GENERAL SCIENCE PAPER 1

ANSWERS

KCSE 2011

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12.1 General Science Paper 1 (237/1)

BIOLOGY SECTION A - (34 marks)

1. (a) Zoology; (1 mar

(b) To sort and group organisms;
For uniformity in identification;
Organise information in an orderly manner to avoid chaos;
Put Organisms into correct groups to make their study easy.
(2 mark

(c) Production of energy; (1 mar

2. (a) Cell wall; chloroplasts; sap vacuole (2 mark

(b) Hold the microscope firmly with both hands
(one hand at the arm and the other at the base);
Place the microscope away from the edge of the table.
(2 mark

3. (a) Hypertonic; (1 mar
Solution of high concentration.

(b) Through osmosis, the plant lost water to the soil environment; this caused the plant to droop; (2 mark
Plant cells lost water -H_2O to the high concentration;
Through osmosis cells flaccid leading to dropping/witting.

4. (a) Carbon (IV) Oxide; water; (any one correct) (1 mar

(b) Closely packed to protect inner cells;
Lack of chloroplasts/transparent to allow light to pass through; the cells are one layer thick/thin in diameter to allow light to penetrate easily;
(any 2 correct) (2 mar

5. (a) Ingestion is taking in food material through the mouth while egestion is the removal of undigested/indigestible food materials thought the anal opening;
(1 ma

(b) (i) in X glucose/amino acids/vitamins; (1 ma
(ii) in Y fatty acids/glycerol. (1 ma

6. Burning charcoal stove reduces the amount of oxygen in the room leading to partial burning; which produce carbon(II) oxide; when inhaled it combines permanently with haemoglobin/blocking uptake of oxygen; (3 ma

7. (a) Pneumococcus/Diplococcus pneumoniae/streptococcus pneumonial/stephilococcus auries; (1 mark)

(b) High vascularization; ventilation mechanism; (2 marks)

(c) Produce carbon (IV) oxide that raises dough; (1 mark)

8. (a) Leaves are tiny/small; reducing the surface area over which transpiration occurs/rate of transpiration is reduced;
Thick, shinny cuticle; reduce rate of transpiration; (2 marks)

(b) Elongated cells; to provide a large surface area for nutrients/water absorption;/Thin; to facilitates diffusion of substances; (2 marks)

9. (a) Excretion; osmoregulation;
PH regulation;
Ionic balance.
(2 marks)

(b) Water; salts; (2 marks)

10. More blood flows closer to the skin;
More heat is lost cooling occurs; (2 marks)

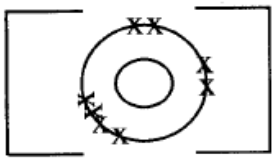
CHEMISTRY - SECTION B - (33 marks)

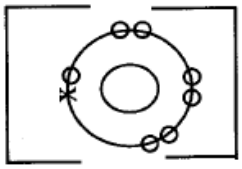
11. Valency - combining power of an element/radical; or number of electron gained or lost by an atom (1 mark)
Electron affinity - energy released when an atom acquires an electron; (1 mark)

12. R;
R is the smallest atom with its outermost electrons near the nucleus hence strongly attracted; (2 marks)

13. (a) Gases in air are separated by physical means;
(b) Both require oxygen gas;
(c) Hydrogen peroxide;
(d) Magnesium has high affinity for the combined oxygen;heat produced by burning magnesium, decomposes carbon (VI) oxide to carbon and oxygen. (4 marks)

14. (a)





Na^+ Cl^- (2 marks)

(b) Covalent bond; (1 mark)

15. Add water to the mixture, warm and stir, sugar will dissolve;
Filter the mixture to obtain sand as a residue; (2 mark

16. (a) To measure the acidity and alkalinity of a solution;/measure the strengths of acids and Bases.

(b) Strong acid is one that dissociates fully to give more hydrogen ions;

(c) $2HCl + CaCo_{3(s)} \longrightarrow CaCl_{2(aq)} + Co_{2(g)} + H_2O_{(l)}$;

(d) Waste of soap;/not economical
formation of scum stains on clothes (5 mark

17. (a) Use anhydrous Copper (II) Sulphate; if it changes form white to blue when in contact with the substance then water is present; /blue anhydrous cobalt chloride paper of cob sulphate to pink

(b) Magnesium hydroxide; (3 mark

18. (a) Mobile ions;

(b) Delocalised electrons; (2 mark

19. (a) R - freezing/solidifying;
S - Condensation/liquefying;

(b) Chromatography;/paper chromatography (3 mark

20. (a) X;

(b) W; W is an alkali metal
Z is a noble element which is stable; Since it has an octet structure or is in gro VIII

(c) 2.8.7; (4 mark

21. (a) double decomposition/precipitation;

(b) $2NaNO_{3(s)} \xrightarrow{heat} 2NaNO_{2(s)} + O_{2(g)}$;

(c) Salt that contains replaceable hydrogen atoms; (3 mark

PHYSICS - SECTION C - (33 marks)

22. (a) Burette (1 ma

(b) Vol of 40 drops $= 42.5 - 26.8$
$= 15.7cm^3$

Vol of 1 drop $= \frac{15.7}{40} = 0.39 \approx 0.4cm^3$ (2 mar

23. (a) Nature of the surface/roughness/smoothness; Normal reaction.

(1 mark)

(b) Attraction forces between molecules of the liquid is less than the attraction of the liquid molecules and glass molecules/adhesive forces are greater than cohesive forces.

(2 marks)

24. (a) Density of B is greater than that of A. (1 mark)

(b) Smoke particles are hit by air molecules which are moving in a (continuos) random motion.

(2 marks)

25. In the morning air is cold and the cable contracts becoming shorter.
At midday the air is hot and the cable expands becoming longer hence sags. (2 marks)

26. When heated the water molecules expand and become less dense.
They rise up and cooler more dense water molecules move downwards. (2 marks)

The potassium paramagnet colour moves up with the less dense molecules hence the colour strains curve up as the water moves in convectional currents. (1 mark)

27. (a) at 50cm mark/or on dieagram.

(1 mark)

(b) weight acts at the 50cm mark.
Clockwise moments = anticlockwise moments

$$m \times 10 = 40 \times 30$$
$$10\,m = 1200$$
$$m = 120g$$

(2 marks)

28. (a) neutral (1 mark)

(b) When the ball bearing is slightly tilted, the position of centre of gravity remains unchanged. (2 marks)

29. $K = \frac{F}{e}$

$$= \frac{150 \times 10^{-3} \times 10}{20 \times 10^{-3}}$$

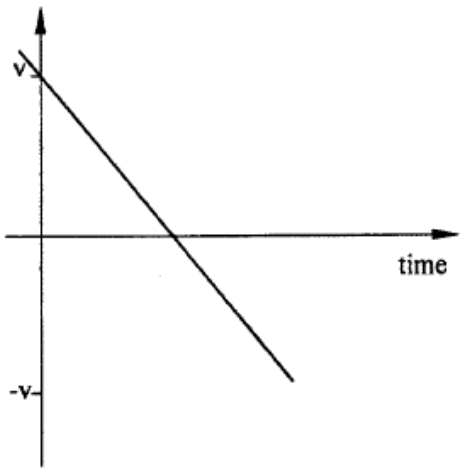
$$M = \frac{Ke}{g}$$

$$= \frac{150 \times 10^{-3} \times 10}{20 \times 10^{-3}} \times \frac{30 \times 10^{-3}}{10}$$

(3 marks)

$$= 225g$$

30.



(2 mar

31. Before the brakes are applied the box was moving at the same speed as the lorry. It continues moving forward due to its inertia when the brakes are suddenly applied/obeys Newton's first law of motion..

(2 mar

32. (a) 2. (1 ma

(b) - weight of the pulley
- amount of friction between the pulley and the string. (2 mar

33. (a) A floating body displaces its own weight of the fluid in which it floats. (1 ma

(b) The ship is "hollow" and therefore it's average density is less than that of water.

(2 mark