


9.0 BIOLOGY (231)

9.1 Biology Paper 1 (231/1)

1. (i) Nephritis; (ii) kidney stones; (2 marks)
2. (a) $i \frac{2}{2}$ $c \frac{1}{1}$ $pm \frac{2}{2}$ $m \frac{3}{3}$; (1 mark)
- (b) Dental carries;  Periodontal/gingivitis/pyorrhoea; (2 marks)
3. (i) Identify similarities and differences between organisms;
(ii) Organize scientific knowledge in an orderly system;
(iii) Monitor emergence, presence and disappearance of organisms in and from the earth;
(iv) Grouping organisms for easy study; (3 marks)
4. (a) Sucking small insects/animals; (1 mark)
(b) A trap into which small animals fall and get trapped; (1 mark)
5. (a) Grass \longrightarrow Grasshopper \longrightarrow Lizards; (1 mark)
(b) (i) Chicken;
(ii) Grass; (2 marks)
6. (a) This is the study of the inter-relationship between organisms and their environment; (1 mark)
(b) The maximum population of a species than a particular habitat can support; without depletion of resources. (1 mark)
7. Water was hypotonic to cell sap of adjacent cells;
and these cells absorbed water through osmosis;
and their cell sap became less concentrated than those of the next cells;
The process was repeated until water reached the sugar solution; (4 mark)
8. Fused head and thorax/cephalothorax often protected by a carapace;
Gaseous exchange through gills;
Two pairs of antennae;
Five to twenty pairs of limbs;
A pair of compound eyes;
Three pairs of mouth parts (consisting of mandibles, maxillary, palp and labium) a pair of mandibles and 2 pairs of maxillae.
First 3 (3 marks)
9. (a) Dicotyledonae; (1 mark)
(b) Monocotyledonae; (1 mark)

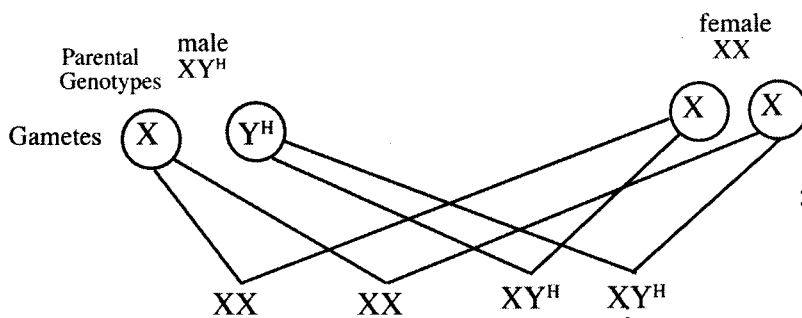
10. (a) (i) Lactic acid in animals while in plants it is ethanol/alcohol;
(ii) No carbon IV oxide produced in anaerobic respiration in animals while anaerobic respiration in plants produces carbon IV oxide; (2 marks)
- (b) Cytoplasm; (1 mark)
11. Moves the body tube through smaller distances to bring the image/specimen/object into sharper focus;
Platform where specimen (on slide) is placed; (2 marks)
12. Chordata; Aves; (2 marks)
13. Source of energy; Storage materials; (2 marks)
14. (a) Dry/Arid/Semi-arid/Desert; (1 mark)
(b) Succulent/fleshy stem; reduced leaves/
leaves reduced into thorns/leaves modified into spines/spikes; (2 marks)
15. (a) To reduce layers of cells to allow light to pass through; (1 mark)
(b) To make the cells turgid/prevent drying up; (1 mark)
(c) To protect the lens on the objective; (1 mark)
16. (a) Weakened/defective valves in veins; causing blood/body fluid to accumulate; leading to swelling. (2 marks)
(b) When exposed to air they disintegrate/rupture/burst; releasing thromboplastin; thrombokinase (2 marks)
17. (a) L - Duodenum;
M - Pancreas; (2 marks)
- (b) (i) Bile;
(ii) Emulsification/emulsifies fats;
(iii) Provides alkaline medium for enzyme action.
(iv) Neutralizes acidic chyme. (2 marks)
18. (a) Sublingual gland; submaxillary gland; parotid gland; submandibular (1 mark)
First one (1 mark)
(b) Lubricating food; digestion of starch; moisten food; provide alkaline medium; (2 marks)
First two (2 marks)
19. (a) (i) Skin; (ii) buccal cavity/mouth cavity (2 marks)
(b) Glucose + Oxygen $\xrightarrow{\text{enzyme}}$ Carbon IV oxide + water + energy;
 $C_6H_{12}O_6 + 6O_2 \xrightarrow{\text{enzyme}} 6CO_2 + 6H_2O + ATP$ (1 mark)
20. (a) X; (1 mark)
(b) X has fewer stomata; most stomata in leaf X are concentrated on the lower side; (1 mark)
Any one (1 mark)

21. (a) Where different structures evolve to perform the same function (e.g. wings of insects and birds are different in structure but are used for flying); (1 mark)
- (b) Missing links;
Distortion of parts during sedimentation/earthquakes/putrefication;
Destruction of fossils by geological activities/faulting/folding; First two (2 marks)
22. Air that enters lungs has a higher content of oxygen than air that leaves the lungs;
Air that enters the lungs has lower content of carbon (IV) oxide than air that leaves the lungs; (2 marks)
23. (a) (i) Ovule; (1 mark)
(ii) Axile placentation; (1 mark)
- (b) Orange or any correctly named citrus plant; (1 mark)
24. (a) (i) Dominant gene expresses itself phenotypically in both its homozygous and heterozygous states while recessive gene can only express itself phenotypically in the homozygous state; (1 mark)
(ii) Continuous variation is a characteristic for which there is a continuum or range while discontinuous variation is a characteristic for which there are discrete categories or units; (1 mark)
- (b) Either all offspring show the dominant characteristics;
or half offspring show the recessive while the other half show the dominant characteristics; (2 marks)
25. (a) Softening of leather; (1 mark)
(b) Treatment of malaria/manufacture of antimalaria drugs.; (1 mark)
(c) Stimulant used in beverages; (1 mark)
26. egg/ovum/ova; (1 mark)
27. (a) Ligament; (1 mark)
(b) Secretes synovial fluid; contains/holds the synovial fluid in place; any one (1 mark)
28. (a) It is a growth movement in plants in response to a unidirectional stimulus; (1 mark)
(b) Accelerates growth of shoots;
Can inhibit growth of roots; (2 marks)
29. Activate enzymes; provides a medium for enzymatic activities to break down stored food to soluble form; Hydrolyses; dissolves food materials; is a medium of transportation of dissolved food substances to growing regions of radicle and plumule;
Softens seed coat to facilitate emergence of radicle; First four (4 marks)

9.2 Biology Paper 2 (231/2)

1. (i) - Testing a leaf for the presence of starch;
 (ii) - A - kill the leaf/break down cells/stop enzymatic activity;
 B - Removal of chlorophyll;
 C - Soften leaf/makes leaf less brittle;
 (iii) Iodine solution;
 (iv) Areas where starch is present stain blue/blue black; Total(6 marks)

2. (a)



(4 marks)

- (b) (i) Probability of girls having hairy ears is zero 'O' ;
 (ii) The gene for hairy ears is on the Y chromosomes which girls do not inherit from their father; (2 marks)
- (c) Haemophilia; Colour blindness; (2 marks)
 (d) Vertebrate embryos have similar morphological features; which suggest a common ancestry; (2 marks)
Total (10 marks)

3. (a) (i) Bordetella pertussis;
 (ii) Streptococcus pneumoniae;
 (iii) Micoplasma pneumoniae; (2 marks)

- (b) Inhaled oxygen dissolves in moisture in the alveolus; since the oxygen concentration in blood is lower; than in the alveolus, oxygen diffuses; through the alveolus epithelium, the capillary wall into the plasma; and finally into the red blood cells. (4 marks)
- (c) Pneumatophores - grow into the air above mud/water; their lenticel for gaseous exchange; (2 marks)
Total (8 marks)

4. (a) (i) P - is cerebral hemisphere/cerebrum;
 R - medulla oblongata; (2 marks)
- (ii) Muscular co-ordination; maintaining body posture; manual /motar dexterity; (first two) (2 marks)
- (b) (i) Follicle stimulation hormone; luteinizing hormone; oxytocin; prolactin; (first two) (2 marks)

- (ii) FSH - stimulates secretion of oestrogen; stimulates development of the Graafian follicle;
 LH - Brings about ovulation; causes development of corpus luteum;
 Oxytocin - causes contraction of uterus; causes expulsion of milk from mammary glands;
 Prolactin - stimulates milk production/secretion; (2 marks)

Total (8 marks)

5. (a) (i) Anthers; Ovary; (2 marks)
 (ii) Anthers are below the stigma to minimise self pollination;
 - petals are large/conspicuous, for insects to land on/ to attract insects encouraging cross pollination;
 - presence of interstitial cells that secrete androgens. (2 marks)

- (b) (i) L is hanging outside the body to ensure optimal temperature for sperm production; it has many, long and coiled seminiferous tubules to increase the surface area for production/storage of sperms; (2 marks)

- (ii) K produces an alkaline fluid that neutralizes acid in the vagina; this fluid contain nutrients for the sperms; and also activates sperms; (2 marks)

Total (8 marks)

6. (a) (i) See graph. (7 marks)
 (ii) 42 hours; (1 mark)
 (iii) Graph M at 50 hrs is 1220 ± 20 .
 Graph N at 50 hrs is 540 ± 20 (2 marks)
 $1220 - 540 = 680 \pm 4$;
 (iv) Population growth stops;
 High temperatures kill the microorganisms/denature enzymes; (2 marks)
 (v) 46 hours to 59 hours death rate of the microorganisms is higher, than their population growth rate; due to exhaustion of nutrients; and accumulation of toxic wastes; (3 marks)

- (b) When the osmotic pressure of the blood increases beyond the normal level the hypothalamus detects this and stimulates the pituitary gland; to secrete more ADH; hormone which make kidney tubules more permeable to water; and more water is re-absorbed into the blood; reducing the osmotic pressure to the normal level.; (accept the reverse description) (5 marks)

Total (20 marks)

7. (a) Plants in arid, semi-arid and desert habitats have leaves covered with thick/waxy cuticles; that are waterproof/impermeable to water; allowing for reduced rate of transpiration; Sunken stomata; in some desert/semi arid areas plants have water vapour accumulating in the pits; reducing rate of transpiration (as the moisture in the pit is not carried away by wind.) Most plants have few or no stomata on the upper surface of the leaf; the fewer the stomata the less the water lost from the plant. Some plants have small stomata/stomatal size decrease when guard cells are flaccid; thus reducing transpiration rate. Plants with small/folding leaves; expose less surface area; hence reduce the rate of transpiration. Leaves with shinny surfaces; reflect light resulting in reduced leaf temperatures; thus reducing the rate of transpiration. Some plants have leaves covered with hairs/scales; which trap a layer of moisture; on the leaf surface reducing rate of transpiration.

Mesophyte have a thin layer of cuticle; to facilitate high transpiration rate; broad leaves exposing large area to transpiration;

Many stomata on both leaf surfaces provide many apertures to enhance transpiration.
(13 marks)

- (b) Erector pili muscle relax; and hair lie flat; trapping less air; thus reducing insulation; Blood capillaries under the skin vasodilate; and more blood is brought under the skin; increasing heat loss; sweat glands release more sweat to the skin surface; the sweat take away heat from the body when it evaporates;
(9 marks)
(7 maximum)

8. (a) The exoskeleton is made of chitin; chitin is not evenly distributed; hence it allows for movement; exoskeleton is secreted by the epidermal cells; when still soft it allows for growth of the insect; when in contact with the air it hardens limiting growth; It is shed regularly; thus regulating the growth of insects. It also supports the internal structures; Because it is hard; it protects; internal organs from mechanical damage. It is water proof; preventing water loss/dessication; of the insect. It also provides a surface for attachment of muscles;
(13 marks).

- (b) Light rays from a near object are more diverged and need to bend more; in order to be focused properly on the retina; ciliary muscles contract; suspensory ligaments attached to the ciliary muscles relax; the lens becomes thicker; increasing its curvature/becomes more convex; light from the object is refracted more; in order to be focused/more sharply on the retina to form an image.
(7 marks)

9.3 Biology Paper 3 (231/3)

- 1 (a) K - Pectoral fin;
L - Dorsal fin;
M - Anal fin;
N - Pelvic fin;
- (4 marks)

- (b) The size of scissors on the photograph is 4.6 }
The length of fish on the photograph is 13.6 };

$$\text{Mg} = \frac{\text{Image length}}{\text{Actual length}}$$

$$\text{Actual length of fish is } \frac{13.6 \times 12.5}{4.6} \} = 36.96 \text{ cm}; \quad (3 \text{ marks})$$

- (c) (i) Yawing - Dorsal fin;
- (ii) Pitching - Pectoral fin; Pelvic fin; (3 marks)

- (d) (i) R - gill rakers;
S - gill bar;
T - gill filaments; (3 marks)

- (ii) R - sharp/numerous/pointed/arranged closely in a row to trap solids that can damage the filaments;

S - rigid/firm to hold gill filaments in place;

T - numerous to increase surface area for gaseous exchange/thin to reduce the distance for gaseous exchange/vascularized to transport respiratory gases away from the respiratory surface/moist to dissolve oxygen for diffusion;

(3 marks)

(Total = 16 marks)

- 2 (a) Leaf D - class dicotyledonae;
Reason - network of veins/presence of petiole;

Leaf E - class monocotyledonae;
Reason - parallel venation/presence of leaf sheath;

(4 marks)

- (b) Broad and flat to offer a large surface area for photosynthesis;

Thin to reduce distance over which carbon IV oxide diffuses to reach the mesophyll cells;

Rich supply of veins to transport water to photosynthetic cells;

Presence of chlorophyll to absorb light for photosynthesis;

(first 3 = 3 marks)

- (c) (i) U - xylem;
 V - phloem;
 W - cambium;

(3 marks)

(ii)

	Cross section of F	Cross section of G
i	No pith	pith present;
ii	Vascular bundles scattered	vascular bundles in a ring;
iii	<u>Vascular bundles numerous</u>	vascular bundles few;
iv	Cambium absent	cambium present;
v	Cortex absent	cortex present;
vi	Small vascular bundles	large vascular bundles;

(First 5)

(5 marks)

(Total = 15 marks)

3

PROCEDURE	OBSERVATION	CONCLUSION
Iodine solution/solution J (added to the food sample drop by drop while shaking;)	Blue black colour formed;	Starch present in food sample;
Benedict's solution/ solution K added to the food sample in test tube in equal amounts. The test tube is then placed in a hot water bath;	Solution changes colour to green, yellow and then orange/brown;	More reducing sugar present in food sample;
Biuret's reagent/solution L added to the food sample drop by drop while shaking;	Colour of reagent retained;	Protein absent in the food sample;

Award marks for correct procedure, observation and conclusion only.

(9 marks)