WAKISSHA JOINT MOCK EXAMINATIONS
MARKING GUIDE
Uganda Advanced Certificate of Education
BIOLOGY P530/2

Qn 1. a) (i) Nephron:

- From 2.5mm to 5mm; **the concentration, gradually / slowly increase slightly** from 300mOsm/l to 400mOsml in the cortex;
- From 5mm to 12.5mm/12.0/13 the concentration of the glomerular filtrate increase rapidly; from 400mOsm/l to 1200mOsm/l in the medulla;
- From 12.5mm to 16mm; the concentration of the glomerular filtrate increases gradually / slight slow to ; at a peak of 1200mOsm/c in the inner medulla;
- From 16 to 20mm; concentration decreases gradually / slowly / slightly in the inner medulla;
- From 20mm to 25mm, the glomerular filtrate concentration decreases rapidly in the medulla from 1200mOsm/c to 400mOsm/c. 20 to 22 – inner medulla
  22 to 24 – outer medulla.
- From 24mm to 30mOsm/c, the glomerular filtrate concentration decreases gradually from 400mOsm/l to 100mOsm/c within the cortex.

Note:
Candidate should describe concentration .... Either decreasing
5monto 10onm – outer medually
10mm for 12.5mm – inner medulla
Rej 5-12mm and without units
Candidate losses all marks if quotes wrong range/ out of range.
Allow deviation in figure/ range ± 1.0
Reak allow deviation of 1000

10 marks

(ii) Collecting duct;
Initially at 3mm the concentration is low at 300mOsm/l with the cortex.
From 3mm to 4mm the concentration increases rapidly with in the cortex.
From 4mm to 7.5mm the concentration increases rapidly with in the outer medulla.

Between 3mm to 15mm the fluid concentration increase rapidly from 300mOsm/l to 1200mOsm/l, the rapid increase rapid in concentration occurs in the outer medulla.
From 7.5mm to 11mm the concentration with in the inner medulla increase / rapidly.
From 11mm to 16mm the concentration increases gradually with in the inner medulla up to the maximum.

Between 15mm to 30mm the fluid in the collecting duct reaches it highest at 1200mOsm/l and remains constant which occurs within the inner medulla.
From 16mm to 31mm the concentration remains almost constant.

Total = 07 marks.

b) **Explanation:**
The concentration increases slightly due to the less loss of water; from the glomerular fitrate at this region the nephron is less permeable; to water;

Concentration increase rapidly because the surrounding fluid is more concentrated ;than the glomerular fitrate hence there is excessive loss of water; from the fitrate; increasing the concentration of the filtrate; this region of the nephron is more permeable to water;

In the inner medulla, the surrounding fluid is very concentrated; thus there is much loss of water; from the glomerular fitrate; the nephron is also impermeable to salts;

From 20mm to 24mm the glomerular filtrate concentration decrease rapidly because is the region the nephron is impermeable; to flow of water; but permeable to the flow of salts; the loss of salts lowers the concentration of the glomerular fitrate;

The more salts lost from the glomerular filtrate; the lower the concentration of the fitrate; in the outer medulla; and the cortex;

Total 10 marks

(ii) Collecting duct
In the cortex and outer medulla; the surrounding fliud is more concentration; so there is a rapid much loss of water; from the collecting duct; to the surrounding fluid;
In the inner medulla; the concentration of the fluid within the collecting duct is almost the same; as that in the surrounding fluid; the concentration remains constant; because the two fluids concentration are the same / equal; so there littles or no loss of water; from the C.T

@ ½ mark
Total = 06 marks

(c) (i) Similarities between concentrations in fluids in vazarecta and collecting duct.
- In the cortex both concentration are low.
- In the inner medulla, concentrations is highest./ maximum
- In both, concentration of fluids increase up to a maximum.
- In both the concentration of the fluid increases rapidly at first with in outer medulla.

Reject peak Any 3 @ 1 mark

(ii) Explanation for the observed similarities.
The vasazecta ensues that the concentration gradient in the different regions of the kidney is maintained ;by not removing/ taking away; any salt from any of the region which facilitate continuous exchange of materials; between the nephron, collecting duct and the kidney tissues.

@ 1 mark
Total = 3 marks

(iii) Other functions performed by the kidney
- Protein synthesis e.g. aquaporins
- Selective secretion.
- Regulating blood volume/ pressure.
- Regulation of blood pH
- Selection of hormones renin.

Any 1 mark

2. a) Similarities
- Embryo sac enclosed in the ovule
- Sporophyle is dorminant and gamelophyle reduced

- Separate male and female spores
- Pollen tube present *Any 4 @ 1 mark*
- Fertilized embryo sac develops into a seed / sexual reproduction
- Xylem and phloem present

Differences

- Angiosperm	Gymnosperm
- Ovule protected in ovary	- ovule unprotected
- Stigma and style present	- absent.
- Cones absent.	- Cones present.
- Fruits formed after fertilization	- no fruits formed
- Companion cells present in phloem	- no companion cells.
- Xylem has tracheids and vessels	- only tracheids in xylem, no vessels.

If student used flowers, present mark, reject any other point concerned to flower.

b) (i) The virus becomes attached onto the surface of the bacteria via tail fibes
- The viral DNA is provided into the bacterium.
- Viral DNA incorporates itself into bacterial DNA strand.
- Bacterial DNA replication ceases
- Viral DNA component synthesis begins.
- Host enzyme and synthetic systems are used to produce viral proteins coats
- Viral DNA cause host systems to produce lysis enzymes to break down host cell wall, releasing new viruses.

(ii) Importance of bacteria
- Decomposition and recycling of plant and animal remains
- Symbiotic relationships, in gut, fix N_2
- Food production e.g. cheese, yoghurt, tea.
- Manufacture of leather, linen, soap powder.
- Antibiotic production *Any 6 @ 1 mark*
- Research and study
- Cause diseases

3. a) Structure and function

(i) Areolar tissue.
- Fibroblasts – secreting
- Protein matrix collagen fibres and elastic fibres.
- Macrophages – mopping cell foreign bodies.
- Mast cells – anti coagulants.
- Fat cells – store fat. *Max 7 marks*
- Collagen fibres – censile strength
- Elastic fibres – allow stretching and function.
- Connects organs to other tissues.

Award marks for drawing of structure are well labeled.

(ii) Striated Muscle.
- Elongate fibres - allow considerable contraction
- Parallel fibres - Give maximum contractile effect
- Fibre ends tapered and interwoven – provide strength.

- Large number of mitochondria – provide ATP.
- Actin and myosin arrangement in sarcomere – allows contraction by filament slight over each other.
- Rich supply of blood vessels – provide adequate supply of oxygen and glucose.
- Myoglobin present – a store of oxygen.
- Motor end plates – allows stimulation of muscle.
- Fibre arranged in molor units – it allows variable degree of contraction.
- Multinucleated.

½ marks tied for structure and its description
½ for function.
Max – 9 mariks

b) Variety of function of proteins is due to variety of structure; which is also due to the infinite arrangement; of amino acids in a protein chain and the different means of folding/ bonds in the protein chain;
variety of bonds / folding e.g sulphide, ionic , salts.
Infinite arrangement of aonion acid.
Variety in structure primary, secondary,……
Example ½

4. a) A receptor is a group by cells tissue / organ (one cell); detect and that transforms; various form of energy/ stimuli; into action potentials; impluses informs the CNS; of external; and internal changes;.

@ ½ mark
Total = 04 marks

b) Features of a receptor
- transforms energy into action potential/ transduction
- specialized in structure and function.
- Creates generator potential.
- Has a threshold value of stimulation.
- Becomes adapted.
- Sensitive to low intensity stimulation.
- Precision/s.

Any 5 @ 1 mark
Max = 5 marks

c)
- Sound energy hits the tympanic membrane after being collected by pinna.
- tympanic membrane vibrates.
- Ear ossicles maleus, incus stapes amplify vibrations to the oval window.
- Vibrations transmited across organ of corti in the inner ear.
- Different sound frequencies take different routes / median
- Endolymph in the organ corti vibrates i.e. cochlearcanal, vestibular and tympanic canal
- Sensory cells between basilar and tectorial membranes veissneus are stimulated.
- Action potentials generated in the sensory hairs pass into the cochlea nerve which forms the auditory nerve.
- Impulses taken to the brain via auditory canal for interpretation.

1 mark @
Max = 12 marks

5. a) Formation of vascular tissues.
Meristematil cells form actively dividing tissue which gives rise to the cells required for growth, the apical menstem is located at the stem tip and other dividing cells form a broken cylinder called the cambium situated inside the stem.

The cells are small, regularly shaped, have dense cytoplasm and with thin elastic walls.

To form the xylem, newly formed cells elongate and vacoulate. They lose their cytoplasm, their end walls breakdown and ligin is deposited in the side walls either through annual, reticulate or whole thickening.
To form the phloem, sieveplates are formed by partial break down of the horizontal cell wall contents are retained, companion cells are formed alongside the sieve tubes.

Max 12 marks

b) (i) Linkage is the association of two or more allelse; so that they tend to be passed from generation to generation as an inseparable unit; and fail to separate; during independent assortment;

@ ½ mark
(2 marks)

(ii) The different frequencies of the allels in the proceeding generation are as a result of greater selection against; the haemophilliac allel; than the colour blind allel;.
The haemophilliac allel is potentiallt lethal; thus individual haemophilliac have less chance; if surviving to sexual at units ; ad less chance of passing it to their off springs;
Some haemophilliacs orcarries of disease choose not to have children incase their offspring are affected.
Colour blindness may however be passed on by carrier and colour blind females and the condition is not as lethal as haemophilia.

6. a) Man's influence on the habitat
- Population fluctuate in stable environment by because of peaching, introduction of alien species, interference with nature causing populations to crash or use.
- Increase in human population resulting into encroachment in swamps and forests
- Deforestation/lumbering.
- Over grazing.
- Mechanization of agriculture
- Pollution.
- Constructions.
- Introduction of wild life animals/game parks, reserves.
- Mining
- Quarrying
- Bush burning

Any 12 well discussed
@1mark

b) (i) Effect of long term use of pesticide.
- Overall decrease in yields
- Increase in number of pests./Pest resurgence
- Increase in different kinds of pests.
- Ineffectiveness of the pesticides

- Decrease in bio diversity/Death of organisms.
- Biomagification effects.

Any 4@1mark

(ii) long term effect of global warming.
- Melting of snow ice caps.
- Avalanches of the floods.
- Increase in sea level.
- Unstable soil structure resulting into landslides.
- Increase in local temperatures resulting into drought.
- Increase in diseases.

Any 4@1mark

END