5 copies

1(a) Water, 72.2% ;
(b) Cellulose ;
(c)(i) Proteins ;
(ii) - Proteins are converted to ammonia ;
- by Saprophytes / bacteria and fungi ;
- ammonia is converted to nitrites by nitrifying bacteria ; Acc. Nitrococcus & Nitrosomonas
- Nitrites are converted to nitrates by nitrifying bacteria / Nitrobacter ;
(ii) Urine contains more proteins / nitrogenous ; compounds which yield more nitrates ;

2. (a) Geotropism ; Rej wrong spelling. +ve -ve geotropism
(b)(i) The shoot tip / plumule curved upwards ; root tip / radicle curved downwards ; Acc. bending Rej growing
Tied
(ii) Auxins migrated downwards / to the lower side ; Higher concentration of auxins on lower side ; caused more growth on the lower side than on the upper side in shoots / inhibited growth on the lower side than upper side in roots ;
(c)(i) The seedling will continue growing horizontally ; Rej laterally
(ii) There was even distribution of auxins in the tip ;

3 (a) Parents RW x KWW ;

Gametes R W W W ;

;

Offspring

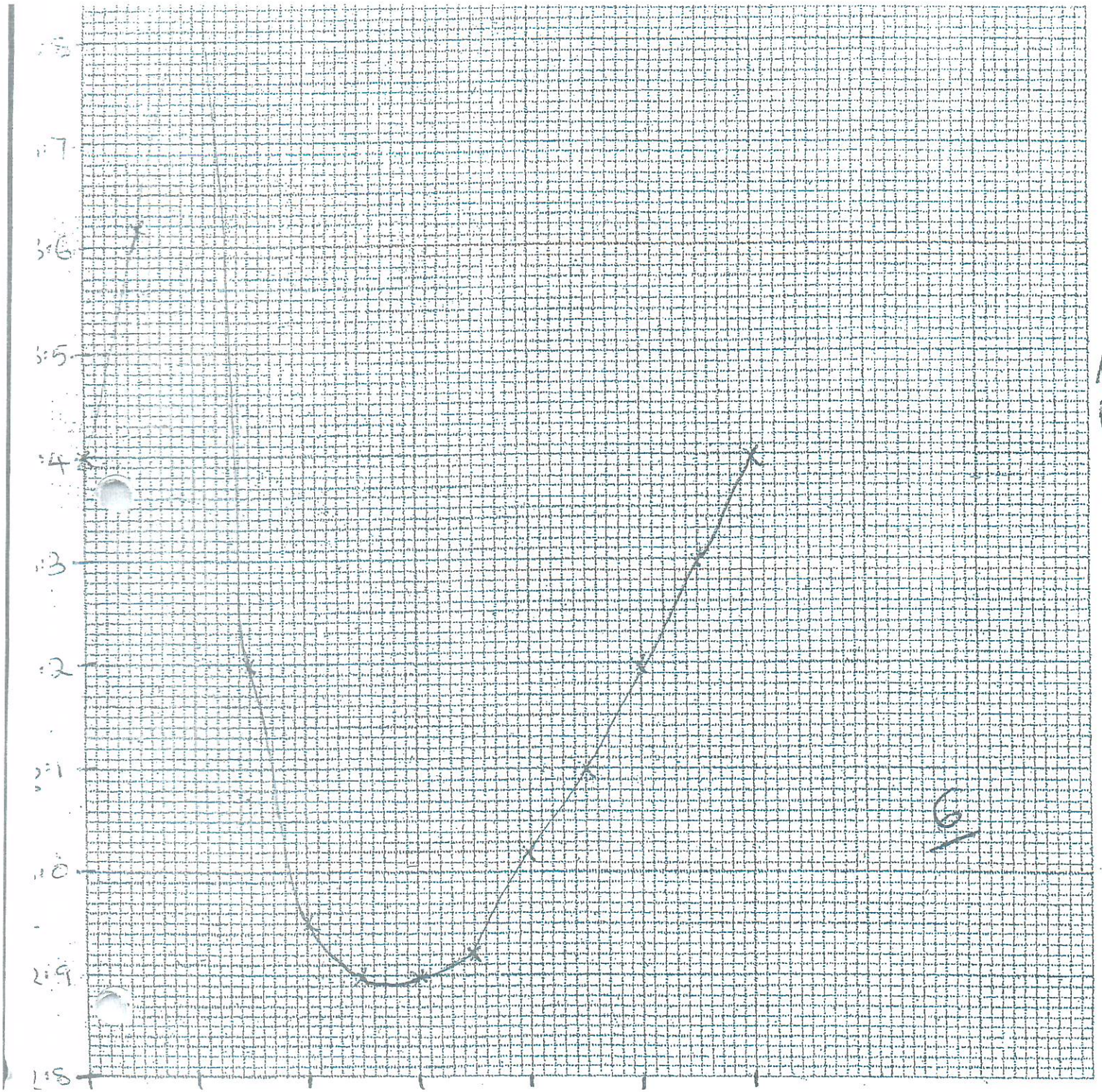
- Gametes circle should be complete
- Fusion lines must
- Punch gametes
- Not penetrate
- Must not touch.

Genotypic ratio rej. 2:2
1 RW : 1 WW
Phenotypic ratio
1 Pink flowered : 1 white flowered ;

(b) - Produces large number of offspring ;
+ has many observable contrasting characteristics ;
- short life cycle ;
- offspring can be crossed with parents ;

4. (a) A - Chromatid ; Acc. Chromosome rej. Plural.
B - spindle fibres ;
C - Homologous chromosomes Acc. Bivalent
(b)(i) Cell Y ;
(ii) - Homologous chromosomes have paired ;
- chiasmat have been formed ;
(c) (i) Anther ; } Should be labelled on diagram
Ovary/ovule ; } - rej. Plural/wrong spelling
(ii) - Large petals to attract insects ;
- stigma located above the anthers ;

5 (b) Continents existed as one large land mass ; Acc: Pangea
The current continents drifted leading to isolation / seperation of organisms ; Organisms in each continent evolved along different lines ;
(a) A situation where organisms have homologous structures / structures with a common embryonic origin which are modified to perform different functions ;
(c) Assists to eliminate disadvantageous xstics / perpetuate advantageous xstics.



scale 1X2=2

Axes 1X2=2

Plotting −1

Curve −1

(M)

6

6

SECTION B

6(b) Carbon(IV) oxide concentration at 4 am = 3.5×10^{-2}%
Acc. 3.48 - 3.52.

Rage of change = $\frac{(3.9 - 3.5) \times 10^{-2}}{3}$;

$= 1.33 \times 10^{-2}$ / hour ;
Acc. 0.0013 % / hr.
Ref. without units.

(c)(i) Rapid decrease in CO_2 concentration ;
Due to utilisation of CO_2 in photosynthesis due to increase in light intensity ;
(ii) CO_2 conc. remains almost constant ;
Photosynthesis rate is equal to respiration rate ;
(iii) Increase in CO_2 conc. ; Rate of photosynthesis drops due to decrease in light intensity ;
Respiration produces CO_2 which accumulates ;

(d)(i) - Wind/air currents ; - Temperature ;
- Light intensity ; - Soil water ;
(ii) - Wind blows CO_2 avoiding its accumulation around the plant ;
- Light intensity affects rate of photosynthesis hence rate of CO_2 consumption ;
- Temperature affects rate of photosynthesis hence CO_2 around the plant ;
- Water affects rate of photosynthesis hence accumulation of CO_2 around the plant ;

7.(a) CO_2 / O_2 / water vapour diffuse through the stomata/lenticels ✓
- Some toxic wastes are converted to non-toxic substances ✓ and deposited in certain tissues of the plant / stored in ageing structures ✓
- Resins/tanins are exuded through the bark of the stem / lost during leaf fall ✓

7(b) When Osmotic pressure is high:
- When the OP of blood rises ~~/ decreases~~ beyond the normal range/level the (osmoreceptors in) hypothalamus ✓ detects and stimulates the ~~hypothalamus~~ pituitary gland ✓
- to secrete more ADH / vasopressin ✓
- which makes the kidney tubules more permeable to water ✓
- And more water is reabsorbed into the bloodstream
- Reducing the OP to the normal level ✓
- When there is too much sodium ions in the blood adrenal cortex responds by secreting less aldosterone ✓
- Which causes less Na^+ to be reabsorbed from the kidney tubules into blood ✓
Lowering the OP to normal level.

When OP is low:
When OP is low (the osmoreceptors in) the hypothalamus detects and the pituitary gland is less stimulated
- And secrete less ADH/vasopressin ✓ which makes the kidney tubules less permeable to water ✓ less water is reabsorbed into the blood stream ✓

When there is too little Na^+ ions in the blood adrenal cortex responds by secreting more aldosterone

7(b) be absorbed from gut into the bloodstream;

8(a) - Reproduces (asexually) by budding;
- (under favorable conditions) a small area of the cell wall of the parent cell softens and forms a projection of bud;
- The nucleus divides by mitosis into two;
- One of the daughter nucleus moves into the new bud;
- The bud increases in size and forms new organelles then detaches from parent cell;

(b) - Secondary thickening is facilitated by meristematic cells;
- Known as Cambium;
- located between phloem and xylem in vascular bundles of the plant;
- (vascular cambium divides radially to form a ring of cambium tissue;
- with the xylem inside the ring and phloem outside the ring;
- Cells of cambium ring divide to form secondary phloem ~~outside~~ outside;
- And secondary xylem on the inside;
- Interfascicular Cambium / Cambium between vascular bundles divides to form secondary parenchyma which becomes medullary rays;
- Much more xylem is formed than phloem;
- Thus pushing phloem outwards;
- Cork cambium is a layer of meristematic cells beneath the epidermis;
- Division of cork cambium cells forms secondary cortex on the inside and cork cells on

- The walls of cork cells become coated with suberin and die (they increase in number and become the bark of the stem);
- The bark prevents water loss, infection from fungi and damage by insects;
- In some areas cork cells form a loose mass known as lenticels for gaseous exchange;
- The rate of secondary growth in stems varies with seasonal changes resulting in annual rings;