30.4 BIOLOGY (231)

30.4.1 Bilogy Paper 1 (231/1)

1. (a) Scales;

   (b) (*Network of*) hyphae (which form mycelia as the vegetative body);
   Carry out sexual and sexual reproduction/most reproduce by means of spores;
   (1 mark)

   Cell wall is made of chitin;
   Reproduction is by means of spores/sporulation/
   some reproduce sexually/budding in yeast; are eucaryotic;
   are heterotrophic/have no chlorophyll/some are saprophytic/some
   are parasitic; some reproduce sexually through conjugation;
   Store food in form of glycogen or oil droplets;
   The first two ***(2 marks)***

2. Food; and shelter
   (2 marks)

3. (a) Magnification of the object/mage; Acc. Magnification alone
   (b) Regulate amount of light (falling on the object on microscope);
   (2 marks)

4. (a) (seed) dormancy:
   (2 marks

   (b) (i) Epigeal;
   (ii) Protection of the (delicate) plumule; pulls the
   cotyledons above the ground;
   (2 marks)

5. (a) (i) Production of plants and animals that have greater
   Productivity/have beneficial characteristics than either
   of the parents. ***(1 mark)***
   (ii) Condition in which an individual has more than
   two sets of chromosomes; ***(1 mark)***

   (b)
   - Radiation such as alpha, gamma, beta and UV light, X-rays;
   - Increase in temperature;
   - Chemicals such as colchicines/ phenols/ pesticides;
   - Heavy metals such as lead/ mercury;
   - Viruses such as papilloma;
   - Mustard gas for gene mutation; (The first two) ***(2 marks)***

6. (a) (i) Dicotyledonae; ***(1 mark)***

   (ii) Vascular bundles arranged in a ring/
   Presence of vascular cambium ***(1 mark)***

   (b) (Divide to give rise to) secondary thickening/increase the
   girth /width/Secondary growth;
   Give rise to additional xylem and phloem tissue; ***(1 mark)***

7. (a) (Site) Protein synthesis;
   (b) Break down worn out cells/organelles/food materials; ***(2 marks)***

8 (a) The placenta; takes the role of the ovary of producing the hormone progresterone; (which maintains pregnancy) *(2 marks)*

(b) Production of sperms; male gametes/male sex cells/male sex cells;
Production of testosterone hormone/androgens/male sex hormones;
Any two *(2 marks)*

9 (a) (i) *Salmonella typhi;*
(ii) *Entamoeba histolytica;* *(2 marks)*

(b) Malaria; *(1 mark)*

10. (a) (i) Vestigial structures are those structures that have ceased to be functional over a long period of time and hence reduced in size; *(1 mark)*
(ii) Appendix/coccyx/nictating membrane/ceacum/body hair/ear muscles/semilunar fold of the eye/cornea. *(1 mark)*

(b) Disease causing organism mutate; and become resistant; *(2 marks)*

11. (a) The auxillary buds will sprout/lateral buds will sprout/lateral branches will be formed; *(1 mark)*

(b) Decapitation removes the hormone auxins /IAA which is produced in terminal bud/the stem tip ;
absence/removal of the hormone promotes branching/ development of auxillary/lateral buds; *(2 marks)*

12. (a) Scapula/shoulder bone/shoulder blade: *(1 mark)*
(b) (i) Humerus; *(1 mark)*
(ii) Ball and socket joint; *(1 mark)*
(c) Attachment of muscles; *(1 mark)*

13. (a) In diffusion molecules move from a highly concentrated region to a lowly concentrated region while in active transport molecules move from a lowly concentrated region to a highly concentrated region; No energy is required in diffusion while energy is required in active transport; No carrier molecules are required in diffusion while carrier molecules are required in active transport; *(2 marks)*

(b) (i) Plants – absorption of water from the soil by root hairs/ Movement of water between plant cells/opening and Closing of stomata/support due to turgidity/feeding in insectivorous plants; *(1 mark)*

(ii) Animals – reabsorption of water by blood capillaries from renal tubules;/absorption of water in the alimentary canal/colon/gut/large intestine;
Movement of water from cell to cell/in and out of cells;
(The first one) *(1 mark)*

14. Parenchyma/collenchyma; *(1 mark)*

15. Cytoplasmic streaming; *(1 mark)*

16. (a) Tracheole; *(1 mark)*

(b) Moist for gases to dissolve (in solution); branched/many/ numerous tubes to increase surface area (for gaseous exchange); thin for fast diffusion; (any two) *(1 mark)*

17. Waste products are mainly made from carbohydrates and hence not as harmful as proteineous materials; waste products are formed slowly; Non-toxic forms/waste products accumulate slowly/ plants are less active;
Some waste products (such as oxygen or carbon IV oxide) are re-usable/re-cycled;
Some waste products (such as resins and gums) are stored in in-soluble form in (dead) tissues; or in living tissues as fruits, leaves and bark;
Some of the waste like some gases are removed by simple diffusion; *(4 marks)*

18 (a) Rate of photosynthesis increased as the Carbon (iv) Oxide concentration increases up to optimum level (and vice versa); until it stops.

(b) Rate of photosynthesis increases as the light intensity increases up to optimum level (and vice versa);
- decreases until it stops *(1 mark)*

19. (a) Kill organisms in water; reduce amount of oxygen in the water; reduce the quality of water for (human) consumption/change water P^H; interferes with the food chain/trophic levels;
leads to entrophication/ algal bloom;
causes water borne diseases/cholera/typhoid/amoebic dysentry;
(The first three) *(3 marks)*

(b) Respiration/defecation/excretion; *(1 mark)*

20. Belt transect;
Line transect; *(2 marks)*

21. Pancrease releases glucagon; hence glycogen is converted to glucose;
Fat is converted to glucose; reduced rate of respiration; .....*(4 marks)*

22. Slide past each other/scissor-like for shearing/cutting/slicing (off) fresh skin/tendon/from bones; large/powerful for breaking/cracking/ crushing bones; *(2 marks)*

23. A component of haemoglobin; *(1 mark)*

24 (a) Age-young people are actively growing hence require more energy than older people;

(b) Occupation – manual workers require more energy than sedentary workers;

(c) Sex – males are more muscular hence require more energy than females; *(4 marks)*

25. Thin walled for easy diffusion of gases;
Have large airspaces/store a lot of air which makes the plant buoyant/ for gaseous exchange; *(2 marks)*

26. Inner membrane is highly folded/have cristae to prqvide a large surface area; for attachment of enzymes; *(2 marks)*

27 Baking; brewing; processing of dairy products; e.g Cheese, yoghurt, sour milk,
production of organic acid; e.g oxalic, citric,vinegar, butyric acid; *(2 marsk)*

28. (a)

Arteries	**Veins**
Thick muscular walls	Thin muscular walls;
No valves	Valves present;
Narrow lumen	Wide lumen;

(3 marks)

(b) Arteriosclerosis; *(1 mark)*

29. (When humidity is high the air around the leaf gets saturated with water vapour hence) less space for water vapour from the leaf to occupy/low saturation deficit/low diffusion gradient; *(1 mark)*

30.4.2 Biology Paper 2 (231/2)

1.0 (a) (i) Parents genotype HH; hh; *(2 marks)*
(ii) Hh; *(1 mark)*

(b) F_1 selfed
(Parental genotypes) Hh x Hh ;

(Gametes) H h H h ;

(Fertilization) ;

HH Hh Hh hh ;

(3 purple)
(1 white)

(4 marks)

(c) The gene for purple colour is dorminant while the gene for white colour is recessive;

2. (a) Herbivorous: *(1 mark)*

(b (i) Tooth J is narrow/sharp/chisel like
while tooth L is broad/ridged/has cusps;
J has one root while L has 2/3/4 roots ; *(1mark)*

(ii) Tooth J is used for cutting/biting
while tooth L is used for grindingcrushing/chewing; *(1 mark)*

(c) (i) Diastema;
(ii) For manipulation of food by the tongue; *(1mark)*

(d) Calcium phosphate; *(1 mark)*

3. (a) (i) Using a living organism to regulate/control/reduce/check the population of another organism;

(ii) Beetles introduce to feed on water hyacinth;
Fish introduced to feed on mosquito larvae;
(any one) *(1 mark)*

(b) (i) Enrichment of water bodies with nitrates/phosphates due to discharge of sewage/run off water containing fertilizers; leading to rapid growth of surface plants/aquatic plants/phytoplanktons; *(3 marks)*

(ii) (Proliferation of plants) block light from reaching plants underneath; Which will not photosynthesise; The plants die and decompose leading to depletion of oxygen; (as a result) animals also die/suffocate; (3 marks)

(c) Nitrogen dioxide/sulphur dioxide; *(1 mark)*
Acc. Nitrogen (IV) oxide & sulphur (IV) oxide

4. (a) (i) Circular muscles of the iris contract while radial muscle relax; reducing the size of the pupil; hence, less light enters the eye; *(3 marks)*
(ii) The retina is protected from damage; *(1 mark)*

(b) Choroid; has a dense network of bold capillaries; from which nutrients diffuse out to supply the eye; *(3 marks)*

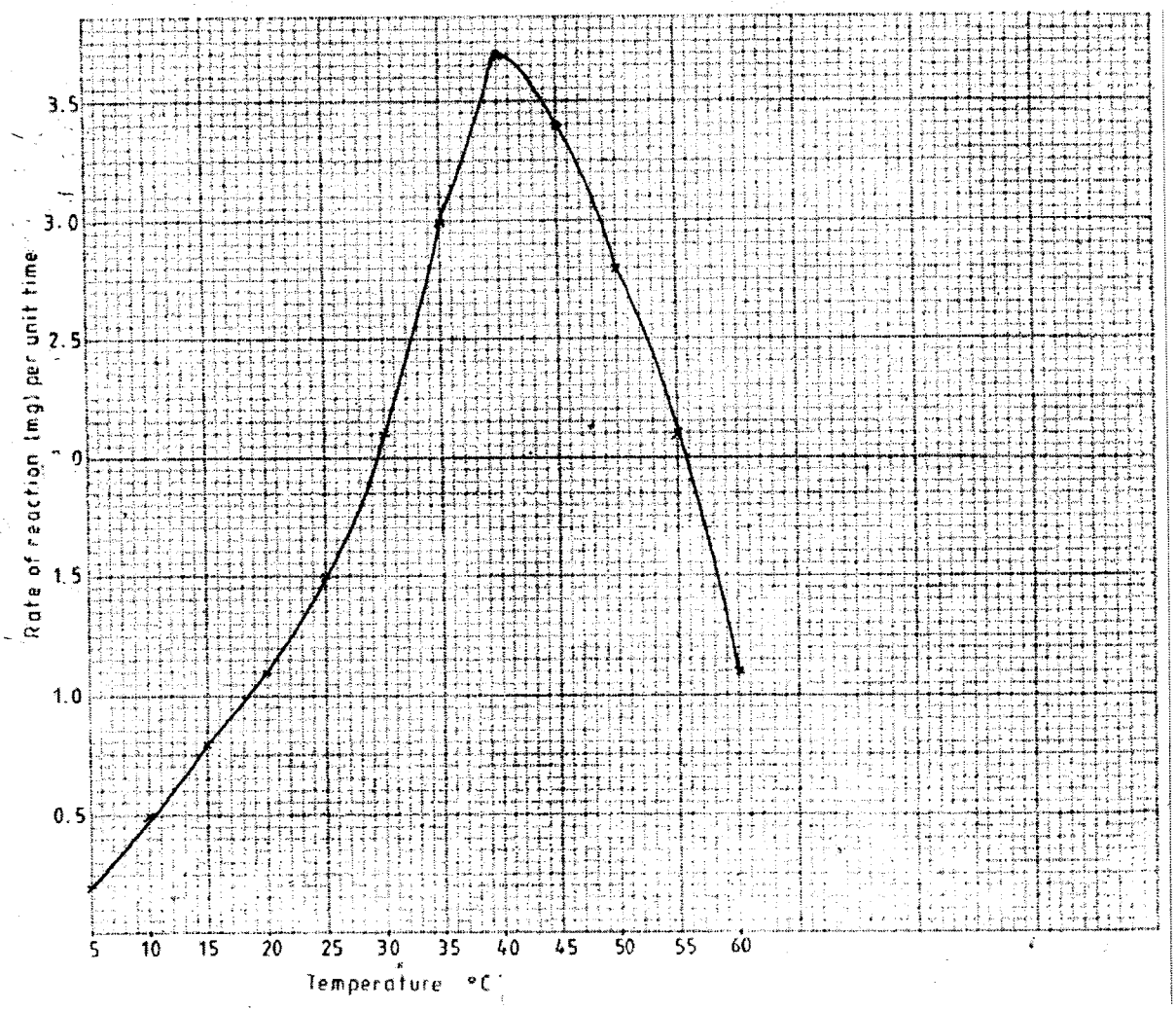
(c) The blind spot has no photoreceptors; hence no impulses are generated to be transmitted to the brain; (for interpretation) *(2 marks)*

5. (a) Root hairs/roots absorb water by osmosis; cells of the plant become turgid; leaves become firm and spread out/plants become firm/upright; *(3 marks)*

(b) (i) Collenchyma;
(ii) Xylema/Tracheids/vessels/sclerenchyma; *(2 marks)*

(c) Steering; Balancing; Braking; Changing direction;
Prevent fish from pitching; Any 3 *(3 marks)*

SECTION B



6. (a) Graph: Scale; Axes: plotting points; curve; ***(6 marks)***

(b) 33°C; and 52°C; (± - 0.5°C) ***(2 marks)***

(c) (i) As temperature increases rate of reaction increases/more products are formed (per unit time); because enzymes become more active; ***(2 marks)***

(ii) As temperature increases rate of reaction decreases/less products are formed (per unit time); because enzymes become denatured; by high temperature; ***(3 marks)***

(d) Increase in enzyme concentration; increase in substrate concentration;(2 marks)

(e) (i) Pepsin; Rennin /chymosin; ***(1 mark)***

(ii) Wall of stomach/gastric glands; produce Hydrochloric acid;

(f) (i) Duodenum;

(ii) Bile juice/salts;

7. **Insect pollinated flowers**
(Entomophilous)
Are scented to attract insects; Have sticky stigma for pollen grains to stick on; Are brightly coloured to attract insects; Presence of nectar to attract insects; Have nectar guides to guide the insect to the nectaries; Stigma/anthers located inside the flower tubular/funnel shaped corola to increase chances of contact by insects; sticky/spiny/spiky pollen grains which stick on the body of insect; and on stigma; large/conspicuous flowers easily seen by insects/ attract insects; Anthers firmly attached to filament for insects to brush against them; landing platform to ensure contact with anther and stigma; Mimicry to attract (male) insects; ***(12 marks)***

Wind pollinated flowers
(Anemophilous)

Anthers/stigma hang outside the flowers to increase chances of pollination; the style/filament is long to expose stigma/anthers; stigma is hairy/feathery/branched to increase surface area over which pollen grains land/trap pollen grains; pollen grains are smooth/dry/light/small to be easily carried by wind; large amount of pollen grains to increase chances of pollination; Anthers loosely attached to filaments to enable them sway to release pollen; Pollen grains may have structures which contain air to increase buoyancy; Flowers have long stalks holding them out in the wind; ***(8 marks)***

8. **Regulation of blood glucose;**

The (normal) amount of glucose in the blood is about 90 mg/100 cm^3; increase in blood sugar level is detected by cells of the pancreas; which secrete insulin; insulin stimulates the liver; to convert excess glucose to glycogen; further excess glucose is converted to fats (until the normal blood sugar level is attained); Excess glucose is oxidized to (Carbon dioxide, water and energy)/excess glucose used in respiration;

Decrease in blood sugar level below the normal level is detected by the pancreas; which secrete glucagon; which stimulates the liver; to convert glycogen to glucose (until the normal sugar level is attained); Fats/amino acids are converted to glucose, Reduced oxidation of glucose ;

Deamination
Excess amino acids are deaminated/removal of the amino group; the amino group is converted into ammonia. Ammonia combines with carbon (IV) oxide to form urea; urea is excreted in urine through the kidney;

Detoxification
Poisonous substances are converted to less harmful compounds;

Maintenance of body temperature/Thermoregulation;
Heat is generated (in the liver) by chemical activities; The heat is distributed;

(20 marks)

30.4.3 Biology Paper 3 (231/3)

1. (a)

	Identify of bone	**Where found in mammalian body**
K	Humerus;	Fore limb/upper fore limb/arm/upper arm/foreleg/front leg;
L	Scapula/shoulder Blade;	Shoulder/pectoral(region);
M	Femur/Thigh bone;	Hind limb/upper hind limb/leg/hind leg/upper hind leg/thigh;
N	Tibia/shin bone;	Hind limb//lower hind limb/hind leg/leg;
P	Ulna-Radius;	Fore limb/lower forelimb/arm/lower arm/forearm/ lower foreleg/lower front leg;

(5 marks)

(b) 1 Condyles/lateral and medial condyles;
2 Glenoid cavity;
3 Head;
4 Patella groove;
5 Ulna/shaft of ulna/shaft;

(5 marks)

(c) **Anterior**
(i) Scapula/shoulder blade;
(ii) Ball and socket;

Posterior

(i) Radius and ulna;
(ii) Hinge; *(4 marks)*

(d) (Large surface area) for muscle attachment/tendons/ligaments;
Limit the movement of radius and ulna/
limits the movement at the joint (acts as a stopper); prevents overstretching of the fore arm; *(1 mark)*

2.

P. Reducing Sugar	To (1 ml of) P add (1 ml of)Benedict's Solution/ Place in hot water bath/ heat/boil;	Green to yellow and eventually to orange/ brown colour (precipitate);	Reducing sugar present;
Q. Reducing Sugar	To (1 ml of) Q add (1 ml) of Benedict's Solution place in hot water bath/ heat/boil;	No colour change/ Blue colour (of Benedict's Solution) persists;	Reducing Sugar absent;
Non-reducing Sugar	To (1 ml of)Q add three drops of dilute hydrochloric acid/Boil (for 5 minutes) Cool, Add sodium hydrogencarbonate (till fizzing stops) Add (1 ml) Benedict's Solultion: place in hot water bath/heat/;	Green to yellow and eventually to orange/ brown (precipitate) colour;	Non-reducing sugar present/ non reducing sugar has been hydrolysed to reducing sugar/ reducing sugar present after hydrolysis;

NOTE:
(a) Award reducing sugar (food substance) once
(i) Award Benedict's test for reducing sugar once for either P or Q.
(ii) Award observation for reducing sugar both for P and Q
(iv) If P is tested for non-reducing sugar, indicate seen

(12 marks)

3. (a) First three labeled parts on one or more seedlings. *(3 marks)*

(b) (i) Epigeal: *(1 mark)*

(ii) Cotyledons above the ground/soil; *(1 mark)*

(c) In W - Grown in the dark/absence of light/insufficient light; ***(1 mark)***

In X – Grown in the light; ***(1 mark)***

(d) (i) Etiolation; ***(1 mark)***

(ii) (Faster growth) to reach light/obtain/get
Search for light; ***(1 mark)***

(e)

Seedling in X	**Seedling in W**
Short internodes/stem	Tall/long internodes/stem;
Thick(er)stem/seedling/plant	Thin(ner)stem/plant/seedling;
Big/large leaves	Small leaves;
Green leaves/stems/cotyledons/ Seedlings	Yellow/light green leaves/stems/cotyledons/ seedlings/Pale green/white;

The first 3 ***(3 marks)***

(f) Seedlings subjected to unidirectional/unilateral source of light/causes auxins to Migrate/diffuse to the dark side of the shoot; Higher conc. of auxin on dark side; Causing faster growth on that side/cell elongation/cell enlargement than on the lit side (hence the bending); ***(2 marks)***