

85 Q.2

Pure water has a low electricity conductivity because

- A. it exists as molecule only.
- B. it takes a long time to establish the equilibrium $\text{H}_2\text{O(l)} \rightleftharpoons \text{H}^+(\text{aq}) + \text{OH}^-(\text{aq})$
- C. it contains equal numbers of $\text{H}^+(\text{aq})$ and $\text{OH}^-(\text{aq})$.
- D. it is only slightly ionized.

85 Q.8

If 1 g $^{12}_6\text{C}$ contains x atoms, the number of atoms in 8 g of $^{16}_8\text{O}$ is

- A. 6x
- B. 8x
- C. 12x
- D. 16x

85 Q.9

If 1 mole of XO_2 contains the same number of atoms as 60g of XO_3 , the molar mass of XO_3 is

- A. 45g
- B. 60g
- C. 76g
- D. 80g

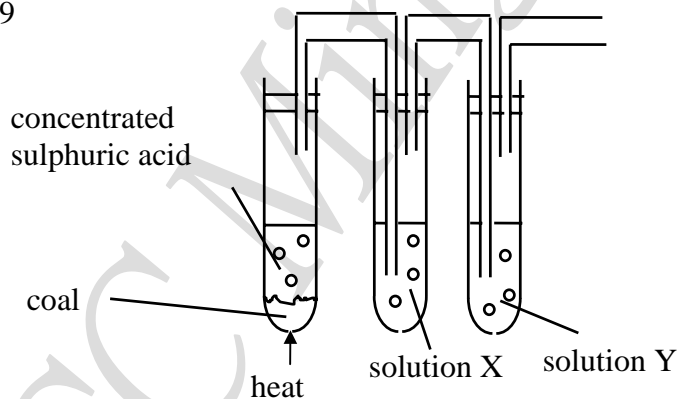
85 Q.12

1.5 moles of a metallic element X react with 12g of oxygen to form an oxide. What is the simplest formula for the oxide?

(Relative atomic mass: O = 16)

- A. XO
- B. XO_2
- C. X_2O
- D. X_2O_3

85 Q.19



To show that sulphur dioxide and carbon dioxide are produced when charcoal reacts with hot concentrated sulphuric acid, solutions X and Y in the above set-up should be

- | <u>solution X</u> | <u>solution Y</u> |
|-----------------------------------|--------------------------------|
| A. acidified potassium dichromate | lime water |
| B. acidified potassium iodide | lime water |
| C. acidified potassium iodide | bromine water |
| D. sodium hydroxide | acidified potassium dichromate |

85 Q.20

When concentrated sulphuric acid is heated with solid sodium chloride, misty fumes of hydrogen chloride are evolved. This reaction shows that sulphuric acid is

- A. a catalyst.
- B. a non-volatile acid.
- C. an oxidizing agent.
- D. a dehydrating agent.

85 Q.21

When sulphur dioxide reacts with concentrated nitric acid

- A. sulphur dioxide is oxidized to sulphite ions.
- B. sulphur dioxide is oxidized to sulphur.
- C. nitric acid is reduced to nitrogen dioxide.
- D. nitric acid is reduced to nitrogen.

85 Q.31

In the electrolysis of molten zinc chloride,
two moles of zinc atoms are deposited by
one mole of electrons.

Each zinc ion carries two positive charges.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

85 Q.37

Which of the following when added to 10 cm³ of 0.1M sodium hydroxide solution, would change the pH value of the sodium hydroxide solution?

- (1) 10 cm³ of 0.1M sodium chloride solution.
- (2) 5 cm³ of 0.1M potassium hydroxide solution.
- (3) 10 cm³ of distilled water.

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

85 Q.38

Which of the following statements concerning 100 cm³ of 2M hydrochloric acid and 100 cm³ of 2M nitric acid is/are true?

- (1) They both liberate the same amount of heat when reacted with 100 cm³ of 2M sodium hydroxide solution.
- (2) They both react with zinc to form hydrogen.
- (3) They both have the same rate of reaction with a given amount of marble chips.

- A. (3) only
- B. (1) and (2) only
- C. (1) and (3) only
- D. (1), (2) and (3)

85 Q.42

Which of the following method(s) are suitable for preparing copper(II) sulphate in the laboratory?

- (1) adding copper to dilute sulphuric acid
- (2) adding copper(II) oxide to dilute sulphuric acid
- (3) adding copper(II) carbonate to dilute sulphuric acid
- (4) adding copper(II) chloride solution to magnesium sulphate solution

- A. (1) and (4) only
- B. (2) and (3) only
- C. (1), (2) and (4) only
- D. (2), (3) and (4) only

85 Q.50.

Which of the following gases can be dried by anhydrous calcium chloride?

- (1) oxygen
- (2) chlorine
- (3) ammonia

- A. (1) only
- B. (1) and (2) only
- C. (1) and (3) only
- D. (1), (2) and (3)

85 Q.52

Which of the following tests can be used to distinguish between sodium nitrate and sodium chloride?

- (1) heating with concentrated sulphuric acid and copper turnings.
- (2) adding silver nitrate solution to the aqueous solutions.
- (3) adding barium chloride solution to the aqueous solutions.

- A. (2) only
- B. (1) and (2) only
- C. (2) and (3) only
- D. (1), (2) and (3)

85 Q.55

Which of the following substances would NOT produce a visible change when added to lead(II) nitrate solution?

- A. potassium hydroxide solution
- B. sodium iodide solution
- C. hydrochloric acid
- D. copper

86 Q.3

Which of the following oxides would dissolve in water to give the most acidic solution?

- A. magnesium oxide
- B. aluminium oxide
- C. silicon (IV) oxide
- D. phosphorus (V) oxide

86 Q.4

In a solution containing potassium nitrate and potassium sulphate, the concentrations of potassium ions and nitrate ions are 0.5M and 0.2M respectively. What is the concentration of sulphate ions?

- | | |
|----------|----------|
| A. 0.10M | B. 0.15M |
| C. 0.20M | D. 0.30M |

86. Q.5

Which of the following has the smallest number of molecules?

(Relative atomic number: H = 1, O = 16, N = 14, S = 32)

- | | |
|-------------------|---------------------------|
| A. 1g of hydrogen | B. 4g of oxygen |
| C. 7g of nitrogen | D. 16g of sulphur dioxide |

86 Q.7

The mass of aluminium oxide formed when 9g of aluminium with excess oxygen is

(Relative atomic number: Al = 27, O = 16)

- | | |
|----------------------|----------------------|
| A. $11\frac{1}{3}$ g | B. 17g |
| C. 25g | D. $28\frac{1}{3}$ g |

86. Q.8

An element X forms an oxide X_2O_3 which contains 30% of oxygen by mass. The relative atomic mass of X is

- | | |
|-------|-------|
| A. 11 | B. 27 |
| C. 31 | D. 56 |

86. Q.10

6.3g of ethanedioic acid dihydrated crystals $(COOH)_2 \cdot 2H_2O$ are dissolved in distilled water, and made up to 250 cm^3 in a volumetric flask. The concentration of this solution with respect to the acid is

(Relative atomic number: H = 1.0, C = 12.0, O = 16.0)

- | | |
|----------|----------|
| A. 0.10M | B. 0.15M |
| C. 0.20M | D. 0.40M |

86 Q.18

Which of the following compounds would produce a gas when heated with concentrated sulphuric acid?

- | | |
|--------------------|------------------------|
| A. sodium sulphate | B. calcium chloride |
| C. magnesium oxide | D. aluminium hydroxide |

86 Q.19

When hot concentrated sulphuric acid reacts with copper, it acts as

- | | |
|-------------------------|-----------------------|
| A. an acid | B. a catalyst |
| C. as dehydrating agent | D. an oxidizing agent |

86 Q.21

Which of the following will occur when a piece of magnesium ribbon is added to very dilute nitric acid?

- A. $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$
B. $2\text{H}^+(\text{aq}) + 2\text{e}^- \rightarrow \text{H}_2(\text{g})$
C. $\text{NO}_3^-(\text{aq}) + 4\text{H}^+(\text{aq}) + 3\text{e}^- \rightarrow \text{NO}(\text{g}) + 2\text{H}_2\text{O}(\text{l})$
D. $\text{NO}_3^-(\text{aq}) + 2\text{H}^+(\text{aq}) + \text{e}^- \rightarrow \text{NO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$

86 Q.40

Farmers sometimes apply calcium hydroxide to the soil

- (1) to reduce soil acidity.
(2) to act as an insecticide.
(3) to act as a weed-killer.

- | | |
|---------------------|---------------------|
| A. (1) only | B. (3) only |
| C. (1) and (2) only | D. (2) and (3) only |

86 Q.41

Limewater acts as a base when it reacts with

- (1) carbon dioxide
(2) dilute hydrochloride acid
(3) aqueous sodium sulphate

- | | |
|---------------------|---------------------|
| A. (2) only | B. (1) and (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

86 Q.50

Which of the following compounds does NOT form a solid oxide when heated strongly?

- | | |
|------------------------|-----------------------|
| A. copper(II) sulphate | B. lead(II) carbonate |
| C. potassium nitrate | D. calcium hydroxide |

87 Q.4

If 1 g of oxygen gas contains X molecules, how many molecules are present in 1g of helium gas?
(Relative atomic masses: He = 4.0; O = 16.0)

- | | |
|-------|--------|
| A. X | B. 4X |
| C. 8X | D. 16X |

87 Q.7

25.00 cm³ of a solution of a dibasic acid required 30.00 cm³ of 0.10M sodium hydroxide for complete neutralization. The concentration of the acid was

- | | |
|-----------|-----------|
| A. 0.03M. | B. 0.06M. |
| C. 0.12M. | D. 0.24M. |

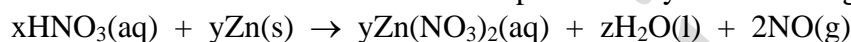
87 Q.8

Which of the following processes is endothermic?

- A. dissolving calcium oxide in water
- B. dissolving ammonium chloride in water
- C. adding concentrated sulphuric acid to water
- D. mixing hydrochloric acid with sodium hydroxide solution

87 Q.9

The action of dilute nitric acid on zinc is represented by the following equation:



The values of x, y and z in the balanced equation are

- | | |
|----------------|----------------|
| A. 3, 4 and 1. | B. 3, 8 and 2. |
| C. 4, 3 and 2. | D. 8, 3 and 4. |

87 Q.15

When dry hydrogen chloride dissolves in methylbenzene, the solution formed

- A. contains hydrogen chloride molecules.
- B. conducts electricity.
- C. is greenish yellow in colour.
- D. gives a pale yellow precipitate with a solution of bromine in tetrachloromethane.

87 Q.20

When barium chloride solution is added to a solution of a compound X, a white precipitate is formed which is soluble in dilute nitric acid. X could be

- | | |
|-------------------------|-------------------------|
| A. potassium carbonate. | B. sodium sulphate. |
| C. silver nitrate. | D. lead (II) ethanoate. |

87 Q.25

Which of the following solutions can be used to distinguish between sodium hydroxide solution and aqueous ammonia?

- A. iron (II) chloride solution
- B. iron (III) chloride solution
- C. zinc sulphate solution
- D. aluminium sulphate solution

87 Q.26

Which of the following reaction sequences is most suitable for preparing magnesium carbonate from magnesium in the laboratory?

- A. $\text{Mg(s)} \xrightarrow{\text{dil. HCl}} \text{MgCl}_2(\text{aq}) \xrightarrow{\text{Na}_2\text{CO}_3(\text{aq})} \text{MgCO}_3(\text{s})$
- B. $\text{Mg(s)} \xrightarrow{\text{dil. H}_2\text{SO}_4} \text{MgSO}_4(\text{aq}) \xrightarrow{\text{CaCO}_3(\text{aq})} \text{MgCO}_3(\text{s})$
- C. $\text{Mg(s)} \xrightarrow{\text{conc. HNO}_3} \text{MgCl}_2(\text{aq}) \xrightarrow{(\text{NH}_4)_2\text{CO}_3(\text{aq})} \text{MgCO}_3(\text{s})$
- D. $\text{Mg(s)} \xrightarrow{\text{O}_2(\text{g})} \text{MgCl}_2(\text{aq}) \xrightarrow{\text{H}_2\text{O(l)} + \text{CO}_2(\text{g})} \text{MgCO}_3(\text{s})$

87 Q.29

A mixture of sodium sulphate and barium sulphite is best separated by the addition of

- A. water, followed by filtration.
- B. lime water, followed by filtration.
- C. dilute hydrochloric acid, followed by filtration.
- D. barium chloride solution, followed by filtration.

87 Q.33

In ammonia, the mass of nitrogen is three times that of hydrogen.

For every nitrogen atom present in the ammonia molecule there are three hydrogen atoms.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

87 Q.41

An aqueous solution of ethanoic acid has a pH value of 4. Which of the following substances, when added to this solution, would increase its pH value?

- (1) solid calcium carbonate
- (2) solid sodium chloride
- (3) aqueous ammonia
- (4) dilute sulphuric acid

- A. (1) and (3) only
- B. (1) and (4) only
- C. (2) and (3) only
- D. (2) and (4) only

88 Q.5

What is the maximum mass of water which can be obtained by igniting a mixture of 6.1g of hydrogen and 44.0g of oxygen?

(Relative atomic masses: H = 1, O = 16)

- A. 22.0g
C. 49.5g
- B. 48.8g
D. 54.9g

88 Q.6

Which of the following expressions represents the mass of a chlorine molecule?

(Relative atomic mass: Cl = 35.5;

Avogadro's constant = $6.02 \times 10^{23} \text{ mol}^{-1}$)

- A. $\frac{1}{35.5 \times 6.02 \times 10^{23}} \text{ g}$
- B. $\frac{35.5}{2 \times 6.02 \times 10^{23}} \text{ g}$
- C. $\frac{35.5}{6.02 \times 10^{23}} \text{ g}$
- D. $\frac{2 \times 35.5}{6.02 \times 10^{23}} \text{ g}$

88 Q.7

Which of the following is the simplest formula for a compound containing 32.8% Na, 13.0% Al and 54.2% F?

(Relative atomic masses: F = 19, Na = 23, Al = 27)

- A. Na_3AlF_6
C. Na_2AlF_5
- B. Na_2AlF_6
D. NaAlF_4

88 Q.9

Which of the following oxides dissolves in both dilute sulphuric acid and sodium hydroxide solution?

- A. CuO
C. Fe_2O_3
- B. MgO
D. Al_2O_3

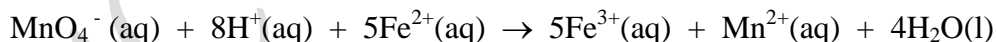
88 Q.10

What volume of water, when added to 25 cm^3 of 2M hydrochloric acid, would give a 0.2M solution of the acid?

- A. 10 cm^3
C. 225 cm^3
- B. 100 cm^3
D. 250 cm^3

88 Q.14

Consider the reaction:



Which of the following statements concerning the above reaction is true?

- A. 1 mole of electrons is transferred per mole of $\text{MnO}_4^- (\text{aq})$ ions reacted.
B. 1 mole of $\text{MnO}_4^- (\text{aq})$ ions required to react with 5 mole of the Fe^{2+} .
C. $\text{H}^+ (\text{aq})$ ions are reduced to $\text{H}_2\text{O} (\text{l})$.
D. the oxidation number of manganese increases from -1 to +2.

88 Q.15

Which of the following solutions is a weak electrolyte?

- A. 0.1M glucose solution
- B. 2.0M propanoic acid
- C. 0.5M ammonium chloride solution
- D. 0.2M sodium carbonate solution

88 Q.19

When a coin containing 92% silver and 8% copper is warmed with excess concentrated nitric acid it forms

- A. a colourless solution.
- B. a pale blue solution.
- C. a colourless solution with some undissolved copper.
- D. a pale blue solution with some undissolved silver.

88 Q.20

In carrying out redox reactions, potassium permanganate solution is usually acidified with dilute sulphuric acid but not with dilute hydrochloric acid because

- A. hydrochloric acid is more expensive.
- B. hydrochloric acid is a stronger acid.
- C. hydrochloric acid is an oxidizing agent.
- D. hydrochloric acid reacts with potassium permanganate solution.

88 Q.33

Concentrated sulphuric acid can char a piece of cloth.

Concentrated sulphuric acid is highly corrosive.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

88 Q.36

If gaseous hydrogen chloride is bubbled into a fixed volume of a dilute hydrochloric acid solution, which of the following are true?

- (1) The pH value of the solution increases.
- (2) The mass of sodium hydroxide required for complete neutralization of the solution increases.
- (3) The conductivity of the solution increases.

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

89 Q.5

If there are y molecules in 8g of oxygen, how many molecules are present in 40 g of sulphur trioxide?

(Relative atomic masses: O = 16, S = 32)

- | | |
|----------|----------|
| A. $y/4$ | B. $y/2$ |
| C. y | D. $2y$ |

89 Q.7

25 cm^3 of a 0.2M solution of an acid requires 15 cm^3 of 0.5M sodium carbonate solution for complete neutralization. What is the basicity of the acid?

- | | |
|------|------|
| A. 1 | B. 2 |
| C. 3 | D. 4 |

89 Q.8

If a glass reagent bottle containing sodium hydroxide solution is allowed to stand in air for a few weeks, it is often difficult to remove the glass stopper due to the formation of a solid round the bottle neck. The solid is probably

- | | |
|----------------------|------------------------------|
| A. sodium oxide. | B. sodium peroxide. |
| C. sodium carbonate. | D. sodium hydrogencarbonate. |

89 Q.26

A white solid W is dissolved in water to give a colourless solution which forms a white precipitate with barium chloride solution. The precipitate dissolves in dilute nitric acid. W is probably

- | | |
|----------------------------|-------------------------------|
| A. K_2CO_3 | B. NaBr |
| C. MgSO_4 | D. $\text{Zn}(\text{NO}_3)_2$ |

89 Q.35

Which of the following properties is / are common to both Group I and Group II elements of the Periodic Table?

- (1) They form basic oxides.
- (2) They form soluble carbonates.
- (3) They form soluble sulphates.

- | | |
|---------------------|---------------------|
| A. (1) only | B. (1) and (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

90 Q.7

The reaction between lead (II) nitrate solution and sodium hydrogencarbonate solution can be represented by the equation below:



Which of the following combinations for x, y and z is correct?

- | | <u>x</u> | <u>y</u> | <u>z</u> |
|----|----------|----------|----------|
| A. | aq | aq | aq |
| B. | aq | l | g |
| C. | s | aq | g |
| D. | s | l | g |

90 Q.9

The molecular formula of a gas is X_3 . If the Avogadro's Number is $L \text{ mol}^{-1}$, how many molecules are there in 96 g of X_3 ?

(Relative atomic mass of X = 16.0)

- | | |
|------------|---------|
| A. $1/2 L$ | B. $2L$ |
| C. $3L$ | D. $6L$ |

90 Q.10

If 2g of carbon dioxide gas contain x molecules, how many molecules are present in 2g of helium gas?

(Relative atomic masses : He = 4.0; C = 12.0; O = 16.0)

- | | |
|---------|--------------------|
| A. x | B. $5\frac{1}{2}x$ |
| C. $7x$ | D. $11x$ |

90 Q.12

150.0 cm^3 of 3.0 M sodium hydroxide solution is mixed with 50.0 cm^3 of 1.0 M sodium hydroxide solution. The concentration of the resultant solution is

- | | |
|----------|----------|
| A. 2.0M. | B. 2.5M. |
| C. 3.3M. | D. 4.0M. |

90 Q.13

A pupil, working with dilute acids in the laboratory, carelessly poured the unused acids into the sink. Later it was found that the copper pipe in the sink had begun to leak. Which of the following acids is / are most likely to have caused the damaged?

- (1) dilute nitric acid
 (2) dilute sulphuric acid
 (3) dilute hydrochloric acid

- | | |
|---------------------|---------------------|
| A. (1) only | B. (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

90 Q.14

Which of the following statements concerning 25 cm^3 of 1M hydrochloric acid and 25 cm^3 of 1M ethanoic acid is / are correct?

- (1) They give the same colour change when the same quantity of universal indicator is added.
- (2) They react with marble chips at the same rate when the initial temperatures are the same.
- (3) They require the same number of moles of sodium hydroxide for complete neutralization.

- | | |
|---------------------|---------------------|
| A. (1) only | B. (3) only |
| C. (1) and (2) only | D. (2) and (3) only |

90 Q.15

The reddish-brown rust that forms on the surface of iron can be removed by using

- A. paraffin oil.
- B. dilute sulphuric acid.
- C. concentrated ammonia solution.
- D. dilute sodium hydroxide solution.

90 Q.16

Sulphuric acid is NOT used to prepare carbon dioxide from limestone because

- A. the reaction between sulphuric acid and limestone is reversible.
- B. the reaction between sulphuric acid and limestone is too vigorous.
- C. sulphuric acid is a strong oxidizing agent.
- D. an insoluble product is formed which stops further reaction.

90 Q.17

Zinc does NOT liberate hydrogen from a 0.5M nitric acid solution because

- A. zinc is an unreactive metal.
- B. nitric acid is an oxidizing agent.
- C. the concentration of hydrogen ions in the nitric acid is too low.
- D. a layer of oxide film is formed on the surface of zinc to prevent further reaction.

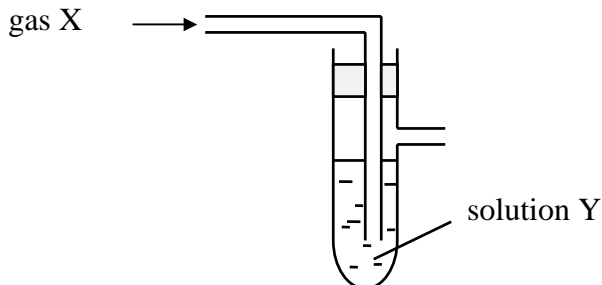
90 Q.22

X is a white solid. When dilute hydrochloric acid is added to X, a colourless gas is liberated. An aqueous solution of X gives a white precipitate with silver nitrate solution. X is probably

- | | |
|-----------------------|-----------------------|
| A. ammonium chloride. | B. sodium ethanoate. |
| C. sodium carbonate. | D. calcium carbonate. |

90 Q.27

Gas X is bubbled steadily into solution Y as shown in the set-up below:



In which of the following cases will NO observable change occur in solution Y?

	<u>gas X</u>	<u>solution Y</u>
A.	sulphur dioxide	bromine water
B.	sulphur dioxide	calcium hydroxide
C.	carbon dioxide	bromine water
D.	carbon dioxide	calcium hydroxide

90 Q.31

16.1g of a hydrated metal sulphate was heated to constant mass. After cooling to room temperature, the residual anhydrous metal sulphate weighed 7.1g. How many moles of water of crystallization are there in one mole of the hydrated metal sulphate?

(Relative molecular masses: anhydrous metal sulphate = 142.0; water = 18.0)

- | | |
|------|-------|
| A. 4 | B. 5 |
| C. 7 | D. 10 |

90 Q.32

Nitric acid can be prepared by heating concentrated sulphuric acid with a metal nitrate because nitric acid is

- | | |
|-------------------|------------------------|
| A. volatile. | B. monobasic. |
| C. a strong acid. | D. an oxidizing agent. |

90 Q.35

Which of the following hydroxides is insoluble in BOTH excess sodium hydroxide solution and excess aqueous ammonia?

- | | |
|-----------------------------|-----------------------------|
| A. $\text{Cu}(\text{OH})_2$ | B. $\text{Zn}(\text{OH})_2$ |
| C. $\text{Fe}(\text{OH})_2$ | D. $\text{Al}(\text{OH})_3$ |

90 Q.44

If dilute hydrochloric acid gets into a student's eye during an experiment, the first thing the student should do is to

- dial 999 for help.
- wash the eye with water.
- wash the eye with dilute ammonia water.
- wash the eye with dilute sodium hydroxide solution.

90 Q.45

Magnesium chloride solution gives a white precipitate with lead (II) nitrate solution.

Magnesium is higher than lead in the metal activity series.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

90 Q.46

A solution of dry hydrogen chloride in methylbenzene turns blue litmus paper red.

Gaseous hydrogen chloride contains hydrogen ions.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

91 Q.11

2.60g of a metal X combine with 1.20g of oxygen to form an oxide in which the oxidation number of X is +3. What is the relative atomic mass of X?
(Relative atomic mass: O = 16.0)

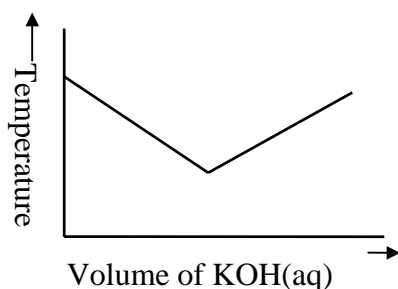
- A. 11.6
C. 52.0

- B. 34.7
D. 104

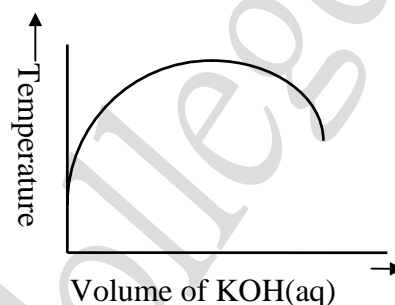
91 Q.13

Which of the following graphs represents what would be obtained in a thermometric titration of 2 M hydrochloric acid with potassium hydroxide solution?

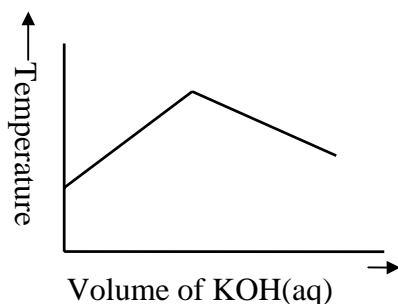
A.



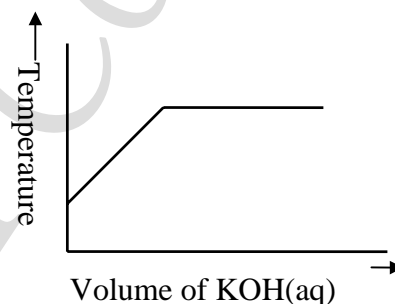
B.



C.



D.



91 Q.16

What volume of water should be added to 100 cm^3 of 2M hydrochloric acid to change the acid concentration to 0.2M?

- A. 100 cm^3
C. 900 cm^3

- B. 500 cm^3
D. 1000 cm^3

91 Q.17

When concentrated sulphuric acid is added to hydrated copper(II) sulphate crystals, which of the following would be observed?

- A. The crystals dissolve to form a blue solution.
B. The crystals change to a white solid.
C. The crystals change to a black solid.
D. There is no visible change.

91 Q.18

22 g of calcium carbonate are allowed to react with 200 cm^3 of 0.5M hydrochloric acid until no further reaction occurs. What is the mass of calcium carbonate left behind?

(Relative atomic masses: C = 12.0; O = 16.0; Ca = 40.0)

- A. 2g
C. 12g

- B. 5g
D. 17g

91 Q.20

What is the number of moles of Fe^{3+} ions in 0.1 dm^3 of $0.5\text{M Fe}_2(\text{SO}_4)_3$ solution?

- A. 0.1×0.5
 B. $2 \times 0.1 \times 0.5$
 C. $0.1 \times 0.5 \times 6.02 \times 10^{23}$
 D. $2 \times 0.1 \times 0.5 \times 6.02 \times 10^{23}$

91 Q.23

1.55 g of a hydrated sodium carbonate, $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$, react completely with 25 cm^3 of 1M hydrochloric acid. What is the value of x ?

(Relative atomic masses: $\text{H} = 1.0$; $\text{C} = 12.0$; $\text{O} = 16.0$; $\text{Na} = 23.0$)

- A. 1
 B. 2
 C. 4
 D. 10

91 Q.44

Which of the following gases can be dried by concentrated sulphuric acid?

- (1) hydrogen chloride
 (2) ammonia
 (3) sulphur dioxide

- A. (3) only
 B. (1) and (2) only
 C. (1) and (3) only
 D. (2) and (3) only

91 Q.47

Distilled water is a poor conductor of electricity.

Distilled water contains an equal number of $\text{H}^+(\text{aq})$ ions and $\text{OH}^-(\text{aq})$ ions.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

91 Q.48

Hydrogen chloride can be prepared by the action of concentrated nitric acid on solid sodium chloride.

Concentrated nitric acid is a non-volatile acid.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

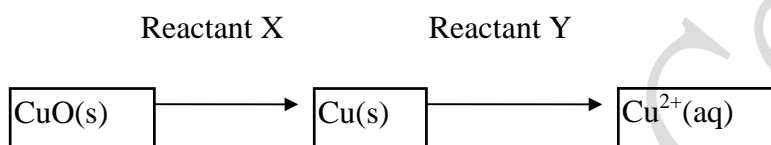
92 Q.1

Rubidium (Rb) is a group I element below potassium in the Periodic Table. Which of the following statements about rubidium is correct?

- A. Rubidium forms an acidic oxide.
- B. Rubidium is more reactive than potassium.
- C. Rubidium can be obtained from its oxide by reduction with carbon.
- D. The formula for rubidium chloride is RbCl_2 .

92 Q.11

Consider the following flow diagram:



Which of the following combinations is correct?

- | | Reactant X | Reactant Y |
|----|-------------------------|--------------------------------|
| A. | $\text{H}_2(\text{g})$ | dilute H_2SO_4 |
| B. | CO(g) | dilute HNO_3 |
| C. | $\text{NH}_3(\text{g})$ | dilute HCl |
| D. | C(s) | concentrated HCl |

92 Q.15

Which of the following substances react with hot concentrated sulphuric acid?

- (1) sulphur
- (2) sodium nitrate
- (3) hydrated copper (II) sulphate

- | | |
|---------------------|---------------------|
| A. (1) and (2) only | B. (1) and (3) only |
| C. (2) and (3) only | D. (1), (2) and (3) |

Directions: Question 92 Q.17 and 92 Q.18 refer to the following experiment:

A student measured the conductivity of a certain acid. When he added barium hydroxide solution dropwise to the acid, he found that the conductivity of the acid gradually dropped to a almost zero.

92 Q.17

The acid is probably

- A. hydrochloric acid.
- B. sulphuric acid.
- C. nitric acid.
- D. ethanoic acid.

92 Q.18

Which of the following reasons accounts for the change in the conductivity of the acid?

- A. Barium hydroxide is a weak electrolyte.
- B. The acid is a weak electrolyte.
- C. The neutralization reaction between barium hydroxide solution and the acid is exothermic.
- D. A precipitate is formed when barium hydroxide solution is added to the acid.

92 Q.19

Solution X is 45 cm³ of 1.2 M HCl and Solution Y is 60 cm³ of 0.9M CH₃COOH.

Which of the following statements concerning X and Y is correct?

- A. X has a higher pH value than Y.
- B. Both X and Y need the same volume of 1M NaOH for neutralization.
- C. Both X and Y have the same electrical conductivity.
- D. Y has a faster rate of reaction with marble chips than X.

92 Q.27

The following experimental results were obtained when 2M HCl was allowed to react separately with 2M NaOH and 2M KOH:

Expt. No.	Volume of acid	Volume of alkali	Rise in temperature
1	100 cm ³ of 2M HCl	100 cm ³ of 2M NaOH	T ₁ °C
2	200 cm ³ of 2M HCl	200 cm ³ of 2M KOH	T ₂ °C

Which of the following is correct?

- A. T₁ = T₂
- B. T₁ = 2T₂
- C. 2T₁ = T₂
- D. 4T₁ = T₂

92 Q.29

After 50 cm³ of 0.6M H₂SO₄ have completely neutralized 100 cm³ of 0.6M NaOH, the concentration of the resulting sodium sulphate solution is

- A. 0.2M.
- B. 0.3M.
- C. 0.6M.
- D. 1.2M.

92 Q.35

Which of the following reagents can be used to distinguish between Fe²⁺(aq) and Fe³⁺(aq) ions?

- (1) ammonia solution
- (2) concentrated nitric acid
- (3) acidified potassium permanganate solution

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

92 Q.36

Which of the following reagents form(s) a white precipitate with lead (II) nitrate solution?

- (1) potassium carbonate solution
- (2) dilute hydrochloric acid
- (3) sodium sulphate solution

- A. (3) only
 C. (2) and (3) only
 B. (1) and (2) only
 D. (1), (2) and (3)

92 Q.40

Which of the following can be used to distinguish between dilute hydrochloric acid and dilute nitric acid?

- (1) copper
- (2) silver nitrate solution
- (3) sodium hydrogencarbonate solution

- A. (2) only
 C. (1) and (3) only
 B. (1) and (2) only
 D. (2) and (3) only

92 Q.49

A solution of hydrogen chloride in methylbenzene can turn blue litmus paper red.

Hydrogen chloride dissolves in methylbenzene to form hydrogen ions.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

92 Q.50

When concentrated sulphuric acid is poured onto a piece of cotton cloth, the piece of cloth becomes charred.

Concentrated sulphuric acid is a strong oxidizing agent.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

Directions: Question 93 Q.5 and 93 Q.6 refer to the following experiment:

A silver coin, with a mass of 12.00g, was dissolved completely in concentrated nitric acid. When excess potassium chloride solution was added to the resulting solution, 14.35g of a white precipitate were obtained.

93 Q.5

Which of the following equations correctly represents the reaction between silver and concentrated nitric acid?

- A. $\text{Ag} + 2\text{H}^+ + \text{NO}_3^- \rightarrow \text{Ag}^+ + \text{NO}_2 + \text{H}_2\text{O}$
- B. $\text{Ag} + 4\text{H}^+ + 4\text{NO}_3^- \rightarrow \text{Ag}^+ + 4\text{NO}_2 + \text{O}_2 + 2\text{H}_2\text{O}$
- C. $3\text{Ag} + 4\text{HNO}_3 \rightarrow 3\text{AgNO}_3 + \text{NO} + 2\text{H}_2$
- D. $\text{Ag} + 4\text{HNO}_3 \rightarrow \text{AgNO}_3 + 3\text{NO}_2 + 2\text{H}_2\text{O}$

93 Q.6

What is the percentage by mass of silver in the coin?

(Relative atomic masses: Cl = 35.5, Ag = 108)

- | | |
|-------|-------|
| A. 45 | B. 60 |
| C. 75 | D. 90 |

93 Q.8

The molecular formula of a gaseous element X is X_2 . If the relative atomic mass of X is 19, what is the number of molecules in 144g of the gas?

(Avogadro's number = 6.02×10^{23})

- | | |
|-----------------------------------|-----------------------------------|
| A. 3 | B. 6 |
| C. $3 \times 6.02 \times 10^{23}$ | D. $6 \times 6.02 \times 10^{23}$ |

93 Q.11

The following substances were burnt in oxygen and the products were mixed with water. Which of these substances would produce a resulting solution with the highest pH value?

- | | |
|------------|-----------|
| A. calcium | B. iron |
| C. sulphur | D. carbon |

93 Q.12

A mixture contains copper powder and zinc powder. In order to remove the zinc powder, the mixture is heated with an acid and filtered. Which of the following acids should be used?

- | | |
|--------------------------|--------------------------------|
| A. dilute nitric acid | B. concentrated nitric acid |
| C. dilute sulphuric acid | D. concentrated sulphuric acid |

93 Q.13

0.12g of sodium metal is added to a large volume of water. When the reaction is completed, the resulting solution is treated with 0.2 M hydrochloric acid. What is the volume of the acid required, to the nearest cm^3 , for complete neutralization?
(Relative atomic mass: Na = 23)

- | | |
|-------|-------|
| A. 13 | B. 26 |
| C. 39 | D. 52 |

93 Q.23

Which of the following statements about a solution of hydrogen chloride in water is correct?

- A. The hydrogen chloride exist as molecules in the solution.
 B. The hydrogen chloride is slightly ionized in water.
 C. The pH value of the solution is greater than 7.
 D. The reaction between the solution and aqueous ammonia is exothermic.

93 Q.26

On heating, blue copper (II) sulphate crystals gradually change to a white powder. Which of the following statements are correct?

- (1) Heat would be liberated if water is added to the white powder.
 (2) On further heating, the white powder turn reddish-brown.
 (3) A chemical change occurs during the heating of the blue crystals.

- | | |
|---------------------|---------------------|
| A. (1) and (2) only | B. (1) and (3) only |
| C. (2) and (3) only | D. (1), (2) and (3) |

93 Q.41

Which of the following experiments is potentially hazardous and should NOT be carried out on a laboratory bench?

- A. heating ammonium nitrate strongly in a test tube
 B. passing ethene through bromine water in a conical flask
 C. adding a small piece of sodium to a beaker of ethanol
 D. pouring a small amount of concentrated nitric acid into a trough of water

93 Q.45

Concentrated sulphuric acid can be used to prepare nitric acid.

Sulphuric acid is more non-volatile than nitric acid.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

93 Q.46

Sodium carbonate is not decomposed by heat.

Sodium carbonate is an ionic compound.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

93 Q.49

100 cm³ of 1 M hydrochloric acid react with excess magnesium ribbon at the same rate as 100 cm³ of 1M sulphuric acid.Both acids contain the same concentration of H⁺ (aq) ions.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

94 Q.8

Which of the following contains the number of atoms as 2.20 g of carbon dioxide?

(Relative atomic masses: H = 1.0; C = 12.0; N = 14.0; O = 16.0; S = 32.0; Cl = 35.5)

- A. 1.70 g of ammonia
- B. 2.25 g of nitrogen monoxide
- C. 2.80 g of sulphur dioxide
- D. 3.55 g of chlorine

94 Q.9

A metal X forms a hydroxide XOH. 1.12 g of XOH were dissolved in some distilled water and then made up to 250 cm³ with distilled water. 25.0 cm³ of this solution required 20.0 cm³ of 0.10 M hydrochloric acid for complete neutralization. What is the relative atomic mass of X?

(Relative atomic masses: H = 1.0; O = 16.0)

- A. 23.0
- B. 24.0
- C. 39.0
- D. 40.0

94 Q.15

Which of the following NOT a suitable method of preparation?

- A. preparation of carbon dioxide from calcium carbonate and dilute sulphuric acid.
- B. preparation of hydrogen from iron and dilute sulphuric acid.
- C. preparation of sulphur dioxide from sodium sulphite and dilute hydrochloric acid.
- D. preparation of nitrogen dioxide from zinc and concentrated nitric acid.

94 Q.16

Which of the following statements concerning a solution of hydrogen chloride in dry methylbenzene is correct?

- A. It can conduct electricity.
- B. Its pH value is smaller than 7.
- C. When magnesium is added to it, a gas is evolved.
- D. When ammonia gas is bubbled into it, a white precipitate is formed.

94 Q.18

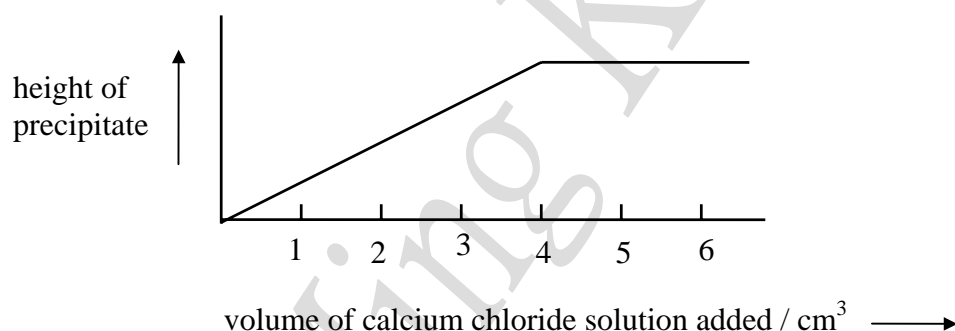
The formula of hydrated magnesium sulphate crystals is $\text{MgSO}_4 \cdot x\text{H}_2\text{O}$. When 3.80 g of the hydrated crystals are heated, 2.00g of anhydrous magnesium sulphate are produced. What is the value of x ?

(Relative atomic masses: H = 1.0; O = 16.0; Mg = 24.0; S = 32.0)

- | | |
|------|------|
| A. 3 | B. 4 |
| C. 5 | D. 6 |

Directions: Question 94 Q.26 and 94 Q.27 refer to the following experiment:

1.0 cm³ portions a calcium chloride solution are added successively to 10.0 cm³ of 1.0 M potassium carbonate solution in a test tube. After each addition, the height of the precipitate formed is measured. The following graph is obtained:



94 Q.26

The concentration of the calcium chloride solution is

- | | |
|-----------|-----------|
| A. 1.0 M. | B. 2.0 M. |
| C. 2.5 M. | D. 4.0 M. |

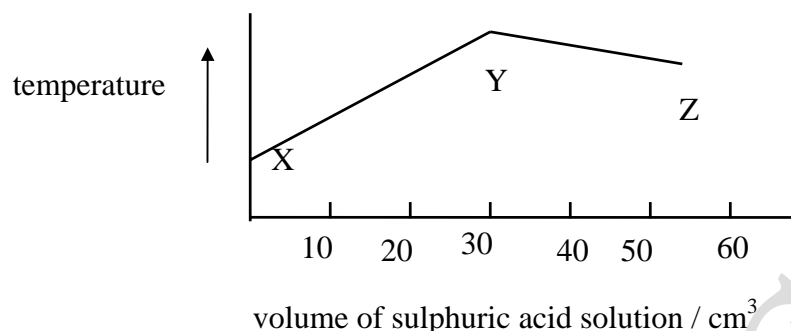
94 Q.27

Which of the following statements concerning the experiment is INCORRECT?

- A. The precipitate is white in colour.
- B. The precipitate is centrifuged before its height is measured.
- C. The height of precipitate formed at the end of the experiment would be the same if 0.5 cm³ portions of the calcium chloride solution are used instead of 1.0 cm³ portions.
- D. A measuring cylinder is used to measure the 1.0 cm³ portions of the calcium chloride solution.

Directions: Question 94 Q.30 and 94 Q.31 refer to the following experiment on a thermometric titration:

A sulphuric acid solution is titrated against 25.0 cm^3 of 3.0 M sodium hydroxide solution. The results of the thermometric titration can be represented by the following graph:



94 Q.30

The concentration of the sulphuric acid solution is

- | | |
|-----------------------|-----------------------|
| A. 1.00 M . | B. 1.25 M . |
| C. 2.50 M . | D. 5.00 M . |

94 Q.31

Which of the following statement (s) is / are correct?

- (1) The temperature rises from X to Y because the reaction between the sulphuric acid solution and sodium hydroxide solution is exothermic.
- (2) The temperature drops from Y and Z because water is formed in the reaction between the sulphuric acid solution and sodium hydroxide solution.
- (3) Z corresponds to the end point of the titration.

- | | |
|---------------------|---------------------|
| A. (1) only | B. (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

94 Q.33

Which of the following statements concerning 25.0 cm^3 of 0.1 M hydrochloric acid and 25.0 cm^3 of 1.0 M ethanoic acid is / are correct?

- (1) They contain the same number of hydrogen ions.
- (2) They require the same volume of 0.1 M sodium hydroxide solution for complete neutralization.
- (3) They react with excess zinc granules at the same rate.

- | | |
|---------------------|---------------------|
| A. (1) only | B. (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

94 Q.38

Concentrated sulphuric acid turns blue litmus paper red and then black. On the basis of these colour changes, which of the following deductions concerning concentrated sulphuric acid are correct?

- (1) It contains $\text{H}^+(\text{aq})$ ions.
- (2) It is an oxidizing agent.
- (3) It is a dehydrating agent.

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

95 Q.7

Which of the following substances, when mixed, would undergo a chemical reaction?

- A. copper and zinc sulphate solution
- B. calcium chloride solution and magnesium nitrate solution
- C. lead (II) nitrate solution and sodium hydroxide solution
- D. bromine water and sodium chloride solution

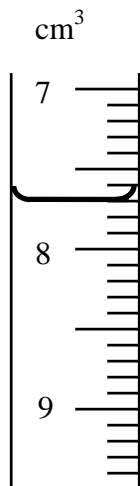
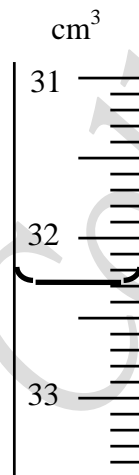
95 Q.8

In order to prepare 250 cm^3 of 0.10 M sodium hydroxide solution from 1.0 M sodium hydroxide solution, which of the following combinations of apparatus should be used?

- A. burette, measuring cylinder, pipette
- B. conical flask, measuring cylinder, volumetric flask
- C. burette, conical flask, wash bottle
- D. pipette, volumetric flask, wash bottle

95 Q.9

A student performed a titration experiment in which he added an acid from a burette to an alkali contained in a conical flask. The following diagrams show the initial and final readings of the burette.

Initial readingFinal reading

What was the volume of the acid added from the burette to the conical flask?

- A. 24.5 cm³ B. 24.6 cm³
 C. 24.7 cm³ D. 32.3 cm³

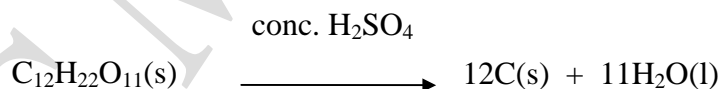
95 Q.12

Which of the following pairs of solutions, when mixed, would give a neutral solution?

- A. 10 cm³ of 1 M sulphuric acid and 10 cm³ of 1 M sodium hydroxide solution
 B. 10 cm³ of 1 M sulphuric acid and 10 cm³ of 2 M sodium hydroxide solution
 C. 10 cm³ of 2 M sulphuric acid and 20 cm³ of 1 M sodium hydroxide solution
 D. 20 cm³ of 2 M sulphuric acid and 10 cm³ of 2 M sodium hydroxide solution

95 Q.13

The reaction of cane sugar and concentrated sulphuric acid may be represented by the following equation.



In this reaction, concentrated sulphuric acid acts as

- A. a strong acid.
 B. an oxidizing agent.
 C. a drying agent.
 D. a dehydrating agent.

95 Q.14

A mixture consists of two solids, sodium chloride and lead (II) oxide. Which of the following methods can be to remove the sodium chloride from the mixture?

- A. Add water to the mixture and then filter.
- B. Add concentrated sulphuric acid to the mixture and then filter.
- C. Add dilute nitric acid to the mixture and then filter.
- D. Add dilute sodium hydroxide solution to the mixture and then filter.

95 Q.16

What volume of water is required to dilute 100 cm^3 of 8M hydrochloric acid to a concentration of 2M?

- A. 200 cm^3
- B. 300 cm^3
- C. 400 cm^3
- D. 700 cm^3

95 Q.46

The basicity of ethanoic acid is four.

One molecule of ethanoic acid contains four atoms of hydrogen.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

95 Q.49

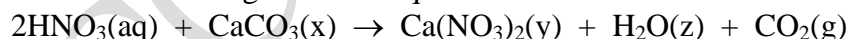
If a student accidentally spills some hydrochloric acid on his hand, he should immediately wash his hand with sodium hydroxide solution.

Sodium hydroxide solution can neutralize hydrochloric acid.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

96 Q.4

Consider the following chemical equation:



- | | <u>X</u> | <u>Y</u> | <u>Z</u> |
|----|----------|----------|----------|
| A. | aq | aq | l |
| B. | aq | aq | aq |
| C. | s | aq | l |
| D. | s | s | aq |

96 Q.6

Which of the following substances is used by farmers to increase the pH of soil?

- A. ammonium nitrate
- B. calcium hydroxide
- C. citric acid
- D. potassium hydroxide

96 Q.9

Which of the following experiments can be used to show that concentrated sulphuric acid is a dehydrating agent?

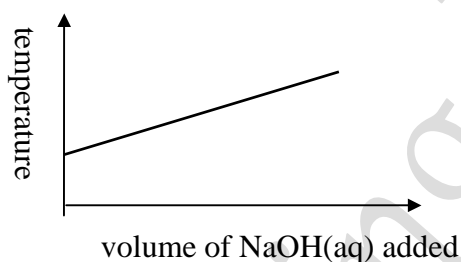
- A. adding it to copper (II) oxide powder
- B. adding it to copper(II) sulphate crystals
- C. adding it to calcium carbonate powder
- D. adding it to sodium chloride crystals

96 Q.10

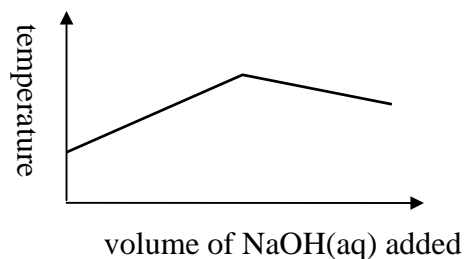
A student added 16 cm^3 of 2M sodium hydroxide solution, in 2 cm^3 portions, to 10 cm^3 of 2M nitric acid. He measured the temperature of the mixture immediately after each addition of the sodium hydroxide solution.

Which of the following graphs represents the relationship between the temperature of the mixture and the volume of sodium hydroxide solution added?

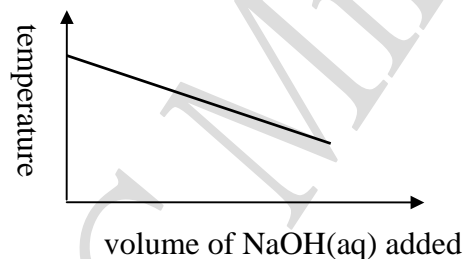
A.



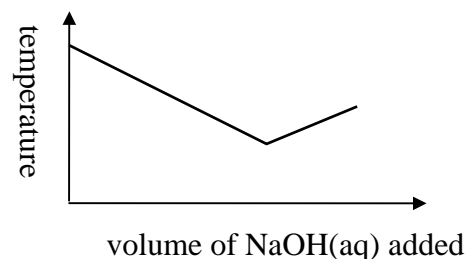
B.



C.

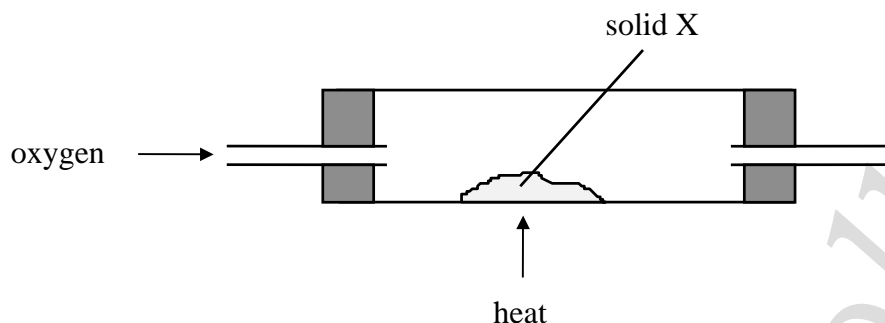


D.



96 Q.12

Consider the following experiment:



After the experiment, the residue in the combustion tube is dissolved in water and an alkaline solution is obtained. X may be

- | | |
|------------|---------------|
| A. carbon. | B. magnesium. |
| C. silver. | D. sulphur. |

96 Q.33

A mixture contains only copper (II) oxide and anhydrous copper(II) sulphate. Which of the following methods can be used to separate copper (II) oxide from the mixture?

- (1) Add water to the mixture and then filter.
- (2) Add dilute nitric acid to the mixture and then filter.
- (3) Add concentrated hydrochloric acid to the mixture and then filter.

- | | |
|---------------------|---------------------|
| A. (1) only | B. (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

96 Q.38

Which of the following substances are commonly found in the waste water produced by electroplating factories?

- (1) acids
- (2) alkalis
- (3) cyanides

- | | |
|---------------------|---------------------|
| A. (1) and (2) only | B. (1) and (3) only |
| C. (2) and (3) only | D. (1), (2) and (3) |

96 Q.39

The atomic number of element X is 16. Which of the following statements concerning X are correct?

- (1) X can react with calcium to form an ionic compound.
- (2) The oxide of X dissolves in water to form an acidic solution.
- (3) X can conduct electricity in its molten state.

- | | |
|---------------------|---------------------|
| A. (1) and (2) only | B. (1) and (3) only |
| C. (2) and (3) only | D. (1), (2) and (3) |

96 Q.49

The volume of hydrogen liberated at room temperature and pressure by the reaction between 10 cm^3 of 10M hydrochloric acid and excess zinc granules is greater than that between 50 cm^3 of 2M hydrochloric acid and excess zinc granules.

10 M hydrochloric acid is a stronger acid than 2 M hydrochloric acid.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

97 Q.6

A 2.0 M sodium chloride solution is prepared by dissolving 11.7 g of sodium chloride in distilled water. What is the volume of the solution formed?

(Relative atomic masses: Na = 23.0; Cl = 35.5)

- | | |
|------------------------|------------------------|
| A. 50.0 cm^3 | B. 100.0 cm^3 |
| C. 250.0 cm^3 | D. 500.0 cm^3 |

97 Q.9

Metal X reacts with dilute nitric acid to give a colourless solution. When sodium hydroxide solution is added to the solution, a white precipitate which dissolves in excess sodium hydroxide solution is formed. X is probably

- | | |
|------------|---------------|
| A. copper. | B. iron. |
| C. lead. | D. magnesium. |

97 Q.13

Which of the following statements concerning the reaction of aqueous ammonia with hydrochloric acid is correct?

- A. The reaction is exothermic.
 B. A white precipitate is formed.
 C. Ammonium chloride and chlorine are produced.
 D. The product ammonium chloride is a covalent compound.

97 Q.14

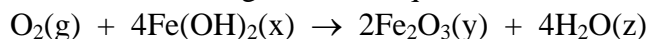
The formula of a metal carbonate is X_2CO_3 . 100 cm^3 of a solution containing 0.69g of the carbonate requires 50 cm^3 of 0.20 M hydrochloric acid for complete reaction. What is the relative atomic mass of metal X?

(relative atomic masses: C = 12.0; O = 16.0)

- | | |
|---------|---------|
| A. 19.0 | B. 23.0 |
| C. 39.0 | D. 78.0 |

97 Q.27

Consider the following chemical equation:



Which of the following combinations is correct?

	<u>x</u>	<u>y</u>	<u>z</u>
A.	s	s	l
B.	s	aq	aq
C.	aq	s	aq
D.	aq	aq	l

97 Q.28

What mass of copper is obtained when 0.40 mol of copper (II) oxide are completely reduced by carbon?

(Relative atomic masses: O = 16.0; Cu = 63.5)

- | | |
|----------|----------|
| A. 12.7g | B. 15.9g |
| C. 25.4g | D. 31.8g |

97 Q.29

An iron nail is heated with concentrated sulphuric acid. Which of the following combinations is correct?

	<u>Gas given off</u>	<u>Colour of solution formed</u>
A.	hydrogen	pale green
B.	hydrogen	yellow
C.	sulphur dioxide	pale green
D.	sulphur dioxide	yellow

97 Q.31

Which of the following statements concerning citric acid is / are correct?

- (1) It is a strong acid.
- (2) It is present in oranges.
- (3) It exists as a solid at room temperature.

- | | |
|---------------------|---------------------|
| A. (1) only | B. (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

97 Q.35

Dilute ammonia solution is used in domestic glass cleaners because

- (1) it can saponify grease.
- (2) it is non-corrosive.
- (3) it contains ammonium ions which can emulsify grease.

Which of the above statements is / are correct?

- | | |
|---------------------|---------------------|
| A. (1) only | B. (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

97 Q.36

Which of the following substances can be used to distinguish between concentrated nitric acid and concentrated sulphuric acid?

- (1) sodium carbonate powder
- (2) copper turning
- (3) cane sugar

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

97 Q.37

Which of the following substances would react with sodium hydroxide solution?

- (1) ammonium chloride solution
- (2) copper (II) sulphate solution
- (3) ethanoic acid

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

97 Q.39

Concentrated sulphuric acid is corrosive to skin because

- (1) it is a dehydrating agent.
- (2) it is an oxidizing agent.
- (3) each molecule of sulphuric acid has two ionizable hydrogen atoms.

Which of the above statements are correct?

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

97 Q.49

When filling a pipette with a solution, a pipette filler is referred to sucking with the mouth.

It is more accurate to fill a pipette with a solution by using a pipette filler than by sucking with the mouth.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

97 Q.50

Concentrated hydrochloric acid can react with silver.

Concentrated hydrochloric acid is a strong oxidizing agent.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

98 Q.9

Which of the following substances has a pH less than 7?

- | | |
|------------------|---------------------|
| A. lemon juice | B. soap solution |
| C. Glass cleaner | D. milk of magnesia |

98 Q.13

In an experiment, 10 cm³ of 1 M hydrochloric acid is added slowly into 10 cm³ of 1 M sodium hydroxide solution. Which of the following statements concerning this experiment is correct?

- A. The temperature of the mixture increases.
 B. The pH of the mixture increases.
 C. The mixture does not conduct electricity at the end of the experiment.
 D. The concentration of sodium ions in the mixture remains unchanged.

98 Q.16

The formula of a solid dibasic acid is H₂X. 2.88 g of the acid is dissolved in some distilled water and the solution is then diluted to 250.0 cm³ with distilled water. 25.0 cm³ of the diluted solution requires 16.0 cm³ of 0.40 M sodium hydroxide solution for complete neutralization. What is the molar mass of H₂X?

- | | |
|-----------|------------|
| A. 22.5 g | B. 45.0 g |
| C. 90.0 g | D. 189.0 g |

98 Q.23

Which of the following is **NOT** the appropriate substance for preparing zinc sulphate by directly mixing with dilute sulphuric acid?

- | | |
|-------------------|-------------------|
| A. Zinc | B. zinc carbonate |
| C. zinc hydroxide | D. zinc nitrate |

98 Q.25

Dilute sodium hydroxide solution is added successively to four different solutions. Which of the following combinations is correct?

<u>Solution</u>	<u>Observation</u>
A. ammonium chloride	white precipitate
B. lead(II) nitrate	yellow precipitate
C. potassium dichromate	orange precipitate
D. iron(III) sulphate	brown precipitate

98 Q.31

What is the purpose of adding quicklime (calcium oxide) to soil?

- A. to neutralize the acidity of the soil
- B. to act as a fertilizer for the soil
- C. to kill micro-organisms in the soil
- D. to increase the amount of calcium ions in the soil

98 Q.44

Upon heating, a mixture of iron and sulphur gives a black substance. Which of the following statements concerning the black substance are correct?

- (1) It is insoluble in water.
- (2) It can be attracted by a bar magnet
- (3) It reacts with dilute hydrochloric acid to give a gas with a pungent smell.

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

99 Q.25

In an experiment, 1.00 M sodium hydroxide solution was added to 25.0 cm³ of 1.00 M sulphuric acid until the acid was completely neutralized. What is the concentration of sodium sulphate (correct to two decimal places) in the resulting solution?

- A. 1.00 M
- B. 0.50 M
- C. 0.33 M
- D. 0.25 M

00 Q.11

Different volumes of 2.0 M potassium hydroxide solution and 2.0 M sulphuric acid are mixed in a polystyrene cup. In which of the following combinations would the temperature rise be the greatest?

<u>Volume of 2.0 M KOH(aq)/cm³</u>	<u>Volume of 2.0 M H₂SO₄(aq)/cm³</u>
A. 20.0	40.0
B. 30.0	30.0
C. 40.0	20.0
D. 45.0	15.0

00 Q.16

Consider the following equation:



Which of the following combinations is correct?

- | | | | |
|----|----------|----------|----------|
| | <u>x</u> | <u>y</u> | <u>z</u> |
| A. | aq | g | aq |
| B. | aq | g | ℓ |
| C. | aq | aq | ℓ |
| D. | ℓ | g | aq |

00 Q.18

Some potassium carbonate solution is added to a sample of tap water. The mixture then appears cloudy. Which of the following ions is probably present in the sample?

- | | |
|--------------------|-----------------------|
| A. NH_4^+ | B. Mg^{2+} |
| C. Br^- | D. SO_4^{2-} |

00 Q.20

A sample of concentrated sulphuric acid has a density of 1.83 g cm^{-3} and contains 94.0% of sulphuric acid by mass. What is the concentration (correct to one decimal place) of sulphuric acid in the sample?

(Relative atomic masses : H = 1.0, O = 16.0, S = 32.1)

- | | |
|-----------|-----------|
| A. 17.5 M | B. 18.3 M |
| C. 18.7 M | D. 19.8 M |

00 Q.22

A white solid dissolves in water to give an alkaline solution. The solution reacts with dilute hydrochloric acid to give a gas. The solid is probably

- | | |
|-------------------------|-------------------------|
| A. calcium oxide. | B. calcium carbonate. |
| C. potassium hydroxide. | D. potassium carbonate. |

00 Q.45

Concentrated sulphuric acid can turn a piece of filter paper black.

Concentrated sulphuric acid is a strong oxidizing agent.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

- B. (2) only
- D. (2) and (3) only

02 Q.5

Consider the aqueous solutions listed below:

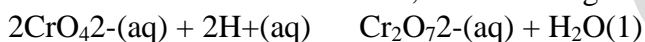
- (1) 1M ethanoic acid
- (2) 1M hydrochloric acid
- (3) 1M ammonia solution

Which of the following represents the increasing order of pH of the solutions?

- | | |
|------------------|------------------|
| A. (1), (2), (3) | B. (2), (1), (3) |
| C. (3), (1), (2) | D. (3), (2), (1) |

02 Q.7

Sodium chromate, Na_2CrO_4 , dissolves in water to give a yellow solution. When dilute hydrochloric acid is added to the solution, the following reaction occurs:



Which of the following statements concerning this reaction is correct?

- A. The colour of the solution changes from yellow to green.
- B. Chromate ions act as a reducing agent.
- C. The oxidation number of oxygen remains unchanged during the reaction.
- D. The reaction is a neutralization.

02 Q.17

Which of the following solutions does NOT react with sodium hydroxide solution?

- | | |
|--------------------------------|---------------------------------|
| A. ammonium chloride solution | B. potassium carbonate solution |
| C. copper(II) nitrate solution | D. zinc sulphate solution |

02 Q.19

Which of the following acids, when heated with copper, would produce a gas?

- | | |
|--------------------------|-------------------------------|
| A. dilute nitric acid | B. dilute hydrochloric acid |
| C. dilute sulphuric acid | D. concentrated ethanoic acid |

02 Q.32

A black powder is suspected to be carbon or a mixture of carbon and copper(II) oxide. Which of the following methods can be used to identify the black powder?

- (1) adding dilute sulphuric acid to the powder
- (2) adding sodium hydroxide solution to the powder
- (3) heating the powder strongly

- | | |
|---------------------|---------------------|
| A. (1) only | B. (2) only |
| C. (1) and (3) only | D. (2) and (3) only |

02 Q.37

Which of the following methods can be used to distinguish between iron(II) sulphate solution and iron(III) sulphate solution?

- (1) observing their colours
- (2) adding acidified potassium permanganate solution
- (3) adding aqueous ammonia

- A. (1) and (2) only
C. (2) and (3) only

- B. (1) and (3) only
D. (1), (2) and (3)

02 Q.48

The basicity of methanoic acid is different from that of ethanoic acid.

The number of hydrogen atoms in a molecule of methanoic acid is different from that in a molecule of ethanoic acid.

	1st statement	2nd statement	
A.	True	True	2nd statement is a correct explanation of the 1st one.
B.	True	True	2nd statement is NOT a correct explanation of the 1st one.
C.	True/False	False/True	Only ONE of the statements is true, the other is false.
D.	False	False	-----

03 Q.11

A sample of $\text{MgSO}_4 \cdot x\text{H}_2\text{O}(\text{s})$ of mass 123.2 g contains 63.0 g of water of crystallization. What is the value of x ?

(Relative atomic masses: $\text{H} = 1.0$, $\text{O} = 16.0$, $\text{Mg} = 24.3$, $\text{S} = 32.1$)

- A. 4
C. 6
- B. 5
D. 7

03 Q.20

A sample of zinc granules of mass 1.8 g was added to 100 cm^3 of 0.25 M hydrochloric acid. What is the theoretical volume of hydrogen produced at room temperature and pressure?

(Relative atomic mass: $\text{Zn} = 65.4$;

molar volume of gas at room temperature and pressure = 24 dm^3)

- A. 0.30 dm^3
C. 0.60 dm^3
- B. 0.33 dm^3
D. 0.66 dm^3

03 Q.26

20.0 cm³ of 2.0 M aqueous ammonia required 16.0 cm³ of sulphuric acid for complete neutralisation. What is the concentration of the sulphuric acid?

(Relative atomic masses: H = 1.0, O = 16.0, S = 32.1)

- | | |
|-----------------------------|-----------------------------|
| A. 61.3 g dm ⁻³ | B. 122.6 g dm ⁻³ |
| C. 183.9 g dm ⁻³ | D. 245.2 g dm ⁻³ |

03 Q.30

40 cm³ of 2M hydrochloric acid was mixed with 40 cm³ of 2M sodium hydroxide solution in a polystyrene cup and the maximum rise in temperature was recorded. Which of the following pairs of solutions, upon mixing, would produce a similar rise in temperature?

- A. 40 cm³ of 2M ethanoic acid and 40 cm³ of 2M potassium hydroxide solution.
- B. 40 cm³ of 2M ethanoic acid and 40 cm³ of 2M ammonia solution.
- C. 40 cm³ of 2M nitric acid and 40 cm³ of 2M potassium hydroxide solution.
- D. 40 cm³ of 2M nitric acid and 40 cm³ of 2M ammonia solution.

03 Q.43

Which of the following pairs of solutions would form a precipitate when they are mixed?

- (1) NH₄Cl(aq) and K₂SO₄(aq)
- (2) NH₃(aq) and Pb(NO₃)₂(aq)
- (3) (NH₄)₂CO₃(aq) and CaCl₂(aq)

- | | |
|---------------------|---------------------|
| A. (1) and (2) only | B. (1) and (3) only |
| C. (2) and (3) only | D. (1), (2) and (3) |

M.C. Answer

85	86	87	88	89	90	91	92	93
2 D	3 D	4 C	5 C	5 D	7 D	11 C	1 B	5 A
8 A	4 B	7 B	6 D	7 C	9 B	13 C	11 B	6 D
9 D	5 B	8 B	7 A	8 C	10 D	16 C	15 D	8 C
12 C	7 B	9 D	9 D	26 A	12 B	17 B	17 B	11 A
19 A	8 D	15 A	10 C	35 A	13 A	18 D	18 D	12 C
20 B	10 C	20 A	14 B		14 B	20 B	19 B	13 B
21 C	18 B	25 D	15 B		15 B	23 A	27 A	23 D
31 C	19 D	26 A	19 B		16 D	44 C	29 A	26 B
37 B	21 B	29 A	20 D		17 B	47 B	35 D	41 A
38 C	40 A	33 C	33 B		22 C	48 D	36 D	45 B
42 B	41 B	41 A	36 C		27 C		40 B	46 B
50 B	50 C				31 D		49 D	49 D
52 B					32 A		50 B	
55 D					35 C			
					44 B			
					45 B			
					46 D			
94	95	96	97	98	99	00	01	02
8 B	7 C	4 C	6 B	9 A	25 C	11 C	15 C	5 B
9 C	8 D	6 B	9 C	13 A		16 B	34 A	7 C
15 A	9 B	9 B	13 A	16 C		18 B	35 A	17 B
16 D	12 B	10 B	14 C	23 D		20 A		19 A
18 D	13 D	12 B	27 A	25 D		22 D		32 C
26 C	14 A	33 A	28 C	31 A		45 B		37 D
27 D	16 B	38 D	29 D	44 B		49 A		48 C
30 B	46 C	39 A	31 D					
31 A	49 C	49 D	35 A					
33 B			36 C					
38 B			37 D					
			39 A					
			49 C					
			50 D					
03								
11								
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