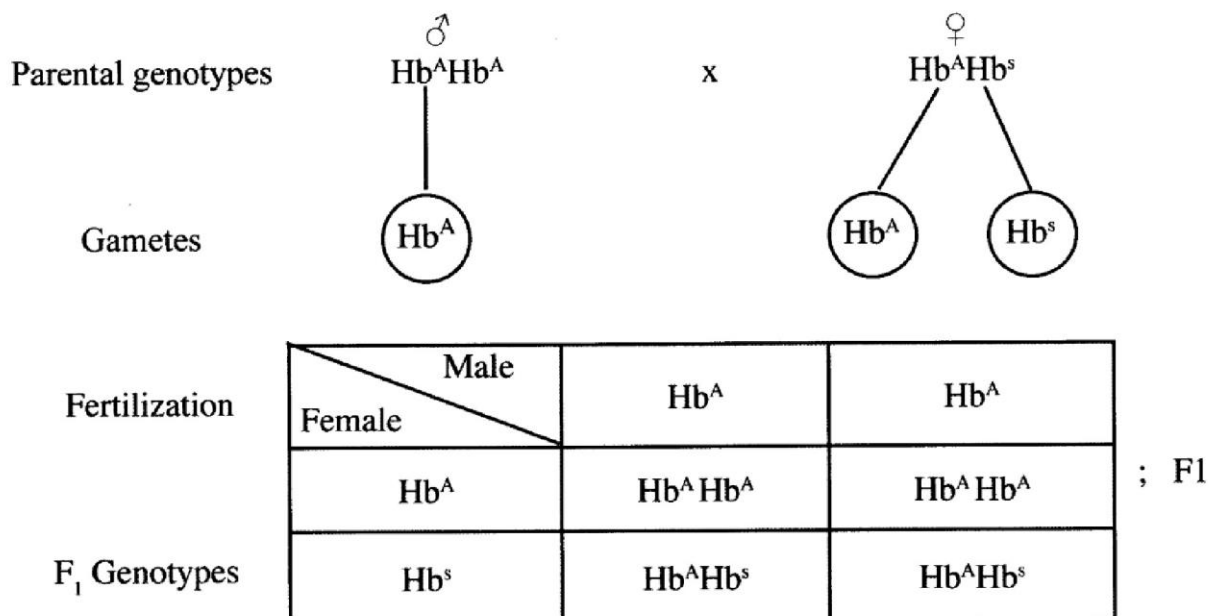


## 4.5.2 Biology Paper 2 (231/2)

## SECTION A (40 marks)

1. (a) Alveolus; (1 mark)
- (b) Y - oxygen/O<sub>2</sub>;  
Z - Carbon (IV) Oxide/CO<sub>2</sub>; (2 marks)
- (c) Oxygen concentration is lower in the blood capillary than in the alveolus; oxygen diffuses; through the epithelium and endothelium of capillary wall, plasma into the red blood cells where it combines with haemoglobin. (3 marks)
- (d) Cigarettes/tobacco contains tar; tar contains carcinogenic substances; which trigger cancer (2 marks)
2. (a) W - ovary wall/ovary; (1 mark)
- (b) Tip of pollen tube bursts open; one of the nuclei fuses with the egg cell nucleus; to form a diploid zygote; while the remaining male nucleus fuses with the polar nuclei; to form a triploid endosperm nucleus; (5 marks)
- (c) R - Endosperm/primary endosperm;  
T - testa/seed coat; (2 marks)
3. (a) Branch of Biology that deals with the study of **inheritance** and **variation**. (1 mark)
- (b) (i) Sex;  
(ii) ABO blood group system/Rhesus factor;  
(iii) Ability to roll tongue;  
(iv) Free or attached earlobe;  
(v) Presence/ absence of hair in the nose/ on the ear pinna;  
(vi) Finger prints; ability to taste PTC (phenylthiocarbamide) PTV (phenylthio urea)  
(vii) Winglength in prosophila;  
(viii) Size of abdomen in drosophila;  
(ix) Eye colour in prosophila;  
(x) Smooth/wrinkled seed coats in pea plants;  
(xi) Green/yellow seed coats/seed coat colour in pea plants;  
(xii) Polymorphism/melanic and non melanic forms in moths. (2 marks)



Complete punnet;

Probability of sickle cell trait ( $\text{Hb}^{\text{A}}\text{Hb}^{\text{s}}$ )

$$= \frac{2}{4} = \frac{1}{2} / 0.5 / 50\%;$$

(5 marks)

4. (a) To destarch/remove starch from the leaves; (1 mark)
- (b) Carbon (IV) Oxide/ $\text{CO}_2$ ; (1 mark)
- (c) (i) Test for starch; (1 mark)
- (ii) P - Retained the colour of iodine solution/brown/yellow; (1 mark)
- Q - Turned blue-black/black/dark-blue; (1 mark)
- (iii) P - Did not photosynthesize /no starch is formed because Sodium Hydroxide pellets absorbed Carbon (IV) Oxide; (2 marks)
- Q - Photosynthesized /starch was formed because Carbon (IV) Oxide was in the flask;
- (d) Control (experiment); (1 mark)
5. (a) Geotropism/Gravitropism; (1 mark)
- (b) (i) The shoot tip/plumule curved upwards; root tip/radicle curved downwards; (2 marks)
- (ii) Auxins migrated downwards to lower side; Higher concentration on the lower side; caused more growth on the lower side than on the upper side in shoots/ inhibited growth on the lower side than on the upper side in the roots; (3 marks)

- (c) (i) The seedling will continue growing horizontally; (1 mark)  
 (ii) There was even distribution of auxins (on the tips); (1 mark)

**SECTION B (40 marks)**

6. (a) (i) Producer - M (1 mark)  
 Reason - Largest in number hence source of food for the other species/  
 - Abundant on the water surface to trap light for photosynthesis; (1 mark)

- (ii) Secondary consumer - N (1 mark)  
 Reason - Smaller in number than L and M (1 mark)

- (b) L - 1.125 m;  
 M - 0.75 m;  
 N - 2.00 m; (3 marks)

- (c) (i) Capture - Recapture (method) / Capture - mark - release - recapture; (1 mark)  
 (ii) Animals are highly mobile; (1 mark)  
 (iii) - No migration during the period of survey/study;  
 - No deaths/variation/reproduction in population during the period;  
 - Method of marking does not affect the animal behaviour;  
 - Marked/released animals will freely mix with others in the pond;  
 - Released/marked animals will have enough time to mix with the others;  
 - There is uniform/random distribution of animals within the period. (Max. 4 marks)

- (d) Decrease in light intensity as depth increases; (1 mark)  
 Decrease in temperature as depth increases; (1 mark)

- (e) Breakdown of organic materials/decompose/rot/decay of materials; to release plant nutrients; (2 marks)

- (f) Flood water may mix with human waste contaminated with cholera bacteria; The flood water may then contaminate food / water sources; The contaminated water/food causes cholera infection when ingested; (3 marks)

7. - Wind - dispersed seeds / fruits are light / small to be carried by air currents;  
 - Some seeds / fruits have developed hairy structure feather-like projections; wing like structure which increase their surface area to be blown about / carried away by wind;  
 - open capsules; borne on long stalks, which are swayed by wind scattering seeds.  
 - Water - dispersed fruits / seeds are also light; to float on water;  
 - Some, (like coconuts) have fibrous /spongy mesocarps to trap air; making them

- buoyant/ floating on water;
- Others (like the water lily) produce seeds whose seed coats trap air bubbles; making them float on water;
- Some have water-proof seed testa / pericarp; remain afloat without soaking / sinking immediately they are released from parent plants;
- Animal - dispersed fruits have developed hooks; to stick on (the fur of passing) animals;
  - In some cases, fruits are succulent, brightly coloured / scented; to attract animals, birds;
  - The seed coats (of some seeds) are hard; and resistant to the digestive enzymes; hence passing out through the gut undigested;
- Self dispersal by explosive mechanism;
- Fruits have sutures/lines of weakness; which split open when drying scattering seeds.

Max = 20 marks

8. (a) Has cardiac muscles; which contract and relax continuously/without fatigue;
- Cardiac muscles are interconnected/form a network of fibres; to rapidly and uniformly spread the contractions;
  - Divided into four chambers; for the atria to receive blood and ventricle to pump blood out of the heart.
  - Divided into two sides by a longitudinal septum; to prevent mixing of oxygenated and deoxygenated blood;
  - Ventricles have thicker walls; to generate high pressure to pump blood;
  - Wall of left ventricle are thicker than those of right ventricle; to pump blood over a longer distance;
  - Has valves; to prevent back flow of blood for double circulation;
  - Cuspid valves have strands of connective tissues/cordae tendinae/tendinous; to prevent the valves from turning inside out during systole when ventricles contract;
  - Has coronary artery to nourish/supply oxygen/nutrients the heart muscles;
  - Has coronary vein; to remove metabolic wastes;
  - Enclosed by a pericardium; to keep it in position/prevent overdistension;
  - Pericardium is externally surrounded with a layer of fats; to cushion the heart against mechanical damage;
  - Pericardium secretes pericardial fluid; to reduce friction/absorb shock;
  - Has Sino Atrio Node (SAN); which acts as a pace maker;
  - Has Atrio Ventricular Node (AVN); which relays contraction waves from Sino Atrio Node to the Purkinje tissue;
  - Has Purkinje tissue/bundle of His; to relay waves from Atrio Ventricular Node; to the ventricular myocardium;
  - Cardiac muscles have numerous mitochondria; to generate energy for the muscular contractions;
  - Vena cava and pulmonary vein; supply blood to the heart;
  - Aorta and pulmonary artery; transport blood away from the heart.

(max 20 marks)