# 2012 PROJECTIONS 001

231/3
BIOLOGY
PAPER 3

## MARKING SCHEME

1. a) P: Oesophagus/gullet
Q: gall bladder

b) Adaptation — Reason
(i) Highly coiled; - to show down the flow of food;
- allowing enough time for absorption;
(ii) Long; - to increase the surface area for absorption.;

(iii) Narrow lumen; - to bring the digested food closer to walls for absorption;.

c) S – Identify – caecum;

Role – Humbours/houses/ contains bacteria; that secret enzyme cellulose for digestion of cellulose.

d) (i) Kingdom: Animalia. (Reject kingdom/Animal/ animal alone.)

Reason: Presence of limbs;
Presence of muscles;
Presence of digestive system etc.
(ii) Class: Mammalia (Rej; mammal)
Reason: Presence of fur/hair/teeth etc.

NB- e) (i) The labels of the heart and the trachea must be placed on the photograph. (2 marks)
(ii) Has rings of cartilage to keep it open/avoid collapsing.
Has cilia that waft dust from the lungs.
Has mucus to dissolve dust/dissolve gases. (Any 2)

2.

| Food substance | Procedure | Observation | Conclusion |
|---|---|---|---|
| Starch: | To food add iodine solution; | Blue black/blue/black; Rej: black blue | Starch present; |
| Vitamin C Rej; vitamin alone | To dcpip and food; Rej: Dcpip added to food | Dcpip is decolourised/colour of Dcpip disappears; | Vitamin C Present: Rej: Vitamins present |
| Reducing sugars; Rej: Glucose | To food add benedict's solution and heat/place in a hot water bath; | Green-yellow-orange-brown colour: Rej: wrong colour sequence | Reducing sugar present; |
| Proteins: | To food add sodium followed by copper sulphate | No colour change: | Proteins absent: |

Note: Rej: Wrong spellings of technical words and reagents
Award once for food substance, procedure, observations and conclusion

3. a) Q – Self dispersal;
Reason – Dihisent/line of weakness for opening

R – Wind dispersal;
Reason – Presence of the parachute for floatation in air

S – Animal dispersal;
Reason – The fuit is succulent

b) Q – Marginal placentation;
S – Parietal placentation;
T – Basal placentaion;
U – Axile placentation;

c) True fruit;
Reason – Develops from the ovary alone.

**BIOLOGY**
**231/3**
**PAPER 3**

# 2012 PROJECTIONS 002

**MARKING SCHEME**

1. (a) SPECIMEN X

| Food | procedure | observation | conclusion |
|---|---|---|---|
| Reducing sugar | Put $2cm^3$ of specimen in a test tube. Add equal amount of benedicts solution and heat / boil | Colour changes from blue, green, yellow, orange to brick red | Reducing sugars present |
| Non reducing sugar | Put $2cm^3$ of specimen in a test tube. Add equal amount of Hydrochloric acid.Heat the solution. Add some Sodium Hydrogen carbonate, until fizzing stops. Add $2cm^3$ of benedicts solution heat / boil | Colour changes from blue, green, yellow, orange | Non reducing sugar present |
| protein | Put $2cm^3$ of food substance / specimen in a test tube. Add $2cm^3$ of Sodium hydroxide and shake the solution, slowly then add copper (II) sulphate | Colour remains blue<br><br>opaque | Proteins absent |

| | | | |
|---|---|---|---|
| | solution slowly | | |
| Food lipids | Smear some specimen on a filter paper. warm over the flame Leave for some time | Paper remain opaque | Lipid absent |

(4mks)

SPECIMEN Z (repeat procedure) All of them

| Food | Procedure | observation | conclusion |
|---|---|---|---|
| Reducing sugar | | Colour changes as in X | Reducing sugar present |
| Non reducing sugar | | Colour changes as in X | Non reducing sugar present |
| protein | | Colour change to purple / violet | Protein present |
| Fats/ lipid | | Filter paper becomes translucent | Fats / lipids present |

(4mks)

1 b) x combination of x and z would provide sugars; needed for respiration; to provide energy to the body
(2mks)

1 c) i) Kwashiorkor;
(1mk)

Obesity
Marasmus

ii) Provide diet rich in proteins for kwashiorkor; provide a balanced diet; (1mk)

2. (a)

| specimen | class | reason |
|---|---|---|
| F | Insecta | -3 body parts<br>-six legs |
| G | Crustacea | - two body parts<br>- strong fore jaws |
| H | Diplopoda | -two legs / appendages in each segment |

| | | |
|---|---|---|
| I | Arachnida | - two body parts<br>- eight legs |

Mark one reason Total 4mks

(b)

| specimen | characteristics | reason |
|---|---|---|
| E | -wings<br>-antennae | -fast movement<br>-for sensing |
| G | -strong jaws | -capture food easily |
| I | -many legs<br>-jaws | -fast movement<br>-jaws to capture food |
| J | -jaw | -suck blood and attachment to host |

Mark one characteristic and reason Total 4mks

(c

| specimen | Steps followed | identify |
|---|---|---|
| F | 1a),2a) | Insecta |
| G | 1b),3a),4a) | Crustacean |
| H | 3b | Diplopoda |
| I | 1b,3a,4b | Arachnida |

(4mks)

3. a) (i)

| specimen | food | reason |
|---|---|---|
| A | Aquatic matter and Invertebrates | Wide shovel shaped beak |
| B | Nectar | Long, thin beak |
| C | Nuts | Short,thick strong beak |
| F | Flesh | Strong sharp curved talons |

(4mks)

(ii)

| part | habitat | reason |
|---|---|---|
| D | Aquatic | Webbed feet for swimming / wading |
| E | Tree branches | Long fingers / toes for perching |

(2mks)

b) (i) Divergent evolution

Reason: similar basic structure and embryonic origin but modified into different forms / appearances

(ii) Enable the organisms / animals to utilize different ecological niches, to avoid competition for food.

c) (i)Structures with different embryonic origin but have similar function

(ii) -Wings of birds and insects.
-Eye of mammals and octopus. (mark one)

**231/3**
**BIOLOGY**
**PRACTICAL**
**PAPER 3**
**1 ¾ HOURS**

## 2012 PROJECTIONS 003

### MARKING SCHEME

1. (a) (i) Head√
Thorax√
Abdomen√
(3mks)
Rej. Spelling mistakes.
(ii) Arthropoda (1mk)
Rej. Anthropoda
(iii) - Segmented body
- Presence of exoskeleton
- Presence of jointed limbs/appendages
- Open circulatory system
Max 3
(3mks)
(iv) Insecta (1mk)
Rej. Insect (1mk)

(b) R T

| | |
|---|---|
| (i) Has 3 body parts | - Has 2 body parts |
| (ii) Has 3 pairs of legs/six legs | - Has 4 pairs of legs/ 8 legs |
| (iii) Has wings | - Has no wings |
| (iv) Has antennae | - No antennae |

Max 3
(3mks)

c) 2 – Cephalothorax
3 – Abdomen
(2mks)

*This paper consists of 2 printed pages*

*Please Turn Over*

2.

| FOOD SUBSTANCE | PROCEDURE | OBSERVATIONS | CONCLUSION |
|---|---|---|---|
| Reducing sugar√ | Add benedicts√ solution to S in a test tube and heat√ | Blue√ colour remains<br>Rej. No colour change | Reducing sugar√ absent |
| Non-reducing√ sugar | To food substance S in a test tube, add dilute hydrochloric√ acid/N; and heat;√ cool √the mixture and add sodium hydrogen√ carbonate/ M until fizzing stops; Add benedict's solution and heat. | Colour changes from blue to green, to yellow then to orange√/brown<br>Rej. Brick red/red brown red. | Non-reducing sugar√ present. |
| Protein√ | To food | Colour changes | Protein√ |

| | | | |
|---|---|---|---|
| | substance S in a test tube, add 1% copper (II) sulphate√ ( 0); followed by 10% sodium hydroxide√/P | to purple√ | present. |

17

mks

NB: - Reject if colour sequence is wrong (e.g.) blue-yellow-green-brown

- Reject if specific food substance is mentioned e.g. glucose, egg, milk etc.

- Reject procedure if steps are not in the correct order, and consequently reject the observation and conclusion.

- reject if formula or reagent is written wrongly.

3. (a) Osmosis;
(1mk)

(b) X – Hypertonic solution;
Y – Hypotonic solution;
(2mks)

(c) (i) X – Cortex cells lose water√ by osmosis; and shrinks;√
(2mks)

(ii) Y – Cortex cells absorb√ water by osmosis and expand√/increase in size; (2mks)

(d) It absorbs water by osmosis; it expands/ increases in sizes; and bursts; (3mks)

**BIOLOGY**
**PRACTICAL**
**PAPER 3**

# 2012 PROJECTIONS 001

## CONFIDENTIAL INSTRUCTIONS TO SCHOOLS

Each candidate will require the following:-

4ml of sodium hydrogen carbonate labeled M

2ml of dilute hydrochloric acid labeled N

10ml a mixture of 10% sucrose and egg whole labeled S

6ml of Benedict's solution labeled Q

4ml of 10% sodium hydroxide labeled P

4ml of 1% copper II sulphate solution labeled solution O

6 six test tubes in a rack

1 test tube holder

Means of heating.

Preparation of suspension S

10g of sucrose mixed with one whole egg in 50$cm^3$ of water then top up to 100$cm^3$ of solution.

# 2012 PROJECTIONS 004

**231/3**
**BIOLOGY PRACTICAL**
**MARKING SCHEME**

**QUESTION 1**

(a)(i) Pisces Rej. Fish but mark (ii) below

(ii) Presence of scales , fins, operculum, lateral line, (tied to (a) (i) above

(b)(i) Streamlined / Torpedo shape

(ii) Reduce friction in water.

(c) (i) 77mm
(ii) 20mm
(iii) $\frac{20}{77} \times 100 = 25.97\%$
(d) (i) Pectoral fin
(ii) Candal fin

Question 2

| | | | |
|---|---|---|---|
| Starch | To the food substance add a few drops of iodine | No (observable) colour change / colour of iodine remains. | Starch absent |
| Reducing sugar | Add Benedicts solution and heat / boil | Colour changes from blue to green, yellow, orange<br>Rej. Wrong colour sequence, blush in colour | Protein present |
| Proteins | Add sodium hydroxide followed by copper (ii) sulphate to the food substance | Purple / violet colour appear | Proteins present |
| Non – reducing sugar | Add Hcl, boil, add sodium hydrogen carbonate, cool;, add benedicts solution and heat / boil | Blue colour remain | Non-reducing sugar absent |

(b) pepsin , amylase, trypsin
(c) Hcl, to hydrolyse / breakdown/ convert/ change non-reducing sugars into simple sugars – monosachariddes

$NACo_3$- to neutralise the HCl

(d) Proteins – growth and development / repair of worn out tissues / metabolic regulation;
Reducing sugars:- Energy production / condensed into larger structural molecules e.g. cellulose

**Question 3**
(a) Division – Spermatphyta;
Reason; they are flowers from flower bearing plants;

(b) Agent- Animals/ insects
Reasons- stigma above anthers / anthers enclosed by corolla

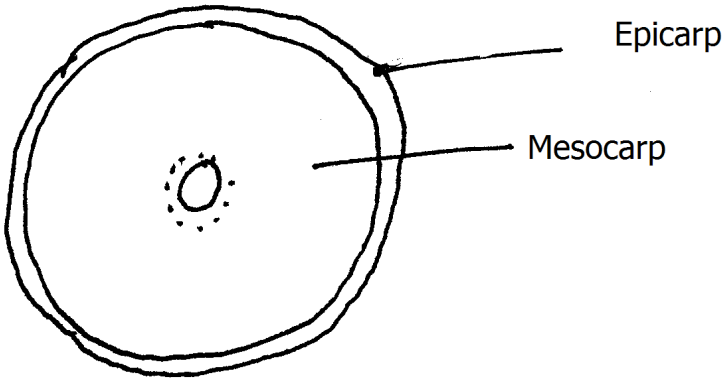
(c)

| $A_1$ | $A_2$ |
|---|---|
| Stigma single lobed | Stigma with many lobes |
| Placenta marginal | Placenta free central |
| Androceium and Gynaecium enclosed in keel (modified petal) | Androecium and Gynaecium exposed |

(d) J- Petal(s)
K- Ovule(s)
R- Receptacle / corns/ thalamus
M- Anther (s)

(e) Multi-lobed stigma (5 lobes)
- Partly fused anthers (acc. Number is counted)
- Poly sepalous (free sepals)
- Poly pettalous (free petals)
- Superior ovary

## 2012 PROJECTIONS 005
231/3
**(PRACTICAL )**
**BIOLOGY**
**PAPER 3**
**MARKING SCHEME**
1. a




Labeling – 2mks
Drawing – 1mk
Magnification – 1mk

b)

| K | T |
|---|---|
| No seeds | Has seeds |
| Has fleshy mesocarp | Lacks fleshly mesocarp |
| Smooth epicarp | Hairy / rough epicarp |

c)

| **Test** | **Procedure** | **Observation** | **Conclusion** |
|---|---|---|---|
| Starch | Add iodine | Blue black / Dark blue | Starch present |
| Reducing sugars | - add benedict and warm / boil | Blue-green yellow to orange / red | Reducing sugars present |
| Protein | - add sodium hydroxide and shake. Add copper sulphate | Blue | Protein absent |

2. a)

| Specimen | Steps | Identity |
|---|---|---|
| A | 1b, 3a | Insecta |
| B | 1a, 2a | Diplopoda |
| C | 1a, 2b | Chilopoda |
| D | 1b, 3b, 4b | Arachnida |
| E | 1b, 3b, 4a | Crustacea |

b) i) Feeding and protection
ii) In cracks and crevices / dark places
iii) - Dorsoventrally flattened for easy movement

- Strong hind led to push it through cracks and crevices
- Dark brown in colour for camouflage
- Chewing mouth parts to feed on solid food remnants

3. a) - Leaf
- petiole
- mid rib
- veins
- lamina

b) i) Less bubbles on upper surface
more bubbles of lower surface

ii) Upper surface has fewer stomata
lower surface has more stomata

c) i) A good outline

ii) Provide a large surface area for absorption of large amount of light for photosynthesis

## 2012 PROJECTIONS 006

**231/3**
**BIOLOGY**
**PAPER 3**
**MARKING SCHEME.**

1. a)i) Monocotyledonous root ; reject root alone.

(ii) - Pith present in centre;
- Xylem and phloem ( alternate (around pith) ***Any 1 correct @ 1 mark***

iii) Transverse / cross section;

b) A - pericycle
C – Endodermis
D- Pith
G - Cortex

c)

$$Mg = 1500 = \frac{image\ length\ (x - y)}{Actual\ length}$$

$$Actual\ length = \frac{Image\ length}{1500} \times 10,000$$

$$= \frac{8cm}{1500}$$

$$= 5333.3\mu$$

d) B – Increase surface area for absorption of water and mineral salts)

C – controls amount of water and minerals salts entering the vascular bundles.(xylem)

e) Structural differences

| E | F |
|---|---|
| - Hollow lumen | - Lumen with Cytoplasmic filament |
| - No cross walls | - Sleve - plate present |
| - Lignified wall | - Wall hot lignified |
| - No companion cell | - Ccompanion cell present |

Functional

| E | F |
|---|---|
| - Transport water and mineral salts | Transport photosynthesis products |

2. a) a) Kingdom – Plantae;
- Green lens – suggesting presence of chlorophyll

b) **Division** – Spermatophyta;
**Reason** – Differentiated into leaves, stem, flower;

b) - Brightly coloured petals / Bracts to attract insect) Animals;
- Scented ; to attract insects ;
- Style / stigma enclosed in petals to be reached by insects;

c) Diagram

d) Gamopetalous ; Hypogynous ; Monicorpous.

3. a) 1- Ilium (rej if spelling is wrong)
2- Ischium ;
3- Femur;

b) i) Ball and socket
(ii) Presence of hollow socket / Head of femur round like a ball

c) i) Lumbar vertebra
ii) - Offer surface for attachment of abdominal muscles.

- Protect spinal cord;

d) - Wide ; to provide large surface area for attachments of muscle .

- Large; to provide firm support to he weight of the animal

- Articulatory facets ; ( for attachments to other bones;

***(any 2 @ 1mk)***

e)

| **FOOD TESTED** | **PROCEDURE** | **OBSERVATION** | **CONCLUSION** |
|---|---|---|---|
| Starch✓ ½ | To 2cc of P add drops of iodine solution. ✓ ½ | No observed colours change / iodine persists. ✓ ½ | Starch not present✓ ½ |
| Vitamin C/ Ascorbic acid ✓ ½ | To 2 cc of DCPIP in test tube add solute on P dropwise | No colour change / colour of DCPIP persist ✓ ½ | Vitamin C not present ✓ ½ |
| Protein ✓ ½ | To 2cc of solution P in test tube and of NaOH solution add $CuSO_4$ solution dropwise and shake | Colour changes purple / violet | Protein present ✓ ½ |

6mks)

## 2012 PROJECTIONS 007

**231/3**

**BIOLOGY**

**PAPER 3**

MARKING SCHEME

1. a) Food tests (8mks)

| Food | Procedure | Observation | Conclusion |
|---|---|---|---|
| Starch; | To $2cm^3$ of solution X, add drops of iodine; and shake | - Blue black colouration; | Starch present; |
| Reducing – sugars; | To $2cm^3$ of solution X, add few drops | Colour changes from blue to green to yellow | Reducing sugars present; |

| | | | |
|---|---|---|---|
| | benedicts solution and heat | to orange/brown; | |
| Protein; | To 2cm$^3$ of solutionX, add drops of sodium hydroxide followed by copper (II) sulphate dropwise; and shake | Colour turns purple/violet; | Proteins present; |
| Vit. C cascorbic acid; | To 2cm$^3$ of DCPIP, add solution X dropwise till in excess and shake; | DCPIP is decolorized; | Vitamin C present; |

- Each tick (✓) is ½ mark each Max 8mks
- If procedure is wrong, deny mark for observation and conclusion.
- Reject DCPIP being added to the food
- Reject heating for starch and proteins
- Ensure shaking of content in test of iodine, protein, vitamin C.

b) Assimilation of the food substances.

**Food substance** **Asimilation**

- Starch digested to glucose - Glucose oxidized to energy in respiration;
- Reducing sugar - Glucose oxidized to energy in respiration;
- Vitamin C - Build up of co-enzymes;
- Protein - Used to make cytoplasm, enzymes, some hormones etc;

(4mks)

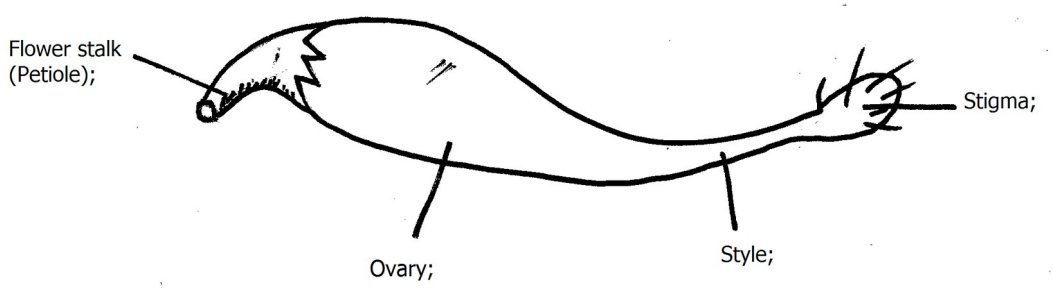
Rej. Protein respired unless stated starvation.
Rej. Starch respired without breakdown to glucose.

2. a)

| Floral Part | Number of the floral part |
|---|---|
| Sepals / calyx;<br>Petals / corolla;<br>Stamen / Androeccium;<br>Pistil/gynoecium; | 5;<br>5;<br>10;<br>1; |

@ 2 marks each total 8mks

b)




Marks Drawing - 1mk
Labeling = any 2 - 2mks
Magnification - 1mk
Total 4mks

Note
- Mag (x ½ - x 1)
- Check for single continous
- Labeling lines to touch the structures
- No shading
- Check for proportionality – deny marks if structures are not proportional (for drawing).

c) i) Agent – Insects / animals eg birds;

ii) - Petals are large and brightly coloured; to attract insects (Pollinator);

- Pistil / gynoecium/stigma and stamens/ and elium/anthers located within the corolla to ensure that they brush against; visiting insects/birds;

- Pollen grains are large and sticky; so as to stick to body of insects;

- Stigma is short and sticky; to receive/ stick/ attract pollen grains from a body of visiting insects;

(any 2 correct – 2mks)

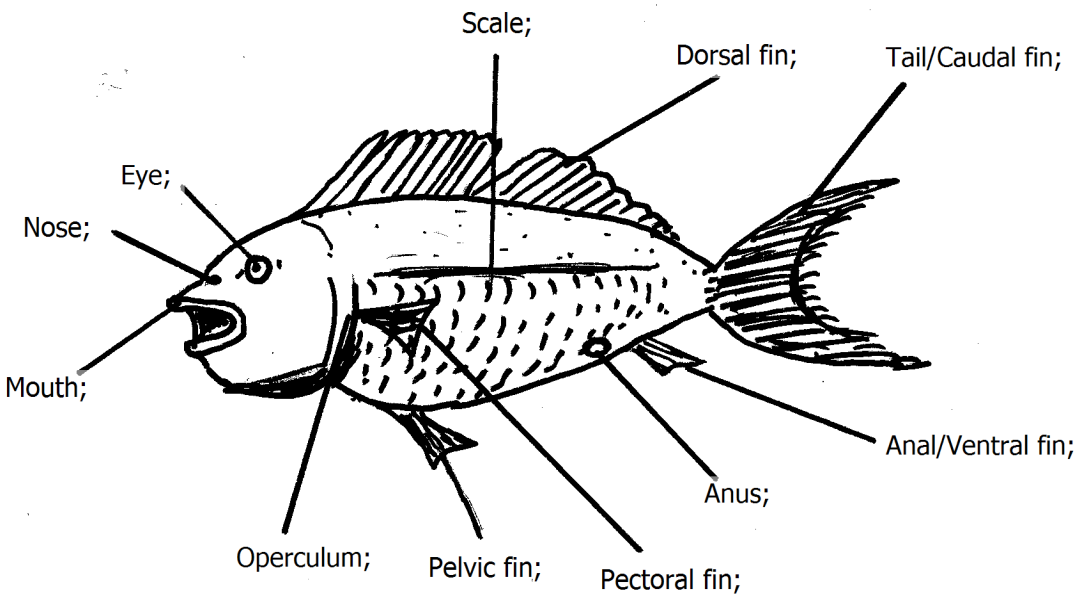
NOTE: To award a full mark, the point should be fully explained.

3. a) i) Animalia;
ii) Chordata;
iii) Pisces; (3mks)

b) - It was a backbone;
- It has endoskeleton;

- Bilateral symmetry body (body can be divided into two equal halves);
- It has post anal tail;
Any 2 correct = 2mks)

c)




Drawing 1mk
Labeling 2mks
Magnification 1mk
Total 4mks
Any 2 correct labels = 2mks)

d) Water / aquatic; (1mk)
Reject - Fresh water environment
- Marine environment

e) - Stream lined body; - to reduce water resistance on forward movement;
- Scales are attached facing backwards; - to reduce water resistance on forward movement;
- Fore limbs and Hind limbs modified into fins; - to increase surface area that push against
water when swimming;
- Tail modified into fin; - to increase surface area that push against water when swimming;
- Tail/Dorsal fin; - Increase vertical surface area to prevent rolling when swimming;
- Flexible backbone; - to easily bent sideways enabling the tail fin to excert a big force on
water when swimming;

(Any 2 correct Ans = 2mks)

f) Gill/ Gills; (1mk)

## BOMET2012 PROJECTIONS 008

**BIOLOGY MARKING SCHEME**

**231/3**
**MARKING SCHEME**

1.

| Food substances | Procedure | Observation | Conclution |
|---|---|---|---|
| Starch | Put 2cm$^3$ of suspension M in a test tube Add 2 / 3 drops of iodine solution and shake Rej.2 to 3 drops | Blue black colour is formed | Starch present |
| Reducing sugar | Put 2cm$^3$ of suspension M in test tube. Add equal amount of Benedict's solution and heat. | Colour changes from blue to yellow to orange.Rej: wrong colour sequence | Reducing sugar present |
| Proteins | Put 2cm$^3$ of suspension M in a test tube Add an equal amount of (10%) sodium hydroxide solution and shake. Add 2 drops of (1%) copper sulphate drop by drop and shake. | No observable colour change | Proteins absent |
| Ascorbic acid / Vitamin | Put 2cm$^3$ of DCPIP in a test | Suspension M decolourises | Presence of Ascorbic acid |

| | | | |
|---|---|---|---|
| C | tube<br>Add solution M drop by drop into the DCPIP in the test tube and shake | DCPIP | |

NB – for wrong procedure reject observation and conclusion

2. a)- Absence of root hairs on piliferous layer / epidermis;
   - Tissues not fully differentiated e.g. vascular tissues;
   - Presence of pith

   b) A-piliferous layer
   B- pith
   C- Cortex

   c) A-protection of inner tissues from mechanical injury / infection, water loss/dessication;
   C –storage / package / support;

   d) D – phloem- translocation / transport of manufacture food;
   E – xylem – transport <u>water</u> and <u>mineral salts</u>.

   e) (i) Protect the apical meristem;
   (ii) Secondary thickening / growth;
   (iii) Increase surface area for absorption of water and mineral salts;

3. a) Thigmotropism / Haptotropism;
   b) Auxins are more concentrated on the side that is not in contact with the branch of support; there is more cell elongation on the outer part in contact with the support plant; hencer the growth curvature is towards the branch;
   d) Shoot \ root tip \ apical meristems;
   -lateral meristems \ cambium;

   e) –stimulation of fruit growth when flowers have not been pollinated \ parthenocarpy;
   - induce growth of adventitious roots in stem cutting for vegetative propagation;
   - Manufacture of selective weed killer;
   - In pruning of crops e.g. tea, coffee, which result in sprouting of side branches;

**2012 PROJECTIONS 0010**
**231/3**
**BIOLOGY**
**PAPER 3**
**PRACTICAL MARKING SCHEME**
**2 HOURS**

1. a) Violet/purple — Peptide/protein
Colourization; — Present X;
(2mks)

b) OBSERVATION

A — Cloudy suspension; — Cloudy suspension unchanged;

B — Cloudy suspension; — Cloudy suspension unchanged;

C — Cloudy suspension; Changes/turns to a clear liquid/solution;

D — Cloudy suspension; — Cloudy suspension unchanged;

(8mks)

c) Enzyme/pepsin;
(1mk)

d) i) Tube C;
Insoluble solid particle of albumen/protein suspension are digested/broken down; action of Y/enzyme/pepsin into soluble particles/clear solution; because the optimum conditions/HCl, pepsin and temp $37^0$ C Present

(ii) <u>Tube D:</u>
(3mks)
Boiling stops enzyme activity/destroys/denature enzyme; hence no digestion of
food substance;
(1mk)

e) Stomach;
(1mk)

2. a)

| | Photograph | STEPS | IDENTITY | |
|---|---|---|---|---|
| i) | H | 1b; 7b; 8b; | Amphibia; | 2mks |
| ii) | J | 1a; 2b; 6b; | Chilopoda; | 2mks |
| iii) | L | 1a; 2a; 3b; 5b; | Arachnida; | 2mks |
| iv) | M | 1a; 2a; 3b; 5a; | Crustacea | 2mks |

Total marks = 8mks

b) - Have little/short fur covering; to encourage heat loss;
- Has flat hooves; to enable walking on sand without sinking;
- Long legs/limbs; raise it above the ground, to avoid extensive heating from the ground;

(6mks)
Total 14 marks
Max: 12mks

3. a) $P_1$ ——— Male inflorescence/flowers/androceia/stamens (1mk)
$P_2$ ____ Female inflorescence/flowers/gynacia/carpels; (1mk)

b) i) Wind;
ii) - Long feathery stigma; hang outside flower/cob; (2mks)
- Numerous stigma hanging/inflorescence increase chances of trapping floating pollens;
- Large anthers hinged/versatile/hanging loosely to the filament; (2mks)
- Numerous male flowers clustered together/form inflorescence; proved numerous pollens/at the top of plant to increase/aid wind pollination (2mks)

Total

8 mks Max: 6 mks

c) Class – Monocotyledonae
(1mk)
Reasons: Leaf stalk modified into sheath;
- Narrow long leaves;
- Leaves have parallel venation;
Acc correct (1mk)

d) i) - Insect;
(1mk)
ii) - Large bell – shaped corolla/petals; (To enable insects get nectar)
- Anthers/stigma occur inside flower/corolla/petals;

**231/3**
**BIOLOGY**
**PAPER 3**
**2012 PROJECTIONS 011**

## MARKING SCHEME

1. a) (i) Pisces; Rej Wrong spelling
Rej fish (pisces)
Rej pisces (fish)
(1 mk)
(ii) Presence of scales;
Presence of fins;
] Presence of lateral line;
Presence of operculum; acc any first two
(2 mks)
**Note** (ii) is tied (i)
b) (i) Streamlined;

(ii) Reduces friction/resistance during locomotion/movements in water; (1 mk)

c) (i) 162mm ±1mm;
(1 mk)

(ii) 82mm ±mm;
(1 mk)

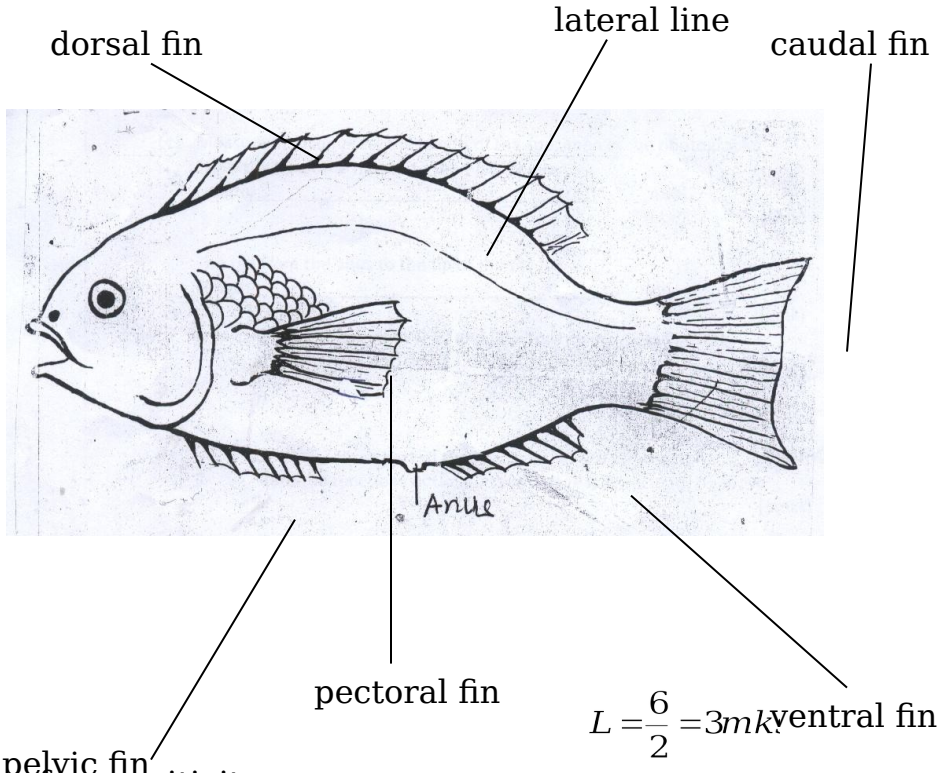
(iii)

Tail power $= \frac{length\ of\ tail\ to\ anus}{length\ from\ mouth\ to\ anus} \times 100$;

$= \frac{820mm}{162mm} \times 100 = 50\%$;

(2 mks)

d)




$L = \frac{6}{2} = 3mk$

Lateral line – for sensitivity;
Caudal fins - for forward thrust / propulsion;
Paired fins / pectoral fin for balance ; breakings;pitching;
Dorsal fins/ventral fin – prevents yawing;

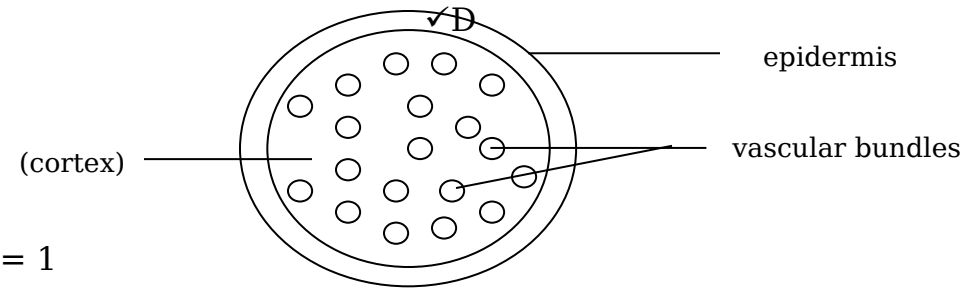
A ny 1st three

3mks

Total marks

14mks

2. a) (i)




L = 2 = 1

2

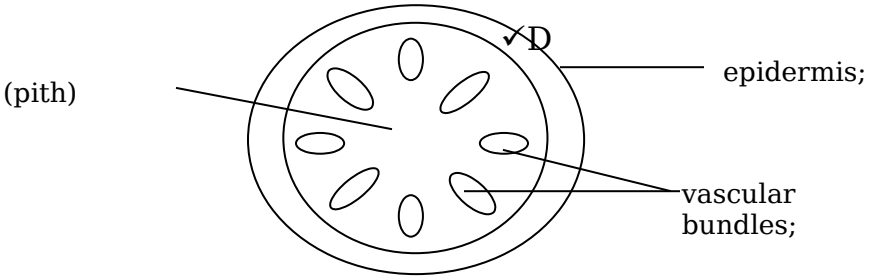
D = 1

2

drawing mark; consider

double lines and
proportionality

(ii)




L=2 = 1

2

D= 2 1

2 2

b) Parts of the vascular bundles were stained blue black indicating presence of starch
(1 mk)

c) Epidermis – Protects inner tissues from mechanical injury / entry of bacteria;
Vascular bundles – Has phloem for translocation of food;
Has xylem for transport of water and mineral salts;
Pith – Strengthening tissue/filling/paching/support;
Cortex – Strengthening/support;
(any first three 3 mks)

d) $D_1$ class: monocotyledonae;
Reason; vascular bundles scattered in the stem;
$D_2$ class: dicotyledonae;
Reason: vascular bundles arranged on a ring/presence of pith; (4 mks)

e) (i) To make the structures more visible/clear/more distinct; (1 mk)

(ii) Water helps the sections wet and keeps /makes the cells turgid; (1 mk)

(iii) For easy penetration of the iodine solution/stain; (1 mk) (total mks16mks)

(iv) So as not to destroy the cells; (1 mk)

3. a) Type of fruit: multiple/compound/false; ( 1mk)

Reasons:

Formed from several fused flowers;
Formed from the inflorescence;
Formed from several fused fruits;
acc any first one (2mks)

b)

| Food substance | Procedure | Observations | Conclusion |
|---|---|---|---|
| Starch; | To the juice add few drops of iodine solution; | Mixture turns yellow/brown; | Starch absent; 2mks |
| Reducing sugars; | Add equal amounts of benedicts solutions and boil/heat/warm; | Mixture turns yellow/orange/brown; | Reducing sugars present; 2mks |
| Proteins; | Add a few drops of sodium hydroxide and copper sulphate ; | Mixture remains (light) blue; | Proteins absent; 2mks |
| Vitamin C/ ascorbic acid; | To DCPIP in test tube add the juice drop by drop; | DCPIP is decolourized/ the blue colour of DCPIP disappears; | Vitamin c present; 2mks |

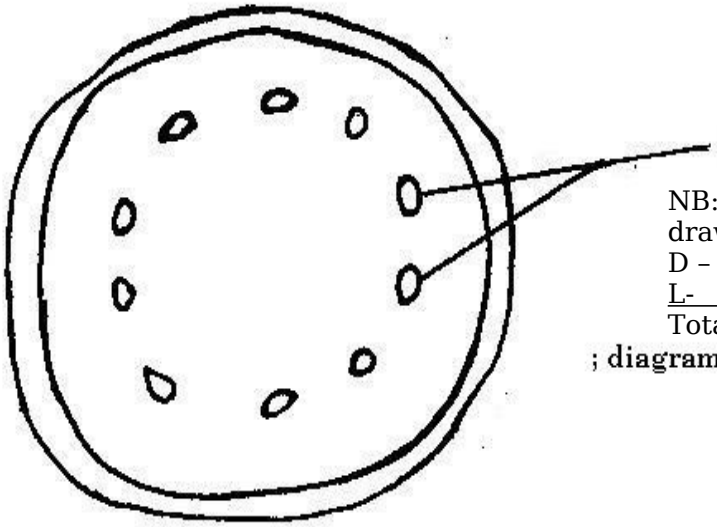
Total= 8mks

# BIOLOGY PAPER 3
# 2012 PROJECTIONS -012
# MARKING SCHEME

1(a) (i) monera
(ii) they are unicellular
(b) (i) Flagella; reject flagellum
(ii) aid in locomotion
(iii) binary fission: accept asexual reproduction
(c) (i) Treatment of sewage/cause diseases/food spoilage and poisoning/food processing like yoghurt, cheese e.t.c
(d) (i) Arthropodas
(ii) Jointed appendages;
Segmented bodies;
(e) Cephalothorax;
(f) **C Class** Arachnida;
**Reason** 2 body parts/cephalothorax and abdomen; 4 pairs of legs in cephalothorax; Absence / lack antennae;
**D Class** Chilopoda;
**Reason** A pair of legs in each segment, Body is dorso- ventrally flattened;

1. (a) (i) terrestrial/ground/dry land;
(ii) strong/woody stem/hard stem
Broad leaves/leaves with large surface area
(b) (i) large, broad leaves;
Simple, entire, pointed apex, net veined, green, hairy/thorny;
(ii) – Regular, polysepalous/ 5 sepals;
– brightly coloured/purple petals (corolla)/polypetalous/free petals
(iii) – large bilobed anthers, free anthers;
– anthers, below the stigma/ shorter than stigma;
(iv) – Superior ovary/ above receptacle
– style longer than filaments/stigma above anthers
- monocarpus.
(c) (i) Insect
(ii) – brightly coloured to attract insects
– anthers below the stigma to prevent self pollination
– scented to attract insects
– nectar guide lives, direct insects to nectray

2. (a) (i)




NB: Observe the principles of drawing
D – 1mk
L- 1mk
Total- 2mks
; diagram ;

(ii) $Max = \frac{Size\ of\ drawings}{Size\ of\ real\ specimen} = \frac{x\ cm}{y\ cm}; = XZ;$ Units must be shownd to earn a mark. If missing looses both marks.

(b) (i) $W_1$ – Dye arranged in a ring while in
$W_2$ – Dye is scattered
(ii) Xylem

(c) (i)

| Food substace | Procedure | Observation | Conclusion |
|---|---|---|---|
| Reducing sugar ½ mk | To 2ml of solution $w_3$ in a testtube add equal amount of benedits solution and heat to boil; (1 mk) Yes benedict | Colour changes to green, yellow, orange, to brown (accept any colour if more then one colour sequence must be followed) (1 mk) | Reducing sugars present; ½ mk |
| Starch (½ mk) | To 2 ml of solution $w_3$ in a test tube add 3 drops of iodine solution; (1 mk) | Yellow/brown colour of Iodine retained/remains (accept no observable colour change) (1mk) | Starch is absent (½mk) |

(ii) sucrose/disaccharide (1mk) rej. No change

**2012 PROJECTIONS 013**
231/3
BIOLOGY
**PAPER 3**
**MARKING SCHEME**

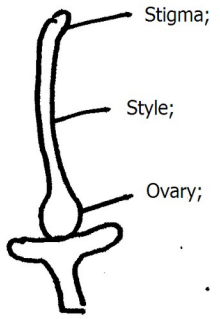
1. a) Axile (1mk)

| Food substrate | Procedure | Observation | Conclusion |
|---|---|---|---|
| Reducing sugar ½ | Put about 2cm$^3$ of juice in a test tube. Add equal amount of benedict solution heat. ✓ ½ | Colour turns from blue – green – yellow – orang ppt. ✓ ½ | Reducing sugar present ✓ ½ |
| Protein ½ | Put about 2cm$^3$ of juice in a test tube. Add 10% NaOH solution shake well then add 10% $CuSO_4$ solution. ✓ ½ | No colour change / blue colour. ✓ ½ | Protein absent ✓ ½ |
| Starch ½ | Put about 2cm$^3$ of juice in a test tube, add iodine solution and shake ✓ ½ | No colour change / yellow/ brown colour ✓ ½ | Starch absent ✓ ½ |
| Vitamin C Ascobic acid ½ | Put about 2cm$^3$ of DCPIP in a test tube. Add the juice drops by ✓ ½ drop until in excess shake well after addition of each drop | DCPIP decolourized. ✓ ½ | Vitamin C present ✓ ½ |

(8mks)

b) i) - Insect Rej animal;
ii) Brightly coloured petals
- Nectar and nectaries visible

- Scented




Mag = X3
- Label – 2mks
- Drawing – 1mk
- Magnification – 1mk
(4mks)

2. a)

| | 1st count | 2nd count | Average |
|---|---|---|---|
| Upper epidermis | (6 – 19) ½ | (6 – 19) ½ | 6 – 19 ½ |
| Lower epidermis | (20 – 29) ½ | (20 – 29) ½ | 20 – 29 ½ |

b) - Upper epidermis has fewer number of stomata than the lower side to reduce the rate of
transpiration since they are exposed to direct sunlight lower epidermis has more stomata to
increase the rate of gaseous exchange (2mks)

c) Habitat – Terrestrial –accept arid / semi – arid
Reasons;
- More stomata on lower sides compared to upper (if answer in habitat was desert accept
succulent leaf for a reason)

d) To maintain turgidity and hence shape of cells
- To avoid dessication / drying;

3. a)

| Leaf | Steps | Identity |
|---|---|---|
| A | 1b, 5b, 7b, 8a (1mk) | Flambouyant (1mk) |
| B | 1a, 2b, 3b, 4a (1mk) | Bougainvillae (1mk) |
| C | 1a, 2a (1mk) | Maize (1mk) |
| D | 1a, 2b, 3b, 4b (1mk) | Hibiscus (1mk) |
| E | 1b, 5a, 6b (1mk) | Clotalaria (1mk) |

(10mks)

b) C

- Monocotyledonae; (1mk)

Reason

- Leaf has parallel veins (1mk)
- Leaf long and narrow (Lanceolate)

D - Class Dicotyledonae; (1mk)

- Leaf has network veins (1mk)

Leaf broad

c) - Broad Lamina provides large surface area for absorption of carbon (IV) oxide and sunlight; (1mk)

- Presence of stomata for efficient diffusion of carbon (IV) oxide into the leaf;
- Presence of veins to transport water and mineral salts to photosynthetic cells and remove products of photosynthesis;
- Thinness of the leaf to allow light and carbon (IV) oxide pass through a short distance to reach photosynthetic cells;

**231 / 3**
**Paper 3**
**PRACTICAL**

## 2012 PROJECTIONS 014

**MARKING SCHEME**

**Q 1. a)** Food substance.

-Starch
(1mrk)

Procedure.

-Put a little of P on a white tile;

- Add iodine solution/ Q to P;
(2mrks)

Observation.

-No colour change / colour of Q retained/traces;
(1mrk)

Conclusion.

-Starch absent/Present;

**b)** Food substance

Reducing sugar;
(1mrk)

Procedure.

-Mix P with distilled water;
-* Put (1ml of) Solution P ;(in a test tube)
- Add (1ml of Benedict's solution/S) to solution P;
- Boil. (over water bath);
(3mrks)

Observation.

-Green to yellow to orange/brown;
(1mrk)

Conclusion.

-Reducing sugar present/Traces;
(1mrk)

**c)** (i) Procedure.

-Rub ;P onto a filter paper;
- Dry; (over flame / in the sun /light),
(2mrks)

Observation.

- Translucent mark appears / present / seen;
(1mrk)

Conclusion.

-Lipids present;

(ii) –Lipase;
- Maltase;

Total
(2mrks)

**Q 2** a)

| Animal | Step followed | Identity. |
|---|---|---|
| E | 1b,2a ; | MOLLUSCA ; |
| F | 1b, 2b, 3a, 4a, 6a, 7b ; | CRUSTACEA ; |
| G | 1b, 2b, 3a, 4a, 6b, 8a ; | ARACHNIDA ; |
| H | 1b, 2b, 3a, 4b, 5a ; | ANNELIDA ; |
| J | 1a, 9a ; | CESTODA ; |

(10mrks

Total (10mrks).

**Q 3** a)

P- Radicle sheath;
Q- Endosperm ;

R- Radicle ;
S- plumule ;
T- Coleoptile ; (1mrk each)
Maximum 5mrks

b) Q- Endosperm;
(1mrk)

c) P- Protect the radical;
Q- Protect the plumule;

(1mrk)

d) Has two scars; or scar for attachment to receptacle and another for attachment of style;
(1mrk)

e) Starch;
(1mrk)
Oil;
(1mrk)

f) Q1 or Endosperm;
(1mrk)

g) Length VW = 9.3 cm. = 93mm;
(½ mrk)

$$\text{Magnification} = \frac{\text{Length of}}{\text{Actual length}}$$ ;; ; (½ mrk)

Actual length $\frac{9.3 \text{ x}10 \text{ x}}{30{,}000}$
(1mrk)

= 3.1 micrometers.
(1mrk)

Maximum (3mrks).

# BIOLOGY PRACTICAL

**2012 PROJECTIONS 015**

# PAPER 3

# 231/3

MARKING SCHEME

| **Food Substance** | **Procedure** | **Observation** | **Conclusion** |
|---|---|---|---|
| Starch | Add 2 drops of iodine solution to the food – substanceM; | No colour change/iodine colour remains the same | Starch absent |
| Reducing – sugar<br>Re; Simple – sugar, mono saccharide | - Add 2mls of Benedict's solution to the food – substanceM;<br>Heat/Boil/Warm in a <u>hot</u> water bath; | Colour change to yellow then to orange.<br><br>Acc. Yellow or orange. | Reducing – sugar present |
| Vitamin C/Ascorbic acid | - Put 2mls DCPIP solution in a test – tube.<br><br>- Add solution M dropwise; (and shake) | Colour changes from blue to colourless/decolourisation occurs; | Vitamin C/Ascorbic acid present; |

(9mks)

Reducing sugar - It is oxidized in the cell to release energy/source of energy;

Vitamin C - For protection against infection/offers resistance to infection.

- Used in formation of collagen, cement of teeth, connective tissues of blood.

(2mks)

2. a) i) Chordata (1mk)

ii) Class: Pisces (1mk)

Reason: Presence of fins/gills/operculum/lateral line

Rej; Scales (1mk)

b) Streamlined; (1mk)

c) i) A Lateral line; Rej:- lateral or line alone
B Operculum; Rej:- Gill – cover (2mks)

ii) C Prevents rolling and yawing; (1mk)
D Balance/braking/steering; (1mk)

d) - Presence of fins;
- Presence of scales overlapping backwards;
- Streamlined body;
(3mks)
Rej; Lateral line, gills, mucous covering the scales.

e) i) 139mm + 1mm (1mk)
-

ii) 45mm + 1mm (1mk)
- 1mm (1mk)

ii) 45/130 x 100; = 34.62% ;
(2mks)

f) Magnification = $\frac{\text{Length of drawing}}{\text{Length of Actual}}$ = $\frac{130}{200}$ = x0.65

3. a) Mitosis/Mitotic cell division; (1mk)

b) V Anaphase/late phase; (1mk)
X Prophase; (1mk)
Y Telophase (1mk)
Z Metaphase (1mk)

c) Somatic/body cells; (1mk)

d) - Growth and development;
- Forms the basis of asexual reproduction.
- ensures chromosome numbers and genetic constitution of the daughter
cell is the same as that of the parent;
(2mks)

e) Plants; (1mk)

Reason: Formation of middle lamella separating two daughter cells;
Accept Lack of centrioles.
(1mk)

f) - Replications of chromosome;
- Synthesis of new organelles;
- Synthesis of energy/Building up of (ATP) energy.
(3mks)

**2012 PROJECTIONS 016**
**231/3**
**BIOLOGY**
**PAPER 3**
**PRACTICAL**
**MARKING SCHEME**

1. (a) J – fresh water habitat
Reason – many leaves/large leaves

K – Desert/arid/semi arid;
Reason – leaves reduced to spines/thick cuticle in stem;

(b) - leaves reduced to spines/thorns to reduce rates of transpiration
- Thick cuticle to reduce rate of transpiration.
- Thick stem/succulent stem; to store water (any 2 correct)

(NB: award full marks only structure is tied to adaptation.)

(c) provides large surface area for transpiration; gaseous exchange; photosynthesis;

(d)

| **J- root system** | **K – root system** |
|---|---|
| Poorly developed/lacks vascular tissue | Well developed, have vascular tissue |
| Lack roots hairs | Presence of many root hairs |
| Shallow and fibrous | Deep and tap root |

| | |
|---|---|
| Do not form superficial roots | Develops superficial roots |

(any two correct contrasting differences) 2 mks)

(e) Xerophyte

2. (a)

| Food substance | Procedure | Observation | conclusion |
|---|---|---|---|
| Starch | To solid J add iodine solution | Turns blue-black | Starch present |
| Reducing sugar | To solid J, add Benedicts solution and heat to boil | Colour changes to yellow/orange/brown/red | Reducing sugar present |
| Lipid/oil | Rub a little solid on filter paper | Permanent translucent mark forms | Lipid/oil present |
| protein | To solid J add sodium hydroxide then a few drops of copper sulphate | Purple/violet colour appears | Protein prestnt |

NB. – Award procedure, observation and conclusion only
- food substance must be correct to score
- wrong procedure, no mark for observation and conclusion

(b) Kwashiorkor / marasmus. Any 1 correct

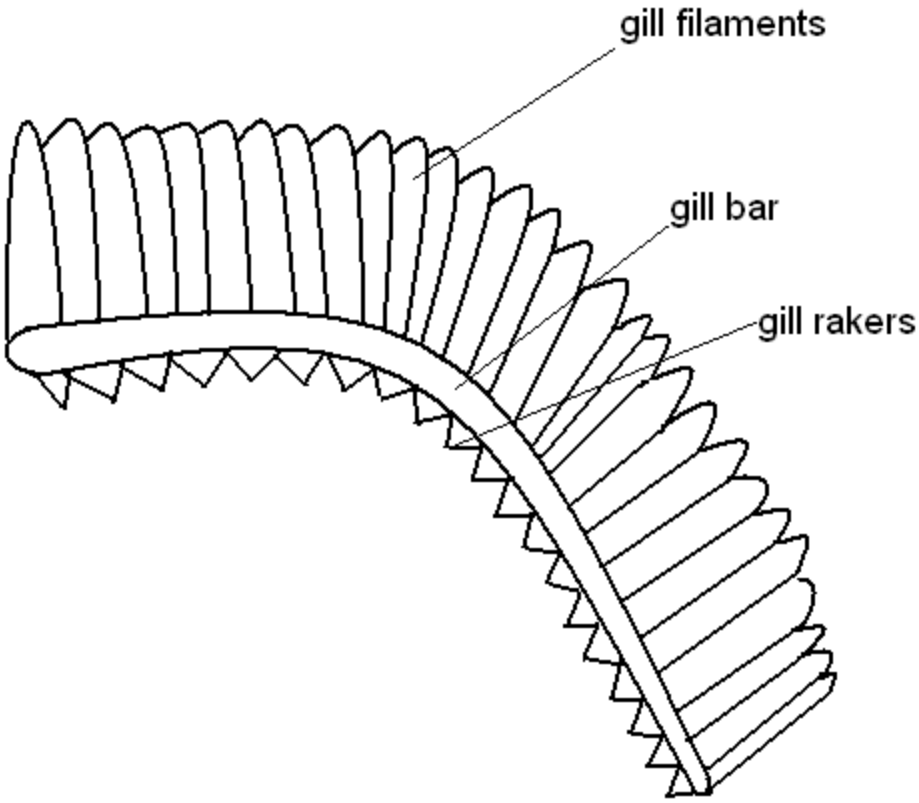
3. (a) (i) pisces
(ii) - presence of fins
- Presence of (overlapping) scales
- Presence of gills/operculum
- Presence of lateral line

Any 2 correct

(b) (i) To the tail smooth; towards head rough;
(ii) Scales overlap; backward/towards the tail end/towards the posterior end;
(iii) minimizes/reduces friction during motion/prevents water getting into contact with body/skin/protection against injury;

(Mark significance wrong if the arrangement was wrong i.e. (iii) tied to (ii))

(c) (i)




Mg x 1 to x 3 D = 1
L = 3/2
M = 1

NB: Gill filaments should be as close together as possible and also they should be single at the edges. The edges/top of filaments should be closed/arise from the gill bar.
- Gill bar/arch should be curved and closed at both ends; reject arc.
- Gill rakers should be serrated; not too far apart. Should arise from gill bar.
- Proportionally – may be too wide, too short, too long.

(ii) - Many/numerous gill filaments to provide large surface area for gaseous exchange;
- (Extensive) vascularisation/many capillaries/blood vessels for gaseous exchange;
- Presence of rakers to filter/trap solid particles/food particles which might damage gill filaments;
- The gill bar is bony/hard/firm/rigid/strong to support gill filaments/rakers

(Mark any 3 correct)

(NB structure tied to function to award full marks)

## 2012 PROJECTIONS 017

231/3
BIOLOGY
**PAPER 3**
**MARKING SCHEME**

1. a) i) A - Renal vein
B - Ureter
C - Pelvis
D - Cortex (4mks)
ii) V - Glomerulus;
W - Proximal convotuled tubule;
X - Distal convoluted tubule;
Y - Blood capillaries (4mks)

b) - Coiled to increase S.A for reabsorption of substance (ii) The tubule is supplied with
blood capillaries to transport reabsorbed substances;

c) i) Loop of Henle
ii) Collecting duct/ Distal convoluted tubule;

d) Kidney tubule becomes less permeable to water; less water reabsorbed into blood stream;
production of large amounts of dilute urine (thus diuresis)

2.

| Substance | Food substance being tested for | Procedure | Observation | Conclusion |
|---|---|---|---|---|
| S | Protein; | Take S in a TT add NaOH then CuSO4 dropwise; | Light blue; | Protein absent; |
| | Starch; | Take S in a TT add iodine solution; | Blue black; | Starch present; |
| T | Protein | Take T in a TT add NaOH then CuSO4 dropwise | Violet/purple colour; | Protein present; |
| | Starch | Take T in a TT add iodine solution | Brown colour; | Starch absent; |

(12mks)

3. a) i) - The leaf
ii) Q - Palisade cells
R - Air spaces
S - Xylem vessels
T - Phloem sieve tuves
U - Cuticle
W - Guard cell

b) -Xylem tissue
- Phloem tissue
i) Function –Photosynthesis
Adaptations - Numerous cells packed vertically to trap more light
- Have numerous chloroplast to absorb light for photosynthesis
ii) - Light intensity
- $P^H$ (reject PH)

c) Formula = Mg = $\frac{\text{L of image}}{\text{L of object}}$

Mg = X 5000

L of image = 3.5cm

L of 1 cell = $\frac{\text{L of image}}{\text{Mg}}$

= $\frac{3.5 \times 1000 \times 1000}{5000}$

= $\frac{3500}{5}$

= 700mu

## 2012 PROJECTIONS 019
## 231/3
## BIOLOGY
### PAPER 3

**MARKING SCHEME.**

**1.**

| **Food** | **Procedure** | **Observation** | **Conclusion** |
|---|---|---|---|
| **Starch** | To about $2cm^3$ of suspension M add after drops of iodine solution | No colour change / brown colour of iodine remains | Absence of starch ; |
| **Reducing sugar** ✓ | To about $2cm^3$ of suspension add equal amount of Benedicts solution and heat to boil ✓ Rej If benedicts is not in possessive form | The colour remain blue ✓ blue colour of benedict remains Rej: no colour change | Absence of reducing sugars ✓ |
| **Protein** | To about $2cm^3$ of suspension M add equal amount of NaOH and shake well. Slowly add 2 | On adding CuSO4 solution, a blue ring forms on the solution . On shaky the mixture turns | Presence of proteins ✓ |

| | | | |
|---|---|---|---|
| | drops of CuSO4 solution and shake✓ | purple ✓ | |
| **Non Reducing sugar** | To about $2cm^3$ of suspension M add equal amount of dilute hydrochloric acid. Heat to Boiling .Cool the mixture and then dropwise add NaHCO3; until fizzing stops ) ; Repeat the Test for reducing sugar. | On testing for reduce sugar the colour changes from blue to green yellow and finally to orange / brown | There is presence of non –Reducing sugar / presence Of reducing sugar after hydrolysis. |

***NB Award marks for benedicts test once***

b) Protease ; to digest protein or sucrase ; to digest sucrose

c) It neutralizes the excess hydrochloric acid after hydrochloric after hydrolysis of Non reducing sugars ;

2. a) i) B; Reason presence f a cell wall / central vacuole

ii) A ; Reason – Absence of a cell wall / vacuole scattered in the cytoplasm and absence of chloroplasts;

b) C – Nucleus
D – Mitochondrion ; Rej Mitonchondria
N – Vacuole ; acc central vacuole
W - Rough endoplasmic reticulum;

c) Photosynthesis;

d) i) Photosynthetic theory or

***5 marks for correct explanation***

ii) Actual length = $\frac{\text{Length in } \mu m \times 1000\ \mu m}{10{,}000}$

3. a) Reproduction ;

**b)**

| R | Q |
|---|---|
| Superior / hypogynous Ovary ; | Inferior / Ovary;Epigynous ovary |
| Monocarpous ; | Polycarpous / apocarpous / free capels |

;

c) A – Receptacle ;
B- Petal / corolla ;

C – Anther ;
D- Sepal / Calyx ;

d) The petals degenerate / weather and are shed ;
The ovary develop into a fruit ;
The ovules develop into seeds
The ovary wall develop into a pericarp;

e) Class – dicotyledonae ;
Reason – The floral structure (anthers ) are in five in Q and 12 ( multiple of 4) in R ;

## 2012 PROJECTIONS 020

**231/3**
**BIOLOGY**
**PAPER 3**
**MARKING SCHEME**

1. a) **ARTHROPODA**
**Reasons** : - Have jointed appendages
- Presence of exoskeleton
- Body segmented

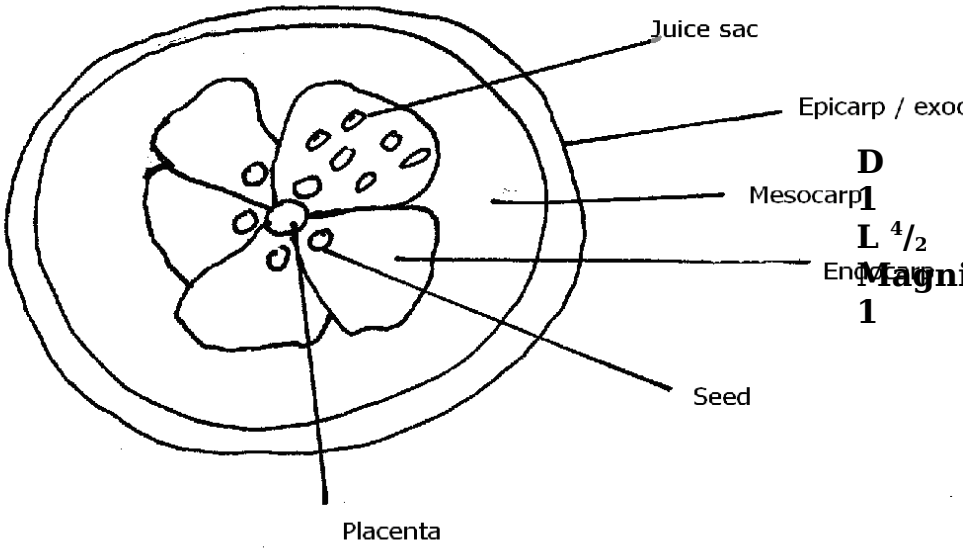
b) L : Class: ARACHNIDA
**Reasons**: - Body divided into 2 segments / cephalothorax and abdomen
- 4 pairs of legs / 8 legs

N : Class: CHILOPODA
**Reasons :** a pair of legs in each body segment.
- Has a pair of antennae
- Body dorso – ventrally flattened.

c) Wings for flying
Legs for walking
Muscular hindlegs for take off.

d) - Aerates soil by burrowing
- Recycling of nutrients by feeding on vegetation.

2. a)




**D = 1**

**L $^{4}/_{2}$ = 2**

**Magnification = 1**

b). i) Berry;
ii) It is succulent / fleshy;
iii) Axile ;

c) By animals/mammals; acc. Man.

d)

| **Food substance** | **Procedure** | **Observation** | **Conclusion** |
|---|---|---|---|
| **Vit. C / Ascorbic acid** | To 1cm$^3$ of DCPIP add juice dropwise | DCPIP is decolorized | Vit C, / Ascorbic acid present |
| **Reducing sugar** | To 1 cm$^3$ of juice add 1cm$^3$ of benedict's solution Boil/ warm/ heat/ put in hot water bath | Colour charges from blue to green to yellow / orange | Reducing sugar present |
| | | Blue to green | Traces of reducing sugar present |

4.

| **Specimen** | **Steps followed** | **Identify** |
|---|---|---|
| L1 | 1a,2a,3b,4a,7 | Bryophylum |

| | | |
|---|---|---|
| | a,8b | |
| L2 | 1a,2a,3b,4b,5b,6a | Bougainvillea |
| L3 | 1a,2a,3b,4b,5b,6b | Mongifera |
| L4 | 1a,2a,3b,4b,5a | Solanum |
| L5 | 1a,2a,3a | Zea |

b) Hairy / has hairs ( to reduce water loss)
Presence of thorns / spines / spikes / prickles (to prevent herbivorous animals/ Brawzers from
feeding on them.

## 2012 PROJECTIONS 021

**BIOLOGY PAPER 3**

# MARKING SCHEME

Q 1. a)
A – Vascular Bundle;
B – Palisade cell
C – Sponge mesophyll cell;
D – Air space;
E – Cuticle layer
F – Stoma;( reject stomatal)
G – Sub – stomatal air chamber
H – Guard cell;

$\frac{8}{2} = 4$

b) - Thinner outer wall and thicker inner wall; to form a curvature when the cells are turgid, opening the stoma
Accept the converse
- Have chloroplasts for photosynthesis, which lead to an increase in osmotic potential;

c) – Pneumatophores / breathing roots
- Lenticels

d) i) Terrestrial / Rainforest / savanna

ii) – Thin cuticle
- Large stomata

Q2.

| Food substance | Procedure | Observation | Conclusion |
|---|---|---|---|
| Reducing sugar √ | To solution T add Benedicts solution / solution Y;√ Heat √ | No colour change√ | Reducing sugar absent√ |
| Non-reducing sugar √ | To solution T add dilute HCl / solution X;√ Heat √ Cool √;Add $NaHCO_3$ until fizzing stops.Add Benedicts solution; Heat.; | √ Colour changes from orange / brown / brown red; Rej. Red; brick-red as final colour | Non-reducing sugar present |
| Vitamin C / √ A ascorbic acid | √ To 1cm $^3$ / 2cm$^3$ of D.C.P.I.P in a test tube, add solution T drop by drop | √ D.C.P.I.P decolorized | √ Vitamin C present |

16

marks. Maximum 14

N. B Award for adding benedicts and heating only once. Either at reducing sugar or non-reducing sugars.

Q3. a) Arthropoda

- Body segmented
- Have jointed appendages

b)

| Animal | Identify | Steps |
|---|---|---|
| A | Diplopoda; | 1b, 2b, 3b, 4b |
| B | Insecta; | 1a |
| C | Chilopoda; | 1b, 2b, 3b, 4a |
| D | Arachrida; | 1b, 2a |
| E | Crustacea; | 1b, 2b, 3a |

N.B

- Reject wrong spellings
- Reject steps if the order is interchanged e.g. 4b, 3b, 3b. 1b
- Accept steps, if correct, even if identify is not given.