+256517234
0779856214

JEBB MOCK 2024 / PROPOSED MARKING GUIDE (B.I.C.)

MR. BUSULWA JULIUS (UMACA CHEM)

Item 1 (a)
Food additive such as food enhancers, food preservatives, antioxidants, food thickners. (@2 scores.)

Item 1 (b)
Food preservatives Increase the shelf life of food
Food enhancers improve on taste and aroma of food. (@2 scores)
Food thickners increase the viriscity of food without altering other physical properties of food.
Artificial sweetners Increase sweetness

Item 1 (c)
Some food additives such as food enhancers among other cause allergies, thirsty, nausea, asthma, increase risks of cardiovascular diseases to people, making them lose concentration and this can be mitigated by using recommended food additives. (@3)

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	Artificial / synthetic
- Can be obtained from plant or animal extracts.	- Can be obtained through chemical reactions.
- Has less side effects	- Has more side effects.
- Less effective in action	- More effective in action.
	(any one)

Item 2 (a)

The materials can be natural and artificial
Natural materials are made by God / exists in nature
their formation is not influenced by man. forexample wood
Artificial materials are materials which are made by
man forexample plastics, glass among others. (03 Scores)

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
- Its ductile and malleable
- Has a high melting point
- Galvanised Iron resists rusting.

Atleast (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 sourcepans. 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 Scores)

Accept any other possible correct

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)°C, high pressures (200atm) and finally divided Iron catalyst.

(cp) $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

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

(cp) $4NH_{3(g)} + 5O_{2(g)} \longrightarrow 4NO_{(g)} + 6H_2O_{(l)}$

Nitrogen monoxide is further oxidised to nitrogendioxide

$2NO_{(g)} + O_{(g)} \longrightarrow 2NO_{2(g)}$

Nitrogen dioxide is ~~reacted~~ dissolved in water in presence of oxygen forming nitric acid. The acid formed is heated with ammonia gas to form (ch) ammonium (cd) nitrate.

$NH_{3(g)} + HNO_{3(g)} \longrightarrow NH_4NO_{3(aq)}$

The ammonium nitrate fertilizer is further concentrated (Pt) 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 animalls.

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

(Disposal)

Social benefits.

Source of government revenue since ~~revenue~~ 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 their standards of living.

Item 4

MANUFACTURE OF ETHANOL

Raw materials; - Starch containing material eg. maize, cassava, sweet potato, millet sorghum or glucose.

- Malt, yeast

Process of production

The starch containing material is crushed and roasted in a large container to extract starch. Maize is crushed to extract malt. Malt contains an enzyme, diastase that catalyses hydrolysis of starch to maltose.

$$\text{Starch} \xrightarrow[\text{enzyme}]{\text{diastase}} \text{Maltose}$$

Millet or Sorghum is then burried in the soil for about 2 to 3 days at room temperature 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 carbondioxide.

$$C_6H_{12}O_{6(s)} \longrightarrow 2C_2H_5OH_{(aq)} + 2CO_{2(g)}$$

Crude ethanol 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 goverment through the taxes collected hence Improved infrastructures.