Gut muscles
- Striated	- Unstriated
- Multinucleated	- Unnucleated
- Long fibred	- Short fibred
- Cylindrical	- Spindle shaped

5. (a) Glucose
(b) Insulin
(c) Diabetes mellitus

6. (i) Streptococcus pneumonia
(ii) Vibrio cholera
(i) Neisseria gonorrhoeae

7. Arachnida
Crustacea

8. – Long and (convulated) to increase surface area
- Has microvilli to increase surface area
- Has thin epithelium for fast diffusion

9. (a) Circulatory system in which blood passes through two capillary systems before flowing back to the heart.
(b) Earthworm leach, ragworm/fish
(c) Ostium Acc. O stia

10. (a) Intermittent growth
(b) Moulting / ecdysis
(c) Ecdysone Rj. Mouting hormone.

11. (i) Flower with one floral part absent
(ii) A flower that can be divided into two similar halves by only vertical section passing through the centre, radically symmetrical
(ii) Flower that can be divided into two equal halves in one particle plane, bilaterally symetrical.
12. Evidence doesnot support Lamarks theory
- Acquired characteristics are not inherited
- Inherited characteristics are found in reproductive cells only.

13. Ball and socket joints
Hinge joint

14. Moist
- Highly supplied with blood capillaries
- Has thin membrane
- Numerous to increase surface area.

15. (a) 20 (b)3

16. Spongy mesophyil cells, guard cells, palisade mesophyill cells.

17. (a) Deferoration in conditions of environment.
(b) diminishing biodiversity
- Pollution
- Soil erosion
- Depletion of ozone layer
- Global warming

18. Light – activates germination hormones
Raises internal temperature of seed
Soaking in water – softens the seed coat.

19. (a) Genes locate on the sex-chromosomes
Are transimitted along those detrmining sex

(b) Colour blindness, hewmophilia, baldness, hairy pinna, hairy ears.

20. – Transport of water
- Transport of manufactured food
- Transport of mineral salts

21. (a) Oviduct / fallopian tube
(b) Has acrosome with lytic enzymes that dissolve vitelline membrane
- Has large number of mitochondria to provide energy for movement
- Has a tail that aids in swimming movement

22. Enymes remains unchanged
They catalyse reversible reactions

23. (i) have cilia, waft to propel dust particles and micro-organisms trapped in mucus.
(ii) Have haemoglobin / are biconcave in shape for transport of oxygen.

24. (a) The ability of an organism to maintain a stable constant internal environment.
(b) Breathing mechanism . gaseous exchange, thermoregulation, temperature regulation, osmoregulation of water and ions, excretion, regulation of blood sugar, regulation of PH.

25. (a) Dispersal of seeds and fruits
- Pollinating agents
- Long and many branches and roots
- Possession of both male and female reproductive parts in an individual
- Autotrophic mode of nutrition

(b) Lack of strengthening tissues that would support their stems if they grow tall.

26. Most amino acids are used in synthesis of tissue proteins and development of foetus hence very little amino acids remain for conversion to urea.

27. (a) (i) Concentrated light towards the stage
(ii) Reflects light

(b) (i) To allow light to pass through
(ii) Make structures visible / clear

2012 -005
(THEORY)
BIOLOGY
PAPER1
MARKING SCHEME

1. i) Breakdown of water molecules into H+ ions / H atoms and O_2 by use of light
ii) Breakdown of glucose into pyruvic acid

2. a) - lack flowers
- have leaflets known as pinna
- show alternation of generations
- have sporangia in which spores are borne

b) - anchorage
- Absorption of water and mineral salts

3. a) Mutation

b) Stops respiration / hinders respiration / hinders formation of ATP

4. i) Entomology

i) Ecology

5. Diplopoda

6 a) X - Nucleus
Y – Chloroplast

b) It bends to open the stoma when guard cells are turgid / unequal expansion to open and close stomata

7. Has lignin; which offers mechanical support

8. Holds and pulls apart chrornatids / chromosomes

9. i) Entamoeba histolylica

ii) Treponema Pallidum

10. Stop / inhibit germination; by causing seed dormancy

11. a) Transparent to allow light pass through

b) Wearing a convex / converging lens; which refract light before reaching the eye lens

12. a) Intercostal muscles

b) Contract and relax to lift and lower the rib cage respectively

13. a) Bi-cuspid valve / atro-ventricular valve

b) - Thick muscular wall to resist / withstand high blood pressure
- Narrow lumen to maintain high blood pressure generated by the heart.

15. i) Anaerobic respiration in plants

ii) Amount of O_2 needed to breakdown accumulated lactic acid

16. a) Breed/ mate to produce fertile organisms / off springs

b) - Latin was the language of communication during Carolus Linnaeus times
- Latin was a universal language
- Greeks became civilized earlier than the rest of populations

17. a) Homologous chromosomes move to the equator of the spindle

b) - leads to growth of organisms
- maintains the genetic constitution / ensures the genetic constitution of the offspring is the same as the parents

18. - Increase in light intensity to optimum
- Increase in CO_2 concentration
- Increase in amount of water

19. i) For sucking small animals from rock surfaces or barks of trees
ii) For catching flying insects

20. - stores sugars and salts

- maintains osmotic pressure of cell
- regulates turgity of the cell

21. a) A – Glomerulus
B - Proximal convoluted tubule
b) Urea

22. i) Transpiration / loss of water through leaves
ii) The lower cobalt II chloride paper turned pink faster than the upper cobalt II Chloride paper.s

23. a) Peristalsis
b) Contraction occurs behind food bolus in position E, pushing it to position E_2
c) Roughage

24. a) A phenomenon where genes controlling other traits are located on the sex-chromosomes are
transmitted together with those determining sex.
b) - Colour blindness
- haemophilia

25. a) Roots are for absorption hence xylem in central for easier uptake of water
b) Stems are for conduction of water only. To provide more mechanical support to carry the
heavy branches

26. a) E – radius
F – Ulna
b) Hinge joint

27. Anthers and stigma mature at different times e.g. protogyny and protandry

28. Lamarckian - inheritance of acquired characteristics / environment induces production of inheritable character that is inherited
Darwinian - inheritance of genetically acquired characteristics. Better adapted character in inherited by natural selection

29. - Magnesium
- Nitrogen
- Iron

30. a) Detect pain and heat
b) - Exchange of materials e.g. food and O_2 taken from them and CO_2 and urea taken into them
- Control and relax to change the position / posture of hair

31. a) $\frac{705}{224} : \frac{4}{224}$
= 3.15: I or 3:1
b) Alleles show equal dominance over each other

2012 -006
231/1
BIOLOGY

PAPER 1
MARKING SCHEME.

1. Utilise the energy from the sun to manufacture food / photosynthesis ; for the subsequent trophic levels / other organisms / answers.
   Rej; point without sunlight
2. A, B AB O; (all be correct to score)
3. Ovary / ovule ; anther;
4. **Act** as **valves** to close / open various parts the canal / regulation of food movement in the canal
   - Pushing food along / peristalsis / churning / mixing with digestive juices ;
5. The surface area to volume ratio is higher in calves than adults ; hence adults retain more heat than the young ; acc the converse
   Rej; loses heat for heat retaintion
6. i) Hepatic portal vein ;
   ii) Pulmonary vein ;
7. - Inversion ; Duplication ; Deletion ;
   - Translocation ; Non – disjunction; F3
   Rej; polyploidy and insertion.
8. - Stomatal / mesophyllm cells / stomatal chambers;
   - Lenticels Rej; lenticles
   - Cuticles Rej; air spaces / intercellular spaces
9. a) Ulna
   b) Radius, Humerus;
10. Chordata;
11. Analogous – structures with different origin but perform similar functions (and appear similar)

    Homologous – have common origin but (have evolved to) perform different functions;
12. a) Zone of cell division ; Acc multiplication
    - Zone of cell elongation / enlargement ; Acc expansion
    b) Protect root tip;
13. a) Lignin;
    b) Phloem;
14. Diffusion – Movement of molecules / particles / ions from a region of high concentration to a region of low concentration (until equilibrium is reached)
    Osmosis – Movement of water / solvent molecules from a hypotonic to a hypertonic solution across a semi – permeable membrane;
    b) - Reabsorption of glucose and some salts in the kidney
    - Absorption of digested food / salt / vitamins from the gut;
    - Excretion of waste products from the body cells;
    - Reabsorption of useful material in the blood stream
    - Sodium pump mechanism in the nervous system.

15. - Transparent to allow light penetration to photosynthesis tissue;
- Thin / single layer of cells to reduce distance over which light penetrates to photosynthetic tissue
- Closely fitted cells to protect inner tissues
- Presence of stomata for gaseous exchange

16. a) Botany; zoology;
b) Help in solving environmental problems ;
- Entry into carrer
- Develops scientific skils like planning, recording analysis;
- Knowledge acquired is useful in international cooperation ;

17. a) A – Photosynthesis
B- Respirat
b)

Process A (photosynthesis)	**Process B (respiration)**
- CO_2 utilised	CO_2 released
- Oxygen released	- Oxygen utilized
- Glucose is formed	- Glucose broken down

18. Lamankian = Inheristance of <u>acquired</u> characteristics / environmental induces traits which are inherited;
Darwinian = Inheritance of genetically acquired traits / characters appear spontaneously the transmitted to off springs ;

19. a) Auxins / idole acetic acid
b) Growth response of part of a plant when is contact with an object;

20. a) - Manufacture of drugs
- Manufacture of stimulants
- Tanning of leather
- Production of rubber products
- Induction of polyploidy in plants
b) Increases permeability of the uriniferous tubules and capillaries ; for water reabsorption;
c) Diabetes inspidus ; Rej water diabetes

21. - Gameto genesis
- Brings about variation
- Maintenance of diploid number of chromosomes in offprings

22. Ribcage moves outwards ; and upwards;
Diaphragm flattens;

23. a) Smooth endoplasmic reticulum
b) Lysosomes
c) Nucleus
d) Golgi bodies / apparatus

24. a) Enterokinase
b) Duodenum
c) Protein
Peptides

25. i) Alternative form of a gene ; Acc variant form;
ii) Unicellular product of fertilizer / a cell formed when the nuclei of male and female gametes fuse;
iii) Product of mutation;

26. - Differentiated into roots, stem and leaves
- Posses clearly defined vascular system (having xylem and phloem);
- Show clearly defined sexual reproduction;
- Fertilization is independent of water ;

27. Wind :
- In windy conditions the rate of transpiration increases
- Wind disperse fruits / seeds ; it's an agent of pollination

Atmospheric pressure
- Variation affects availability of CO_2 ; which affects photosynthesis ;
- Low atmospheric pressure increases rate of transpiration ; and affect amount of oxygen ; for respiration ;

28. Light (energy) is absorbed by chlorophyll ;
- The light splits water molecule / photolysis ; to hydrogen ions / atoms / H^+ and oxygen gas / molecules ; (light is converted to Adenosine triphosphate / ATP. Any 3

2012 -007
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BIOLOGY
PAPER 1
MARKING SCHEME

1. Movement of molecules against concentration gradient; using energy; (2mks)

2. i) Hooks on the ovary walls or on the calyx;
ii) Succulent/brightly coloured and scented;
iii) Seed coats of some are hard and resistant to digestive enzymes so that they pass through the gut undigested; (3mks)

3. - Packaging of synthesized material;
- Secretion of packaged material; eg glycoprotein etc.
- Transport of the packaged material;

4. a) In Darwinian theory, environment determines the changes and which organisms to survive and reproduce or perish; while in Larmakian theory, organisms change in order to survive in their environment; Alt; In Darwinian, environment only determines the direction evolution will take while in Larmakian environment determines variation;

b) Divergent evolution – one from of a structure gives rise to various different forms;
convergent evolution – structures have different embryonic origins but are evolved to
perform similar functions; (2mks)

5. Body parts / Division; no. of limbs/ legs; body segment; (3mks)

6. i) Pulmonary artery; (1mk)
ii) Hepatic portal vein; (1mk)

7. Large surface area;
- Thin membrane;
- Moist surface;

8. a) Stimulate cell division / cell elongation in stems and roots;
- Causes tropic responses; Apical dominance; max 1mk (1mk)
b) Control reabsorption of water in the kidneys/nephron/loop of hence regulation of water in
the body by osmotic pressure; (1mk)

9. Insertion/Deletion/Substitution/ inversion; any 3 (3mks)

10. a) Capsule; (1mk)
b) Sori/sorus; (1mk)

11. a) prophase I (1mk)
b) i) An ovum is fertilized; and later cells separate in early cell division; (2mks)
ii) Two ova are released; and fertilized by two different sperms; (2mks)

12. a) Rough/smooth endoplamic / golgi bodies/ robosomes/ lysosomes; (1mk)
b) Mitochondria / mitochondrion; (1mk)

13. In 2 – 5km, population increase because sewage provide nutrients;
In 5 – 10mk, population decrease because of depletion of nutrients; in sewage/decomposition of
sewage is complete; Max 2 (2mks)

14. Intraspecific is competition between organisms of same species; while interspecific competition is
between organisms of different species; (2mks)

15. - Carbon (IV) oxide;
- Ethanol / alcohol; (2mks)

16. i) A – Biceps (Flexor muscles);
B – Triceps (extensor muscle); (2mks)
ii) Biceps – Relaxes
Triceps – Contracts.

17. Cerebrum / cerebral hermisphere/ cerebral cortex; (1mk)

18. - Dura matter;
- Pia matter;
- Arachnoid; (3mks)

19. a) Central nervous system (CNS); (1mk)
b) i) Motor neurons; (1mk)

ii) A – Dendrites; (1mk)
B – Axon; (1mk)

20. a) A – Pulmonary vein;
E – Tricuspid Valve; (2mks)

b) To pump blood at high pressure; to distant parts of the body; (2mks)

21. a) Bryophyta (1mk)

b) X – Sporophyte (1mk)
Y – Rhizoids (1mk)

22. - Lignified
- Made up of vertically elongated cells that are arranged end to end forming a long continuous column.

23. a)

Simple reflex action	Conditioned reflex action
- Single stimulus to bring about response - Directional / simplest form of behaviour and independent of experience - Sensory and motor component are the same at all time	- Repeated stimulus to bring about response. - Involves modification of behaviour and dependent on experience - Primary sensory component is replaced by secondary sensory component but motor component remains unchanged. 1 x 2 = 2

b) - Cordination of body movement
- Maintenance of balance and posture
- Dextrity in fine movement 1 x 2 = 2

24. a) State during which a seed cannot germinate/state of rest before seed germinate;
Rej. – inability to germinate.

b) i) Lag phase – few dividing cells/ cells not yet adjusted to surrounding environment

ii) Plateau phase – most cells fully differentiated / rate of cell division equals rate of cells dying.

25. - Large air spaces; Thin cell walls (2mks)

26. - Cooling the plant; movement of water up the xylem; transport mineral salts and water;
Absorption of water and mineral salts from soil(4mks)

27. a) **Vessel 1**
Reason – glucose obtained from the digestion of starch is transported through it to the liver (1mk)

b) Fats

28. a) Insects; Birds and reptiles (1 x 2 = 2mks)

b) Carbon (IV) oxide; oxygen and water vapour diffuse through the stomata; lenticels; thin
cuticle of some plants.

2012 -008

MARKING SCHEME

1. i. Sweep net;
   ii. Pair of forceps;
   iii. pooter;

2. (i) Rough Endoplasmic Recticulum – Transport proteins;
   (ii) Smooth Endoplasmic Recticulum – Synthesise lipids;

3. a) The insects that carry out pollution attracted by the smell from the flowers which leads to pollination;

   b) The process is passive where particles move along a diffusion gradient;

4. a) Cell membrane/plasma membrane;
   b) A-protein layer;
   B-phospholipid layer;
   c) Encloses cell contents;
   Allow selective movement of substances in and out of the cell;

5. a) Is a ratio showing the relationship between the amount of carbon (IV) oxide produced and the amount of oxygen consumed in a given period of respiration;
   $RQ=\frac{CARBONIV\,OXIDEPRODUCED}{OXYGENUSED}$; (Acc. Correct formula)
   b) Lactic acid;
   c) Adenosine Triphosphate; (Rej. ATP)
   d) –Fats are not soluble therefore cannot be easily transported to respiratory sites;
   –Fats require more oxygen to be oxidized;

6. a) A-stroma; B- grana
   b) A-photolysis; (Acc.balanced equation. $2H_2O \xrightarrow{Ligh\ Ener} 4H+O_2$)
   B- carbon (IV) oxide fixation; (Acc. Equation- $6CO_2+6H_2O \xrightarrow[Chlorophyll]{Light} C_6H_{12}O_6+60_3$)

7. –Has blood vessels which transport gases/nutrients;

- Presence of nerves for sensitivity;

8. (a) Transpiration — Guttation

- Loss of water from plants in Gaseous forms — -loss of water in plants in form of a liquid
- Occurs in leaves, cuticles,lenticels — - occurs in hydathodes, pneumatophores;

9. –Dorsal aorta transports blood to most of the body away from the heart; (e.g. gut, liver, hind limb)
Vena cava transports blood back to the liver from the body tissues;

10. (a)They have perforated cross walls that allow for lateral flow of water;
(b) They prevent them from collapsing

11. a) Breathing rate increases hence <u>more</u> oxygen is taken into the lungs and carbon (IV) oxide is exhaled;
b) Pulse rate increases, causing <u>faster</u> supply of oxygen into tissues and removal of carbon (IV) oxide;
c) Arterioles dilate to bring <u>more</u> blood near the skin surface hence extra heat loss;

12. a) X- Epicotyl;
Y- Radicle;rej Radical
b) Epigeal germination;
c) Provides anchorage to growing seedling/absorb water/mineral salt form the soil to be used by the germinating seeds;

13. They are active at all times;
They can colonize any habitat;

14. a) A-antipodal cells;
B-egg cell;
C- synergids;
b) Diploid zygote;

15.

Male gametes	Female gametes
-Much smaller in size - Nucleus prominent but cytoplasm; Cytoplasm negligible	- larger than the - large amount of

- Specialized for motility with tail - no specialization hence non-motile;
And axial filaments

(Mark each as a whole)

16. Three body parts; (Acc. Head, thorax, abdomen, all mentioned.)
Three pairs of legs; (Acc. Six legs)
A pair of antennae; (Acc.two antennae)

17. Divergent evolution;

18. a) C- Radius;
D- Ulna;
b) Muscle B contracts and muscle A relaxes (mark as a whole)

19. a) cloning – a type of reproduction where a group of cells arise from a single individual cell without fertilization;
b) Gene therapy – is the replacement of faulty gene with normal ones aimed at correcting genetic disorders;

20. i) Vena cava;
ii) Capillaries;
iii) Weak carbonic acid (Rej.carbonic acid only)
- Carbaminohaemoglobin (Acc. Bound to haemoglobin and other proteins)

21. The hair become erect/ up right; trapping air around the skin; hence insulating the body against heat loss;

22.

	Nervous	Hormonal
Nature of transmission	– electrical impulse	chemical;
Route of transmission	– via nerves	via blood/blood stream;
Speed of transmission	– rapid	slower
Speed of response	– rapid	slower
Duration of response	– confined to effector cell or effector organ	more wide spread

(Mark first three as a whole)

23. a) Aquatic;
b) Obtain more energy from one tropical level to another;

24. a) The concentration of oxygen would decrease while that of carbon (IV) oxide would decrease;(mark as a whole)

b) Germination is a respiratory process (breaking down stored food in the seed to release energy for growth of plumule and radicle) leading to oxygen in the flask being absorbed for respiration; the respiration process produces carbon (IV) oxide which accumulates in the flask;

25. Progesterone;
26. Aestivation;
27. – source of food
- fix Nitrogen in the soil;

2012 -009
231/1
BIOLOGY
PAPER 1 MARKING SCHEME
THEORY

1. a) Formation of spindle fibres;
Formation of cilia / Flagella;
b) Large air spaces; for buoyancy / storage of respiratory gases; gaseous exchange;
2. A B O blood grouping;
3. Arachinida;
4. Thickened walls / Lignin deposition on wall;
5. Dense cytoplasm;
Thin cell wall;
Absence of vacuoles; - Mark first two
6. Moist to dissolve respiratory gases;
Highly vascularised to transport respiratory gases / maintain diffusion gradient;
Thin lining for easy diffusion of gases / reduce diffusion distance of gases;
7. Wind disperses fruits / seeds/ spores;
An agent of pollination;
Affect the rate of transpirtation;
Affects the rate of evaporation of soil water.
8. Converted to fats; (and) stored beneath the skin/ around internal organs /fat depots in body;
9. Coiling; clustering; burrowing; migration; hibernation;
(Mark 1st floor)

10. Smearing with Vaseline blocked the stomata; carbon IV oxide could not diffuse into leaf; hence no photosynthesis took place;
11. Fossil records; comparative anatomy; comparative embryology, geographical distribution; cell biology;
(Mark 1st three)
12. a) Femur;
b) Hinge joint;
c) Walls are lignified / have lignin.
13.

Sperm Cell	**Egg Cell**
Has tail /flagellum	No tail/ Flagellum;
No Yolk	Yolk Present;
Smaller in size	Larger in size;
Numerous mitochondria	Fewer Mitochondria;

(Mark 1st two)
14. Blood pressure in veins is reduced by capillary resistance; blood is pumped to arteries by heart at
higher pressure;
Arteries have narrower lumenhence reduced pressure veins have wider lumen hence reduced prepare;
15. Adults and larvae occupy different ecological niches / feed on different food levels / no competition
for food;
Pupa doesn't feed; (mark 1st two)
16. Prevents entry of pathogens / disease causing micro organisms into the uterus during pregnancy.
17. Increase in temperature increases energy content of molecules; hence faster diffusion;
18. Lack of food;
Presence of predators;
Diseases outbreak;
Poaching; (mark 1st three)
19. Circular muscles (of Iris) relaxes as radial muscles contract; pupil enlarges; more light enters the
eye (for Vision)
20. Increased resistance to drought / pests / diseases; increased yields;
Early maturity;
21. i) Phototropism – exposes leaves in position to maximize light absorption; to enhance
photosynthesis / manufacture food;
ii) Thigmotropism – enables (non woody) plants to obtain mechanical support;
22. Manufacture of insecticides;
Causes lung cancer / respiratory diseases
Low birth weight / death of foetus;
Manufacture of cigarettes;

23. a) Stomata (in leaves);
Lenticels (in roots and stems);
Moist cells surfaces under lenticels / airspaces;
any b) have chloroplasts hence photosynthetic;
Have thicker inner wall and thinner outer wall hence open stoma when turgid; (mark 1st one)

24. Reduces friction; absorbs shock; (during movement)

25. i) Hairs trap moisture; causing high saturation around the leaf (hence reduced rate of transpiration);

ii) Faster rate of transpiration due to direct exposure to sunlight; More stomata exposed to allow for quick loss of excess water (through transpiration)

26. Protandry / Protogyny;
Self sterility;
Unisex flowers / Pistillate / Staminate flowers/ plants.
(Any 3)

27.

MONOCOTYLEDONAE	**DICOTYLEDONAE**
Narrow leaves	Broad leaves;
Leaves parallel veined	Leaves net veined;
Vascular bundles scattered	Vascular bundles arranged in a ring;
Floral Parts in threes or multiples of three	Floral parts in fours or fives or their multiples;
Cambium absent	Cambium present;
Phloem and Xylem alternate each other in a ring in root	In roots xylem (star- shaped) at the centre as phloem alternates with the arms of xylem; (Mark 1st three) (N:B complete difference to earn a mark)
Absence of pith	Presence of pith;

28. a) To investigate production of heat / energy by germinating seeds;

b) Seeds started germinating; respiration took place; heat / energy produced. (causing increase in temperature.

c) To prevent heat gain / heat loss / Heat produced by germinating seeds is very little so must be kept in;

29. Golgi apparatus / bodies;

30. a) Urea; Uric acid ; ammonia; creatinine; trim ethylamine oxide;

b) To avoid accumulation of excretory / waste products of metabolism;
To avoid alteration of conditions under which cells work;

31. - Absorption water from soil by root hairs;
- Opening and closing of stomata;
- feeding in insectironous plants;
- Contributes to turgidity hence support in plants; (Mark 1st two)

32. Individuals best adapted/ suited to the environment survive; as those that are poorly adapted perish /
die;

33. Mitochondrion;

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BIOLOGY
PAPER 1
2012 -010

MARKING SCHEME

1. a) it helps in determining the genetic constitution/genotype of an organism;
   b) Adenine, uracil, guanine, cytosine; (all must be correct)
2. a) A frond;
   B pinna;
   b) Produce spores; which germinate into the gametophyte;
3. I. Premature baldness; hairy pinna; DMD; (any more)
   II. Hemophilia;
   Colour blindness; (any one)
4. Ability to pollinate; response (nastic, tropic) to stimuli;
   Ability to exploit localized nutrients;
   Ability to disperse seeds/fruits; propagation; (any two to score)
5. Most enzymes within the body function within a narrow range of temperature;
   High temperature (above optimum) denatures enzymes;
   Low temperature inactivates enzymes
6. Heterostyly/unisexual/dioecious/staminate/pistillate flowers; protandry;
   Protogyny/incompatibility/self sterility;
   Acc; dichogamy for both protandry and protogyny (any 1st two)
7. a) Has blood capillaries which supply nutrients/gases/O_2 and CO_2
   Presence of nerve endings for detection of heat for sensitivity;
   b) It is the hardest part/ contains calcium phosphate that protects the teeth from mechanical injury/ from bacterial invasion; Rej (germs for bacteria)
8. a) Thick waxy cuticle/water proof cuticle;
   Reduced leaf size /needle – like leaves/spines
   Shedding of leaves; {Rej leaf fall alone but acc leaf fall during drought}
   Sunken stomata;
   Less stomata on upper leaf surface
   Fewer stomata/reduced no. of stomata
   Rolling of leaves; (any 1st three)

b) Increased light intensity;
Low relative humidity;
High temperature
windy/wind/air/current;

9. a) For sucking small animals from rock surfaces/barks of trees
b) For magnifying images of objects/specimens;
c) For catching crawling animals ;

10. Cell diameter $\frac{diameter\ of\ field\ of\ view}{No.\ of\ cells\ in\ the\ field\ of\ view}$;

$= \frac{5}{6} \times 1000\mu m; = 833.3\mu m;$

11. a) The study of an individual species interacting within a community
b) The study of different species of organism interacting among themselves within an ecosystem
c) Is a specific locality with a particular set of conditions where an organism lives

12. a) Produce sweat; which evaporate causing a cooling effect
b) Relax hair lies flat; less air is trapped between hairs causing more heat loss by convection/radiation
c) (Superficial) blood arterioles vasodilate enhancing more blood flow near the surface of the skin leading to more heat loss by convection/radiation.

13. a) In search of food/shelter; escape from predators/enemies/unfavourable conditions;
b) Responding /reacting/adjusting to change within the environmental conditions;

14. a) Wind;
b) Has hairs/pappus/parachute -like structures/feathery parachute; Rej parachute alone
c) Light in weight
Winged/papery extension;

15. Gills are numerous to increase surface area for efficient gaseous exchange;
Thin membrane/one cell thick membrane for rapid gaseous exchange;
Rich supply of blood/highly vascularized for efficient transport of gases;
acc – dense network of blood capillaries.

16.

Nervous	**Hormonal**
Electrical transmission Transmission via nerves Transmission is rapid Transmission is short-lived Transmission confined to effector	Chemical transmission Transmission via blood (stream) Transmission is slower; Transmission usually long lasting Transmission more wide spread/ diffuse;

Cell/organ	(any 1st three)

17. a) Is the emergence of present forms of organisms gradually from pre-existing ones (some of which no longer exist);
b) Divergent evolution-basic structural form is modified/ evolved to serve/perform different functions; while convergent evolution-different structural forms are modified/evolve to perform a similar function;
c) Standing upright/erect posture;
High intellectual capacity/bigger brain/communication through language/ speech; (any one)

18. a) Prevents overstretching of the forearm
Provides surface for attachment of muscles
b) (i) Ball and socket joint
(ii) Hinge joint

19. a) To show geotropism/response due to gravity
b) **set A** radical and shoot/seedling will grow horizontal
set B radical will grow bending downwards while shoot will grow bending upwards/shoot curvature upwards radical curvature downwards.)
(c) Auxins migrate down on the lower side of the radical, due to gravity high auxins concentrate on lower side inhibit growth on lower side hence curvature downwards; **OWTTE**

20. a) Semi permeability;
Possession of electrical charges;
Sensitive to extreme changes in temperature;
b) Osmotic pressure is the pressure that is applied against the semi-permeable membrane to stop water molecules from the distilled water entering the concentrated solution/stop osmosis from taking place while osmotic pressure is the hidden pressure of a concentrated solution that only becomes real when a solution is separated from distilled water by a semi permeable membrane; (comparison in order to score)

21. Act as a solvent
Evaporate thus cooling the organism;
Provides a medium of transport;
Provides a medium of bio- chemical reactions/facilitates hydrolysis; (any 1st three)

22. a) (i) The blood plasma except blood cells and proteins; that has filtered out of capillaries;
(ii) It is a medium of exchange of substances between capillaries and body cells
b) Hepatic portal vein;

23. a) Control locomotion/control movement of limbs/ lips/neck
Integration of sensory impulses such as vision/hearing/taste/speech personality, intelligence;
Association related to memory;
b) There would be loss of muscle coordination/balance;

24. Causes irritation in the trachea that leads to lung damage
Consumes a lot of digested food leading to malnutrition in (children);
In its life cycle in human, feeds on blood causing anaemia;
Heavy infections in humans may lead to intestinal blockage; (any 1st two)

25. Have numerous chloroplasts to absorb light/epidermis has numerous chloroplasts to absorb light
Have large airspaces for storage of air/buoyancy;
Are deeply truncated/divided to increase surface area for absorption of light
Lack cuticle to facilitate exchange of gases; (any two)

26. a) it is inherited/transmitted from parent to offspring;
b) It is developed after suffering from a disease/ through vaccination;

27. Insecta;

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BIOLOGY
PAPER ONE
2012 -011
MARKING SCHEME

1. (a) It is the science of classification;
(1mk)

(b) When they can freely interbreed; to give rise to viable / fertile offsprings; (2mks)

2. Cell division; cell growth; cytoplasmic streaming; protein synthesis; cell respiration; cell secretions/ excretion. Any three correct answers.
(3mks)

3. Haemolysis is the bursting of the red cells when placed in dilute/ hypotonic solution while plasmolysis is the process by which plant cells loss water; shrink and become flaccid; (2mks)

4. flat and broad lamina; presence of waxy transparent cuticle; thinness of the leaf;
any 2 (2mks)

5. provide optimum pH / acidic medium for enzymes activity; kill bacterial that may be present in food; unfold proteins for action of pepsin; stimulate conversion of inactive pepsinogen to active pepsin;
any two correct (2mks)

6. (a) Blood capillaries; (1mk)

(b) Small in diameter/ narrow lumen to increase pressure/ resistance for nutrients to filter out; thin wall/ consist of a single layer of cells to allow diffusion of substances; numerous/many in number/ form dense network to

provide a large surface area for exchange of materials;
any two correct (2mks)

7. (a) Water vapour accumulates in the depression of the stomata; lowering the water vapour concentration gradient; leading to lower rate of transpiration.

(b) Small surface area is exposed and folding of leaf protects the stomata from direct sunlight and saturates the area around the stomata.

8. (a) skin; Buccal cavity; lungs; any two (2mks)

(b) It decreases the volume of the thoracic cavity; and increases the pressure inside; thus air is forced out of the lungs through the air passage into the atmosphere; (3mks)

9. (a) Anaerobic respiration.
(1mk)

(b) Carbon (IV) oxide.
(1mk)

(c) Baking of bread;
(2mks)
Brewing in industries.

10. (a) A – sebaceous gland;
(2mks)

B – Horny / cornified layer

(b) C – sweat gland; Are involved in body temperature regulation through loss of excess heat by evaporation of water.

(c) Sweating / secretion of sweat;
any two (2mks)
Vasodilatation/ re – direction of blood into the skin;
Relaxation of erector (pili) muscle/ hair lies low/ flat/ flattens;

11. (a) Cells of both are enclosed by cell wall; cells of both have vacuoles and granules that contain stored food;
(2mks)

(b) – presence of mammary glands;
- Body covered with fur/hair; any two correct (2mks)
- 2 pinnae (external ear);

12. a) Malaria
b) amoebic dysentery
(2mks)

13. Lead to entrofication /Algae bloom ; reduce they circulation of air / oxygen in water; causes death of aquatic life e.g. aquatic animals.
(2mks)

14. a) Ecological niche - is the position that organism occupies in a habitat / role an organism plays in the habitat. Habitat is the specific locality with particular set of conditions where an organisms lives.
Any correct 2mks
b) The living organisms / plants and animals interact with each other; and also interact with environment
(2mks)

15. i) Parturation – process of giving birth;
(2mks)
ii) Implantation – It is the attachment of blastocyst to the wall of uterus;
b) Luitenizing hormone / follicicle stimulating hormone.;
(1mk)
c) Act as shock absorber / protect the foetus from mechanical shock .
(1mk)

16. a) Embryo may not yet be fully mature; presence of chemical inhibitors e.g. abscisic acid; very low concentration of hormones e.g gibberellins and enzymes
Hard impermeable seed coats. Any two (2mks)
b) Epigeal type is when cotyledon is brought above the ground. Hypogeal is germination in which cotyledon remain below the ground.
(2mks)

17. a) i. sudden genetic change that occur within a population
ii. This is a variation where there are definite distinct groups of individuals with no intermediate form.
b) Men have only one X chromosome; so it is not possible to have a carrier for such disease in male, while female have two x chromosomes hence can be carriers

18. a) Geographical distribution, fossils records, comparative anatomy; any two
b) It is the modification that occur to structures with a common embryonic origins to enable organisms with such structures to exploit different environment. (2mks)

19. a) Short sightedness/ myopia.
(1mk)
b) i. The eyeball is too long/light rays are focused before reaching the retina's. (1mk)
ii. Divergence /bend the light rays outwards before reaching the eyes.
(2mks)

20. Skeletal muscles are striated while smooth muscles are unstriated
Skeletal muscles are long and cylindrical fibres while smooth muscles are spindle shaped.
Skeletal muscles are multinucleated while smooth muscles are single nucleus.

In skeletal muscles the nuclei are peripheral while in smooth muscles the nucleus is centrally located. Any three correct (3mks)

21. a). Cervical vertebra (1mk)
    b). t–neural spine (2mks)
    m–transverse process
22. a). X– epidermal cells rej. Cell
    Y–guard cells.
    b). site for gaseous exchange (2mks)
    site for transpiration
23. long to provide large surface area for reabsorption of substances; walls of the tubule is thin to facilitate faster diffusion of substances; living cells has many mitochondria for energy production for active reabsorption. (3mks)
24. a) Fruit development without fertilization. (1mk)
    b) auxin/ IAA (1mk)
    c) escape digestion rej. Resist digestion (1mk)
    d) Has two scars;
    it develops from the ovary. (1mk)

2012 -012
231/1
BIOLOGY
PAPER 1
MARKING SCHEME

1. a) - Lysosomes
   - Ribosomes
2. Weak carbonic acid
   - Carbominohaemoglobin (2mks)
3. - Funnel shaped enables them receives eggs
   - Inner linings contain cilia which propels / warts ovum towards uterus
   - Tubule walls lined with smooth muscles which aid in contraction;
4. b) i) Genus name does not start with capital letter;
   - Names not underlined separately or written in italics when typed;
   ii) Binomial nomenclature;
5. i) RQ = $\frac{\text{Carbon (IV) oxide produced}}{\text{Oxygen consumed}}$
   $= \frac{1}{1.43} = 0.69$;
   ~ 0.7;

ii) - To know the type of respiration;
- To know the type of food substrate being oxidized;

6. a) - Acquired characteristics are never inherited ;
b) - This is continous competition among individuals of a population for limited resources eg
water, food and environmental problems eg. Drought, diseases, predators etc.

7. Fig 1 – Reticulate(1mk)
Fig 2 – Annular; (1mk)

8. - Formation of proteins eg. Enzymes, antibodies ;
- Growth and repair of worn out parts/ formation of new cells ;

9. i) - Protogyny
- Monoecious

10. O+ has Rhesus factor
O- has no Rhesus factor

11. There are structures which have ceased to function and have diminished in size over time;
Example: Appendix in man
- Coccyx in man
- Wings of ostrich / kiwi
- Nictigating membrane in humans

12. a) - Lack sap vacuole
- Have thin cell wall
- Dense cytoplasm
- Are non-specialised
b) - Oxidises food to release energy

13. a) RNA / Ribonucleic acid;
b) Presence of uracil
c) T – C – G – G – T – G – C;

14. a - Study of all organisms in a natural ecosystem while autecology is the study of a single
species within a community :

15. a) - Anaphase;
- <u>Sister</u> chromatids separate and move to opposite poles of the cell;
b) Help in moving chromosomes to different parts of the cell;

16. a) Negative phototaxis
b) To prevent dessication; to prevent them from predation;

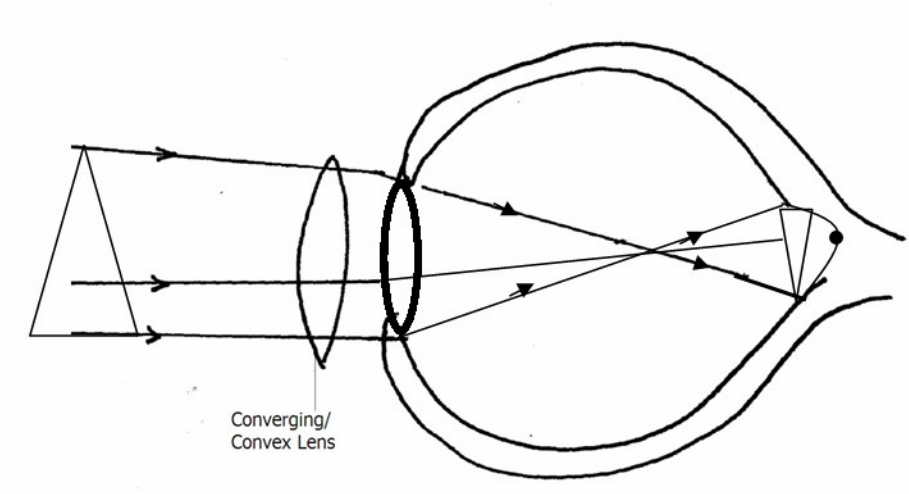
17. i) - Plasma proteins are too large to filter through the blood capillaries in the glomerulus;
ii) - Along the tubules water is reabsorbed while urea is not;
iii) The individual is suffering from diabetes mellitus; The pancrease doesn’t secrete sufficient
insulin which stimulates liver cells to convert excess glucose to glycogen/ fats hence
excess glucose is excreted in urine;

18. i) To absorb the shock; reduces friction;

ii) Passage of blood versels/ vertebral artery;
iii) Nourishes spinal cord cells; shock absorber;

19. a) Plasmolysis;
b) The cell is placed in hypertonic solution, it loses water by osmosis to the solution, making
the cell membrane to be withdrawn from the cell wall;

20. a) Long sightedness/ hypermetropia
b)



Iodopsin;

21. a) A – Hydrogen ions
B – Carbon (IV) oxide
C – Starch

b) $6CO_2 + 6H_2O \xrightarrow[Sunlight]{Chlorophyll} C_6H_{12}O_6 + 6O_2$

OR

Carbon (IV) oxide + water $\xrightarrow[Sunlight]{Chlorophyll}$ Carbohydrate + Oxygen

22. - Triceps – contract;
- Biceps – Relax;

23. - Air gets into the internal parts by the spiracles;
- Spiracles are found in the thorax and abdomen ✓ ½ therefore since there are no structures for

gaseous exchange on the head it is not possible to drown it by holding its head in water ✓ ½

24. a) - Uric acid;
    b) - Ammonia;
    c) - Urea;
25. a) - Plasmodium;
    b) - Neisseria gonorrhea;
26. a) - Production of antibodies to counteract disease causing micro-organisms;
    - Amoeboid shape to engulf pathogens
    - Production of anti-toxins to neutralize effect of toxins ; (first 2)
27. i) Cerebrum – Intergrate sence such as vision, hearing or tastes
    ii) Cerebellum – Maintenance of body balance and posture;
    iii) Medula oblongata – controls breathing, vomiting, swallowing and involuntary movement
28.

Cell	**Region of root tip**
A	N
B	K
C	L
D	M

29. a) Resolving power – ability to distinguish two close points as being separate; while
    magnification power – Ability to enlarge objects;
    b) Reflects light to the specimen on the stage
    c) Concentrates light on the specimen;

231 / 1
Paper 1
Biology theory
Time: 2 hours
2012 -013

MARKING SCHEME

1. Zoology; (1mk)
2. a) Cell wall;(1mk)
   b) Nucleolus;(1mk)
3. a) Microscopic plants → Small fish → large fish → Crocodile
   Or
   Microscopic plants → Mosquito larvae → Large fish → Crocodile

   Mark only one.

   b) Microscopic plants;
   c) They are producers; (b and c are tied.)
4. (i) A-duodenum (1mk)

C- Oesophagus / gullet (1mk)

(ii) - Temporary storage of faeces / undigested / indigestible materials;

- Absorption of water; any one (1 x 1 = 1mk)

5. a) Ability of the eye to form and focus sharp images from near or distant objects on the retina;

b) – Shorter eye ball;

- Thin / weak lens; (3mks)

6. a) (i) A condition where other floral plants raised above / positioned above the ovary / inferior ovary.

(ii) Male flowers /has stamen only / has male plants only;

b) - Large anthers loosely attached to the filament to be easily shaken in the wind;

- Small and light pollen grains to be easily carried by wind;

7. a) Homoitherms are organism whose body temperatures remains constant; despite fluctuations in the internal or external environment.
Poikilotherms are organisms whose body temperatures varies / changes with the surrounding temperatures;
(2mks)

b) Provides favourable / optimum temperature for the action of enzymes;

8. a) Due to production of oxygen; during photosynthesis;
(2mks)

b) It releases Carbon (iv) oxide in water necessary for photosynthesis.
(1mk)

c) Increase in light intensity increases the rate of photosynthesis up-to optimum level above which it drops.
(1mk)

9. a) (i) Ulna and radius;

(ii) X – sigmoid notch;

Y - Ulna;

(3mks)

b) Vertabraterial canal;
(1mk)

10. a) Internal intercostals muscles relax; internal intercostals muscle contract;

b) They lack stomata and cuticle allowing dissolved oxygen and carbon (iv) oxide diffuse through the epidermal cells in and out of the plant;
(3mark)

11. a) (i) Protoctista;

(ii) Animalia;

b) – Lack chlorophyll;

- Cell wall made up of chitin or cellulose.
(4marks)

12. a) Increase in temperature increases the rate of osmosis up-to optimum level then it drops;

Kinetic energy of water molecules increases with increase in temperature; (2mks)

b) (i) Visking tubing will become turgid / big / large / increase in size / swollen;

(ii) Sucrose solution is hypertonic; water moves from baker into the visking tubing by osmosis;

(Through semi-permeable membrane)

13. Nature allows organisms favourable variation / adapted will live up-to reproductive age; while those with unfavourable characteristics / not well adapted are selected against. This leads to gradual change in the characteristic of a species eventually producing new species;

(3mks)

14. a) (i) B. (ii) O.

b) The recipient does not produce antibodies which correspond to the donors antigens, (3mks)

15. a) Secondary growth / secondary thickening,

b) Primary phloem,

c) Divide to form secondary phloem and secondary xylem,

(3mks)

16 a) (i) Magnify/Amplify and transmit sound vibrations to the inner ear,

(ii) Convert sound waves into vibrations and transmits them to the middle ear; (1 x 2 =2mks)

b) Negative phototactic;

17. a) W and Y / Canis lupus and Canis familiaris,

b) They belong to the same genus /have the same generic name / belong to the genus Canis,

(a) and (b) are tied.

(2mks)

18. a) Luteinising hormone.(LH),

b) – Allows passage of nutrients and oxygen from mother to foetus / urea and CO_2 from foetus to mother.

- Produces progesterone / Oestrogen that are responsible for maintaining the pregnancy.

- Prevents passage of pathogens from mother to foetus, Any two (1 x 2 = 2mks)

19. a) Amoebiosis/Amoebic dysentery;

b) Schistosomiasis / Bilharzia

20. a) RNA / mRNA / tRNA /rRNA ;
has uracil;

b) G-C-A-G;

21 a) platelets / thrombocytes,

b) Calcium ions,

c) - Help in healing of wounds;

- Prevent bacterial / micro-organisms from entering the body;

- Reduces dehydration due to too much loss of body fluid;

- Prevent excessive loss of blood; Any two (1 x 2 = 2 mks)

22.a) X- Motor neurone / axon of motor neurone ;
Y- Sense organ / receptor / sensory receptor / sensory organs, (2mks)

b) – Has node of Ranvier to speed rate of impulse transmission;
- Has myeler sheath to insulate;(axon). Any 2(1x2=2mks)

23. (i) Nitrosomonas oxidizes/convert ammonia into nitrate,
(ii) Nitrobacter converts nitrite into nitrates;
(2mks)

24. a) Caudal fin;
b) Streamlined body / scales pointing backwards / mucus on the body surface. (2mks)

25. a) -Scented / brightly coloured to attract the animal;
- Have hooks sticking on the coat / for animals;
- Juicy / succulent attracting the animals;digested
-Some have tough seed coats that are not by digestive enzymes. Any 3 (1x3=3mks)

26. At high altitude there is low air pressure hence low oxygen concentration. The body therefore adjusts itself by producing more red blood cells in order to carry enough oxygen for respiration. (2mks)

27. Skin lightening cosmetics reduces production of melanin exposing the skin to ultra-violet rays; (that causes cancer)
(1 x 2 = 2mks).

28. - Capillarity;
- Transpiration pull,
- Cohesion; Adhesion; Any two. (1 x 2 = 2mks)

2012 -014

BIOLOGYPAPER 1231/1

MARKING SCHEME

1. i) Golgi bodies/Golgi apparatus; (1mk)
ii) Centriole; (1mk)
iii) Nucleolus ; (1mk)

2. i) Coronary artery; (1mk)
ii) Renal vein; (1mk)
iii) Hepatic portal vein; (1mk)

3. - Low temperature/temperature below 35^0c/; optimum
- Extreme PH; (1mk)
- Presence of enzyme inhibitors; (1mk)

4. i) To dissolve gases (for faster diffusion);
ii) To reduce diffusion distance for gases;

5. - Protection of delicate organ. (1mk)
- Surface for muscle attachment; (1mk)
- Prevents excessive loss of water from body tissue. (1mk)

6. Lenticels ; (1mk)
Cuticle ; (1mk)

7. a) RQ= $\frac{\text{Vol of } CO_2 \text{ produced}}{\text{Vol of } O_2 \text{ used}} = \frac{57}{80}; = 0.7125 \approx 0.7$ (2mks)

b) Fat/Lipids/Oils ; (1mk)

8.

Fresh water	**Desert**
Many; and large glomeruli;	Few; and small glomeruli;

2mks (Each mark as a whole)

9. As the water in the sweat evaporates; it takes away latent heat vaporization;

10. a) Predation; Disease; Parasitsm; competition; food scarcity/or availability;
(2mks)

b) seechi disc; anemometer (2mks)

11. Primary growth results in increase in length/height;
Primary growth occurs at the tip of roots and shoots
Secondary growth results in increase in girth/diameter of stem
Secondary growth occur within/stem and woody plants. (2mks)

12. Nature selects those individuals that are well adapted; to survive and reject/weeds out those that are poorly adapted to the environment. (1mk)

12. b) Resistant of some bacteria to antibiotics;
Resistance to fungicides by fungi;

Resistance of insects to insecticides;
Resistance of plasmodia to antimalaria drugs;
(Any two correct) (2 mks)

13. Phylum: Arthropoda;
Class: Arachnida (Names to start with capital letters. (2mks)

Presence of four pairs of legs;
Lack of anteanae;
Presence of pedipalps; (any first 2 correct)

14. a) Plant cells have - Chloroplast while animal cells lack them
Plant cells have cellulose; cell wall/lack animal cell
Plant cells have definite shape and irregular shape in animal cells;
Large vacuole; small or no vacuole.

b) Parasitology; (1mk)

15. i) Diffusion; (1mk)
ii) Active transport; (1mk)

- Chloride;
- Active transport requires energy synthesized by use of oxygen;

16. Pooter; (1mk)

17. a) i) grana/granum;
ii) stroma;

b) i) Hydrogen ions;
ATP/ Adenosine triphosphate; (3mks)

18. a) i) Progestrone;
ii) Maintenance of pregnancy; (2mks)

b) Sticky for pollen grains to adhere/attach/hold;

19. a) Vitamin A/Retinol;
b) i) Formation of thyroxine;
(Reject prevention of goitre)
ii) Transmission of nerve impulse;
Maintains the osmotic pressure of body fluids; (3mks)

20. a) Codominance/incomplete dominance/partial; dominance.
b) ABO blood group; (2mks)
21. a) Shoots grows/increases in height; and straight/upwards

b) Have more rods than cones in retina; Rods have retinal convergence. (2mks)

22. Hibernation - State of deep sleep to escape extreme cold temperature;
Aestivation - Deep sleep/rest to escape extreme hot temperatures; (Mark as whole) (2mks)

23. a) Org. Rhizobium sp
Import. Nitrogen fixation; (2mks)

b) Denitrification; (1mk)

24. a) Protection of meristem;
b) A - Cell division/multiplication;
B - Cell elongation/expansion
C - Cell differentiation/specialization;

25. Causes hallucination; one becomes violent; lack of control of voluntary action; (3mks)

26. i) Cerebellum;
ii) Hypothalamus;
iii) Cerebrum; (3mks)

27. i) Have the genus and spp name;
ii) Generic starts with capital letter, ssp-small;
iii) When typed italicized, when hand written; underlined separately; in manuscripts bold; (3mks)

28. a) Diffusion; (1mk)
b) Inside - Colour turns blue-black; (1mk)
Outside - Iodine colour remains /NO change in colour/colour remain brown; (1mk)
c) Outside; - Banana molecules are large, could not pass through the visking tubing hence iodine colour remains; (OWTTE)

Inside; - Iodine molecules diffused across the visking-tubing,

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BIOLOGY
PAPER 1

MARKING SCHEME

1. Ribosomes
   - endoplasmic reticulum

1 mark each

2. Light energy is absorbed by chlorophyll. The light splits water molecule/photolysis, to form hydrogen ions/H^+ and oxygen gas (reject oxygen atoms); light is converted to adenosine triphosphate (ATP); (reject light absorbed by chloroplast)

3. (a) (i) domestica
   (ii) musca

   (b) Arthropoda (reject wrong spelling)

4. - epidermis has numerous chloroplasts to absorb light;
   - deeply divided/branched leaves to increase surface area;
   - Large air spaces for storage of air/buoyancy;
   - Lack cuticle to facilitate the exchange of gases through epidermis.

   (Any two correct) (2 mks)

5. (a) (i) study of a single species/individual species within a community; or study of a population in a given ecosystem. (1 mk)

   (ii) Study of natural communities within an ecosystem;
   All different species of plants and animals within an ecosystem. (1 mk)

   (b)

Leaf	Habitat
A	aquatic/freshwater
B	forest; terrestrial/savannah
C	arid/semiarid (Accept desert)

   (c) Sunken;
   Hairy;
   Reversed rhythm;
   Small stomatal pore/aperture/opening; Acc small stomata

   (any 3 correct) 1 mark each

6. (a) (i) maintenance of a constant internal environment.
(ii) Mechanisms which regulate osmotic pressure of internal environment of an organism; regulation of salts and water balance in the body.

Accept maintenance of an optimum osmotic pressure.

(b) Insulin
Glucagon

7. (a) The genetic/nuclear material is not surrounded by a membrane/lack nuclear membrane/prokaryotic;
Smaller in size; lack most organelles;

(b) insecta;

8. (a) Co dominance/partial dominance/incomplete dominance;

(b) /Red flowered; 2 pink flowered plants:/ white flowered plant.

9. (a) Zone of cell division; /cell multiplication;
Zone of cell elongation/enlargement/expansion

(b) To protect root tip/apical meristem

Reject apical alone

10. - structures which (appear similar and) perform similar functions but have different origins;
- structures which have a common origin but (have evolved) to perform different functions;

11. (a) Myopia/shortsightedness; (accept short sight)

(b) Concave lens/divergence lens;
To diverge the rays so that the image is focused on the retina;

(Accept biconcave lens) (NB: b tied to a)

12. (a) anaerobic respiration

(b) Carbon (IV) oxide

(c) - baking of bread
- brewing industry
- Biogas production
- Making compost manure

(any correct two)

13. (a) sister chromatids separate; sister chromatids move to opposite poles

Accept chromatids separate at the centromere.

(b) - Gamete formation (accept formation of sex cells)
- Source of variation

14. (a) (i) The male reproductive organ/stamens/anthers/androecium mature earlier than the female reproductive organs /carpels / stigma/ gynoecium/ pistil;

(ii) Pollen grains are sterile on the stigma of the same plant/flowers. (Accept converse)

(b) – increase in variety
- Hybrid vigour/heterosis
- Resistance to diseases/adverse conditions

(Accept resistance to pest/ accept examples of virus and fungi)

15. (a) The rate of photosynthesis increases as the Carbon (IV) Oxide concentration increases up to an optimum level (and vice versa): accept up to a certain point

(b) Rate of photosynthesis increases as the light intensity increases up to an optimum level. (And vice versa)
(reject; if up to an optimum level is omitted)

16. (a) Kill organisms in water; reduce amount of oxygen in water; reduce the quality of water for consumption; change water PH; interferes with food chain/trophic levels;
leads to eutrophication; causes waterborne diseases;

(b) respiration/defacation/excretion

17. (a) P – chroloplasts reject chlorophyll
Q - stoma reject stomata

(b) P – site of photosynthesis;
Q – allows entry of Carbon (IV) oxide used in photosynthesis.

18. (a) Having same kind/type/similar teeth
Having different types/kind of teeth

(b) Scissor – like for shearing/slicing/cutting off tendon/flesh (from bones) large/powerful for cracking/ breaking/crashing bones

(c) i $^{0}/_{3}$ c $^{0}/_{1}$ pm $^{3}/_{3}$ m $^{3}/_{3}$;

19. (a) osmosis
(b) diffusion

20. (a) inversion
(b) insertion

21. (a) deamination
(b) Removal of excess amino acids/availing energy in the body/formation of glycogen/fat for storage

(c) Proteins

(d) - Essential aminoacids are acquired from food
- Non essential are synthesized in the body;

22. (a) haptotropism; thigmotropism

(b) Expose the leaves/shoot in position for maximum absorption of sunlight for photosynthesis;
- Enables roots of plants to seek water
- enables roots to grow deep into the soil for anchorage
- enables pollen tube to grow towards the embryo sac to facilitate fertilization;
- enables plant to obtain mechanical support especially those that lack woody stems;

(reject embryo for embryo sac)
(any 3 correct)

23. (a) Diabetes insipidus
(b) ADH (antidiuretic hormone)

24. Current continents existed as one large landmass /pangea/Eurasia; the present continents drifted leading to isolation of organisms; organisms in each continent evolved along different lines; hence emergence of new species.

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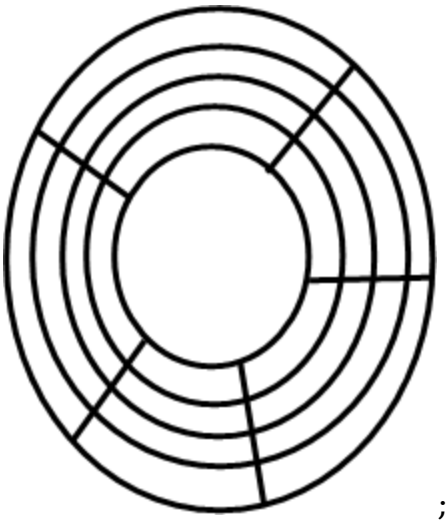
BIOLOGY
PAPER 1
MARKING SCHEME

1. i) Synthesis of RNA;
ii) Formation of spindle fibres – cell division
Formation of cilia and flagella;
2. - The exoskeleton is shedy; so that rapid growth of the insect can occur before the new skeleton
hardens
- Allows for increase in size
3. a) So that they could be destrarched / use up all the stored starch;
b) No starch in the plant;
- The NaOH absorbed carbon (iv) oxides, from the air hence no photosynthesis occurred to
form starch;
4. a) Capture – recapture method / Capture – mark – release – recapture;
b) $\frac{FM \times SC}{MR}$; $\frac{260 \times 193}{72}$; 697 grasshoppers;
Key
FM - First marked
SC - Second capture
MR - Marked recaptured
5. Combines permanently / with RBC does not readily dissociate; hence reducing capacity to
transport / carry O_2 to the tissues leading to suffocation;
6. a) - Brown colour;
- Blue – black colour;
b) Starch by converted enzyme/ ptyalin/salivary amylace to maltose; hence absence of starch;
7. i)



;

The size of the pupil should be larger than the drawn diagram by the setter.

ii) The circular muscles of the iris relax and the radical muscles contract increasing the
diameter of the pupil; Allowing more light into the eye;

8. - Myelin sheath;
- Nodes of Ranvier;

9. BCG; oral polio vaccine;

10. - Reducing emission of carbon IV oxide and other green house gases;
- Reduce use of wood and other fossil fuel;
- Planting more trees / Re afforestation;

11.

Insect	Wind
- Smaller - Firmly attached to the filament; - Located inside the flower	- Larger - Loosely attached to the filament Located on filament that hangs out of the flower

12. a) Pentadactly limb
b) Walking; running; jumping; hopping; swimming

13. i) Lenticels
ii) Pheumatophores;;
iii) Stomata

14.

Description	Bone
Has odontoid process	Axis;
Lacks centrom	Atlas;
Has longes transverse process	Lumbar;
Articulates with sigmoid notch as at	Humerus;

the distal end	

15. a) Maturation and storage of sperms;
b) Passage of ovum to the uterus; place where fertilization occurs;
c) Produces alkaline fluid that neutralizes any acidity resulting from remaining urine in the urethra;

16. a) - Bryophyta;
- Pteridophyta;
b) Chordata

17. Early maturity;
- Higher yields;
- resistance to disease /pests;

18. - Seeds that germinated in light continued to increase in weight; because they synthesized more food during photosynthesis resulting in growth
- In darkness seeds lost weight; depletion of stored food because they were unable to photosynthesis;
- Stored food in endosperm is hydrolysed; and used up by the embryo for growth.

19. i) -Ribcage
- Moves upwards and outwards;
ii) Diaphragm
- Diaphragm muscles contract and shorten thus flatten;
iii) - Intercostal muscles
- External intercostals muscles contract while internal intercostals muscles relax;

20. a) - Observable differences among the living organisms;
b)

Continuous	Discontinuous
i) No distinct groups with intermediate forms; ii) Controlled by many genes; and Physical expression influenced by environment	- There are definite distinct groups with no intermediate forms - Controlled by 1 or 2 major genes not influenced by environmental factors;

21. a) - Thickness of cuticle
- Leaf surface area
- Size of stomata
- Number of stomata
- Position of stomata;
b) i) Replaces water lost through the leaves;
ii) Responsible for turgor in plants
iii) Serves to cool the plant

22. a) i) Amino acid;
ii) Fatty acids and glycerol;
b) Temperature; P^H; Substrate concentration;
(PH should be written correctly (H is superscript) reject PH)
23. - Maintenance of body balance/ posture;
- Muscular co-ordination for rapid activities eg running;
24. i) Are eukaryotic and multicellular; body differentiated into stems, leaves and roots, cells
have cellulose cell walls; Have photosynthetic pigment – are autotrophic show alleration
of generation;
- Reproduction is both asexual and sexual;
(any first 2 correct)
25. a) Translocation of manufactured food/ products of photosynthesis;
b) Translocated food substances accumulate; it could not get across the ringed part since the
phloem tissue was removed.
26. Heart beat – To supply more oxygen to tissues and carry away carbon (iv) oxide; Rate of
breathing – increase the oxygen supply to tissues and expel carbon (iv) oxide;
- Lactic acid formed in the muscles is toxic; hence must be removed;
- To increase supply enough oxygen and remove the CO_2 formed (any 2 correct)
27. G – C – C – U – A – G – A – U;

2012 -017
BIOLOGY
PAPER 1
MARKING SCHEME

1. i) Concentrate light rays / beam to the stage ;
ii) Give a fine focus of the specimen ;
2. A mouse has a large surface area to volume ration than a dog ; hence lose more heat at a faster rate than a dog.
3. a) Acquire Immuno – deficiency Syndrome / AIDs
b) It destroy the Immune system virus replicates rapidly
Virus is obligate intracellular
c) - Screen blood for HIV virus before transfusion ;
- Avoid multiple sexual partner
- Sterlise surgical implements before use
- HIV positive mothers should avoid breast feeding.
Mark one
4. a) Ear Osicles : Transmits / amplify / magnify (sound)
Vibrations;
b) Cochlea : Converts sound vibrations into new impulse ;

c) Semi – circular canals : Maintains posture / balance ;
d) Eustacian tube ; Balance pressure in middle ear with that of the outside /
Balance pressure on both sides of the ear.

5. - Shields foetus from pathogens from the mother :
- Holds foetus in position by umbilical cord;

6. Oxygen is required in respiration to produce energy ; used by carrier molecule;

7. - Highly dissected to provide a large surface area for maximum absorption of light /
carbon (IV) Oxide ;
- Thin for rapid diffusion of gases;
- Have air spaces / aerechyma to provide buoyancy;

8. a) Condensation ;
b) Ribosome ;
c) i) Q - Polypeptide
ii)X - Peptide bond ;

9. a) AA ; AO
b) Determine the genotype of the parents by crossing F1 progeny with a reseive offspring;

10. a)i) Allow air in and out of the trachea;
ii) Site for gaseous exchange ;
b) Chitin;

11. Lumbricate the food;
Protect the lining of the digestive system from digestion by enzymes ;

12. Divergent evolution : structure with similar embryonic origin modified to perform different functions e.g vertebrate fore limb / pentadacty limb / beak structure in birds / feet in birds.

Convergent evolution; structures with different embryonic origin modified to perform similar function e.g wings of birds and insects.

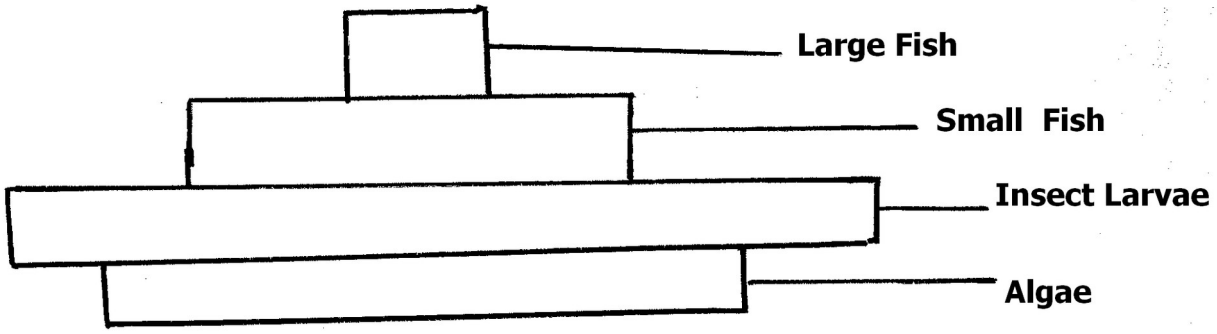
(Mark as a whole)

13. a) M . Neural spine:
b) P: Neural canal;
L : Centrum

b) Provide a canal for passage of spinal cord:

14. Down's Syndrome ;
Turners syndrome;
Klinefetters' syndrome; ***mark the first 2.***
Achondrolasia

15. a) Accept suitable scale : (1mk)



Correctly drawn diagram – (1mk)
Accurately drawn bars (1mk)

b) Inverted of Numbers ; ***Reject if the term inverted is missing.***

16. a) Fern ;
b) x: Sporophyte; generation ;
Y Gametophytte ; generation
c) Absorption of water ; / Anchorage ;

17. Translates coded information from DNA / MRA ;
Into proteins which determines an organism characteristies;

18. Endosperm material converted / Oxidised into new cytoplasm ; used for growth of the embryo;

19. Abdomen;
Cephalothorax / prosoma;

20. a) Ball and socket joint;
b) Hinge joint;

21. a) Protandry : Male / Androecium / Stamen / Anthers reproductive organs mature
earlier than female / Pistil / gynaecium / carpels / Stigma reproductive organs;

Self sterility : Pollen grains are sterile to the stigma of the same plant / flower ; Accept the converse
b) Hybrid vigour / Heterosis ;
- Increase resistance to disease / resistance to unfavourable conditions ;
- Increase in variation;

22. To expose the leaves to be able to trap maximu light for photosynthesis ;
- Positioning of flowers approapriately for pollination ;

23. i) Synecology ; Study of the many species in a habitat;
ii) Habitat : Specific locality with a particular set of conditions where an organism lives;

24. a) A sensory Neurone ;
B Relay Neurone ;

C Motor Neurone ;

b) Conduct impulse from the sensory organ to the spinal cord / CNS ;

25. a) A : Synergids ;
D : Antipodal cells ;

b) Part B / Accept Egg cell;

26. a) Water accumulates in pits reducing the saturation deficit;

b) Low temperature reduces the Kinetic ;

27. Deposition / accumulation of fats / cholesterol in the walls of the coronary vessels
Artery walls become increasingly fibrous;

28. Oxygen required to breakdown lactic acid formed when oxygen supply is less than demand ;

29. Hypertonic solution has high / more solutes in solvent
Hypotonic solution has lower / less solutes in heat;;

30. i) Cytoplasm ;
ii) Matrix of mitochondrion ;

31. Growth curvature in response to touch on solid / hand objects;

32. Lenticells ;
Stomata ;
Pneumatophores

2012 -018
231/1
BIOLOGY
PAPER 1
MARKING SCHEME

1. a) - Packaging and transport of glycoproteins
- Secretions of synthesis proteins.

b) - Manufacture / synthesis proteins

2. (i) Cones
(ii) Choroid / choroid coat
(iii) Sclera or sclerotic layer

3. The two polar nuclei, each haploid; are fertilized by a haploid male nucleus; (making the endosperm cell triploid)

4. - Thin wall (epithelium) for faster diffusion of gases.
- Moist for dissolving gases
- Large surface area for maximum diffusion / gaseous exchange.
- Hihgly vascularised to facilitate / enhance diffusion;

5. - Lightning
- By rhizobium in root nodules of legumes
- Free living bacteria in soil / Azotobacter;

6. - Long loop of henle
- Small glomeruli;
- Few glomeruli

7. (a) The crossing of an organism of unknown genotype with a homozygous recessive
organism to determine the genotype.
(b) The existence of triploid or tetraploid organism / tripling or quadrupting of chromosomes of an organism;
(c) Is the external appearance of organism as determined by the genes / is the expression of the gene;
8. (a) X^hY
(b) - Crossing – over
- Non – disjunction
9. (a) Relay / bipolar neurone
(b)i) Propagates nerve impulses / speeds up the transmission of nerve impulse.
(ii) Secrets the myeline sheath.
10. (a)i) Hand of a man, flipper of a whale fore leg of a horse.
(ii) Wing of an insect and wing of a bird
b)i) Divergent evolution
(ii) Convergent evolution
11. - Smooth muscle
- Striated / skeletal muscle.
- Cardiac muscle.
12. Water in RBC'S moves out osmosis ; and the RBC shrink / becomes crenated;
13. a) The ability of an organism to maintain a stable / constant internal environment;
(b) To 1 cm^3 of urine sample, add equal amount of Benedict's solution; Boil ; Color changes from Blue → green → yellow → orange / Brown hence presence of reducing sugar thus positive for diabetes mellitus;
14. - Thick / waxy cuticles;
- Reduced leaves size / thorns / spikes;
- Shedding leaves;
- Sunken stomata
- Rolling leaves
15. a) - Exchange of gases, nutrients ;
Nitrogenous waste
- Secretion of progesterone.
b) - Protandry / early maturing of the Androecium
- Protogyny / early maturing of gynoecium
- Dichogamy – protandry
Protogyny
16. a) - Prevent competition / over crowding;
- Occupy new habitats / colonization of new areas.
b) - Light in weight; winged.
Acc. Extension of pericarp / seed coat.
17. - In search of food

- In search of mates.
- Escape from unfavourable environmental conditions
- Looking for shelter;

18. (a) Haemophilia / sickle cell anaemia;
    (b) Duplicetion
    - Inversion
    - Deletion
    - Translocation
    - Non disjunction / polyploidy
    c) - Radiations – e.g ultraviolet rays
       - Chemicals – e.g mustard gas.

19. - Muscles respire anaerobic ally ; resulting in accumulation of lactic acid in the tissues; causing fatigue / muscle cramp ;

20.

	RNA	DNA
-	Has ribose sugar	Has deoxy ribose sugar;
-	One O2 atom more	Has oxygen atom less
-	Hass uracil	Has thymine
-	Has no genes	has genes
-	Single strand	Double strand.

21. a) Digests starch to maltase
    b) - Mouth ;
       - Duodenum ;

22. a) Capsule ;
    b) Sori / sporangia ;

23. - Thick walls
    - Muscular
    - Elastic

24. Cells will not produce enough energy causing them to die, glucagons secreted which will convert; glycogen to glucose;

25. a) nastic / naptonasty / thigmonasty;
    b) Chemotaxis;
    c) phototaxis;

MARKING SCHEME

BIOLOGY PAPER 1

2012 -019

1. Magnification = $\frac{\text{Drawing diameter}}{\text{Actual diameter}}$

$= \frac{4\text{cm}}{10\text{cm}}$ (N.B units to be shown here)

$= x0.4$

2. a) Pooter. Rj wrong spelling (1mk)

b) For sucking small crawling animals from rock surfaces or barks of trees; (1mk)

3. Conversion/breakdown of starch to maltose;

4. Exhaled air after exercise has less oxygen than exhaled air at rest / from a sleeping man;
-Exhaled air after exercise has more CO_2 than exhaled air at rest;
-This is because the rate of respiration increases during exercise using up more O_2 and yielding
more CO_2;

5. a) i) Sensory nerve cell/sensory neurone;
ii) Cell body is on a branch/at the side off axon/loft the axon/cell body is unipolar;

b) Myelin sheath;

6. i) X – Bicaps/fleror;
W – Triceps / extensor;
ii) Muscle W / Triceps contracts while biceps relaxes; and this straightens the ulna – radius;
leading to extension of the arm

7 i) Ethanol, Carbon (IV) oxide, Energy;
(All 3 mentioned)
ii) Manufacture of dairy products;
- Sewage and effluent treatment;
- In brewing – production of alcohol DRINKS;
- In bread production;
(any 2 correct uses)

8. i) Cones – Percieve high of high intensity;
- For colour vision;
Rods –Percieve light of low intensity;

9. a) i) Deletion;
ii) Inversion;

b) Albunism, sickle – cell anaemia, colour blindness, chondody strophic dwarfism. (any 2)

10 Water vapour accumulates in the pit/cavity lowering diffusion gradient between the inside of
the leaf and immediate environment;

11. a) Respiration / aerobic respiration;
rej. Anaerobic respiration

b) i) Calcium hydroxide solution forms white precipitate;
ii) Carbon (IV) oxide was produced by the respiring rat; carbon (IV) oxide reacts with
calcium hydroxide to form white precipitate (calcium carbonate);

12. **Endocrine system** **Nervous system**
- Chemical substance evoke response - Nerve impulse evoke response;
- Response takes place involuntary - Response takes place voluntarily and involuntarily;
- Effects are long lasting - Effects are rapid and short – lived;
- Response affects several parts of the body - Response are localized and specific;
- Response slow - Response quick;
Any 4

13. a) Hypersensitive reaction to antigen by the body;

b) Natural active immunity The body develops resistance to disease after first contact with
disease causing organism; Natural passive immunity – It is developed when antibodies from the mother cross the placenta into the foetal circulation / young babies get antibodies from colostrums –from breast milk;

14 . i) Liguin;

ii) – Turgor pressure;
- Twinning around other plants / objects;
-Use of tendrils;

15. Tympanic membrane
- Receives sound waves;
- Transforms sound waves into vibrations;

- Transmits sound waves to ear ossicles;

Eustachian tube
-Equalizes / balances air pressure in the middle ear to that in the outer ear;

Ear ossicles
- Amplify / magnify vibrations
- Transmits vibrations from tympanic membrane to the inner ear;

16. i) – Mitochodia
- For production of energy;

ii) Golgi bodies;
- For packaging and transportation of secretions;

17. – Due to presence of hydrochloric acid; which creates an acidic media stopping the action
of anuylase enzyme;

18. o) Thoracic vertebrae;
rej. Thoracic bone
rej thoracic

19 a) Sorus / sori;

b) Similarity – Botu have alternation of generations (have a ganmetophyte and sporophyte)
generation;

Difference → Pteridophytes have well defined vascular system while Broyophyta lack have vascular system / pteridophyte have phloem and xylem
Bryophyta lack phloem and xylem;
- Bryophyte have rhizoids, Ptendophyta have adventitious roots;
- Gametophytes dominant in Bryophyta, sporophytes dominant in ptendophyta;

20. Contractions originate from the cardiac muscle cells; at Sino A trio Node;

21. The circulatory system does not transport respiratory gases; The gases diffuse in and out of the body through tracheal system;

22. – Trachea is made of incomplete rings of cartilage along its length which resist collapse due ; to decrease in chest cavity;

- Inner lining of trachea produces mucus to trap and filter micro organisms and dust particles preventing them from entering the lungs;
- The trachea is lined with cilia which move mucus upwards into the pharynx;
- Presence of epiglottis which closes up to prevent food from entering trachea during swallowing;

23. a) – To kill living tissue, and prevent further chemical reaction;

- To break open / rapture starch granules;

b) To dissolve the chlorophyll / Decolorize the leaf;
c) To soften the leaf;

24. Cerebrum;

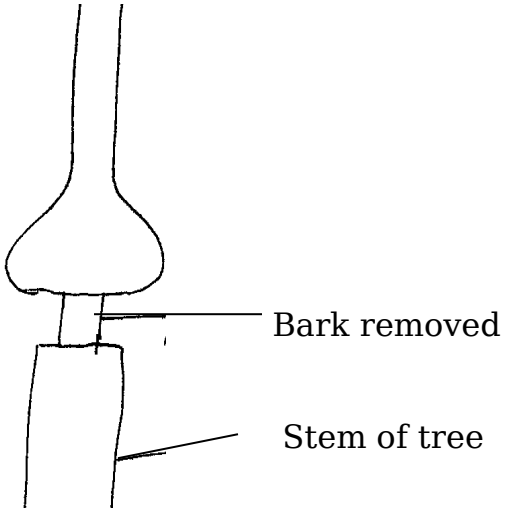
25. a) P – Pectoral fin;
b) Q – Pelvic fin;

b) – Changing direction;

- Braking;
- Upward and down ward movement;

Any (2)

26. - Has a long tail – like extension for swimming towards the ovum;

- Has many mitochondria to provide energy required for movement;
- Has acrosome which contains lytic enzymes to wear away the ovum wall;

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