NYANDARUA WEST CLUSTER EXAMINATION
BIOLOGY PP2 MARKING SCHEME 2018

1 a) L- root hair
K- Xylem (2mks)

b).water moves from the soil into the root hairs by osmosis; because the cell sap has higher solute concentration than the surrounding soil water; the root hair cell sap becomes dilute than the cell sap of the adjacent cells; hence water moves to this adjacent cell by osmosis, this process continues as water enters the xylem of the root ; (4mks)

c) i) water - osmosis
ii) Mineral salts –active transport (2mks)

2 a) Initially the rate of reaction increases with increase in substrate concentration ;after sometime , the rate of reaction remains constant; (2mks)

b) i) More and more active sites of enzymes become occupied with substrate leading to increase in reaction rate . (1mk)

ii) All active sites of enzymes have been occupied by substrate hence saturation point is reached. Excess substrate has nowhere to occupy hence remain in the solution i.e enzyme concentration becomes limiting (1mk)

c) – By increasing the amount of enzyme ;
- By removing the products ;
- By adding enzyme co-factors and co-enzymes;

d) - Enzyme inhibitors;
- Temperature;
-pH;

3 a) i) Protoctista; rej -wrong spelling
-if it starts with a small letter
ii) single-celled eukaryotic organism

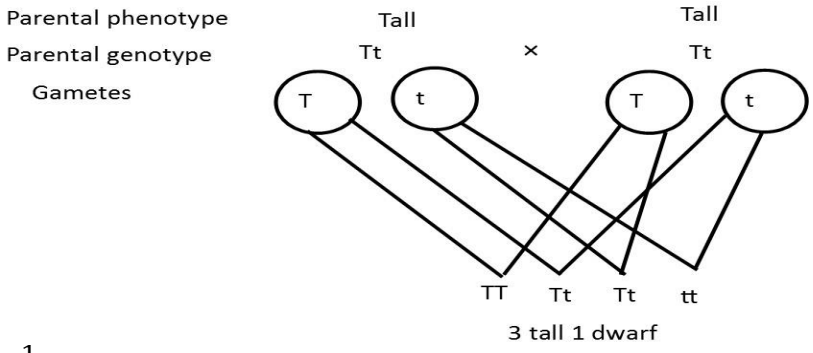
b) the membrane forms pseudopodia which is extended to surround; and engulf the food particles and then form a food vacuole

c –food spoilage;
-recycling of nutrients in the ecosystem through decomposition thus clean the environment;
-causes diseases in plants and animals;
-production of medicines;
-spoilage of fabrics and leather shoes;

4 a) i) sensory neuron
ii) Motor neuron
b) Effector organ-skeletor muscles, glands receptor organ-eye, ear, tongue, skin;
c) i) adrenaline
ii) increased metabolic rate; skeletal muscles contract and relax;arterioles to the skin and gut constrict;
iii) prepares the body to cope with the emergency situation;

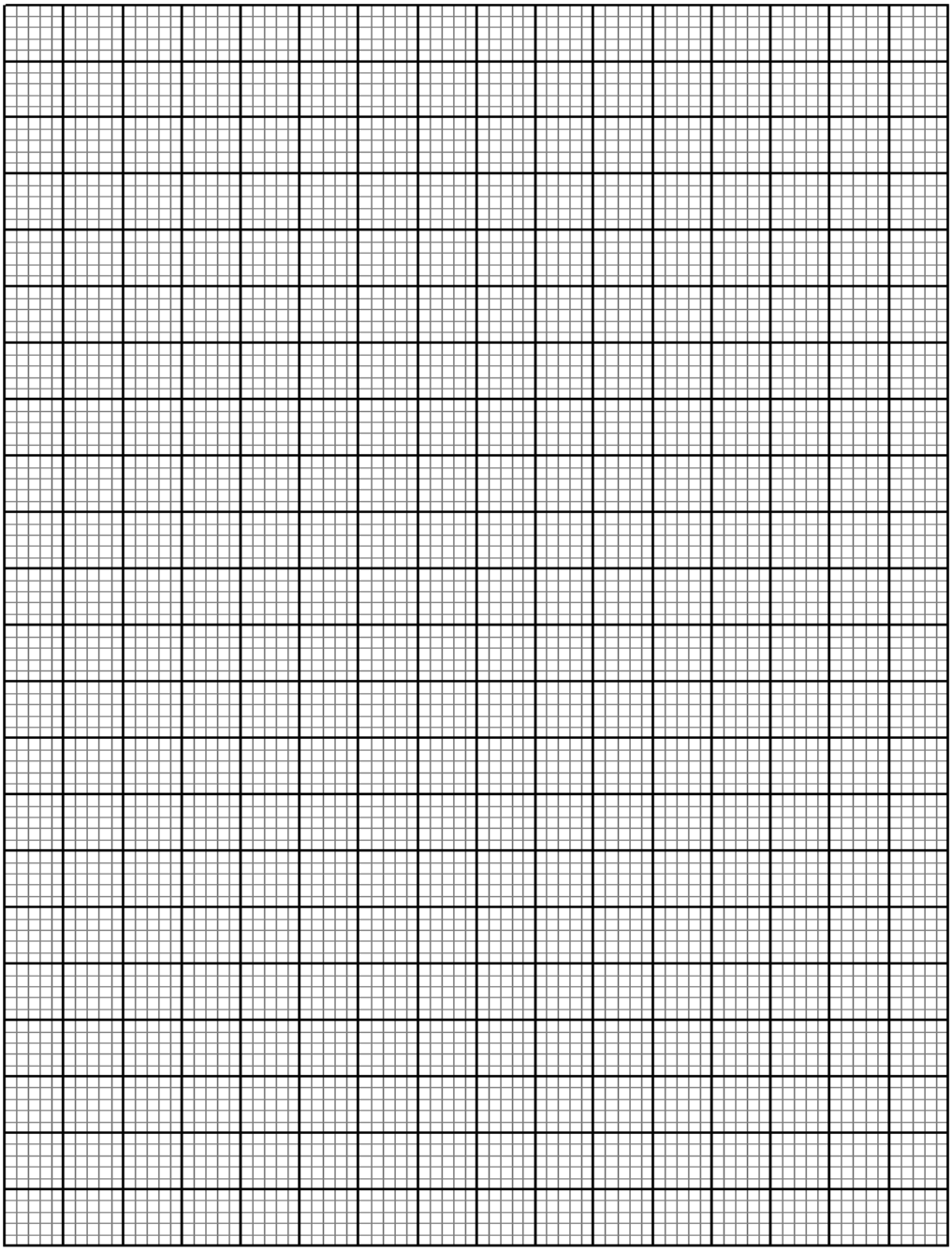
5 a) the gene for tallness must have been dominant over the gene for dwarf ness thus dwarfness was not expressed in the fi generation.

b)



$\frac{1}{4}$ Of the f2 plants are dwarf.
$\frac{1}{4}$×1780=445 dwarf plants

c) a testcross is a cross between individuals of unknown genotype with an individual of homozygous recessive genotype;
6) i)



ii) 0.41

iii) 88

b) i) all the cells were haemolysed; this is because the concentration was hypotonic to the cytoplasm of the red blood cells; water molecules moved into the red blood cells by osmosis; they swell and burst open

ii) No haemolysed cells because the salt concentration is isotonic to the red blood cell cytoplasm; the red blood cells neither lost or gained water molecules; hence the number of cells remained the same;

c) The solution is hypertonic to the red blood cell cytoplasm; water molecules will move from red blood cells by osmosis; the red blood cell will became crenated;

d) Uptake of water by the plants from the soil;
Maintain turgidity of cells by herbaceous plants;
opening and closing of stomata;

7) –has cornified layer made of dead cells; which protect the body against entry of bacteria; also reduces desiccation and protects the inner tissue against mechanical damage;
-the Malpighian layer contains actively dividing cells; that give rise to new cells hence replace old worn ones; also contains melanin the black pigment that protects the body;
-has sebaceous glands which secrete sebum that is antiseptic ; hence protect the body against invasion by micro-organisms and also keeps the skin supple and prevents it from drying;
-contains many blood capillaries which supply the skin with oxygen and nutrients and also remove waste products from the skin; blood vessels also help in temperature regulation where superficial arteries vasodilate when temperature rises above normal to encourage heat loss as more blood flows near the skin surface; when the body temperature drops below normal superficial arteriole in the vasocontricts thereby becoming narrow and less blood passes through them and this reduces heat loss;
-has sweat glands that become stimulated when hot; to produce sweat which evaporates causing a cooling effect as latent heat of vaporization is lost;
Has erector-pilli muscle that regulates body temperature; when body temperature rises erector-pilli muscles relaxes reducing the angle of hair follicle; the hair on the skin lie flat hence less air is trapped and this encourages heat loss; when temperatures are low erector-pilli muscle contract; hair follicle straightens hair erects trapping a layer of air ; air is a bad conductor 0f heat and hence acts as an insulator;
-contain various nerve cells that run through the muscles and glands; to detect changes and create awareness.

8) a) are plants growing in desert or semi-desert
-leaves are modified to spines or thorns to reduce s/a over which transpiration occurs;
-some shed their leaves during the dry season to reduce surface area exposed for transpiration
-some fold their leaves to reduce the rate of transpiration
- have sunken stomatas which accumulate moisture hence low diffusion gradient thus reducing transpiration rate; some have reduced number of stomatas thus reducing transpiration rate; since the surface for water loss is reduced.
-some have reversed stomatal rhythm; to prevent excessive water loss through transpiration.
- some have very deep roots to absorb water from deep soils
-some have superficial roots which grown horizontally close to the soil surface; to absorb water after a short/ light shower of rain.
-some have thick waxy cuticle; to minimize the rate of cuticular transpiration.
-possession of parenchyma cells in swollen stems and leaves for storage of water.

b) –they grow in fresh water
- have large air-filled tissues for buoyancy and gaseous exchange
- their leaves are numerous and have sensitive chloroplast that photosynthesize at low light intensity
- Floating plants have long fibrous roots to absorb mineral salts
- Some have poorly developed roots lacking root hairs to reduce the absorption of water;
-flowers are raised above to allow for pollination;
-some have broad leaves with many stomata on the upper surface to increase transpiration;
-Some have hair-like structures to keep water away from the leaf surface;
-submerged hydrophytes plants have highly dissected leaves to increase s/a for photosynthesis and gaseous exchange;