JINJA JOINT EXAMINATIONS BOARD

MOCK EXAMINATIONS 2023

BIOLOGY – 553/1

MARKING GUIDE

SECTION A (30 MARKS)

1	D	11	B	21	D
2	A	12	A	22	D
3	D	13	B	23	C
4	C	14	C	24	D
5	A	15	A	25	C
6	C	16	D	26	A
7	D	17	C	27	D
8	B	18	D	28	A
9	C	19	B	29	D
10	D	20	B	30	A

SECTION B

31. (a) (i) The dry mass of endosperm decreases because the food reserves are hydrolyzed/broken down. And the products transported to the embryo; the rate of respiration also increases during germination; using up food stores in the endosperm; the dry mass of embryo increases because there is synthesis of new material as it grows; (5 marks)

(ii) Endosperm physiological activities

- Proteins are hydrolyzed to amino acids;
- Lipids are hydrolyzed to fatty acids and glycerol;
- Carbohydrates are hydrolyzed to glucose;
- There is oxidation of a glucose and lipid in respiration. (4 marks)

Embryo physiological activities

- Protein synthesis;
- Cellulose synthesis;
- Enzymes are formed; (3 marks)

(b)(i) Germination is the process by which the seed embryo emerges and develops into a

seedling, which is capable of establishing itself as a new independent plant with favorable conditions; (1 mark)

(ii) Epigeal germination; In this type of germination, the cotyledons are brought above the ground due to elongation of the hypocotyl; more than the epicotyl; for example, in cow peas.

Hypogeal germination;
The epicotyl elongates faster that the hypocotyl; resulting in the plumule being pushed upwards above the ground; leaving the cotyledons still enclosed within the seed coat below the soil surface; (max 3 h)

32. (a)

G- stele of conducting strands;

H- cortex;

I- Lateral / axillary root;
J- Root hair;
K- Meristem region;
L- Root cap; **(6 marks)**

(b) Zone P;

(c) Zone O; (2 marks)

(d) (i) – Absorb water and mineral salts from the soil; (1 marks)

(ii) – Protect the delicate meristem cells which are dividing and growing; (1 mark)

- Enable root to push through the soil as it grows down; (anyone)

33. (a) 178.2;
183;
11;
588;
7.5;
33;

(b) (i) Antidiuretic hormone (vasopressin) or ADH;

(ii) Osmosis;

(iii) Pituitary gland;

(c) (i) Water;

(ii) Urea;

(iii) Glucose;

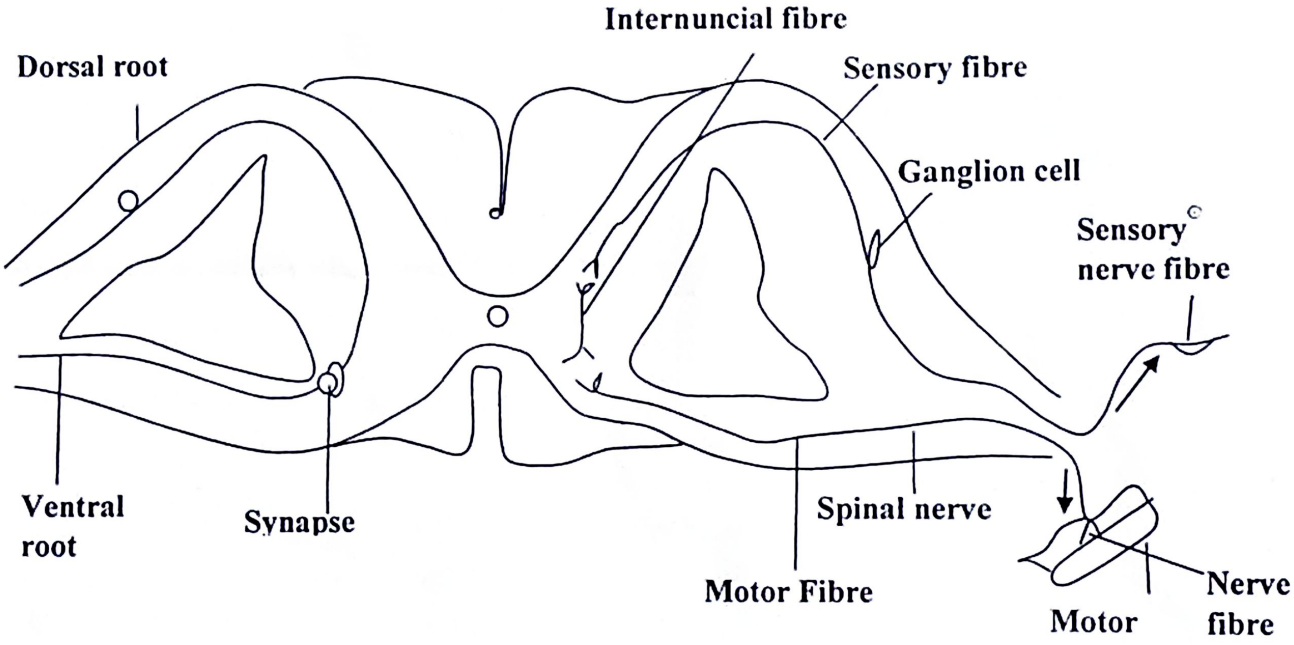
(d) (i) Excretion;

(ii) Osmoregulation;

SECTION C (30 Marks)

34. (a) A reflex action is an automatic response to a stimulus;

(b) A CROSS-SECTION OF THE SPINAL CORD AND THE ARRANGEMENT OF THE NEURONS IN A REFLEX ARC:



(c) (i) When an object such as a hand or insect approaches the eye, it blinks; This involves the eyelid moving down rapidly in an attempt to prevent damage to the eyeball;

(ii) If one attempts to pick up a very hot object, the sense cells in the skin and hand either drop the object or withdraw the hand from the object; This relaxation and contraction of certain muscles is a reflex action designed to protect the skin from burning;

(iii) The iris reflex, reducing light intensity or increasing light intensity; thus protecting the retina;

(iv) Rapid inhaling of air and then coughing; to remove phlegm;

(v) Rapid exhaling of air, by sneezing; to clear the nasal passages;

(any 2; 4 marks)

35. (a) (i) Photosynthesis is the process by which living plant cells with chlorophyll manufacture complex organic materials mainly in form of carbohydrates from simple inorganic materials like carbon dioxide and water using sunlight energy trapped by chlorophyll, releasing oxygen as a by-product;

(ii) Carbon dioxide;
Chlorophyll;
Light;
Temperature;
Water;
Mineral salts;

(b) The function of the dicotyledonous leaf is photosynthesis and it is adapted in the following ways;

→ The leaf has a large surface area to capture as much sunlight as possible;
→ It is thin which enhances light penetration to all photosynthesizing cells it has;
→ The leaf has numerous palisade cells packed with chloroplasts and near the upper epidemis to trap most of the incoming light;
→ The mesophyll cells in the leaf have chloroplasts which adjust position in order to absorb light efficiently;
→ The leaf has numerous stomata that allow diffusion of gases into and out of it;
→ The stomata on the leaf can open and close to enhance entry of carbon dioxide for photosynthesis but also prevent water loss;
→ The leaf has spongy mesophyll cells with many air spaces which enhances diffusion of gases between the atmosphere and palisade mesophyll for an efficient process;
→ The leaf has a large central midrib with xylem and phloem tissue; the xylem permits water and mineral salts to enter the leaf; and the phloem carries away sugar solution;
→ A leaf has a network of small veins that further enhance the constant supply of water for photosynthesis and removing the sugar produced;
→ The leaf and others on the plant are arranged in such a way that they do not close off the other from sun light;

36. (a) (i) Arteries carry blood away from the heart; (1 mark @)

(ii) Veins carry blood towards the heart;

(iii) Capillaries carry blood through the tissue of the body;

(b) (i) The artery walls are thick. and muscular; to withstand the high pressure; They are elastic; so they can expand and contract as the blood pulses;

(ii) The vein walls are thin; since there is little pressure to burst them;

They are non-elastic;

They are large in diameter; since the blood pressure is too low to force it through narrow tubes;

(iii) They are very small in size; so they can penetrate to all parts of the body;

Their walls are made of single flattened cells; so that materials can easily diffuse through them to and from the blood and the cells outside;

In this way the cells of the body are supplied with the materials that they need and get rid of their waste materials;

(c) A double circulation consists of two cycles; so that blood has to pass twice through the heart before returning to the body;

One cycle takes blood from the left side of the mammal heart, around the body and back to the right side of the heart;

The second cycle takes blood from the right side of the heart through the lungs and back to the left side of the heart;

The circulation around the body is called the systemic circulation;

That around the lungs is the pulmonary circulation;

37. (a) (i) Competition refers to a phenomenon whereby members of the same or different

species share limited resources including nutrients, light, space, or mates;

The weak competitors normally are displaced by the stronger ones;

Sometimes members of closely related species may occupy different niches in the same environment limiting competition;

(ii) Predation refers to a relationship whereby one organism kills another for food;

The predator is the one which kills while the prey is the one killed for food.

Predators may have various adaptations for instance moving fast, strong teeth, good eyesight and camouflage; and prey may also display camouflage, mimicry and fast movement;

(iii) Parasitism is a feeding relationship whereby one organism obtains nutrients from another organism without killing it;

The one organism which obtains is called a parasite; and the one that provides is called the host;

A parasite living inside an organism is called an endoparasite; while one living outside is called an ectoparasite. (3 marks)

(b)(i) Tape worms have suckers or hooks on their heads for attachment to the intestinal wall of the host;

(ii) Tapeworms have flattened bodies that offer a large surface area for absorption of soluble nutrients across the body wall;

(iii) They secrete a lot of mucus and anti-enzyme substances that protect them from the digestive actions of the host's enzymes;

(iv) Each tapeworm can produce millions of eggs that remain infective for long periods of time ensuring successful transmission to the next host;

(v) They can respire anaerobically and therefore can derive the very low oxygen concentrations in the host gut;

(vi) They employ intermediate hosts is that enhance the efficiency of transmission from one host to another; (Primary and secondary hosts)

END