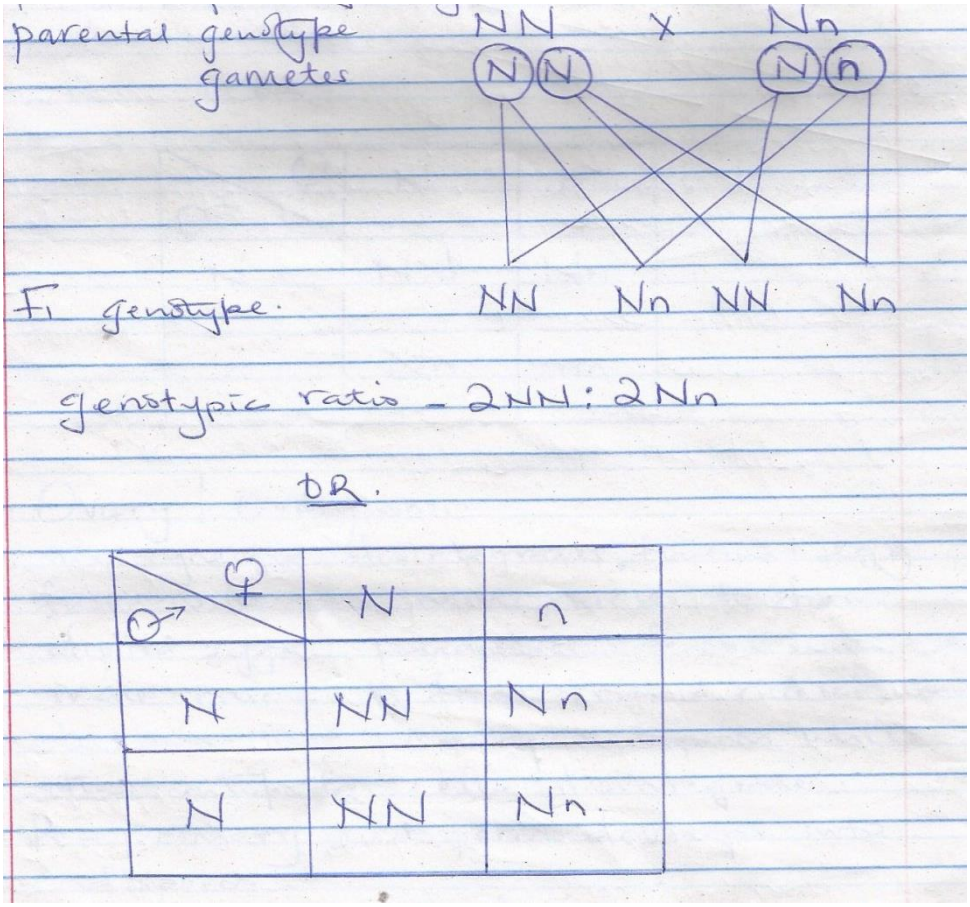
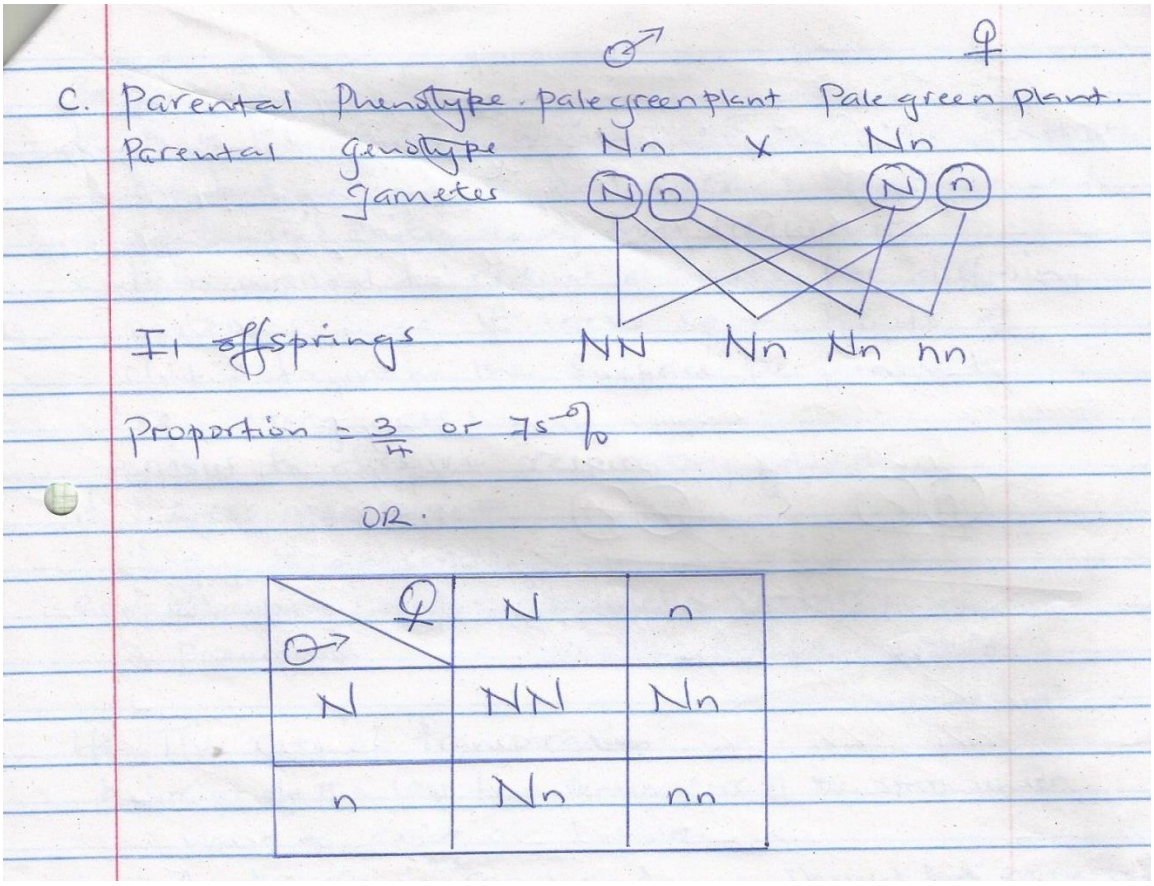
231/2 BIOLOGY MARKING SCHEME PAPER TWO

1. a) Lack of organism food; because plant (are white hence they lack chlorophyll, the plants cannot photosynthesis hence no starch is formed. The plant dies as soon as the food reserves are depleted.

   b) Parental phenotype green plants pale green plant



c) Parental phenotype palegreen plant palegreen plant.



2. a) Ovary / ovary wall.

b) The synergid disintegrates funtinal egg fuses with one male nuclei. To form diploid zygote. Polar nuclei fuses with one male nuclei to form triploid nuclei which becomes the primary endosperm while the antipodal cells disintegrates.

c) R – Primary endosperm develops into endosperm.
T – Testa – seed coat.

d) Anthers.

3. a) Spiracle.

b) R is the trachea which is air tubes that penetrates the body space carries oxygen to and carbon (iv) oxide away from

tracheoles.

c) Thin walled to reduce distance for diffusing ,molecules. Since it lacks spiral bands of chitin to make the surface permanent to respiratory gases.
Moist to dissolve respiratory gases.

d) i) Cell membrane.
ii) gill filament.

e) i) whooping cough – Bordetella pertussis.
ii) pnemonia – streptococcus Pneumoniae.

4. a) The rate of transpiration.

b) i) Cut off the last few centimeters of the stalk under water to avoid air bubbles.
- All the air in the capillary tubule should be expelled to avoid introduction of air bubbles xylem.
- Jelly should be applied around the stem and around the rubber bung to make the tube and rubber bung air tight.
- The end of capillary tubing should rest in beaker of water for continuity of water uptake.

c) temperature, Humidity, atmospheric pressure, light intensity.
d) Result in cooling of plants.
- serves to replace water lost through leaves.
- through the process, mineral salts and water are transported in plants.
- it is responsible for turgor in plants.

5. a) Herbivorous.

b) Structural – tooth J is narrow / sharp / chisel like while tooth is broad/ ridged.
Functional – tooth J is used for cutting and bitting while tooth L is used for grinding and crushing food.

c) i) Diastena.
ii) To allow manipulation of food by tongue, separating chewed and newly cut vegetation.

d) Calcium phosphate.
e) Homodont – organisms having same / similar kind/ type of teeth, hence same function.

Heterodont – organisms having different type /kind of teeth hence different function.

6. a) i) Axis – (2mk)
Scale (2mks)
Ploting – 1mk
Curve - 1mk

ii) 0.475% ± 0.05.

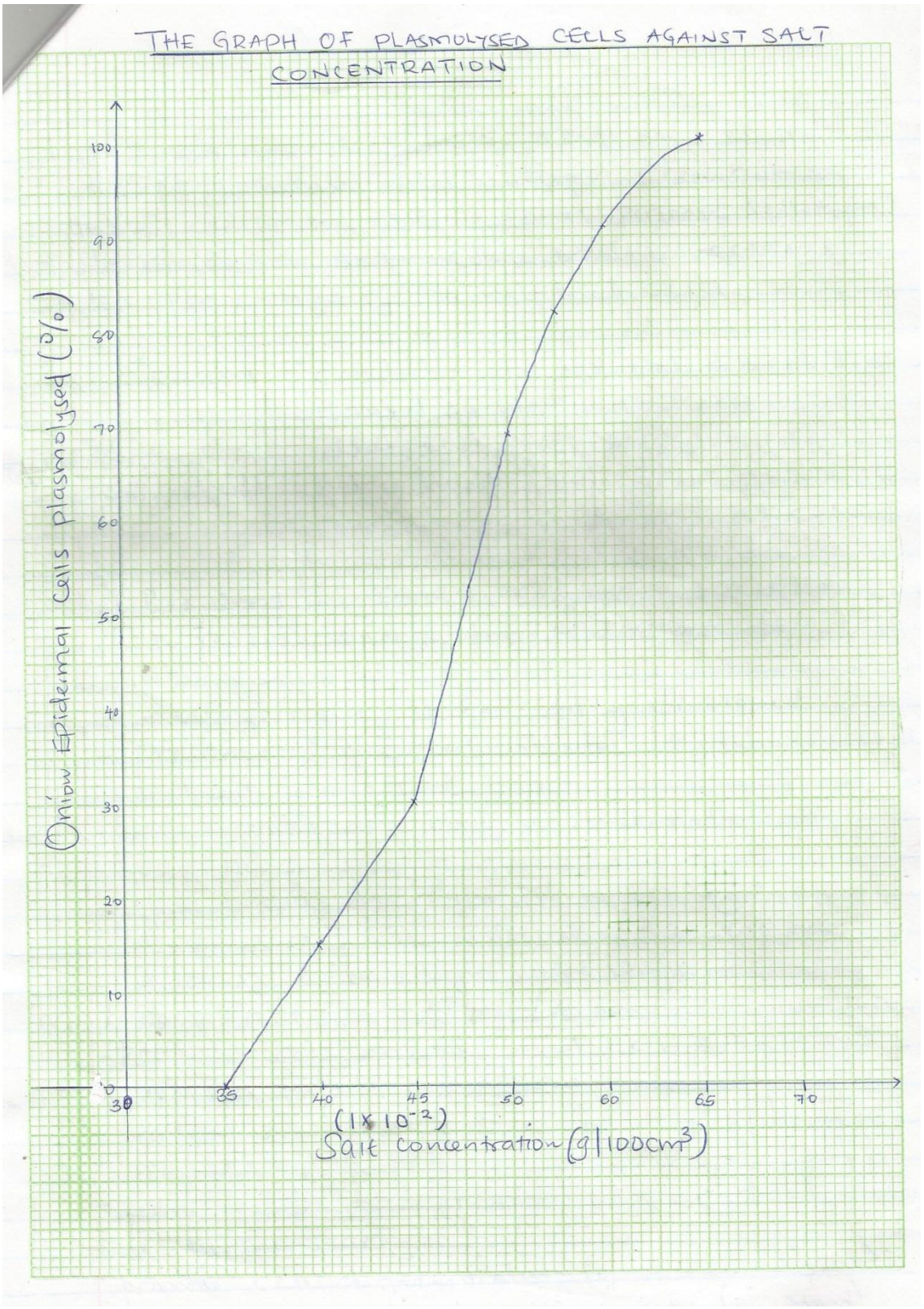
iii) 0.465% ± 0.05.

b) i) Concentration gradient between the hypertonic salt solution and the cell sap of the epidermal cell is low; but the salt is still hypertonic; to cause same cells to lose water by osmosis and hence get plasmolysis.

ii) Concentration gradient between hypertonic salt solution and the cell sap of the epidermal cell is very high; thus all cells loose water; by osmosis to the surrounding solution and get plasmolysis cells.

d) No; animal cell lack a cell wall and would therefore shrink and undergo crenation on loosing water by osmosis (to a hypertonic solution)

e) Increases in molar concentration increases the percentages of plasmolysis cells.


THE GRAPH OF PLASMOLYSED CELLS AGAINST SALT CONCENTRATION
Onion Epidermal Cells plasmolysed (%)
100
90
80
70
60
50
40
30
20
10
0
30
35
40
45
50
60
65
70
(1 x 10^-2)
Salt concentration (g/100cm^3)

7. a) i) Epigeal – cotyledon are bought above the ground surface when hypocotyl elongates then straightens .
Hypogeal – cotyledon remains below ground surface when epicotyl elongate and pushes out of the soil.
ii) Required in aerobic respiration / oxidation, to release energy from food reserve for germination.

b) – Embryo may not have fully developed .
- Presence of chemical inhibitors e.g (abscisic acid) Inhibit germination.
- Low hormone and enzymes concentrations – e.g gibberellins.
- Unfavorable environmental factors e.g low. Temperature which inactivates the enzymes, lack of certain light wave length.

c) Indole acetic acid/ AA / Auxins .
- Promotes cells division and cell elongation.
- promotes trophic responses.
- promotes formation of abscission layer/ bring about leaf fall.
- Promotes fruits formation without fertization i.e parthenocarpy.
- promote cell differential (of vascular tissue).
- promotes growth of adventitious roots (on stem)
- Cause epical dominance / inhibits growth and development of lateral buds.
- IAA + Cytokinn induce formation of callus tissue (during healing of woulds)

GIBBERELLINS.
- Promotes cells division/ cell elongation in dwarf varieties.
- Parthenocapy after fertilization.
- Promotes formation of side branches (of stem) and dormancy (in buds)
- Inhibits growth of adventitious roots.
- Activates (hydrolytic) enzyme during germination/ promotes germination of seeds hence breaks seed dormancy.
- Affect leaf expansion and shape /retard abscission.

CYTOKININS.
- Breaks dormancy (in same species)
- Promotes flowering in same species.
- Promotes cell division (in presence of IAA)
- Stabilizes protein and chlorophyll.
- Promotes roots formation.
- Low concentration encourages leaf senescence high concentrated protein increased cell enlargement.

- Promotes flowering (in same species)

ETHYLENE/ ETHENE.
- Stimulates lateral bud development.
- Ripening of banana/ fruits.
- Induces thicknening of stems / inhibits stem elongation.
- Promotes germination of certain seeds.
- Causes abscission of leaves / fruits fall.

ABSCISIC ACID ABA.
- High concentration of ABA causes stomata closure (by interfering with uptake of potassium ions.
- Inhibits germination / growth of embryo / cause seed dormancy.
- Causes abscission of leaves /fruits / leaf fall.
- Inhibits elongation growth inhibits sprouting of bud / induces dormancy in bud.

FLORIGENS.
- Promotes flowering
(maximum 15marks)

8. - The presence of :
   - The sclerotic layer or sclera; which contains tough connected tissue fibres which helps it to support and protect; the other parts of the eye ball;.
   - The choroids; which contains many blood capillaries which supply oxygen and nutrients to the retina; and removes metabolic wastes ; from eye; its highly pigmented; to prevent reflection of light within the posterior chamber of the eye ball;
   - The retina; which contains photoreptor cells called cones and rods; it is the light sensitive part of the eye ; cones ;are adapted for light and colour vision; while rods; are adapted are adapted for dim light vision;.
   - The vitreous humour; - it's a viscous fluid which is under pressure. It helps to maintain the shape of the posterior chamber of the eye ball; it also plays an important part in the reflection of light rays enabling them to be focused on the retina.
   - The cornea; is transparent t allow light into the eye; and is curved to refract light hence help in focusing of the image on the retina; if accounts for the largest refraction of light rays;
   - The aqueous humor; - contains oxygen and nutrients, which nourish the cornea and the lens. If is under pressure thus helping to maintain the shape of anterior chambers of the eye; it also plays a part in the refraction of light rays enabling them to be focused on the retina;.
   - The iris is heavily pigmented to prevent entry of light into the eye except through its central aperture called the pupil; It contains circular and radial muscles; which constricts or dilate the pupil: it contains circular and radial muscles which constrict or dilate the pupil depending on the intensity of light;.
   - The lens is elastic; therefore allows changes in its shape depending on the tension exerted through the suspensory ligaments; this enables it to bring light rays from either near or far objects into sharp focus on the fovea;.
   - The ciliary's body; contains the ciliary muscles whose contraction and relation alters the tension exerted on the suspensory ligaments; This is turn alters the shape of the lens enables it to focus for both near and distant objects;
   - suspensory ligaments; the eyelids which are movable and opaque structures can be closed through reflex action to protect the eye from too much light or from foreign objects;.
   - The eye muscles help to move the eye ball within the orbit; The lateral rectus muscles; move the eye up and down whole the oblique muscles the eyeball in its up and down movement;.
   - The lachrymal gland; which continuously secrets a watery, saline and antiseptic fluid called tears;. The tears moisten the cornea and wash foreign particles out of the eye.; ***(maximum 20 mks)***