WAKISSHA JOINT MOCK EXAMINATIONS
MARKING GUIDE
Uganda Advanced Certificate of Education
UACE August
BIOLOGY P530/1

1	B	11	B	21	D	31	A
2	A	12	C	22	B	32	C
3	B	13	A	23	A	33	B
4	~~C~~ A	14	B	24	B	34	D
5	D	15	D	25	B	35	B
6	B	16	B	26	~~D~~ C	36	D
7	A	17	B	27	~~B~~ D	37	D
8	C	18	B	28	D	38	B
9	D	19	C	29	B	39	A
10	~~C~~ A or B	20	B	30	D	40	C

SECTION B

41. (a) (i) Is the pressure exerted by the protoplasm against the cell well ; due to osmotic uptake of water

(ii) Maintains shape and form of plant ;
Holds herbaceous plants upright ;
Holds plant leaves in a flat and horizontal position ;
Important in cell enlargement and consequently stretching of stems ;
~~Control~~ Control opening ~~and closing~~ of stomata ;

(b) (i) Stomata remain closed ; as $C0_2$ accumulates in the leaf because of no photosynthesis ; Accept either no photosynthesis or CO_2 accumulation

(ii) Stomata remain open ; as $C0_2$ produced inside the leaf is used in photosynthesis ;

42. (a) ~~Have~~ Triploblastic coelamate; ~~Have~~ ~~Metamerie~~ segmentation ; Have Exoskeleton ; Have jointed appendages ~~Limbs~~ Are bilaterally symmetrical possess an open circulatory system reject segmented legs / malpighian tubules

(b) Muscular movements of the gut wall can be separated from muscular movement of the body, as coelom separates gut from body wall.
Provide a cavity in which organs can grow, and function independent of each other.
Increase in size and complexity is possible ;
~~Acts~~ functions as a hydrostatic skeleton in annelids ,
Coelmic fluid may circulate food and waste materials ;

(c) Final body size is limited, as surface area to Volume ratio ~~increases~~ due to rigid body ,
It restricts growth ; ~~Moulting~~ due to rigid skeleton is required if the animal is to grow; ~~Which~~ ~~makes~~ during moulting animal vulnerable to attack by predation; Limits flexibility during locomotion; because it is rigid; Max
limits exchge of materials between the organism and the environment

43. (a) (i) X oestrogen ;
Y Progesterone ;

(b) (i) The levels of oestrogen increase; While those of progesterone decrease ; Increase in the levels of oestrogen makes the uterine walls more sensitive to oxytocin, Which makes the uterine muscles contract;

(ii) Bring about growth of the mammary glands, in readiness for lactation ;

(c) In the male the hormones are produced uniformly all the time, Whereas in females they are produced in waves; C give rise to the menstrual cycle.

44. (a) having various thresholds ,
Adaptation,
Spontaneous activity , enable it make a response to astimuli of very low intensity.
Summation ,

(b) (i) Rate of conduction is faster in Rats than lizards ; as Rats are endothermic; Maintaining a higher body temperature ; for diffusion of ions,

(ii) myelination increases rate of conduction of impulse, as the myelin sheath is an insulator, impulses jump from one node of ranvier to another;

45. (a) (i) disruptive selection ;

(ii) Selection favours individuals at the extremes ;
And eliminates intermediates ,
Giving rise to two phenotypic forms ;
Which increase variation,

(b) Increased size leads to increased selection pressure ; on food space mates etc
Organisms better adapted survives and pass on their genes to the next generation; While the less adapted are eliminated ;
Over time those that survive become the majority and give rise to a new species ;

46. (a) important for activity of enzymes,
Important for formation and action of hormone,
Muscular contraction,
Nerve impulse transmission ,

(b) Plants have a lower metabolic rate,
Plants synthesise organic compounds as material become available ,
Structure of plants based on carbohydrates rather protein
CO_2 and H_2O easily excreted by gaseous diffusion,

(c) The vessels run parallel to the loops of Henle , As a result blood in the vasa recta comes into equilibrium with solute in each part of the medulla, so blood gains ions in the descending loop and gives it in the ascending loop;

END

Qn 1. a) (i) ~~Cortex:~~ Nephron

- From 0 to 5mm the concentration, increase slightly from 300mOsm/l to 400mOsml in the cortex.
- From 5mm to 12.5mm the concentration of the glomerular increase rapidly from 400mOsm/l to 1200mOsm/l in the ~~outer~~ medulla.
- ~~From 12.5mm to 20mm the concentration of the glomerular filtrate remains/ almost constant at a peak of 1200mOsm/c in the inner medulla.~~
- From 20mm to 25mm, the glomerular filtrate concentration decreases rapidly in the ~~outer~~ medulla from 1200mOsm/c to 400mOsm/c.
- From 25mm to 30mOsm/c, the glomerular filtrate concentration decreases gradually from 400mOsm/l to 100mOsm/c within the cortex.

10 marks

(ii) Collecting duct;

~~The~~ Initially at 3mm the concentration is low at 300mOsm/l with the cortex.

~~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.~~

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.

b) **Explanation:**

The concentration increases slightly due to the loss of water from the glomerular fitrate, at this region the nephron is permeable to water but salts.

Concentration increase rapidly because the surrounding fluid is more concentrated than the glomerular fitrate hence there is ~~exercise~~ excessive loss of water, from the fitrate, increasing the concentration of the filtrate.

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 25mm the glomerular filtrate concentration decrease rapidly because ~~is~~ in this ~~the~~ region the nephron is impermeable, to flow of water, but permeable to the flow of salts, thus the loss of salts lowers the concentration of the glomerular fitrate.

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

(ii) Collecting duct

In the cortex, the surrounding fluid, is less concentrated so there is little loss of water from the fluid as the duct, more thus the outer medulla, the surrounding fluid concentrated increases so more water flows out of the collecting duct increasing the concentration. In the inner medulla the surrounding fluid is much concentrated causing much loss of water by osmoisis of the surrounding tissue.

(c) (i) Similarities between concentrations in fluids in vasorecta and collecting duct.

- In the cortex both concentration are low.
- In the inner medulla, concentrations is highest.
- In both, concentration of fluids increase up to a maximum and then decrease.

(ii) Explanation for the observed similarities.

The vasorecta 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.

(iii) Other functions performed by the kidney

- Protein shynthesis e.g. aquaporins
- Selective secretion.
- Regulating blood volume. / Pressure
- Regulating blood pH
- secretion of hormones

2. a) Similarities

- Embryo sac enclosed in the ovule
- Sporophyte is dorminant and gamelophyte reduced
- Separate male and female spores
- Pollen tube present
- Fertilized embryo sac develops into a seed.
- 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
- Compainion cells present in phloem	- no companion cells.
- Xylem has tracheids and vessels	- only tracheids in xylem, no vessels.

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 application ceases
- Viral DNA component synthesis begins.
- Host enzyme and synthetic systems are used to produce viral proteins coats
- Viral DNA cause host systems to ... host cell wall ...

CamScanner

(ii) Importance of bacteria
- Decomposition and recycling of plant and animal remains
- Symbiotic relationship.
- Food production e.g. cheese, yoghurt, tea.
- Manufacture of leather, linen, soap powder.
- Antibiotic production
- Research and study
- Cause diseases
- free living bacteria fix Nitrogen into the soil / Bio fertilizers.

3. a) Structure and function

(i) Areolar tissue.
- Harvezian canal contains blood vessels for nounshment and never fibres for co-ordination
- Canaliculus contains osteocytes
- Endosteum for strength and support.
- Volkman canal links haversian canal to circumferential lamellae
- Periosteum, a dense connective tissue for strength and support
- Interstitials lamella for strength and support.
- Lacum contains osteocyles
- Schafer fibre, a collagen fibre holding periosteum to underlying bone.
- Outer circum ferential lamellae
- Haversian system containing harvezian canal.

(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 motor units – it allows variable degree of contraction.
- Multinucleated muscle fibres.

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 in the protein chain.

4. a) A receptor is a group of cells (one cell) that transforms various form of energy into action potentials, informs the CNS of external and internal changes.

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

max. 1 — Vibration
1 — transmission

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

12 marks

5. a) Formation of vascular tissues.
Menstemate cells form activity dividing tissue which gives size to the cells required for growth; the apical menstem is located at the stem up 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 vacuolate, They lose their cytoplasm, their end walls breakdown and ligin is deposited in the side walls either through annual, reticulate or whole.
To form the phloem, sieveplates are formed by partial break down of the contents are retained companion cells are formed alongside the sieve tubes.

Max 12 marks

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

(2 marks)

(ii) The different frequencies of the allels in the proceeding generation are as a result of greater selection against the haemophilliac allele than the colour blind allele;
The haemophilliac allele is potentiallty lethal; thus individual haemophilliac have less chance of surviving to sexual molarity ad less chance of passing it to their off springs;
Some haemophilliacs carriers 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 marks

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

Any 12 @ 1 mark

b) (i) effect of long term use of pesticide. - bioaccumulation

- Overall decrease in yields
- Increase in number of pests. / Pest resurgence.
- Increase in different kinds of pests. / Pest resistance
- Ineffectiveness of the pesticides
- Decrease in biodiversity / death of untargetted pests.

(ii) long term effect of global warming. @ 1 mark 2 mks.

- Melting of snow ice caps.
- Avalanches of the floods.
- Increase in sea level.
- Unstable soil structure resulting into landslides.
- Increase in local temperatures. / drought
- Increase in diseases.
- Change in rain patterns due to increased evaporation

END