

1. Press each of them gently to feel the surface of each egg and record your findings.

(2marks)

Specimen Q:

Soft/wrinkle/weak

Specimen R:

Hard/firm/rigid/swollen

(i) Account for the observations in (a) (i) on behaviour of specimen Q and R.

(3marks)

Specimen Q:

Molecules of S1 (salt) were hypertonic to cytoplasm of the egg/cell/Q: water molecules were drawn/move/forced out of the egg/cell cytoplasm by osmosis:

(2marks)

Specimen R.

Molecules of S2 (distilled water) were hypotonic to cytoplasm of the egg/cell/R; water molecules were drawn/move/forced into the cell/egg cytoplasm by osmosis;

(b) Suggest the nature of solutions S1 and S2 above.

(2marks)

S1: hypertonic/highly concentrated/with more solute (salt) molecules.

S2: Hypotonic/less (lowly) concentrated/dilute/with more water molecules.

(c) Give the term that would best describe the appearance of each of the eggs if the set up were allowed to stand for 5 more days.

(2marks)

Specimen Q;

Crenated acc. crenation

Specimen R:

Lysed cell/cytolyzed cell acc. Lysis/Cytolysis rej. haemolysed

(d) State one way in which the accuracy of the results would be improved. (1marks)

Use equal volume of solutions

Use eggs of same size/mass/weight

(e) Suggest a control experiment for this set up. (1mark)

Place one de-shelled egg in empty beaker/with no solution

2. You are provided with specimen N and Photographs Q, U, V and X which are specimens from different plants.

(a) State one structural similarity and one structural difference between the specimens in photographs V and X.

Similarity. (1mark)

Both have succulent/fleshy pericarp

Both have seeds

Both have axile placentation

Both have one scar

Difference. (1marks)

V	X
<i>White pericarp</i>	

(b) Complete the table below using the specimens in the photographs. (4marks)

Specimen	Mode of dispersal	Adaptive feature
N	<i>Animal</i>	<ul style="list-style-type: none"> - <i>Hooks; that attach to the fur/body hairs of the animal.</i> - <i>Dark coloured; such that animals do not easily see it.</i> - <i>Small sized; so that it may not easily detected by animal</i>
Q	<i>Wind</i>	<p><i>Hair-like extension; to enable it float in air/wind or to increase surface area for easy blowing by wind.</i></p> <p><i>Small in size; to reduce resistance for easy blowing away by wind.</i></p>

(c) Remove one of the specimen N, observe under hand lens and draw a well labeled diagram. (2 marks)

(d) Explain how the seeds of specimen U are dispersed by its mechanism of dispersal. (2marks)

When pod dries up (and become smaller); seeds inside develop tension/exerts pressure on the pod; that splits along sutures/lines of weakness; thus, violently scattering the seeds away from the parent plant

(e) Using a glass rod, Macerate (crush) the tomato provided into a paste then add some little water to form a juice. Put 1ml of solution F into a test tube and add juice of tomato dropwise until colour disappears. Shake the test tube after addition of each drop. (1mark)

(i) Record the number of drops used.

2-5 drops

(ii) If one drop of 0.1% solution of ascorbic acid is required to decolorize 1ml of solution F. Calculate the percentage ascorbic acid concentration in the juice of tomato. (2marks)

% ascorbic concentration = $\frac{\text{Number of drops of ascorbic acid} \times \text{Ascorbic concentration}}{\text{Number of drops of juice used}}$

$$\frac{1 \text{ drop} \times 0.1}{2-5 \text{ drops}}$$

Ans: 0.05-0.25%

(iii) From the test above, suggest the identity of solution F.

(1mark)

Dichlorophenol Indophenol acc. DCPIP

rej wrong spelling/dcpip

(a) (i) Name the type of evolution depicted by the beaks.

Divergent evolution

(ii). Explain your answer in (a) (i) above.

3 marks)

All birds are of same/common ancestry/embryonic origin; but have evolved different beaks structures; to suit different modes of feeding/exploit different ecological niche

(b) (i) Name structure Y in foot E.

(1 marks)

Web

(ii) Structures Y is an adaptation of the foot to the organism's habitat. Explain?

2 marks)

(Web) create/provide a larger surface area for swimming on water/walking on soft mud; while looking for food.

(c). Explain the emergence of the structure labeled S in foot F based on Larmak's theory.

(3 marks)

All birds had same long /sharp/ curved claw / talons; the environment (mode of feeding) favoured long feet talons/curved claws; leading to continuous natural use; long feet talons/curved claws kept increasing; the longer/curved claws trait was then passed on to offspring along the generations;

OWTTE

(d) How are birds with beak type A adapted to their feeding habits.

(3 marks)

Have sharp/curved/hooked beak for tearing flesh/seizing prey.

Have sharp/curved/long talons/claws for grasping/grabbing/killing/carrying prey

Have large and well-developed sense of sight to enable them spot their prey

Are fast flight; with well-developed wings that allow them to soar, to quickly strike and carry their prey,