BONDO SUB-COUNTY SECONDARY SCHOOLS JOINT EVALUATION TEST - 2015 231/1 BIOLOGY Paper 1 July/August- 2015

MARKING SCHEME

2.

- 1. Antigen B; rej. Small b
- Antigen Rhesus; (1mk)
 - (i) for strength / to transmit weight of stationery animal to the rest of body; (1mk)
 - (ii) for attachment of muscles (to maintain posture and flex spine); (1mk)
- 3. (a) Situation where organisms have homologous structures / structures with common embryonic origin but modified to perform different functions; to adapt organisms to different functions; to adapt organisms to different habitats / niches; (1mk)
 - (b) Standing upright / erect posture ; high intellectual capacity / thinking capacity hig; communicate through speech / language; acc correct comparison (2mks)
- 4. Body covered with dry scaly skin;
 - Majority have four limbs with snakes having no limb
 - Eggs have leathery shell (to reduce desiccation)
 - Have lungs for gaseous exchange
 - Heart is three chambered two atric and partially divided ventricle or four chambered;

(3mks)

- 5. (a) L Glycogen granule; rej Plural
 - K Vacuole; (2mks)
- 6. (i) Root; (1mk)
- (ii) Shoot; (1mk)
- 7. (i) Moves the body through small distances to bring image / specimen / object into sharper focus;
 - (ii) Concentrates light (from mirrow) into object on stage; (2mks)
- 8. (i) to keep it open / provide mechanical strength
 - (ii) to propel dust / bacteria / mucus out of trachea. (2mks)
- 9. (a) Sclerenchyma;
 - (b) thickened with lignin;

Has tapered ends (tracheids); (3mks)

10. (a) (i) Primary consumer;

(b)

Ticks		
Wild beak		
Grass	(1	lmk

- 11. (a) (i) <u>Schistosoma mansoni;</u>
 - (ii) <u>Treponema pallidum;</u> (2mks)
 - (b) (i) Swellings in veins due to weakened / defective valves resulting into accumulation of blood;

1

(ii) Formation of (a blood) clot in the blood vessels; (2mks)

231/1 Biology

12.	(a)	(i) Sucrose ; (2mks)
		(ii) Starch;
	(b)	Pollisade;
		Spongy; (2mks)
13.	(a)	Burst / break drum to release lytic enzyme; to digest dead and worm out cell organelles;
	(b)	Form spindle during cell division/ formation of cilia and flagella; (1mk)
14.	(a)	Active transport / Diffusion; (1mk)
	(b)	Osmosis ;(1mk)
15.	(i)	$10 \ge 2 = 20$;
		$11 \ge 2 = 22$
		= <u>42</u> teeth; (2mks)
	(ii)	Heterodont;
		Reason – Has different types of teeth; OWTTE.
16.	(a)	(i) Dicotyledonae; rej wrong spelling Dicot, dicotyledonae
		(ii) Vascular bundles arranged in (concentric) ring around the pith; presence of pith;
		(1mk)
17.	(a)	Aerenchyma (tissue); (2mks)
		Pneumatophores; rej breathing roots
	(b)	Have large air spaces for circulation of air / gaseous exchange; (1mk)
19.	(a)	Structures from the same (embryonic) origin / ancestry but modified to perform different
		functions; (1mk)
	(b)	Structures that have ceased to function over long period of time hence become reduced in
		size; (1mk)
20.	(a)	Chemotropism
	(b)	Negative photo taxis;
	(c)	Haptonasty / Thigmonasty;
21.	(a)	Genetic engineering;
	(b)	Reproduce of very fast; hence producing more lormures;
22.	(a)	(i) Currents sound waves to sound vibrations; transmit sound vibrations to ear
		obscicles;
		(ii) Currents vibrations into impulses (for hearing)
	(b)	More sweat produced; but does not evaporate; due to humid conditions, hence more leaf
22	Done	reas secreted insulin hormone, hormone activates liver calles to convert evenes always to
23.	ranc	teas secreted insumi normone, normone activates river cens; to convert excess glucose to

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glycogen fats / increase in the rate of metabolism to break down glucose into energy; (3mks)

24.	1	-	$X^{n}Y$; (1mk)	
	2	-	$X^{N}Y$; (1mk)	
	6	-	$X^{N}X^{n} / X^{N}X^{N}$; (1mk)	

25.

28.

Sensory neurone	Motor neuron
Transmit impulses from receptors to CNS	Transmit impulses from CNS to effectors; (1mk)

- 26. Ability to fly;
 - Can inhabit most types of habitats;
 - Have varied mouth past for feeding
- 27. (a) Plasmolysis (1mk)
 - (b) (i) Strong salt solution; (1mk)
 - (ii) The salt solution passed through the cell wall because it is fully permeable; but cannot pass through the cell membrane which is semi permeable; (2mks)
 - Protect the seeds; As a storage organ; Aids in seed dispersal; Max (2mks)
- 29. (i) Decomposition / recycling of nutrients;
 - (ii) requlate population of he prey / herbivores; (1mk)
- 30. Reabsorption of salt and sugar in kidney nephrons;
 - Absorption of digested food;
 - Excretion of waste products from body cells
 - Sodium pump in the nervous system

BONDO SUB-COUNTY SECONDARY SCHOOLS JOINT EVALUATION TEST - 2015 231/2 BIOLOGY Paper 2 July/August- 2015

MARKING SCHEME

1.	(a)	 (i) Caterpillars; ✓ Aphids; ✓ Mice; ✓ Slug: ✓ 	
		(ii) Primary consumers; \checkmark 3mks	
	(b)	(i) Plant \longrightarrow Caterpillars \longrightarrow Insectivorous birds \longrightarrow Hawk	
		(ii) Plant \longrightarrow Aphids \longrightarrow Beetle \longrightarrow Insectivorous birds \longrightarrow H	Hawk
		Plant \longrightarrow Slug \longrightarrow Frogs \longrightarrow Snakes \longrightarrow Hawk (2mks)	
	(c)	- Lightening provide high activation energy; which causes Nitrogen to combi	ne with
		oxygen forming various oxides of Nitrogen; The oxides combine with rain v	vater to
		form nitric acid; The acid sinks in soil and reacts with various salt ions to fo	rm
		nitrate salts; (3mks)	
		Total 08 marks	
2.	(a)	W is Soda lime; Absorbs any carbon (IV) oxide present / produced by the animal; (2mks)
	(b)	- To maintain the temperature of the flask where the animal is at constant / ro	om
		level; (1mk)	
	(c)	(i) - There will be a rise in the level of coloured water;	
		(ii) - The animal respires using up oxygen in the flask and producing carb	on (iv)
		oxide which is absorbed by the soda lime; The air pressure in the fla	sk
		falls; causing the atmospheric pressure to push fluid up the capillary	tube;
		(3mks)	
	(d)	- Body size;	
		- Sex of individual;	
		- Health;	
		- Basal metabolic rate;	
		Mark first two Total 08mks	
3.	(a)	- Round seed – Mm;	
		- Wrinkled seed – mm: (2mks)	
	(b)	- Round seed parent (M) and (m) // M and m ;	
		- Wrinkled seed parent m and m // all m; (2mks)	
	(c)	Round Seed Wrinkled seed	
		Genotype Mm x mm	
		Gametes M m m m	
		F1 Mm Mm mm ;	

@-2015 Bondo Sub-county Academic Committee 1

231/2 Biology

(c)

5.

Genotypes	Mm	and	mm
Phenotype	Round		Wrinkled
	Seed		Seed; (3mks)

(d) A situation where there are more than two genes occupying the same gene locus, but only two form a pair in a diploid cell; (1mk)

Total = 08 marks

- 4. (a) Excess amino acids are deaminated / amino group is removed; and converted to ammonia; Ammonia combined with carbon (IV) oxide in ornithine cycle to form Urea; carbohydrate group is converted to glucose for respiration / glycogen for storage; (3mks)
 - (b) Glomerulus;
 - Bowman's capsule;
 - Proximal convoluted tubule;
 - Distal convoluled tubule; (2mks)

Mark first two

- (i) Carboxyhaemoglobin;
- (ii) Carboxyhaemoglobin does not dissociate easily; thereby reducing the capacity of haemoglobin to transport oxygen; (3mks)

Total – 08 marks

- (a) Broad and flat lamina / leaf to provide large surface area for absorption of gases;
 Thinness allows gases to pass through short distance;
 - Presence of stomata ensures efficient diffusion of gases
 - Presence of air spaces for easy diffusion of gases; (3mks)

Mark first three

- (b) Has ring of cartilage which is hollow for passage of air; and keep it open allt he time;
 - Has Cilia that move mucus / particles to the top of trachea / pharynx;
 - Has mucus to trap dust / solids particles and micro organism (Acc. Microbes / Pathogens / bacteria / Virus / microscopic fungi) (3mks)
- (c) Has hairs / mucus secretion which trap solid / foreign particles;
- Air is warmed as it enters the lungs to conform with body temperature
- 6. (a) Graph of rate of reaction against P^H, of the enzymes



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- Enable them to move away from predators / enemies / hostile _ environment
- Enable them search for better breeding places;
- Enable them to search for mates; (8mks)
- Carbon (IV) oxide from the respiring cells of the biceps muscles diffuse into the (b) blood; within the venule bed of capillaries; where it forms weak carbonic acid; in the plasma; and carbominohaemoglobin in the RBCs; From here blood moves into a (branchial) vein; which joins the subclavian vein; that connects with (superior) vena cava:
 - From the vena cava the blood containing carbon (IV) oxide enters the right auricle / atrium; The right auricle contracts to push blood into the right ventricle; via the tricuspid valve;
 - Blood from right ventricle is pushed into pulmonary artery; via semi lunar valve; from the pulmonary artery the blood enters the capillary system on the lung alveoli at the arterial bed; At this point carbonic acid and carbonmonohaemoglobin dissociates; to release carbon (iv) oxide; which diffuses across the capillary wall and wall of alveoli into the alveolar cavity; (12mks)

Total 20mks

- 8. The process of cell division is mitosis where two daughter cells each having the same number of chromosome as parent is formed;
 - It involves behavior of chromosome which occur in various stages
 - The first stage is interphase; here there is multiplication of genetic material (so that daughter cells have the same number as parent cell); there is also synthesis of new cell organelle; and build up of energy to drive the cell through the process;
 - The cell gets into a prophase stage; where the centrioles separate and move to opposite poles of the cell; spindle fibres begin to form; the nuclear membrane begin to disappear; the chromosomes shorten and thickens; and chromatids become visible;
 - At metaphase stage; nuclear membrane disappears completely and chromosomes appear free in the cytoplasm; The spindle fibres lengthens; and chromosomes align themselves at the equator of the spindle / cell; The chromosomes attach themselves to the spindle by their centromere;
 - During anaphase stage; the chromatids seperate at the centromere and migrate to opposite poles; this is due to shorteneing of spindle nfibres; spindle fibres begin to disappear; cell plate forms and grows to separate the cell into two;
 - The cell merges into the last stage called telophase; where chromatide collect together at the two opposite poles of the cell; The nuclear membrane forms around each set of chromatids; chromatids replicates and become chromosome;

BONDO SUB-COUNTY SECONDARY SCHOOLS JOINT EVALUATION TEST - 2015 231/3 BIOLOGY Paper 3 July/August- 2015

MARKING SCHEME

- 1. (i) Tissue in L1 should be shorter tham 3cm
 - Tissue in L2 should be longer than 3cm
 - tissue intest tube F (blank) should be 3cm. (3mks)
 - (ii) L1 is hypertonic to the cell sap of potato tissue; and therefore water moves out of the cells into L1 by osmosis; the cells become plasmolysed and flaccid and thus leads ro shrinking and decrease in length of the potato tissue;
 - E L2 is hypotonic to the cell sap of the potato tissue cells; the cells therefore gain water by osmosis; and become turgid leading to increase in length of the tissue; (3mks)
 - (iii) It acted as a control experiment (1mk)

(iv)

Food substance	Procedure	Observation	Conclusion
Starch	To cm3 of the food	Blue back colour seen	Starch is present
	substance in a test tube add 2		
	drops of iodine solution and		
	shake;		
Reducing Sugar	To 2cm3 of the food	Colour changes from	Reducing sugar present
	substance in a test tube, add	blue to green, to yellow,	
	2cm3 of Benedict's solution,	Orange or brown;	
	Heat to boil;		

2. (a) (i)

Specimen	Food	Reason
А	Aquatic matter and small invertebrates	Wide shovel shaped beak
В	Nectar	Long, thin beak
С	Nuts	Short, thick strong beak
F	Flesh	Strong sharp curved talons /claws

(4mks)

(6mks)

	(ii)	
Part	Habitat	Reason
D	Aquatic	Webbed feet for swimming / wadding
E	Tree branches	Long feet / toes for grasping / perching

(4mks)

 (b) (i) Divergent evolution; Reason: Similar basic structure and embryonic origin but modified into different forms / appearance; (2mks)

1

(ii) Enable the organisms / animals to utilize different ecological niches; to avoid competition for food; (2mks)

3. $Q - Self dispersal; \checkmark$

- Reason Dihisent / line of weakness for opening;✓
- R Wind dispersal; \checkmark
 - Reason Presence of the parachute for floating in air; \checkmark
- S Animal dispersal;√

	Reason – The fruit is succulent / Juicy;✓	(6mks)
(b)	Q- Marginal Placentation; S-Parietal placentation;	
	T – Basal Placentation;	
	U – Axile Placentation;	(4mks)
(c)	Berry;	
	Reason - has got fleshy / succulent mesocarp; (2mks)	
		(2mks)