

NAME:

SEMINAR DAY & TIME:

www.talent-100.com.au 1300 999 100

Preliminary Chemistry

Reactive Chemistry III

General Instructions

- Reading time – 5 minutes
- Working time – 30 minutes
- Write using black or blue pen
- Draw diagrams in pencil
- Board-approved calculators may be used
- All necessary working should be shown in every question

Total marks – 20

Section III – Extended Response

20 Marks

- Attempt all questions
- Write on the lines provided

Section I (Multiple Choice) and Section II (Single Response) must be submitted on My Mentor.

Section III

20 marks

Allow about 30 minutes for this part

- 14** Flame tests are a qualitative test often used by chemists to identify the presence of specific metal ions in solution based on the colour of the flame produced when a sample of the solution is exposed to a naked flame.

The following table presents the expected flame colour for a range of metal ions.

Color	Chemical
White	Magnesium Sulfate (Epsom salts)
Purple	Potassium Chloride
Violet	1 Part Potassium Nitrate (Saltpeter) & 3 Parts Potassium Sulfate
Green	Copper Sulfate or Boric Acid
Yellow-Green	Borax
Carmine	Lithium Chloride
Red	Strontium Chloride or Strontium Nitrate
Orange	Calcium Chloride (bleaching powder)
Yellow	Sodium Chloride (table salt) or Sodium Carbonate
Blue	Copper Chloride

For each of the parts (a) –(c):

- Write a balance chemical equation for the reaction
- Identify the colour of the flame if a solution of the ions of that metal is exposed to a naked flame

(a) Calcium metal and hydrochloric acid **(2 marks)**

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(b) Silver nitrate and potassium chloride solutions **(2 marks)**

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(c) Copper metal placed into a solution silver nitrate until all silver has been replaced by copper(II) **(2 marks)**

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15 Describe a firsthand investigation you have performed to distinguish between sodium, iron, magnesium and copper with reference to their reactions with water and dilute acid **(4 marks)**

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- (a) Write a balanced neutral species equation for the displacement reaction between copper(II) sulfate and magnesium metal **(1 mark)**

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- (b) Write the oxidation and reduction half-equations for this reaction **(2 marks)**

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- 17** 10.0 g of magnesium metal is placed in a large container for several hours containing 500.0 mL solution of 1.00 M CuSO_4 . Calculate the final concentration of copper(II) ions in solution **(4 marks)**

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- 18** Solutions of lead nitrate and silver nitrate were prepared in a laboratory by a student however without any labels. Name a metal that can be used in to confirm the identity of each solution and explain your choice in terms of the relative reactivity of the metals **(3 marks)**

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Section I (Multiple Choice) and Section II (Single Response) must be submitted on My Mentor.
Please contact Student Services if you have any issues.

End of paper