

TORORO GIRLS' SCHOOL
SENIOR SIX CHEMISTRY REVISION TEST, 2020

PAPER ONE

2 HOURS AND 45 MINUTES

Instructions

- Attempt all questions in section A
- Attempt any six questions from section B.
- All answers must be shown in the spaces provided.

SECTION A

1. Lithium and magnesium show diagonal relationship.

(a) Define diagonal relationship. (1 mark)

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(b)(i) state three properties in which lithium resembles magnesium unlike the group (I) members. (3 marks)

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(ii) state two other pairs of compounds which show diagonal relationship. (2 marks)

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2. (a) Define a co-polymer. (1 mark)

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(b) For each of the following polymers, name the monomer(s) which can be used to produce the polymer.

(i) Nylon-6 (1 mark)

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(ii) Perspex. (1 mark)

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(iii) Natural rubber. (1 mark)

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3. (a) (i) State the distribution law. (1 mark)

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(ii) Give three limitations of the distribution law. (1 ½ marks)

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(iii) Apart from solvent extraction, state two other applications of the distribution law. (1 mark)

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(b) 25 cm³ of an aqueous solution containing 2g of solute M, was mixed with 25 cm³ of trichloromethane, calculate the mass of M that remained in the water.

[distribution coefficient of M between water and trichloromethane is 20]

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4. Solid nickel (II) carbonate was heated strongly and a solid was formed.

(a) (i) State what was observed. (1 mark)

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(ii) Write the equation for the reaction that took place. (1 ½ marks)

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(b) The resultant solid was to dilute nitric acid and warmed followed by sodium hydroxide solution until in excess.

(i) State what was observed. (1 mark)

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(ii) Write the equation(s) for the reaction(s) which took place. (3 marks)

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5. Carbon, silicon, germanium, tin and lead are elements of group (IV) of the periodic table.

(a) Write the general chemical formula of the oxide(s) of group (IV) elements. (1 ½ marks)

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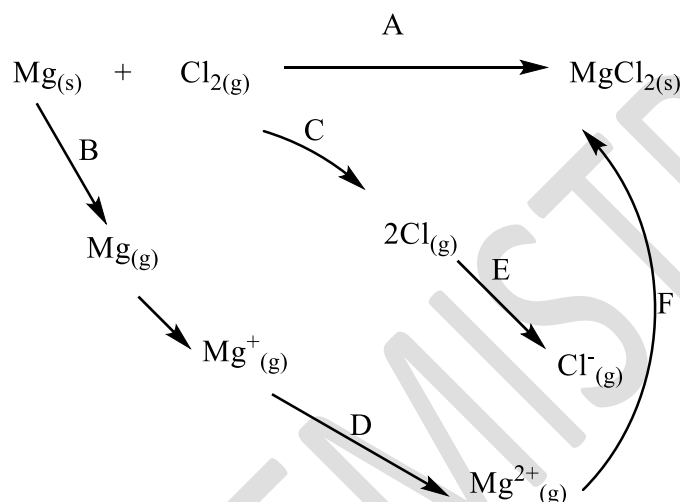
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(b) Write the equation(s) for the reaction between the oxides of group (IV) elements with sulphuric acid. (4 ½ marks)

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6. The born haber cycle below is for formation of magnesium choride.



Name each of the energy changes accompanying the reactions;

A.

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B.

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C.

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D.

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E.

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F.

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7. Name a reagent which can be used to identify the common functional group in each of the following pairs of organic compounds. State the expected observation when the reagent is used.

(a) Propanone and propanal. (2 marks)

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(b) Propan-1-ol and propan-2-ol (2 marks)

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(c) Propyne and But-2-yne. (2 marks)

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8. (a) Define Eutectic mixture. (1 mark)

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(b) State four properties which show that eutectic mixtures are not compounds. (4 marks)

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9. Draw and name the shapes of each of the following molecules (6 marks)

molecule	shape	Name
Trimethylamine		
Hydrogensulphite		
water		
carbondioxide		

SECTION B

10.State what is observed and write the equation for the reactions which take place in each case.

(a) Passing hydrogen sulphide gas through acidified potassium manganate (VII) solution, (3 marks)

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(b) Addition of magnesium turnings to a solution of phenylammonium chloride. (3 marks)

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(c) Passing carbon dioxide gas through potassium manganate (VII) solution. (3 marks)

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11.(a) (i) Define an acidic buffer solution. (1 mark)

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(ii) Give one an example of an acidic buffer solution. (1 mark)

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(b) (i) Calculate the mass of ethylamine which can be added to
500 cm³ of 0.1M hydrochloric acid to form a solution of pH =5
(6 mark)

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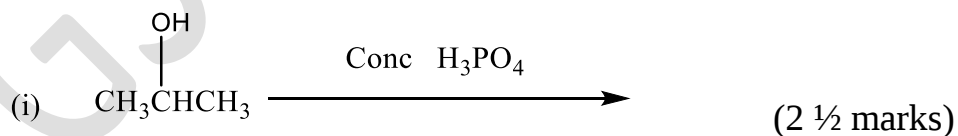
(ii) State the assumptions made in b(i) (1 mark)

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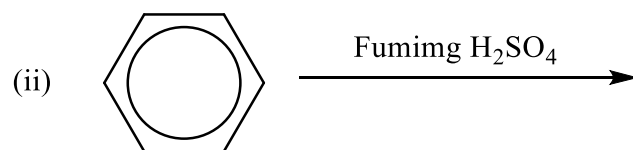
12.(a) Complete each of the following equations and write a mechanism for the reaction.



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(3 ½ marks)

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- (b) (i) Using equations only show how the product in a(ii) can be converted to a diazonium salt. (2 marks)

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- (ii) Write equation for the reaction between the diazonium salt and 2-naphthol. (1 mark)

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- 13.(a) (i) Define a primary standard solution. (1 mark)

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- (ii) State two properties of a good primary standard (2 marks)

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(b) To 200 cm³ of a solution containing copper (II) sulphate was 30 cm³ excess potassium iodide

(i) Write the equation for the reaction which took place.

(1 ½ marks)

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(ii) 25 cm³ of the resultant solution required 20 cm³ of 0.1M sodium thiosulphate solution in the presence of starch indicator. Calculate the concentration of copper (II) sulphate in moles per litre. (5 ½ marks)

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14.(a) (i) Zinc belongs to D-block but it's not a typical transition metal, explain. (2 marks)

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(ii) State one property in which Zinc behaves as a transition metal. (1 mark)

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(b) Zinc (II) oxide was dissolved in dilute hydrochloric acid to form a colorless solution. The resultant solution was divided into two portions. To the first portion was added sodium hydroxide solution dropwise until in excess and to the second portion was added ammonia solution dropwise until in excess. State what was observed and write the equation for the reaction on addition of ;-

(i) sodium hydroxide solution. (3 ½ marks)

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(ii) ammonia solution. (3 marks)

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15.(a) Define solubility product. (1 mark)

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(b) Magnesium hydroxide is sparingly soluble in water with a solubility product of 1.71×10^{-4} at 298K.

(i) Write the equation for the solubility of magnesium hydroxide in water at 298K. (1 ½ marks)

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(ii) Calculate the pH of a saturated solution of magnesium hydroxide at 298K. (4 ½ marks)

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(c) Apart from determining pH of a saturated solution, state two other applications of solubility product. (2 marks)

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16. Two compounds X and Y have molecular formula C_7H_7Cl . Both compounds burn in oxygen with a sooty flame. Compound X reacts with hot sodium hydroxide solution followed by silver nitrate to give a white precipitate but Y does not.

Compound Y reacts with fuming sulphuric acid to give only one compound.

(a) Identify; (2 marks)

(i) X

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(ii) Y

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(b)(i) Write equations for the reaction between Y and hot sodium hydroxide solution followed by silver nitrate solution. (2 ½ marks)

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(ii) Using equations only show how compound Y can be synthesized from benzene. (3 marks)

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(c) Write the equation for the reaction between Y and fuming sulphuric acid. (1 ½ marks)

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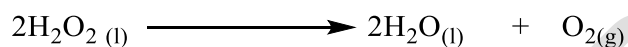
17.(a) Differentiate between molecularity and order of reaction. (2 marks)

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(b) The data in the table below is for the decomposition of hydrogen peroxide.



Concentration of hydrogen peroxide/mol dm ⁻³	8.96×10^{-2}	4.48×10^{-2}	2.24×10^{-2}	1.12×10^{-2}
Time (minutes)	0	8.02	16.0	24.1
Log[H ₂ O ₂]				

(i) Plot a graph of Log[H₂O₂] against time. (4 marks)

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Use your graph to determine;

(i) The rate constant for the reaction. (1 ½ marks)

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(ii) The half-life for the reaction. (1 ½ marks)

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END