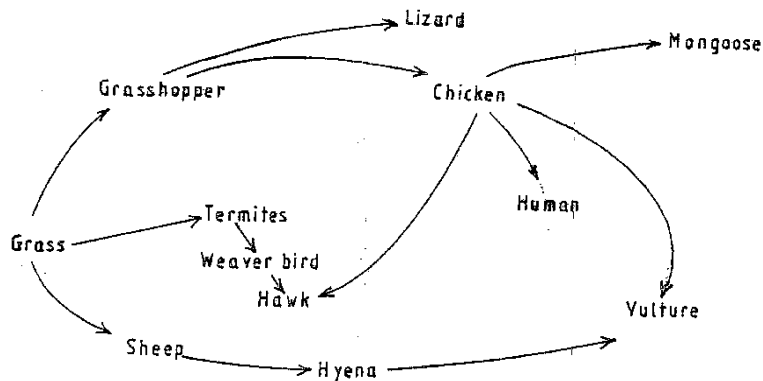


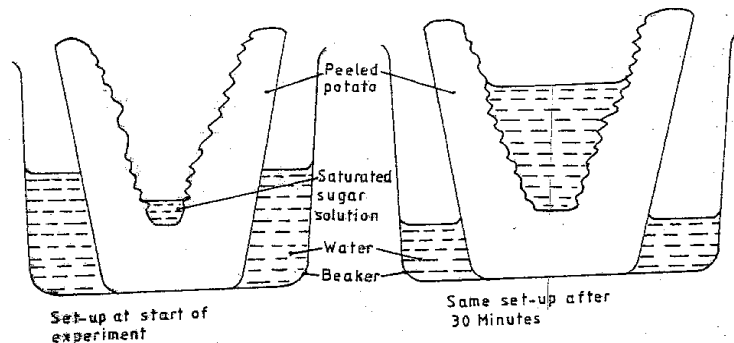
**THE YEAR 2011 KCSE KNEC EXAMINATION
BIOLOGY 231
PAPER 1**

1. Name two kidney diseases.
2. (a) Write the dental formula of an adult human.
3. Give three reasons for classifying organisms.
4. State one use for each of the following apparatus in the study of living organisms.
 - (a) Pooter
 - (b) Pitfall trap
5. The figure below illustrates a food web in a certain ecosystem.



From the food web:

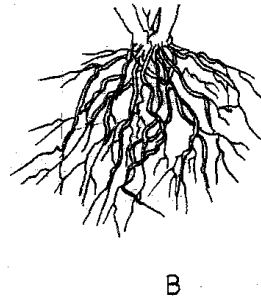
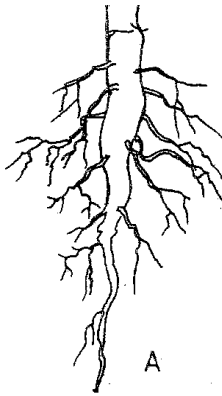
- (a) Draw the shortest food chain;
 - (b) identify the organisms with the highest
 - (i) Number of predators
 - (ii) Biomass
6. What is meant by the following terms?
 - (a) Ecology
 - (b) Carrying capacity
 7. The diagrams below show an experiment set up to investigate a certain process in a plant tissue.



Explain the results obtained after 30 min.

8. State three characteristics of the class crustacean.

9. The diagrams below illustrate the organs of some flowering plants.



State the classes of plants to which each belong.

A

B

10. (a) give two differences in the products of anaerobic respiration between plants and animals.

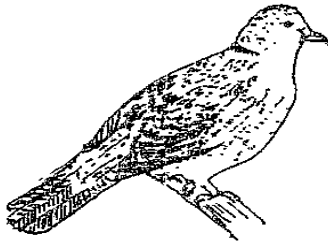
(b) Name the site of anaerobic respiration in a cell.

11. State two functions of the following parts of a light microscope.

Fine adjustment knob

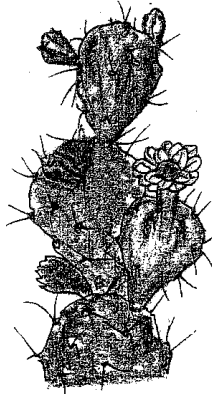
Stage

12. The diagram below represents a certain organism.



State the phylum and class of carbohydrates in the human body.

14. The diagram below represents a certain plant.



(a) What is the likely habitat of the plant?

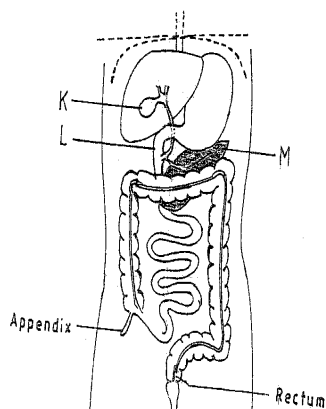
(b) Give two reasons for your answer in (a) above.

15. Give reasons for carrying out the following procedures when preparing temporary wet mounts of plant tissues.

- (a) Making thin plant sections
- (b) Adding water on the plant section.

16. (a) describe the condition known as varicose veins.
 (b) What is the role of blood platelets in the clotting process?

17. The diagram represents part of the human digestive system.



(a) Name the organs labeled L and M.

L

M

(b) (i) Name the substance named in b (i) above.

19. (a) Apart from the lungs, name two gaseous exchange surfaces in a frog.
 (b) Write an equation that summarizes the process of aerobic respiration.

20. The number of stomata on the lower and upper surface of two leaves from plant X and Y were counted under the field of view of a light microscope. The results were as shown in the table below.

Leaf	Number of stomata	
	Upper surface	Lower surface
X	4	12
Y	20	23

(a) Which of the leaves would be expected to have a lower rate of transpiration?

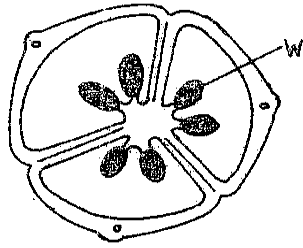
(b) Given a reason for your answer in (a) above

21. (a) what is meant by convergent evolution?

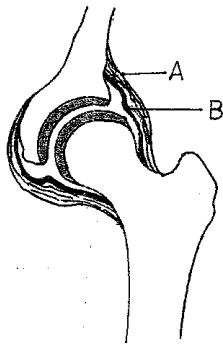
(b) State **two** limitations of fossils as an evidence of evolution.

22. State the difference in content of oxygen and carbon (IV) oxide in the air that enters and leaves the human lung.

23. The diagram below represents a transverse section of an ovary from a certain flower.



- (a) (i) name the structure labeled W
(ii) name the type of plantation illustrated in this diagram.
24. (a) Difference between the following terms:
(i) dominant gene and recessive gene;
(ii) continuous variation and discontinuous variation
(b) What would be the expected results from a test cross?
25. State one economic importance of each of the following plant excretory products.
(a) Tannin
(b) Quinine
(c) Caffeine
26. Name the gamete cells that are produced by the ovaries.
27. The diagram below represents features of a joint mammal.



- (a) Name the part labeled A
(b) State the function of the part labeled B
28. (a) What is a tropic response?
(b) State **two** ways by which auxins regulate growth in seedlings
29. State **four** reasons why water is significant in seed germination

THE YEAR 2011 KCSE KNEC EXAMINATION

BIOLOGY 231

PAPER 1

MARKING SCHEME

1. Nephritis
Kidney stones
2. a) $I^{2/2} C^{1/1} PM^{2/2} M^{3/3}$ or $2(I^{2/2} C^{1/1} PM^{2/2} M^{3/3}) = 32$
b) Dental carries; periodonties/periodontal disease/pyorihoea
3. (i) Identify similarities and differences between organisms
(ii) Organize scientific knowledge in an orderly system
(iii) Monitor emergency presence and disappearance of organisms in and from earth
(iv) Grouping organisms for easy study
4. (a) Sacking small insects/small animals
(b) A trap into which (small) animals fall and get trapped; acc. Examples of small animals e.g. insect/reptiles. Arachnids
5. (a) Grass → Grasshopper → Lizards
(b) (i) Chicken
(ii) Grass
6. (a) This is the study of the interrelationship between organisms and their environment
(b) The maximum population of a species/Total number of organisms that a population habitat/area/region/ecosystem can support
or
Total number of population of a species a given habitat/area/region/ ecosystem can support without depleting available resources. **Rej.** If different species
7. Water was hypotonic to cell sap of adjacent and these cells absorb water through osmosis; and their cell sap became less conc. than those of next cell; the process was repeated until water reached the sugar solution.
Or
Sugar solution was hypotonic to cell sap of adjacent cells; they lost water by osmosis; cell sap became more conc. than those of next cell sap; the process was repeated until water was drawn from the beaker
8. - Fused head and thorax/cephalothorax (often) protected by carapace
- Gaseous exchange through gills
- Two pair of antennae
- Five more pairs of limbs/five to twenty pairs of limbs; **rej.** five
- A pair of compound eyes
- Three pairs of mouth parts (consisting of labial pulps/maxillae)
9. A – Dicotyledonae
B – Monocotyledonae
10. (a) (i) Lactic acid in animals while plastic is ethanol/alcohol
(ii) No CO₂ produced in anaerobic respiration in animals while anaerobic respiration in plants produces CO₂
(b) Cytoplasm

11. **Fine adjustment knob**
 Moves the body tube through smaller distances to bring image/specimen/object into sharper/sharp focus
Stage
 Platform where specimen (on slide) is placed
12. Phylum - Chordate
 Class – Aves
13. Source of energy
 Storage of materials
14. (a) Dry/arid/semi-arid/desert
 (b) Succulent/freshly stem; reduced leaves/leaves reduced into thorns/spines. **Acc.**
 Thick stem for storage of water
15. (a) (To reduce layers of cells) to allow light to pass through
 (b) To make the cell turgid/prevent drying up
 (c) To protect lens on objective; exclude air/dust/foreign particles; hold specimen in position/place.
16. (a) Weakened/defective valves in veins; causing blood/body fluid/tissues fluid to accumulate (leading to swelling)
 (b) When exposed to air they disintegrate/burst; releasing thromboplastin/thromborinase
17. (a) L – Duodenum
 M – Pancrease
 (b) (i) Bile
 (ii) Emulsification/emulsification of fat; neutralize acidic chime from stomach; provides alkaline media for enzyme to work
18. (a) Sublingual; submaxillary/submandibular; parotid
 (b) Lubricating food; digestion of starch; moistens food; provides alkaline medium; softens food; dissolves food. **Acc.** for correct component of saliva to correct function.
19. (a) Skin
 Buccal cavity/mouth cavity; **rej** mouth
 (b) $\text{Glucose} + \text{Oxygen} \rightarrow \text{Carbon (IV) Oxide} + \text{Water} + \text{Energy}$
 $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \quad \quad \quad 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{ATP/Energy}$
20. (a) X
 (b) X has fewer stomata; most stomata in leaf X are concentrated on the lower side
21. (a) Where different structures evolve to perform different functions e.g. wings of insect/birds, eye of human and octopus. **Rej;** wrong example given. **Acc.** if no example given
 (b) Missing links; distortion of parts during sedimentation
 Destruction of fossils by geographical activities. **Acc.** correct examples
22. - Air that enters the lungs has high content of oxygen than air that leaves
 - Air that enters the lungs has lower content of CO₂ than air that leaves
Acc. air that enters the lungs has 20% - 21% oxygen, air that leaves has 15% - 17% oxygen, air that enters lungs has 0.03 – 0.04% CO₂, air that leaves has 4.0% CO₂
23. (a) (i) Ovule; **rej;** ovules

- (ii) Axile
- (b) Orange or any other citrus fruit; lemon, tangerine, grape, lime, tomato, Sodom apple, Irish potato, egg plant, thorn apple, banana
24. (a) (i) A dominant gene expresses itself in both its homozygous and heterozygous state while recessive gene can only express itself in the homozygous state
 (b) (Either) all offsprings show dominant characteristics; or half offsprings show the recessive while the other half show dominant characteristics
25. (a) **Tannin** – softening of leather/conversion or treatment of hides or skins to leather/tanning leather/treatment of leather; manufacture of ink/printing of fabrics/dyeing of cloths/printing patterns in pots
 (b) **Quinine** – treatment of malaria
 (c) **Caffeine** – stimulant in beverages/increase mental activities/reduce fatigue
26. Egg/ovum/ova; **rej**; ovula
27. (a) Ligament
 (b) Secretes synovial fluid; contains/holds the synovial fluid in place
28. (a) It is a growth movement in plastic/part of a plant in response to a unidirectional stimulus; **rej**; unilateral
 (b) Accelerates growth in shoots
 (c) Can inhibit growth in roots **Acc**; High conc
 Promote growth in roots
 Inhibit growth in shoots **acc**; low conc
29. Activate enzyme; provide a medium for enzymatic activities (to break down stored foods to soluble form); hydrolysis; dissolves food materials; a medium of transportation of dissolved food substances/oxygen/nutrients of growing region (of radicle and plumule); soften seed coat to facilitate emergence of radicle