

## Essay {Paper02}

**[SPM04-09]****(a) Source**

1. SO<sub>2</sub> released from factory
2. Toxic waster from factory

**Process**

1. SO<sub>2</sub> dissolved in rains water and produce acid rain
2. Toxic waste go to drain/lake. Combine with water in the drain/lake

**Effect**

1. Corrode the building
2. Increase the pH of lake/Soil

(c)Materials : Copper Block and Brass block

Apparatus : Steel bearing, 1 Kg weight, clamp, ruler, sellotape tape, thread

**Procedure :**

1. A steel ball bearing is fixed onto the surface of a copper block by using a sellotape.
2. A weight of mass 1 kg is held 1 metre above the surface of the copper block by using a thread and a rules
3. The weight is released so that it hits the steel ball bearing
4. The diameter of the dent formed on the copper block surface is measured with a ruler
5. The experiment is preformed three times
6. The experiment is repeated by using a brass block of similar thickness in place of the copper block
7. The data collected is tabulated.

Type of block	Diameter of dent/cm			Average/cm
	1	2	3	
Copper				
Brass				

**Explanation**

1. Brass is alloy which contain tin and copper atoms
2. The presence of tin atom in the brass produces atoms of different size
3. this disturb the orderly arrangement of copper atoms
4. the layers of atom in brass not easily slide when the force is applied

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**[MRSM05-08c]**

1. ammonia is gas state, that the root of plant cannot absord directly
2. when ammonia dissolved in the water nearer of the plant, the pH is alkaline solution

$$\begin{aligned}
 \text{(ii) Nitrogen \% in ammonium sulphate} &= 2N / (\text{NH}_4)_2\text{SO}_4 \times 100\% \\
 &= 2(14) / [(14 + 4) \times 2 + 32 + 4(16)] \times 100\% \\
 &= 28 / 132 \times 100\% \\
 &= 21.21 \%
 \end{aligned}$$

$$\begin{aligned}
 \text{Nitrogen \% in urea} &= 2N / \text{CO}(\text{NH}_2)_2 \times 100\% \\
 &= 2(14) / [12 + 16 + (14 + 2) \times 2] \times 100\% \\
 &= 28 / 60 \times 100\% \\
 &= 46.67 \%
 \end{aligned}$$

The percentage of nitrogen in urea is higher

- (iii) 1. Calcium hydroxide and ammonium fertiliser contain hydroxide ions  
 2. The concentration of hydroxide ion will be higher, then increase the pH of soils
- (iv) 1. add 2cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> NaOH to the 2 cm<sup>3</sup> of solution.  
 2. Gently warm the test tube.  
 3. Test the emerging gas with a litmus paper. it supposed to turn red litmus blue.

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### [SPM11-08c]

- (i). 1. X: Sulphuric acid  
 2. Y : sulphur dioxide
- (ii) 1. When pollutant Y is released to air,  
 2. it dissolves in water to  
 3. produce acid rain.
- (iii). 1. It can corrode the building  
 2. Increase the acidity of water and soil  
 3. it can kill aquatic organism and plants

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### [SPM11-07a]

- (a) (i). A: Iron                      B: Steel
- (ii). 1. Steel is alloy which contain iron atoms and carbon atoms  
 2. The presence of carbon atom in the steels produces atoms of different size  
 3. this disturb the orderly arrangement of iron atoms  
 4. the layers of atom in steel not easily slide when the force is applied

(b)

V	Borosilicate glass	Withstand to high temperature
W	Ceramic	Withstand to high temperature
X	Fibre glass	Light and strong
Y	Bronze	Shiny
Z	Duralumin	Light and strong

- (c). 1. Synthetic polymers are non-biodegradable  
 2. They may cause flash flood if they are not disposed properly.  
 3. Burning it can produce harmful gas  
 4. and can cause global warming

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**[SBPdiag08-10]**

- (a) 1 Name of suitable reactant e.g: zinc/zinc oxide/zinc carbonate and nitric acid  
 2 [50-200] cm<sup>3</sup> of [0.1-2.0] mol dm<sup>-3</sup> of nitric acid is poured into a beaker  
 3 Heat /Warm the acid  
 4 Add in zinc/zinc oxide/zinc carbonate into the acid bit by bit until in excess/  
 no longer dissolves  
 5 Stir the mixture and filter  
 6 The filtrate is poured into an evaporating dish.  
 7 heat until saturated  
 8 The solution is allowed to cool  
 9 The crystals formed are filtered and by compressing/pressing between 2  
 sheets of filter paper.  
 10 Suitable chemical equations e.g ;



- (i) An alloy is a **mixture of two or more elements** with a certain fixed composition  
 in which the major component is a metal
- (ii) To increase the strength/ hardness of a pure metal  
 To increase the resistance to corrosion of a pure metal  
 To improve the appearance of a pure metal
- (iii) In pure copper, atoms are of the same size  
 atoms are orderly arranged in layers  
 the layers of atoms can slide over each one another when a force is applied

In brass, atoms of tin and copper have different size  
 the presence of tin atoms disrupt the orderly arrangement of the copper atoms.  
 The layers of copper atoms are more difficult to slide over each other.

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**[SBPtrial08-07a,b]**

- (a)
1.  $N_2$  :  $2 \times 14 = 28$
  2.  $CO_2$  :  $12 + 2(16) = 44$
  3.  $H_2S$  :  $2(1) + 32 = 34$
  4.  $H_2O$  :  $2(1) + 16 = 18$
- (b)
- 1 moles of water vapour =  $\frac{0.9}{18}$   
 $= 0.05$
- 2 no. of molecules =  $0.05 \text{ moles} \times 6 \times 10^{23}$   
 $= 3 \times 10^{22}$
- 3 moles of  $CO_2$  =  $\frac{2.2}{44}$   
 $= 0.05 \text{ moles}$
- 4 no. of molecules =  $0.05 \text{ moles} \times 6 \times 10^{23}$   
 $= 3 \times 10^{22}$

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**[MRSM07-10b]**

1. X is alloy/bronze and Y is pure metal/copper
2. Pure copper is made up of same type of atoms and are of the same size.
3. The atoms are arranged in an orderly manner.
4. The layer of atoms can slide over each other.
5. Bronze is made up of atoms of different size// In bronze, tin atoms and copper atoms are of different size.
6. The atoms **are not** orderly arranged// The presence of tin atoms disturb the orderly arrangement of copper atoms.
7. This reduces/prevents the layer of copper atoms from sliding.

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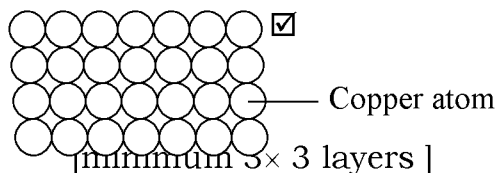
**[SBPtrial09-07]**

- (a)
- (i) A mixture of two or more elements with a certain fixed composition in which the major component is a metal.
  - (ii)
    1. Improve the appearance
    2. Improve the strength and hardness
    3. Increase the resistance to corrosion
 [Any two corrections]
- (b)
- (i) Bronze is harder than copper.
  - (ii)
    1. Pure copper is made up of same type of atoms and are of the same size.
    2. The atoms are arranged in an orderly manner.
    3. The layer of atoms can slide over each other.
    4. Bronze is made up of atoms of different size// In bronze, tin atoms and

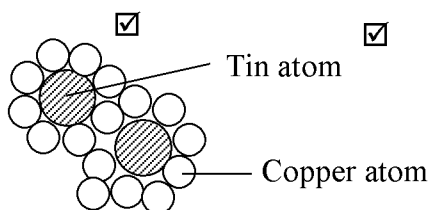
copper atoms are of different size.

5. The atoms **are not** orderly arranged// The presence of tin atoms disturb the orderly arrangement of copper atoms.
6. This reduces/prevents the layer of copper atoms from sliding.

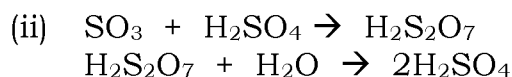
(iii) Pure copper:



Bronze:



- (c) (i) Sulphur trioxide is dissolved in concentrated sulphuric acid to form oleum. Oleum is diluted with water to produce sulphuric acid.

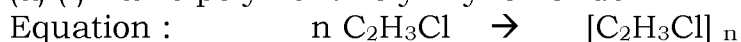


- (iii) Moles of S = moles of sulphur  
 $= 48 / 32 = 1.5$   
 Volume of  $\text{SO}_2 = 1.5 \times 24 \text{ dm}^3$   
 $= 36 \text{ dm}^3$

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### [MRSM08-08a,b,c]

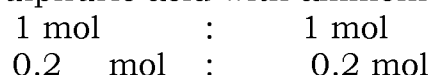
(a) (i) Name polymer : Polyvinyl chloride



- (ii) 1. Synthetic polymers are non-biodegradable
2. They may cause flash flood if they are not dispose properly.
3. Burning it can produce harmful gas and can cause global warming

(b) 1. Mol sulphuric acid =  $MV/1000 = 2.0 \times 100/1000 = 0.2 \text{ mol}$

2. ratio between sulphuric acid with ammonium sulphate



3. Mass ammonium sulphate = mol X molar mass  
 $= 0.2 \times 132 = 26.4 \text{ g}$

- (c) 1. Pure aluminium is made up of same type of atoms and are of the same size.  
 2. The atoms are arranged in an orderly manner.  
 3. The layer of atoms can slide over each other.  
 4. Duralumin is made up of atoms of different size// In Duralumin, copper atoms and aluminium atoms are of different size.  
 5. The atoms **are not** orderly arranged// The presence of copper atoms disturb the orderly arrangement of aluminium atoms.  
 6. This reduces/prevents the layer of aluminium atoms from sliding.

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**[MRSM05-08b]**



- (ii) 1. Not easily biodegradable, will make in-balance for ecosystem.  
 2. when burning of synthetic polymer, it will be produce harmed gas  
 3. green house effect

- (iii) 1. Reduce, reused and recycle the synthetic polymer  
 2. used alternative for synthetic polymer that biodegradable

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**[MRSM06-08d]**

**Punca**

Penghasilan/ penggunaan yang tak terkawal

Pembakaran tidak lengkap bahan polimer

Pembakaran lengkap bahan polimer  
 Bahan polimer tidak terurai

Pembuangan bahan polimer menjadi tempat takungan air

**Kesan**

Krisi sumber tenaga// sumber tenaga berkurangan // harga bahan api (minyak) naik

Membebaskan gas karbon monoksida yang toksik

Gas karbon dioksida – kesan rumah hijau  
 Penggunaan tanah luas untuk tempat pembuangan sampah // timbunan sampah

Tempat pembiakan nyamuk

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**[MRSM11-08a]**

(a)

	Properties of glass	Properties of Ceramic
Melting point	high	High
Hardness	No	Hard but brittle
Electric conductivity	No	Not good
Chemical resistatant	High	weak

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