NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016
KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)
Biology 231/1
(Theory) Paper 1
JULY/AUGUST 2016
MARKING SCHEME

1. i) Positive phototropism; (1mk)
   ii) Thigmotropism; (1mk)
2. C-G-G-T-C-T-A-G-T-C; (1mk)
3. Umbilical vein
- High concentration of Oxygen/lower concentration of CO_2
- High concentration of nutrients / lower concentration of excretory wastes
  Umbilical Artery
- High concentration of CO_2 lower conc. of oxygen;
- Lower conc. of nutrient /higher conc. of excretory wastes; (2marks)
4. i) Carrying capacity
- maximum number of organisms an area can support without depleting / exhausting the resources; (1mark)
  ii) Biosphere
- Parts of the earth and its atmosphere that support life; (1mark)
5. i) Species; (1mk)
   ii) Kingdom (1mk)
6. protein molecules are large sized , they cannot pass through the pores;
   Proteins are necessary in the body for making protoplasm;
   Glucose is reabsorbed back into the blood stream; (3mark)
7. moist;
   Thin membrane/one cell thick;
   Highly vascularized;
   Large surface area; (2marks mark 1st 2)
8. a) Hydrolysis; (1mk)
   b) Glucose; (1mk)
9. a) Fermentation/Anaerobic respiration; (1mk)
   b) Formation of bubbles;
      White precipitate; (2mks)
   ii) Carbon (IV) Oxide produced during anaerobic respiration reacted with Calcium hydroxide/lime water forming a white precipitate;
      Bubbling was due to presence of CO_2; (2marks)
10. a) Ecology; (1mark)
    b) Palaentology; (1mark)
11. Auxins; (1mark)
12. a) i) Meiosis; (1mark)
    ii) presence of bivalents / homologous chromosomesassociate;
        Presence of chiasma; (2marks)
    b) Prophase I; (1mark)
13. i) to keep specimen in position;
    Prevent formation of air bubbles;
    Prevent dehydration of specimen; (1mark)
    ii) Prevent dehydration/to make cells turgid; (1mark)
14. a) Stem; (1mark)
    b) i) Monocotyledonae; rej. Monocotyledone (1mark)
    ii) Vascular bundles scattered within the cortex; (1mark)
15. a) pooter; (1mark)
    b) Prevents dirt / organisms from entering the suction tube; (1mark)
16. Cell wall
    - Permeable
    - Made of cellulose
    - Rigid
    - Found only in plant cells
      Cell membrane
    - Semi-permeable;
    - Made of protein and phospholipid;
    - Living;
    - Flexible;
    - Found in both plant and animal cells; (Mark any three) (3marks)
17. i) Natural passive immunity; (1mark)

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ii) Natural acquired immunity (1mark)

18. a) Human – remains constant; (1mark)
Snake – increases; (1mark)

b) - Enables them to be active throughout;
- enables them exploit different habitats; (any one 1mk)

19. Dispersion;
Density;
Population growth;
Sex ratio;
Age structure;
(mark first three (3mks)

20. a) Structures in organisms with a common ancestral origin have same basic plan but have evolved to perform different functions. (1mark)

b) Pentadactyl limbs in vertebrates;
Feet of birds;
Beaks of birds; (first two 2mks)

21. - Braking;
- Changing direction;
- Balancing
- Control pitching
(any 2 two marks)

22. Linear magnification = $\frac{\text{length of drawing}}{\text{Length of organism;}}$
= 12/4
= X3; (2marks)

23. a) Incisor; (1mark)

b) chisel – shaped for cutting / gripping;
Sharp edged for cutting
Has root for anchorage; (2marks)

24. Stomata;
Lenticels / Pneumatophores;
Cuticle;
Epidermis;
(any three 3marks)

25. Ecdysone / moulting;
Juvenile hormone; (2marks)

26. A- Archegonia;
B – Rhizoid; (2marks)

27. Non - disjunction; (1mark)

28. To enable plants to withstand external forces e.g herbivores, gravity, wind;
To expose leaves to obtain maximum light for photosynthesis;
To hold flowers in position for pollination;
To expose seed / fruits to agents of dispersal; (any 3 , 3 marks)

29. Haemophilia;
Colour blindness;
(2marks)

30. a) Hypertonic / concentrated solution; (1mark)

b) Crenation; (1mark)

31. Water;
Oxygen;
Optimum temperature;
Viability;
Hormones
Enzymes (mark first three 3marks)

32. a) Centrioles
- Formation of spindle fibres during cell division
- Formation of cilia / flagella (in organisms where they occur) (1mark)

b) Lysosomes
- Contains lytic enzymes that destroy worn out organelles / cells / large molecules;

33. a) K – cell body;
L – axon; (2marks)

b) Sensory neurone; (1mark)

c) A synapse is a gap / junction between dendrites of two adjacent neurones; (1marks)

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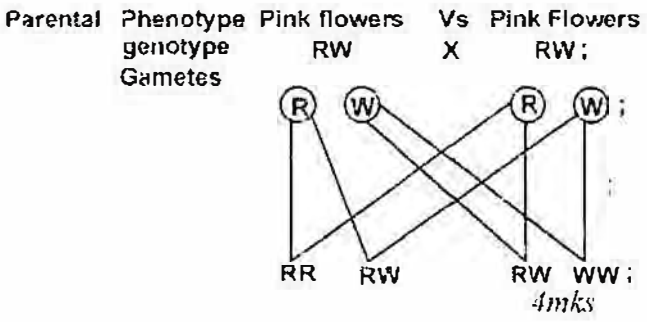
NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016
KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)
Biology 231/2
(Theory) Paper 2
JULY/AUGUST 2016
MARKING SCHEME

1.



b) Genotypic ratio 1RR : 2RW : 1WW (1mk)
c) Incomplete dorminance / partial dorminance (1mk)
d) 7324 x ¼ ;
1831; (2mks)

2. a) Osmosis; (1mk)
b) - Sugar crystals dissolve in water forming sugar solution in cavity;
- Level of water in beaker decreases; (2mks)
c) Sugar cystals are more concentrated than the cell sap;water is drawn out the cells through osmosis;cell sap of the cells next to the cavity become more concentrated compared to adjacent cells.water is drawn from cell to cell;until its finally drawn from the beaker; (3mks)
d) - absorption of water in roots;
- feeding in insectivorous plants;
- Opening and closing of stomata;
- Support;
- Movement of water from cell to cell; Mark 1st 2 (2mks)

3. a) Plants → Mice → Snakes → Hawks
Plants → Slugs → Snakes → Hawks
Plants → Caterpillar → Insectivorous bird → Hawks Mark any 2 (2mks)

b) Caterpillar; Aphis; mice; slugs; ½ x 4 = 2mks
c) Primary consumer 1mk
d) Decomposer 1mk
e) Snakes would starve to death or migrate; plant would increase; hence more food for caterpillar, aphids and mice and their number would increase (1mks)

4. a) Phototaxis; 1mk
b) Expose the organism to light so that it can photosynthesis; 1mk
c) - chemicals – chemotoxis;
- temperature – thermotoxis; 2mks
Mark as whole both factor and response.
d) Phototropism;
e) - seedling shoot tip bends towards source of illumination / light;
- auxin migrates to the darker side;
Causing rapid growth in the darker side hence a curvature; (3marks)

5. a) T – ulna; 1mk
R – scapula; 1mk
b) C- biceps;
D – triceps; 1mk
c) i) Synovial fluid; 1mk
ii) It acts as a lubricant that reduces friction at the joint. 1mk
d) i) Ball and socket joint; 1mk
ii) Ligaments – tissues that hold the bones together at the joints.
Tendon – connective tissue that joins muscle to bone. 1mk

6. b) 40.8°c – 33.5°c = 7.3°c 1mk
c) i) Stored fat is metabolized to produce energy and metabolic water;
Metabolic water enables the camel to go for long periods without drinking water; 2mks

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ii) Prevents the body of the camel from overheating ; due to reduced insulation by the fat; 2mks

d) No sweating occurs; and it helps to conserve water; 2mks

e) i) evaporation causes cooling; because latent heat of vaporization is lost from the body; 2mks

ii) Excess water;
Mineral salt;
Urea / uric acid / nitrogenous waste;
Lactic acid
Heat; 2mks

f. They undergo vasolidation; (more blood flow to the skin surface) to facilitate heat loss; 2mks

g. Hypothalamus; 1mk

7. a) External intercostal muscle contract; internal intercostal muscles relax; ribcage move upwards; and outwards; diaphragm muscles contract ; causing it to flatten; volume of thoracic cavity increases; while pressure decreases; due to higher atmospheric pressure; air is drawn in through the nostrils making the lungs to inflate; 10mks

b) - Exercise / activities; - during vigorous physical activities the rate of breathing increases so as to meet oxygen demand;
- age; - younger people have a higher demand for oxygen;
- Emotions; - body emotions such as fear, anxiety, and fright increase the rate of breathing;
- Temperature – When the temperature is high there is a tendency to increase the breathing rate.
- Health – Ill health increases body temperature which tends to increases body temperature which tends to increase body metabolic rate hence increased breathing rate.;
- altitude – High altitude has low oxygen concentration leading to increased breathing rate.

Total 12 (max 10marks)

8. Air pollution is caused by

- Sulphur oxides / nitrogen oxides / hydrogen sulphide chloride; dissolved in rain water forming acid rain; acid rain lowers soil PH; corrodes metals; causes chlorosis; causes leaching; kills microorganisms in the soil;sulphur oxides and nitrogen oxides also causes respiratory tract illness.
- Aerosols / CFC / herbicides / insecticides;
  CFC depletes ozone layer; causes respiratory diseases; heavy metal poisoning.;
- Smoke / fumes;
  Cause formation of smog that reduces visibility; cause eye irritation; breathing difficulties; carbon monoxides causes respiratory poisoning; carbon IV oxide causes green house effect;
- Dust;
  It closes stomata of the leave limiting photosynthesis; causes respiratory diseases; reduces visibility, eye irritation;
- Lead and Heavy metals;
  Affects physiological functioning of the body organs; interferes with mental development in children; block stomata in plant leaves;
- Noise; causes stress in animals; it's an irritant causes deafness;
- Radioactive emissions;
  Causes cancer / mutations; affect respiratory system;

Controls Measures

- Stiff penalties / heavy fines
- Use of unleaded fuels
- Use of renewable energy resources e.g solar
- Use CFC free aerosols;
- Use biological control methods in agriculture
- Use earmuffs when working in industries
- Environmental conservation e.g soil conservation measures (accept any other examples)
- Educating public on sustainable environmental management e.g afforestation
- Fitting chimneys with scrubbers/ tall chimneys;
- Recycling of gases e.g SO_2 forms sulphuric acid;
- Treaties in use of nuclear arms / energy;

Max 20mks
Mark only one cause, one effect and one control measure (total 21 max. 20mks)
Award the following once

- Respiratory system
- Photosynthesis
- Eye irritation

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NTIMA, NYAKI AND MUNICIPALITY CLUSTER EVALUATION 2016
KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)
Marking scheme
Biology 231/3
(Practical) Paper 3
JULY/AUGUST 2016

1. a) i) Production of bubbles / effervescence; 1mk
Gas – Oxygen;
Rekindles / relights glowing splint; 2mks

b)

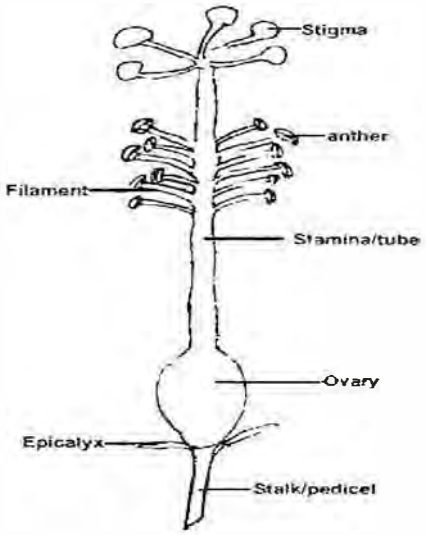
Food test	Procedure	Observations	Conclusion
Starch;	Put some paste in a test tube Add some drops of iodine solution;	Blue-black;	Starch present;
Reducing sugars;	Put a little paste in a test tube Add 2ml of benedict's solution. Heat the mixture;	Retained the colour of Benedict's solution;	Reducing sugars present;
Proteins;	Put a little paste in a test tube Add 2ml of sodium hydroxide solution and shake well. Add 1% copper sulphate solution dropwise as you shake;	Purple colour observed;	Proteins present;

½ x 12 = 6mks

c) Has proteins; growth and repair;
Carbohydrates; provide energy; Max. 3mks

2. a)i) Insects / animal; 1mk
- Brightly colour petals to attract insects / animal;
- Scented to attract insects / animal;
- Have nectaries;
- Sticky pollen grains; Mark any 2 (2mks)

ii)



Mg = 1
Drawing= 1
Labelling ½ x 6 = 3
Total 5mks

iii) Hypogynous; acc . superior ovary 1mk

iv) – Petals – some sepals / style / stamens wither and die;
- Ovules develop into seeds;
- Ovary develop in a fruit;
- Integuments develop into a seed coat; 4mks

b) i) Gymnospermaphyta /
Gymnospermaphyta; 1mk

ii) Presence of needle-like leaves;
Presence of cones; 2mks
K – male cones;
L – female cones; 2mks

3. a) C – ureter
D – Urinary bladder;
E – Urethra; 3mks

b) i) A – adrenal gland; 1mk

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ii) Hormone – aldosterone; 1mk
Function – regulation of sodium ions;

c) i) F / renal artery;
ii) B – renal vein 1mk

d) – Longer loop of Henle; to increase surface area for reabsorption of water;
- Smaller / fewer glomeruli; to reduce ultrafiltration;
Any two marks (2mks)

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