

705517234  
07798562748

JEBB

MOCK  
2024

PROPOSED MARKING  
GUIDE B.S.T

MR. BUSULWA JULIUS  
(JANJA CHEM)

Item 1 (a)

Food additive such as food enhancers, food preservatives, antioxidants, food thickeners. (02 scores)

Item 1 (b)

Food preservatives increase the shelf life of food.  
Food enhancers improve on taste and aroma of food.  
Food thickeners increase the viscosity of food without altering other physical properties of food.  
Artificial sweetness increase sweetness.

Item 1 (c)

Some food additives such as food enhancers among others cause allergies, thirst, nausea, asthma, increase risks of cardiovascular diseases to some people, making them lose concentration and this can be mitigated by using recommended food additives.

Item 1 (d)

Similarity.

Both natural food additives and Artificial food additives

- Increase the shelf life of food (any one)
- Improve on the taste and aroma of food

Differences:

Natural food additives

- Can be obtained from plant or animal extracts.
- Has less side effects
- Less effective in action

Artificial / Synthetic

- Can be obtained through chemical reactions.
- Has more side effects.
- More effective in action.

(any one)



### Item 2 (a)

The materials can be natural and artificial.  
Natural materials are made by God/exist in nature.  
their formation is not influenced by man. for example wood.  
Artificial materials are materials which are made by man for example plastics, glass among others.

(03) Score

### Item 2 (b)

Home utensils have different qualities based on their nature and they are made using the following.

Aluminium: - Has a low density

- It is durable

- Has a high melting point

- Has a high electrical/heat conductivity.

Steel/Iron - Very strong

- Has a high tensile strength

- It is ductile and malleable

- Has a high melting point

- Galvanised Iron resists rusting.

At least (4) properties on any one material.

Plastics.

- Man-made polymers which can undergo permanent deformation without breaking

- They are flexible so can be bent easily.

- They are also good insulators.

- They are water proof.

### Item 2 (c)

Iron is strong so it can be used for making sauce pans, spoons, forks; among others.

Aluminium has a high melting point so it can be used for making sauce pans. among others.

(Any one material)

### Item 2 (d)

Iron is non-biodegradable so it can cause soil infertility when left to accumulate in the soil and this can be mitigated by recycling Iron into other products.

(03) Score

Accept any other correct answer.



### Item 3

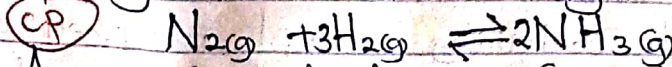
#### MANUFACTURE OF AMMONIUM NITRATE FERTILIZERS

⇒ Raw materials,

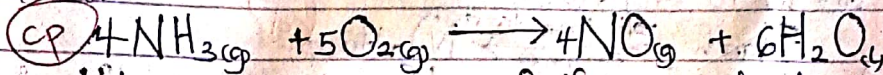
- Nitrogen gas (Rm)
- Hydrogen gas.

⇒ Process of production

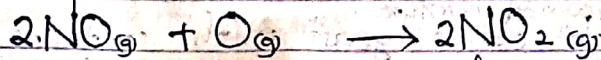
Nitrogen from fractional distillation of liquid air is reacted with hydrogen from natural gas in the ratio of 1:3 respectively to form ammonia by haber process. This reaction requires low temperatures ( $450-500^{\circ}\text{C}$ ), high pressures (200 atm) and finally divided Iron catalyst.



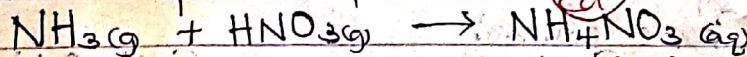
Ammonia produced is air (oxygen) in presence of platinum catalyst forming nitrogen monoxide and water. All these in a tank.



Nitrogen monoxide is further oxidised to nitrogendioxide



Nitrogendioxide is ~~reacted~~ dissolved in water in presence of oxygen forming nitric acid. The acid formed is heated with ammonia gas to form ammonium nitrate.



The ammonium nitrate fertilizer is further concentrated and converted into solid form.

#### Side effects and mitigations.

Some fertilizers when dissolved in water form acidic solution that alters soil pH, hence low crop production

Run off into water bodies promoting increased algae growth thus oxygen supply is cut off leading to suffocation of aquatic animals.

All these can be mitigated by using organic fertilizers and also proper disposal of these fertilizers in places which are far from water bodies.

#### Social benefits.

Source of government revenue since the production plant is taxed and that revenue collected is used to improve on other sectors such as the medical sector.



Source of employment opportunities to some people since some residents get salaries hence improving on the standards of living.

#### Item 4

#### MANUFACTURE OF ETHANOL

Raw materials; - Starch containing material eg. maize, cassava, or glucose. <sup>(in large contain)</sup> sweet potato, millet, sorghum.

- Malt; yeast. <sup>(Km)</sup>

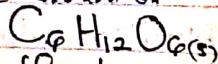
#### Process of production

<sup>(cp)</sup> The starch containing material is crushed and roasted to extract starch. Maize is crushed to extract malt. Malt contains an enzyme, diastase that catalyses hydrolysis of starch to maltose.

Starch  $\xrightarrow[\text{enzyme}]{\text{diastase}}$  Maltose <sup>(cd)</sup>

Millet or Sorghum is then buried in the soil for about 2 to 3 days <sup>at room temperature</sup> to obtain yeast which contains an enzyme maltase that catalyses the hydrolysis of maltose to glucose. Zymase enzyme also in yeast catalyses the decomposition of glucose to crude ethanol and carbon dioxide.

~~Crude ethanol~~



Crude ethanol <sup>(PF)</sup> is converted to pure ethanol by fractional distillation.

#### Side effects and mitigation

Ethanol spills on the surface leading to falls on surface.

Hot surface burns during distillation.

All these can be mitigated by putting on personal protective equipments.

#### Social benefits

Employment opportunities to people, making them earn salaries.

Source of revenue to the government through the taxes collected hence improved infrastructures.