4.5.3 Biology Paper 3 (231/3)

	Test tube contents	Amount of effervescence observed	Explanation
1(a)	HCl + macerated specimen **N** + H_2O_2;	No/little effervescence/foam/ frothing/bubbling;	Although there was adequate surface area exposed (by macerating the potato) for enzymatic action, the acidic medium/low pH did not favour the working of the enzymes/ catalyze/increase rate of enzymatic reaction/denature enzyme;
	NaOH + macerated specimen **N** + H_2O_2;	Vigorous/rapid/ high/a lot of/more effervescence;	Adequate surface area exposed (by macerating the potato) for enzymatic action; favourable/suitable pH/alkaline medium/high pH for enzymatic action;
	NaOH + cube of specimen **N** + H_2O_2;	Moderate/ average/medium effervescence;	Less/little surface area exposed for enzymatic action;

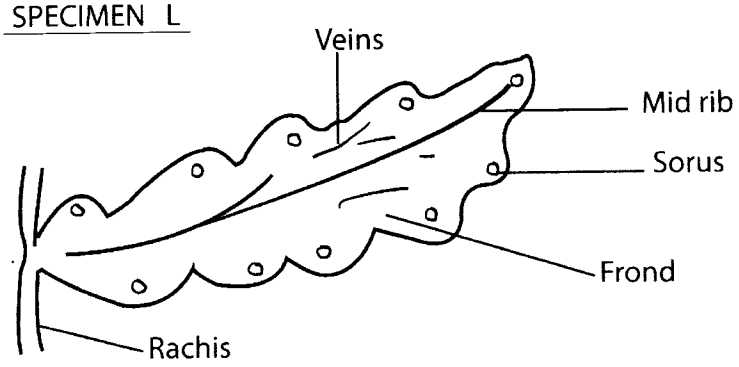
(Max 10 Marks)

	Procedure	Observation	Confirmation
1 b)	Add (a drop of the) iodine solution provided to specimen **N**;	Blue-black colour observed;	Starch present (in specimen **N**); (3 marks)

(13 marks)

2a)(i)	Specimen **G**	Division : Spermatophyta/Spermaphyta; Reason : Seed-bearing/naked seeds/green;	(2 marks)
(ii)	Specimen **E**	Kingdom : Fungi/Mycophyta; Reason : feed on dead matter/saprophytic/have hyphae/ Rhizoids/mycelium/lack chlorophyll/non-green;	(2 marks)
(iii)	Specimen **M**	Division : Spermatophyta/Spermaphyta; Reason : Presence of leaves/stems/roots; Have chlorophyll/are green; Remains of fruit/seed/cotyledons;	(2 marks)
(iv)	Specimen **H**	Phylum : Arthropoda; Reason : Segmented body/presence of limbs/jointed appendages; Presence of exoskeleton/external skeleton/ bilateral symmetry;	(2 marks)

b)(i)	Specimen **F** has its **b**ody covered with hair while the body of specimen **K** (crocodile) is covered with scales; Specimen **F** has the opposable thumb in its pentadactyl limb while the limbs of specimen **K** are uniform; Specimen **F** has mammary glands while specimen **K** does not have; Specimen **F** is viviparous while specimen **K** is oviparous;	(2 marks)
b(ii)	Specimen **M** and **J** • Specimen **M** has narrow; (leaves) with parallel veins; while specimen **J** has broad leaves; with net veins; • Specimen **M** has fibrous root (system); while specimen **J** has tap root (system); • Specimen **M** has a sheath while specimen **J** has a petiole;	(2 marks)

c		SPECIMEN L  Appropriate diagram with at least 3 labels.	(1 mark)
d		Specimen **J** (bean) is a flowering plant, reproduces sexually; specimen **E** reproduces a asexually/sporulation/by spores;	(2 marks)

3	a	Pisces; • Body covered with scales; • Streamlined body; • (Presence) of gills; • (Presence) of fins; • (Presence) of operculum; • (Presence) of lateral line:	(1 mark) (3 marks)
	b	**Adaptations** – Streamlined body enables it to move fast in water with minimum/reduced resistance/friction; – Scales pointed backwards/overlapping to reduce friction during movement in water; – Body covered with a slimy substance/mucoid for easier movement/reduce friction; – Has fins for movement/swimming/balancing/propulsion in water – Swim bladder to vary its depth/buoyancy; – Inflexible head to enable/maintain forward thrust; – Myotomes that contract and relax alternately enabling side to side movement;	(3 marks)
	c	• Protection of the (delicate) gills; • Opening/closing to let water out for ventilation/act as a valve/allow water to flow in one direction;	(2 marks)
	d(i)	For gaseous exchange;	(1 mark)
	(ii)	➢ Gill filaments are: • Numerous to increase the surface area for gaseous exchange; • Thin to reduce the diffusion distance/for easier/efficient/ faster diffusion of respiratory gases (in/out); • Are wet/moist to dissolve respiratory gases for efficient gaseous exchange; • Highly vascularized/numerous capillaries for transport of respiratory gases/maintain/create a steep concentration gradient; ➢ Gill bar is long for attachment of/support the gill filaments; is bonny/rigid /hard to support the gill rakers/ gill filaments; ➢ Gill rakers are sharp/pointed/rake-like to filter/trap foreign objects/protect the (delicate) gill filaments; (Max-3 marks)	(3 marks)