

2007 WASSCE INTEGRATED SCIENCE 2 SOLUTION

Paper Two

SECTION 2

1.

i) Mulching is the act of covering the soil surface with a layer of any material.

ii) Advantages of mulching

Keeps the soil cool

Keeps the soil moist or prevents loss of water

Improves soil structure

Increases organic matter content of the soil or adds nutrients to the soil.

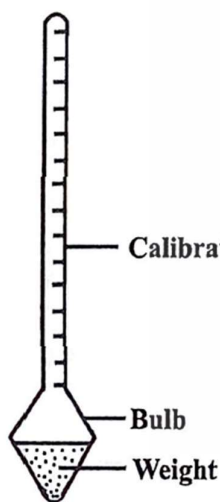
Increases water infiltration into soil

Keeps down weeds

Increases microbial activities

Controls soil pH or buffering

Prevents soil erosion or control erosions.



b) i)

ii) Determination of density of a liquid

The hydrometer is lowered gradually into the liquid and left in it.

Read the value on the hydrometer.

The reading is the relative density of the liquid.

The density of the liquid is obtained by multiplying the relative density by the density of water.

c)i) Mass number is the sum of neutrons and protons in the nucleus of an atom.

ii) Relative atomic mass is the ratio of the mass of an atom to $1/12$ the mass of one atom of carbon-12.

d) i) Biotechnology is the industrial and commercial applications of biology(particularly of microorganisms, enzymology, and genetic engineering) produce industrial products or to achieve a particular purpose

i) Examples of food items that can be produced using biotechnology

Cheese

Yoghurt

Butter

Bread

Milk

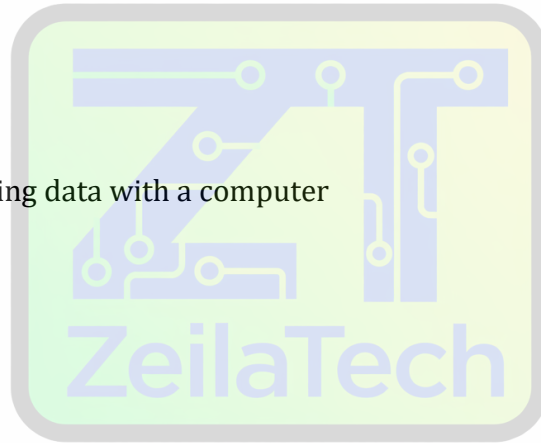
Kenkey

e) Stages involved in processing data with a computer

Input

Processing

Output



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2.

a) i) A thermostat is a device used to regulate temperature changes or for maintaining a steady temperature in electric appliances

i) Appliances which use thermostat

Refrigerator or deep freezer or fridge

Air conditioner

Electric iron

Electric oven

Car radiator

Microwave oven, electric incubator

iii) Current $I = \text{Potential difference (V)}/\text{Resistance(R)}$
 $= 120/5 = 24A$

b) i) Mechanism of inhalation

During inhalation, the external intercostal

muscles the internal contract and the internal intercostal muscles relax.

This causes the ribs to move up and out to make the diaphragm flatten or contract.

This makes the volume of thorax to increase and air pressure decreases forcing air to rush into the lungs

ii) Harmful effects of smoking

Bronchitis

Narrowing of the blood vessels which leads to heart attack

Lung cancer

Miscarriage in pregnant women

Raise blood pressure

Catarrh

Stroke

Bad breath

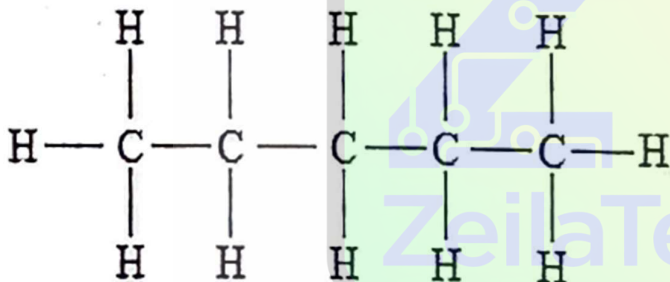
Stained teeth

Heart diseases

Madness

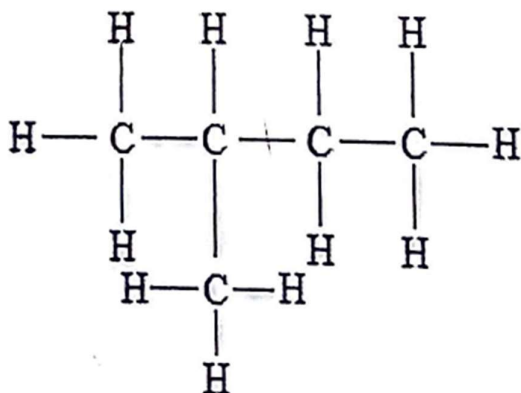
c) Isomers of C_5H_{12}

c) **Isomers of C_5H_{12}**



OR $CH_3CH_2CH_2CH_2CH_3$
Pentane

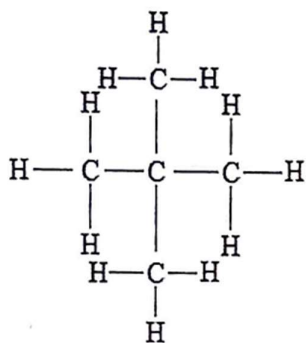
OR $CH_3CH_2CH_2CH_2CH_3$ - Pentane



OR $CH_3CH(CH_3)CH_2CH_3$
2-Methylbutane

OR $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$

2-Methylbutane



OR

$\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_3$

2, 2-Dimethylpropane

OR $\text{CHC}(\text{CH}_3)_2$

CH_3 2, 2-Dimethylpropane

d) Reasons for keeping farm records

Gives an account of performance on the farm.

Enables weaknesses in the farming enterprise to be traced.

Provides information for evaluation and decision making

Makes it possible to exercise managerial control.

Enables the farmer to access income generated

Provides information on tax assessment.

Provides information for planning and budgeting

Helps the former to obtain loans

Helps the farmer to know the movement of tools.

3.

a) i) Polymer is a large molecule formed from the combination of many smaller and simple organic molecules or monomers

a) Examples of natural polymer

Rubber

Cellulose

Starch

Proteins etc.

B) Examples of synthetic polymer

Bakelite

Nylon

Dacron

PVC

Polythene

Teflon

ribosome

Polyester etc

b) i) Culling is the elimination or removal of unhealthy or unproductive animals in animal husbandry to maximize economic gains.

i) Brooding is the stage of poultry keeping during which newly hatched chicks are confined in brooder houses so as to be provided with necessary warmth and feed until they develop enough feathers to be able to maintain their body temperatures.

c) Uses of computer in a school

For keeping records

To prepare time tables to schedule classes

To prepare academic records of student

To issue receipts

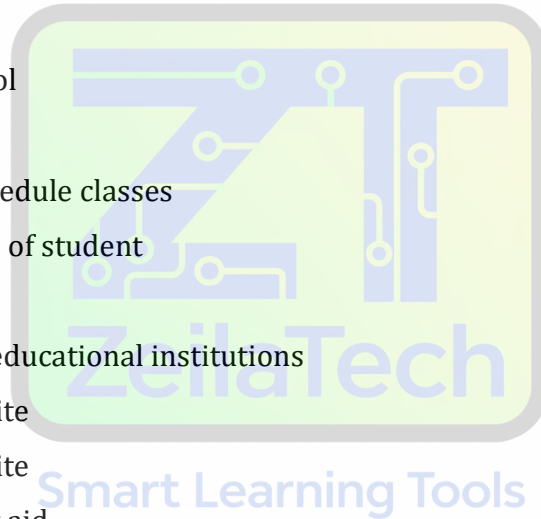
To keep financial records of educational institutions

Help children to read and write

Help children to read and write

Used in teachings as teaching aid

Used in communication



d) i) Lymph is a body fluid without red blood cells but with large proteins. OR Tissue fluids that flows in the lymph vessels.

i) Functions of lymph

Medium of exchange of materials or nutrients between the blood and body tissues

Carries white blood cells or lymph cell to body tissues (for defense against pathogen invasion).

Carries digested food materials.

Takes excess tissue fluids back into the blood

e) i) Principle of flotation states that a floating

body displaces an amount of fluid equal to its weight

i) Principle underlying the flying of paper kite

As the pupil drags the kite against the wind while running air pressure underneath the kite becomes greater than the pressure on the kite.

The kite is then lifted up by greater pressure.

The kite being less dense than air ascends high into the sky.

In ascending, the kite displaces some amount of air.

When the weight of the air displaced is equal to the weight of the kite, it ascends and floats

4.

a) i) Functions of liver

Production of bile

Conversion of excess glucose to glycogen

Destruction of old red blood cells

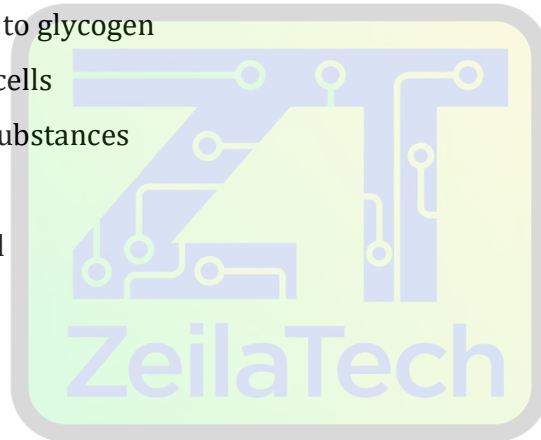
Detoxification of poisonous substances

Heat production

Control of blood glucose level

Production of plasma protein

Stores blood



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ii) Functions of pancreas

Produces pancreatic juice

Produces insulin

i) Sources of protein

Fish meal

Milk

Groundnut cake

Soybean meal or cake

Palm kernel cake

Blood meal

Coconut cake

Leguminous forage crops

ii) Reasons for castrating farm animals

Animals put on weight or increase in growth or fattens

Makes animal calm or docile

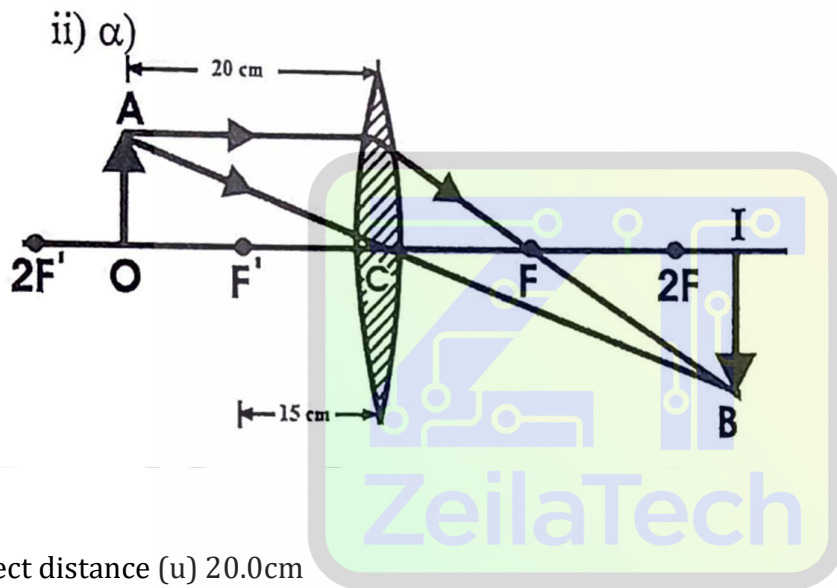
Makes the meat tender

Animal conserves energy (for work)

Removes odour from male goat

Avoids inbreeding

c) i) Real images can be obtained on screen while virtual images cannot be obtained on screen.



ii) a)

B) Object distance (u) 20.0 cm

Focal length (f) = +15.0 cm

Image distance (v) = ?

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

$$\frac{1}{15} = \frac{1}{v} + \frac{1}{20}$$

$$\frac{1}{v} = \frac{1}{15} - \frac{1}{20} = \frac{1}{60}$$

$$v = 60 \text{ cm}$$

d) i) Why water is softened before it is used in laundries

Soap is wasted in laundry or avoid wastages of soap

Prevent the formation of scum or to avoid the staining of the fabric

ii) How permanent hardness of water can be removed Distillation

Water is boiled or vaporized,

The vapour cooled or condensed back into pure water.

Distilled mineral salts including those responsible for hardness remain in the container.

Precipitation

Add washing soda (Na_2CO_3) to water

This removes calcium ions as insoluble calcium trioxocarbonate (IV), (CaCO_3) which precipitates out and can be filtered off.

Ion Exchange

A modern ion exchanger contains a solid mixed-bed resin.

Mixed bed resins made of beads of polymers Such polystyrene, treated to adsorb sodium ions.

The hard water containing the calcium and/or magnesium ions is allowed to wash through the mixed-bed resin.

Sodium ions replace the calcium ions to obtain the useful resin.

5.

a) i) Gaseous air pollutants

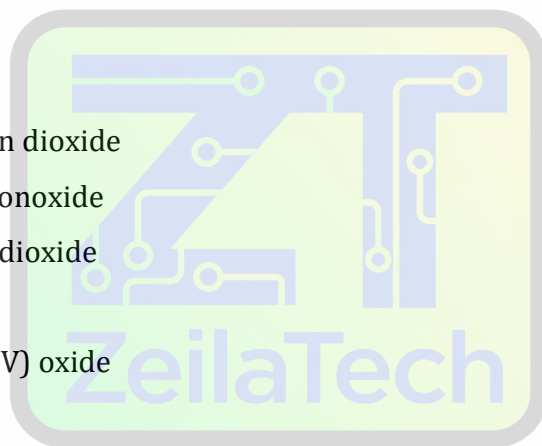
Nitrogen (V) oxide or nitrogen dioxide

Carbon (I) oxide or carbon monoxide

Carbon (IV) oxide or carbon dioxide

Hydrogen sulphide

Sulphur dioxide or Sulphur (IV) oxide



ii) The gas moves or diffuses from a region of high concentration to a region of lower concentration.

b) i) Covalent compounds are formed by the sharing of pair(s) of electrons between the two atoms involved.

ii) Examples of covalent compounds

Water (H_2O)

Ammonia (NH_3)

Carbon dioxide (CO_2)

Hydrogen chloride gas (HCl)

Examples of ionic compounds

Sodium chloride (NaCl)

Calcium chloride (CaCl_2)

Magnesium chloride (MgCl_2), etc

c)i) Joints found in humans

Ball and socket joint

Hinge joint

Gliding joint

Fixed (Immovable) joint

Pivot joint

Cranial joint

ii)

Name of Joint	Part of the Human Body
shoulder or hip	Ball and socket
elbow or knee	Hinge
wrist or ankle	Gliding
cranium or skull	Fixed (immovable)
between the atlas and axis	Pivot

b)i) Malnutrition is a condition or situation in an organism where there is insufficient or lack of the required essential nutrients in their right proportions.

ii) Effects of malnutrition

Fluid imbalance

Leads to slow or stunted growth

Malformation of tissues

Makes animals and man susceptible to diseases.

Kwashiokor

Night blindness

Goitre

Rickets

6.

a) Functions of the World Health Organizations

Clearing house for information and research on health

Standardisation of quarantine and vaccination

Sponsors the control of epidemic diseases

Production of medical publication

Provides experts for member countries to train and advise health personnel.

Assists national programmes for the control of diseases and vectors

Provides drugs, vaccines and other medical materials in cases of emergency.

Standardisation of drugs.

b) Factors influencing choice of site for a fish pond

Nearness to market

Source or availability of feed

Easy access to the fish pond

Topography of land

Source and availability of fingerlings

Absence of shade

Soil characteristics

Nearness to source of water

Nearness to the owner or farmer

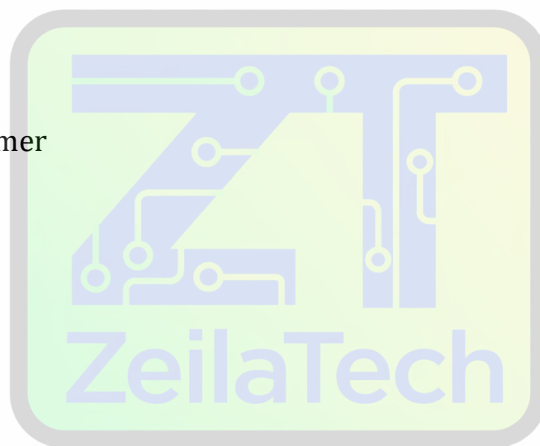
c) i) $Q = mc\Delta T$

$$= 1.5 \times 4200 \times (70 - 20)$$

$$= 1.5 \times 4200 \times 50$$

$$= 1.5 \times 4200 \times 50$$

$$315,000\text{J} = 315 \text{ kJ}$$



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ii) -Water expands in volume, when changes from liquid to solid.

No space was made for expansion when it freezes.

As a result the glass bottle cracks due to the force exerted by the frozen water.

d) i) a) Excess alkaline in the soap reacts with aluminium

b) Iron fillings have larger surface area or smaller particle size than iron nails

The rate of reaction in a larger surface area is faster than that in a smaller surface area. OR The rate of reaction on a smaller particle size is faster than that in a smaller surface area

ii) Method of preventing rusting

Greasing or Oiling or Lubricating

Electroplating

Sacrificial protection or cathodic protection

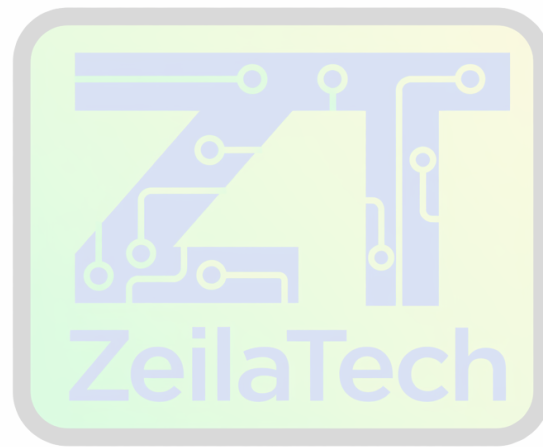
Alloying

Tin plating

Painting

Plastic coating

Galvanization



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