GENERAL SCIENCE PAPER 1

ANSWERS

KCSE 2010

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General Science Paper 1

SECTION A: BIOLOGY

1. Transport of food materials/oxygen/carbon IV oxide/hormones/urea/mineral salts;
   Protection/defence;
   Regulation of body temperature; thermoregultion   (3 marks)

2. (a) Provides energy; (needed to combine carbon IV oxide/carbon dioxide and water molecules)
   (b) Glucose;
   (c) It is broad with cusps for chewing/crushing/grinding;   (3 marks)

3. (a) Arthropoda;Rej Anthropoda, Arthropod
   Insecta; Rej insect
   (b) Carbon IV oxide/carbon dioxide;acc.symbol. (mark the 1st two)
   Water; acc. symbols
   Energy;
                Any two   (4 marks)

4. (a) Liver cirrhosis;
   Hepatitis;
   (b) Maintains a constant internal environment for optimal physiological processes;
                                                     (3 marks)

5. Internal volume of the bell jar will increase as pressure decreases; air rushes through glass tube into
   balloons; the balloons inflate/fill with air; volume & pressure must be mentioned.
   (3 marks)

6. (a) A – Cortex;
   B – Pyramid;- Rej. pyramind
   C – Medulla;
   (b) Urinary bladder; not only bladder   (4 marks)

7. (a) Solving environmental problems (e.g. food shortage, poor health, misuse of natural
   resources) /entry into careers (e.g. public health, medicine, veterinary practices)/development of
   scientific skills, including planning, observing, recording, classifying and analyzing;

   (b) (i)   -Build new cells/repair damaged tissues;
        (ii)   -prevent vitamin deficiency diseases/they are coenzymes;
        (iii)   -Medium for reactions/solvent/give cells shape/transport/maintaining constant body
                 temperature;   (4 marks)

8. (a) Cell membrane;
   Cyloplasm;
   Nucleus;
   (b) Magnification of specimen
   =eye piece lens magnification x objective lens magnification
   =10 x 40
   =x 400;   (4 marks)

9. Water would move out of the cell into the surrounding solution/ sodium chloride solution; down a
   concentration gradient; hence cells shrink/ become plasmolysed;   (3 marks)

10. (a) Sugar;
    Amino acids;
    (b) Loss of water from aerial parts of a plant by evaporation; Leaves   (3 marks)

SECTION B: CHEMISTRY

11. Add water to dissolve sodium sulphate. $\checkmark^1$

Filter to separate lead (II) sulphate as residue and sodium sulphate as filtrate. $\checkmark^1$

Evaporate the filtrate to concentrate $\checkmark^{1/2}$ it. Cool to obtain crystals of sodium sulphate $\checkmark^{1/2}$.

Dry the crystals with filter paper.   (3 marks)

12. A – Air Hole $\checkmark^1$

B - Jet $\checkmark^1$ (2 marks)

13. D, $\checkmark^1$ Reason is F is basic $\checkmark^{1/2}$ while D is acidic. $\checkmark^{1/2}$

14. (a) White solid is formed $\checkmark^1$ (2 marks)

(b) $2Mg_{(s)} \rightarrow O_{2(g)} \rightarrow 2MgO_{(s)}$ $\checkmark^1$ (2 marks)

15. (a) Gas G is insoluble in water. $\checkmark^1$

(b) $Ca_{(s)} + 2H_2O_{(L)} \rightarrow Ca(OH)_{2(aq)} + H_{2(g)}$ $\checkmark^1$

(c) G is used as a fuel in balloon $\checkmark^1$ hardening of oils/raw materials in production of Hcl.

(3 marks)

16. (a) (i)   K $\checkmark^1$

(ii)   H $\checkmark^1$

(b) J and L; $\checkmark^1$ have the same atomic numbers but different atomic masses. $\checkmark^1$

(4 marks)

17. (a) Halogens $\checkmark^1$

(b) Trend 1, $\checkmark^1$ Electrons are being added to the same energy level and yet there is increase in nuclear change $\checkmark^1$ making the atomic radius to shrink across the period. $\checkmark^1$ (4 marks)

18. (a) N $\checkmark^1$

(b) (i)   Q $\checkmark^1$

(ii)   P $\checkmark^1$ (3 marks)

19. (a) See the diagram. $\checkmark^1$ (electrone on the left side).

(b) The anode becomes smaller. $\checkmark^1$

This is because it dissolves. $\checkmark^1$ (3 marks)

20.   (a)   Inability of water to lather easily with soap. $\checkmark^1$

(b)   (i)   Caco$_3$ or MgCo$_3$ $\checkmark^1$

(ii)   It wastes fuel. $\checkmark^1$ (3 marks)

21.   (a)   Calcium Chloride or Calcium Oxide. $\checkmark^1$

Iron (III) Chloride is deliquescent. Therefore the drying agent prevents hydration of the salt. $\checkmark$

(b)   Pass Chlorine gas through the apparatus to drive out air. $\checkmark^1$ (3 marks)

22.   The level of the water will not change since all the oxygen will have been used up. $\checkmark^1$

(1 mark)

23.   Volume of 30 drops $= 40 - 25 = 15$ ml $\sqrt{^1}$

    1 drop $= \dfrac{15}{30} = 0.5$ ml $\sqrt{^1}$

24.   Volume $= 25 - 19 = 6$ cm^3 $\sqrt{^1}$

    $\varphi = \dfrac{m}{v} \dfrac{48}{6} = 8$ g/cm^3 $\sqrt{^1}$

25.

Figure 1

W x 20 = 2 x25 $\sqrt{^1}$

W $= \dfrac{2 \, x \, 25}{20} = 2.5$ N $\sqrt{^1}$

W = mg
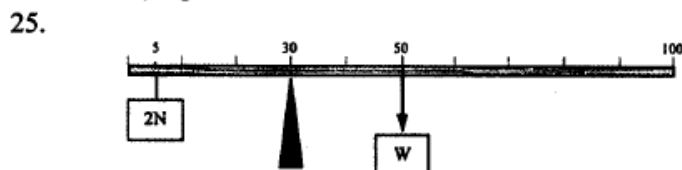
M $= \dfrac{2.5}{10} = 0.25$ kg $\sqrt{^1}$

26.   Smoke particles are hit randomly $\sqrt{^1}$ by the molecules of air $\sqrt{^1}$ moving randomly.

27.   F. contracts more than $\sqrt{^1}$ E hence becomes shorter $\sqrt{^1}$ than E.

28.   The wind mill rotates, air around the flame becomes less dense $\sqrt{^1}$ when heated and rises pushing the wind mill.

29.   (a)   The cross-sectional area of the <u>tip of the pin</u> $\sqrt{^1}$ is much smaller than the pin head.

       Hence for the same force of the thumb, pressure is <u>higher</u> $\sqrt{^1}$ at the pin point.

    (b)   Pressure in liquids $= \varphi hg$

       For constant <u>pressure,</u> $\sqrt{^1}$ when h increases φ must decrease since g is constant.

30.   (a)   L=1.8 mm

    (b)   Wire will be <u>longer</u> $\sqrt{^1}$ than the original length because the force had exceeded the elastic limit.
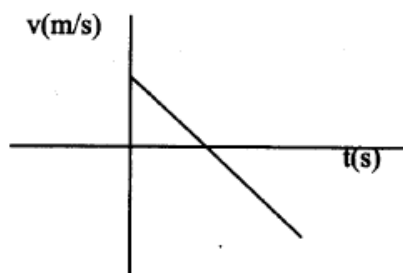

Figure2

$\sqrt{^1}$ V starts at a point drops down to zero and to negative.

$\sqrt{^1}$ straight line of negative gradient.

31.　　$40 - 5 = 35$ = resultant force.

from $f = Ma$

$\qquad 35 = 5a \; \checkmark^1$

$\qquad a = \dfrac{35}{5} = 7 \; m/s2. \; \checkmark^1$

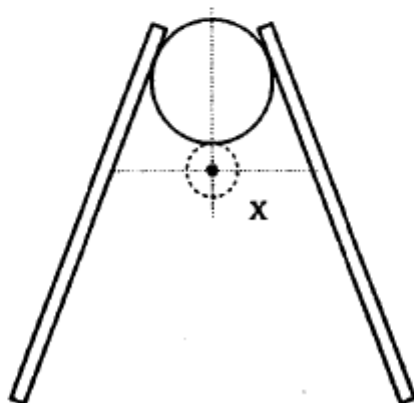32.　　(a)　　(i)　　Greatest height = 10m. $\checkmark^1$

　　　　　　(ii)　　mgh = P.E $\checkmark^1$

$$M = \dfrac{20}{100} = 0.2 \; kg \; \checkmark^1$$

　　　(b)　　Kinetic energy at heighest point = O.

33.　　$W = u = 6000 \; N \; \checkmark^1$

A floating body displaces its own weight of the fluid in which it floats. $\checkmark^1$

34.　　(a)

Allow approximate value of X

Figure 3

　　　(b)　　Increase the <u>wheel base</u> $\checkmark^1$/ base area.