

MARKING SCHEME

BIOLOGY - PAPER 1

1. (a) Cytology: Rej cell biology
(b) Microbiology

2. (a) Stem
(b) i) Monocotyledonae
ii) Vascular bundles scattered not arranged in a ring;
Absence of pith; Absence of vascular cambium.
(c) Epidermis

3. (a) Protein synthesis (Accept: site for protein symbiosis)
(b) Destroys worn out organelles/cells/tissues
Destroys micro-organisms.

4. (a) i) Root hair(cell)
ii) D – cell wall
E – cell sap (vacuole)
(b) Controls the functioning of the cell/ controls cell activities

5. A large surface area for efficient diffusion of gases
Moist for gases to diffuse in solution form/to dissolve gases
Thin for efficient/diffusion of gases (across a short distance)
Most be close to body cells/well supplied with blood vessel to active cells
Ventilation mechanism for bringing in air rich in O₂ and expelling air rich in carbon(iv) oxide

6. (a) Maintain balance/posture/control/muscular movement
(b) Control heart beat/ blood pressure/ breathing(rate) control involuntary activities/ response
Accp. Curved examples of v.a e.g. eating, swallowing e.t.c.

7. Haemolysis – process by which red blood cells take in water till they burst; while
Plasmolysis – loss of water from plant cells until the cell membrane is detached from the cell wall/ until the cell become flaccid.

Chilopoda	Diplopoda
<ul style="list-style-type: none"> - A pair of (walking)legs per segment - Body flattened dorsoventrally - Body divided into head and trunk Acc. Body divided into two body parts - Posterior genital aperture - Has poisonous claws - Have long antennae 	<ul style="list-style-type: none"> - 2 pairs of(walking)legs per segment - Body cylindrical in shape - Body divided into head thorax and trunk Acc body divided into three body parts - Anterior genital aperture - Lacks poisonous claws - Have short antennae.

8.

- They contain chlorophyll which traps/absorb light (energy)
 - They have grana which increase surface area for accommodation of a large number of chlorophyll molecules for photosynthesis
 - The stoma has enzymes for photosynthesis
9. - Resistance to diseases/pests/adverse weather conditions (Acc. Correct examples e.g. drought, very high/ low temperatures)
- Increased yields
 - Earlier maturity Acc. Early maturity
10. (a) Aquatic / fresh water
- (b) Large air space/aerenchyma
- Sclereids
 - Stomata on upper epidermis/absence of stomata in lower epidermis
 - Absence of cuticles
 - Poorly developed vascular bundles
11. J – sporangium
- Absorption of soluble substances/ digested food
 - Secretion of digestive enzymes;
 - Anchorage(of mould on substrate); anchorage must be in the right context
12. (a) Place/environment in which (specified)organism lives
- (b) A natural unit with abiotic and biotic factors
13. Charcoal in limited supply of air produces carbon(ii)oxide; which combines with haemoglobin forming carboxyhaemoglobin; which is stable/ does not dissolve reducing capacity of the haemoglobin leading to suffocation/ death;
14. a)
- X – Starch present
 - Y – Starch absent
- b) X – acts as a control; Y – CO₂ absent absorbed by potassium hydroxide pellets; Acc correct explanation
15. Emulsification / breaking down of fats into (tiny) droplets
- Creating alkaline medium for digestive enzymes/ neutralizing acidic chyne (from the stomach)
16. (a) Herbivorous; Rej Harbivores
- (b) Lack canines/ incisors on upper jaws
17. Animal form waste products more rapidly than plants/ Produce more metabolic wastes
- Animals don't reuse their waste while plans reuse some of their wastes;
18. When temperature is high they dilate; when low they constrict (Acc. Vasodilatation)
19. Higher chances of fertilization
- Embryo/gamete is protected from external environment conditions
20. (a) P – sutures
- (b) i) Atlas;
- ii) Hinge joint
21. (a) Passage of ova/ site of fertilization
- (b) Storage of sperms
- (c) Hold the testis/ protect the testis
- 22.
- Absence of nucleus, increase of space for packaging haemoglobin(for carrying oxygen)
 - Possession of haemoglobin which has high affinity for oxygen
 - Bi-concave shape creates large surface area for combining with oxygen



- Ability to change shape/flexible to enable them pass through capillaries.
 - Have carbonic anhydrase which increase CO₂ transportation
 - Are numerous/many to be able to carry max amount of oxygen
 - Has plasma membrane which allow rapid diffusion of gases
23. (a) Use and disuse
Acquired traits can be passed on to offspring
- (b) Acquired characteristics cannot be inherited
No evidence to support the theory
- 24.
- Overcrowding
 - Accumulation of toxic wastes
 - Limited resources such as nutrients
25. (a) Provide support
Enables plants to grow forward light
- (b) In search of nutrients
Anchorage
26. (a) Failure of homologous chromosomes to segregate during meiosis/ anaphase I/ meiosis I
Failure of sister chromatid to segregate during meiosis/ anaphase II / meiosis II.
- (b)
- i) Down's syndrome; Turner's syndrome; Klinefelter's syndrome
Surnerz syndrome
Acc. Mongolism for Doran's syndrome
 - ii) Albinism; single cell anaemia; heamophilia; colour blindness
Chondrotyrophic dwarfism/ Achondroplasia
27. Arteries have thick muscular walls; veins have thin and less muscular walls
Arteries have narrow lumen, veins have wider lumen
Arteries have no valves except at junction with heart; veins have valves at regular intervals.
28. (a) Gymnospermae/ Gymuspermatophyta/ Gymnosperonaphyta;
- (b) Needle-like leaves; thick waxy cuticle
Naked seeds; sunken stomata.
29. The inhibition of growth of lateral buds; by auxins; produced by the growing apical bud.



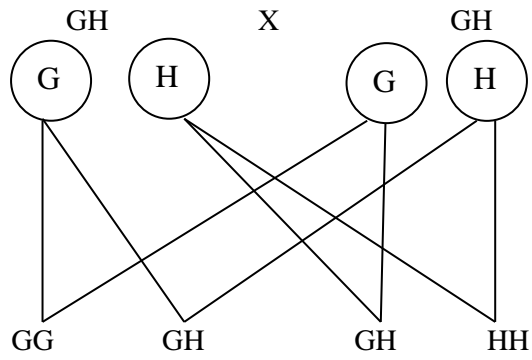
MARKING SCHEME
BIOLOGY - PAPER 2

1. .
- a) Respiration (Rej: external respiration/ anaerobic respiration)
Acc: aerobic respiration.
 - b) i) Rise/ increase in thermometer / temperature reading.
ii) stored starch/ glucose/ carbohydrates in germination seeds are broken down/ oxidized to get energy.
Some of the energy is released to get energy; some of the energy is released as heat.
 - c) To kill bacteria/ fungi/ micro-organisms; that would cause decay/ decomposition / respire. (of the bean).
 - d) To conserve heat/prevent heat loss to surrounding
 - e) Use similar set up with dead disinfected seed.
Use dead disinfected bean seed/ use of dry bean seeds; acc formaldehyde / formalin for disinfection sodium hypochlorite.
2. .
- a) **P** – tissue fluid / intercellular fluid/ space.
Q – Venule.
 - b) i) Glucose, oxygen; Rej: formulae
ii) Carbon (IV) oxide, water; Rej; carbon dioxide OR Formula.
 - c) Blood entering the arteriole has a higher pressure; than that leaving the venule, the pressure force water and small solutes (molecules) in blood to go through capillary wall forming tissue fluid; Nutrients / oxygen in tissue fluid move into the tissue cells by diffusion; Acc. Nutrients like glucose/ mineral salts/ vitamins/ fatty acids & glycerol. (Acc 2 nutrients)
 - d) Red blood cells/ proteins/platelets; Acc one example of protein e.g. globulin.
3. .
- a) i) Primary consumer
ii) Primary consumer / Secondary consumers;
 - b) Green plants → Caterpillars → Small insects → lizard
Decaying leaves → Caterpillars → Small insects → lizard
 - c) i) Hawks;
ii) At each trophic level energy is lost as heat / respiration; and during decomposition; or lost in defecation/ feces/ waste products of metabolism/ excretion; some parts of the organism are not eaten; (hence less biomass as one moves up the tropic levels.
4. .
- a) **X** – pupil
Y – circular muscues
 - b) i) Dimlight / low light intensity/ darkness/ dull light.
ii) Circular muscles in (iris) relax; while radial muscle contract; the pupil becomes bigger allowing more light to enter the eye.
iii) allow one to visualize/ see objects under dim light;



5. .

a) Parental genotype
Gametes



- Genotypes
- Gametes

F2

Genotypic ratio GG: GH: HH = 1:2:1;

Punnet Square

Parental genotype GH x GH NB: use of difference letter away 1mark for fusion lines only.

	G	H
G	GG	GH
H	GH	HH

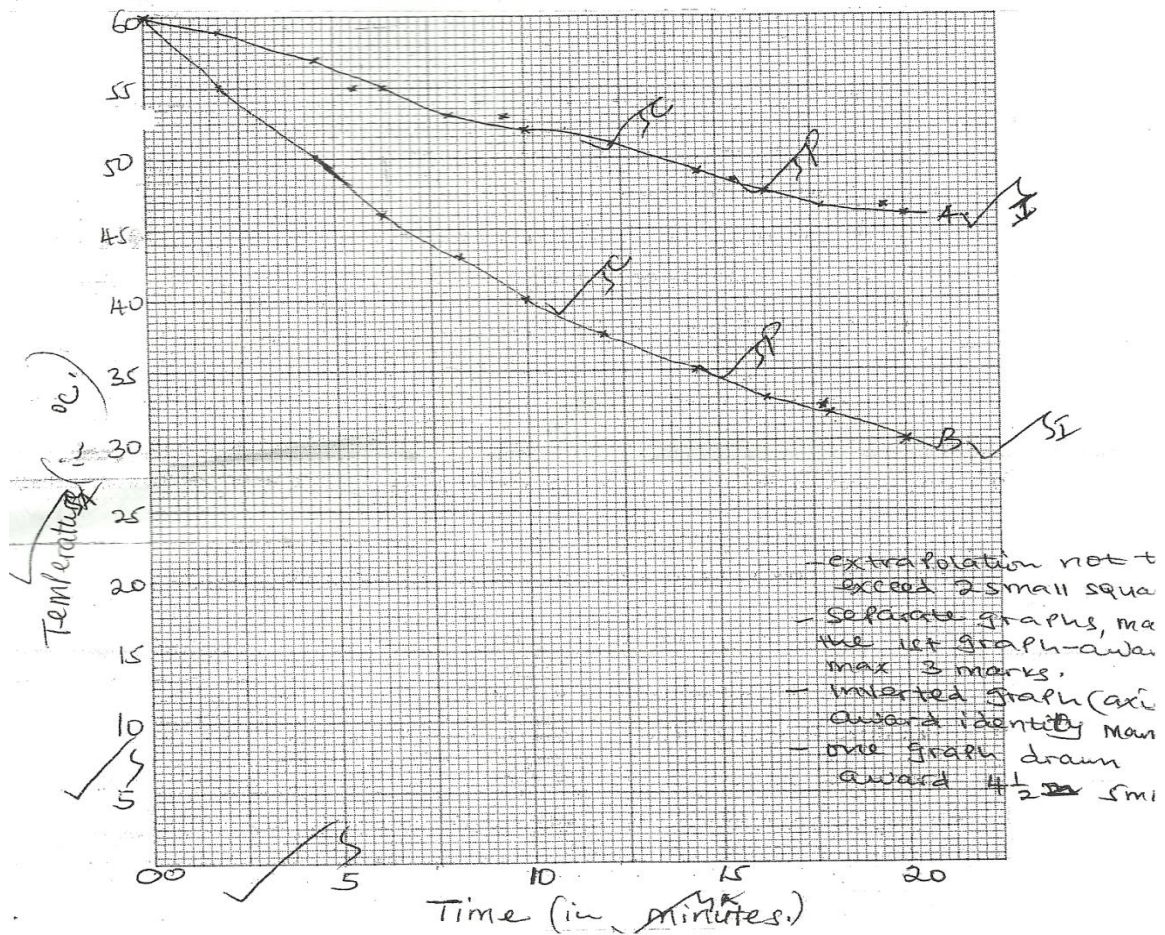
b) Black : Black & white : White = 1: 2 : 1

c) i) Codominance; (Rej: incomplete dominance, partial dominance, equal dominance, blending inheritance.

ii) ABO blood group inheritance. Acc. Blood group(Rej; Rhesus factor sickle cells trait.

6.

a) .



b) i) A $\frac{56 - 48.5}{15 - 5} = \frac{7.5}{10} = 0.75 \pm 0.05$ per minute.

B $\frac{48 - 34}{15 - 5} = \frac{14}{10} = 1.4 \pm 0.05$ per minute.

ii) B has a large surface area to volume ratio making it to lose heat to the surrounding faster; Acc the converse/ viceversa.

iii) A rat has a larger surface area to volume ratio compared to an elephant; making the rate to lose heat at a faster rate than an elephant; Acc: the converse/ Viceversa.

c) i) Insulate against heat loss (to surrounding)

ii) Subcutaneous fat (layer) / Adipose tissue/ Blubber; fur/ hair; Rej: wool.

d) Are active always(even under very cold conditions);

Able to escape from predators/ search for food/ mates (because they are active always)

Can survive in (any habitat) both cold & hot habitat / wide range of habitats.

7. Pollen grains land onto the stigma and adhere to it as a result of the stigma cells secreting a sticky substance . it absorbs nutrients; & germinates forming a pollen tube; the pollen tube grows down the style to the ovary; deriving nourishment from surrounding tissue. The pollen tube has tube nucleus at the tip; and



generation nucleus immediately behind it; As the tube grows downwards into the ovary the generative nucleus divided 9by mitosis) mitotically, to give rise to two nuclei; which represent the male gametes; the pollen tube penetrate the ovule/ embryo sac/ chalaza through micropyle. After the pollen tube enters the embryo sac the tube nucleus breakdown/ disintegrates/degenerates; leaving a clear passage for the entry of the male nuclei. The (two male) nuclei then enter into the embryo sac; where one fuses with the egg cell nucleus (Acc; egg cell/ ovum/ oosphere, to form a diploid zygote; which develop into an embryo. The other male nuclei fuse with the two / both polar nuclei; to form a triploid nucleus/ primary endosperm nucleus; which becomes the endosperm. This (type of fertilization) is called double fertilization; Acc vegetative nucleus for tube nucleus.

8. Movement of fish in water is by swimming. It involves forward movement and control of the body position in water. Mucus / streamline body shape reduces friction/ resistance (Acc; scale overlapping backwards) to enhance forward movement; forward movement/ propulsion is caused by the tail. The tail is long (almost half the large of the body of the fish) to enable it create enough force(to enable the fish push forward). Propulsion is achieved when the tail pushes sideways against water. Sideways movement is brought about by muscles arranged in segmented blocks/ myotomes on both sides of vertebrate column to swing sideways; when the muscle blocks on the right relax and those on the left contract; the body bends to the left side. When the muscle of the left relax and those on the right contract; the body bends to the right side; the fish uses its fins to control the position of body in water. During forward movement paired fin/ pectoral & pelvic fins). Lie flat on the body surface to reduce friction/ resistance. To change direction the fish uses the paired fins. Paired fins also are used by fish to change its level in water / control pitching. The fish spreads out the pectoral & pelvic fins at 90^0 to the body; to enable it brake. Fish can also use the swim bladder to change its level in water. When the bladder fills up with air the fish become less dense / lighter making it to rise in water; when the air leaves the bladder the fish becomes more dense/ heavier; making it to sink deeper in the water. Water currents may cause sideways swaying of the body of the fish/ yawing. The dorsal and ventral fins (also) prevent rolling / yawing; Acc anal fin for ventral fin.

