# Sec1 Sci C7p EQ 2nd 61marks

**Q# 1/ Q13.**          A Japanese volcano erupted in 1936. Molten sulphur poured out of the volcano.

When it cooled it formed rock sulphur.



(b)     Sulphur is a **non**-metallic element. It is yellow and melts at 115°C.

          Complete the sentences about sulphur.

(i)      Sulphur is a poor conductor of

………………………………………

1 mark

(ii)     At 115°C sulphur changes from

a …………………………………… into a …………………..……………

2 marks

(c)     Sulphur burns in air to form an oxide.

What gas in the air reacts with sulphur when it burns?

………………………………………

1 mark

**Q# 2/ Q18.**          The list below shows properties that different elements can have.

* magnetic
* can be compressed
* very high melting point
* very low melting point
* good conductor of heat
* poor conductor of heat
* good conductor of electricity
* poor conductor of electricity

(a)     Which **two** properties from the list above make aluminium suitable for saucepans?

1. .................................................................................................................

2. .................................................................................................................

2 marks

(b)     Which property in the list above explains why:

(i)      copper is used in the cable of a television?

.............................................................................................................

1 mark

(ii)     a lot of oxygen gas can be pumped into a very small container?

.............................................................................................................

1 mark

**Q# 3/ Q21.**          (a)     The table below shows the melting points of four metals.



(i)      Which metal in the table has the highest melting point?

............................................................

1 mark

(ii)     Which metal in the table has the lowest melting point?

............................................................

1 mark

(b)     Gold can be a **gas** or a **liquid** or a **solid.**

          Choose from these words to fill the gaps below.

          When gold is heated from room temperature to 1070°C, the gold

          changes from a ................................. to a ................................... .

1 mark

(c)     5 g of gold is melted and **all** of it is poured into a mould to make a pendant as shown below.



          What is the mass of the gold pendant?

          ...........................  g

1 mark

(d)     The table below shows how the four metals react with oxygen when heated in air.



(i)      Which is the **most** reactive metal in the table?

............................................................

1 mark

(ii)     Which is the **least** reactive metal in the table?

............................................................

1 mark

**Q# 4/ Q22.**          The drawing shows a gold mask from a tomb in Egypt. The gold is still shiny after thousands of years.



(a)     What is pure gold? Tick the correct box.

         a compound                       a mixture     

            an element                      a solution     

1 mark

(b)     The list shows some of the properties of gold.

          **It conducts electricity.          It melts at 1064°C.          It is yellow.**

          **It is easily scratched.          It stays shiny.          It conducts heat.**

(i)      Which **one** of these properties shows that gold does **not** react with oxygen in the air?

.............................................................................................................

1 mark

(ii)     Which **two** of the properties above are properties of **all** metals?

1. .........................................................................................................

2. .........................................................................................................

2 marks

(c)     Old iron objects from tombs in Britain are often covered with rust.

Iron reacts with oxygen when it rusts.

          What else is needed for iron to go rusty? Choose **one** substance from the list below.

**lead          nitrogen          carbon dioxide          water**

...................................................................

1 mark

(d)     A box contains a collection of metal objects from a tomb.

          What piece of equipment would you use to separate the iron objects from the other metal objects?

...............................................................

1 mark

**Q# 5/ Q15.**          The diagram shows the parts of an iron.



(a)     Choose words from the list below to fill the gaps in the sentences.



          The bottom of the iron is made of steel because steel is a good

          conductor of ……………………………, and because steel has a

          …………………………… melting point.

          The steel is polished until it is very smooth to reduce the force of

          …………………………… between the iron and the cloth.

3 marks

(b)     Suggest what material the handle could be made from.

………………………………….

1 mark

          Give a reason for your answer.

……………………………………………………………………………………….

1 mark

(c)     The iron has three temperature settings.

The settings for different fabrics are shown below.



          What might happen if nylon clothes are ironed on the    setting?

……………………………………………………………………………………….

1 mark

(d)     After it is switched on, the iron heats up. The time it takes to heat up is shown below.



          Suggest the time to heat up on the   setting.

Write your answer in the table.

1 mark

Maximum 7 marks

**Q# 6/ Q20.**          At school Ellen heated some copper powder until it went black.

(a)     Give the name of the black substance formed when copper reacts with oxygen.

.............................................

1 mark

(b)     Ellen added the black substance to some dilute sulphuric acid. The black substance reacted with sulphuric acid forming a blue solution of copper sulphate.

          What type of substance is copper sulphate?

Tick the correct box.



1 mark

(c)     (i)      Ellen poured 20 cm3 of the blue copper sulphate solution into a dish, A, as shown below.



         She left the dish in a room at 21°C for two days.

What **two** changes would Ellen observe in dish A two days later?

1. .......................................................................................................

2. .......................................................................................................

2 marks

(ii)     Ellen poured 20 cm3 of the same blue copper sulphate solution into another dish, B. She put a lid on dish B and left it in the room at 21°C for two days.



         After two days the contents of dish B looked different from the contents of dish A.

Give **one** difference Ellen would observe and explain how the lid caused this difference.

.............................................................................................................

.............................................................................................................

2 marks

**Q# 7/ Q14.**          The diagram shows an outline of part of the Periodic Table of Elements.



(a)     What is the name of the element with the symbol H?

………………………………….

1 mark

(b)     In which regions of the Periodic Table are the following types of element found?

(i)      non-metals (such as oxygen and chlorine);

region …………

1 mark

(ii)     very reactive metals (such as sodium and potassium);

region …………

1 mark

(iii)     less reactive metals (such as copper and zinc).

Region …………

1 mark

(c)     Why is copper sulphate **not** found in the Periodic Table?

……………………………………………………………………………………….

1 mark

(d)     An iron nail is placed into some blue copper sulphate solution.

A reaction takes place between the iron and the copper sulphate.

(i)      Complete the word equation for the reaction.

iron + copper sulphate → ……………………… +…………………………

1 mark

(ii)     Describe **one** change you would see on the surface of the nail.

………………………………………………….…………………………….

1 mark

**Q# 8/ Q12.**          The diagrams represent the arrangement of atoms or molecules in four different substances, A, B, C and D.



          Each of the circles, ,  and represents an atom of a different element.

(a)     (i)      Which substance is a compound?

…………

1 mark

(ii)     Which substance is a mixture?

…………

1 mark

(iii)     Which **two** substances are elements?

………… and …………

1 mark

(iv)    Which **two** substances could be good thermal conductors?

………… and …………

1 mark

(v)     Which substance could be carbon dioxide?

…………

1 mark

 (b)     The following experiment was set up. Test-tubes containing substances B and C were placed together as shown. The substances did **not** react.

They were left for five minutes.



(i)      How many molecules are there in the mixture compared to the total number in substances B and C?

……………………………………….………………………………………. 1 mark

 (ii)     Complete the diagram which is a model of this experiment.



1 mark

**Q# 9/**         Q16  The table shows the melting points and boiling points of four substances present in the air.



(a)     What happens to a piece of solid carbon dioxide if it is heated from –100°C to –78°C?

.....................................................................................................................

1 mark

(b)     ‘Liquid air’ can be formed from air in a heat exchanger. As the air passes through, thermal energy is transferred from the air to the surroundings. This is shown in the flow diagram below.



(i)      Suggest a likely temperature for the ‘liquid air’ that leaves the heat exchanger.

................°C

1 mark

(ii)     Use the information in the table to explain why carbon dioxide and water vapour need to be removed from the air before it is pumped through pipes to the heat exchanger.

State the consequences of **not** removing these two gases.

.............................................................................................................

.............................................................................................................

2 marks

(c)     The ‘liquid air’ is a mixture of liquid nitrogen and liquid oxygen.

Use the information in the table to suggest how liquid oxygen could be obtained from the mixture.

.....................................................................................................................

1 mark

(d)     A room measures 4 m x3 m x2.5 m.

 (iii)     How does the distance between the particles in atmospheric air compare to the size of the particles themselves?

.............................................................................................................

1 mark

**Q# 10/ Q17.**          Chris has two rubber party balloons. One is filled with air and the other is filled with helium.

Both balloons contain the same volume of gas.

(a)     (i)      Explain why the helium balloon rises.

.............................................................................................................

1 mark

(ii)     Explain why the air balloon drops to the ground.

.............................................................................................................

1 mark

(b)     The chemical symbol for helium is He.

Explain why air does **not** have a chemical symbol or formula.

.....................................................................................................................

1 mark

(c)     The diagram below shows seven arrangements of particles.



          The two party balloons are coated with a thin layer of aluminium.

Give the letter of the diagram which best represents the particles in:

(i)      the helium gas; .......................

1 mark

(ii)     the air; .........................

1 mark

(iii)     the thin layer of aluminium. .........................

1 mark

(d)     Over several days, the balloons shrink because the particles of gas diffuse through the balloon and escape. The helium balloon shrinks more quickly than the air-filled balloon.

Answer the following questions in terms of particles.

(i)      Why does helium escape more quickly than air from a balloon?

.............................................................................................................

1 mark

(ii)     A rubber balloon coated with aluminium takes longer to shrink than a rubber balloon **without** an aluminium coating.

Suggest a reason why gas particles diffuse more slowly through aluminium than through rubber.

.............................................................................................................

1 mark

Maximum 8 marks

# Mark Scheme

**Q# 1/ M13.**          (b)     (i)      any **one** from

•    thermal energy

*accept ‘heat’* ***or*** *‘energy’*

•    electricity

**1 (L3)**

(ii)     **answers may be in either order**

•    solid

**1 (L3)**

•    liquid

*accept ‘fluid’*

**1 (L3)**

(c)     oxygen

**1 (L4)**

**[6]**

**Q# 2/ M18.**          (a)     very high melting point

*answers may be in either order*

**1 (L3)**

good conductor of heat

*do* ***not*** *accept ‘good conductor’*

**1 (L3)**

(b)     (i)      good conductor of electricity

*do* ***not*** *accept ‘good conductor’*

**1 (L3)**

(ii)     can be compressed

**1 (L4)**

**[4]**

**Q# 3/ M21.**          (a)     (i)      iron

*do* ***not*** *accept ‘1540°C’*

**1 (L3)**

(ii)     mercury

*do* ***not*** *accept ‘–37°C’*

**1 (L3)**

(b)     solid *to a* liquid

*answers must be in the correct order*

***both*** *answers are required for the mark*

**1 (L3)**

(c)     5

**1 (L3)**

(d)     (i)      sodium

**1 (L3)**

(ii)     gold

**1 (L3)**

**[6]**

**Q# 4/ M22.**          (a)     an element 

*if more than one box is ticked, award no mark*

**1 (L4)**

(b)     (i)      it stays shiny

**1 (L3)**

(ii)     it conducts electricity

**1 (L3)**

it conducts heat

*answers may be in either order*

*accept ‘it conducts’ for one mark if neither*

*of the fully correct answers is given*

*accept ‘it stays shiny’*

**1 (L3)**

(c)     water

**1 (L4)**

(d)     any **one** from

•    a magnet

•    an electromagnet

**1 (L3)**

**[6]**

**Q# 5/ M15.**          (a)     heat

**1 (L3)**

          high

**1 (L4)**

          friction

*answers must be in the correct order*

**1 (L4)**

(b)     plastic

*accept a suitable, named plastic*

*accept ‘wood’* ***or*** *‘rubber’*

**1 (L3)**

          any **one** from

•    it is a poor conductor of heat **or** electricity

*accept ‘it does not conduct’* ***or*** *‘it is an insulator’*

***or*** *‘your hand does not get hot’*

•    it is light

•    it is easy to shape

*accept ‘it is rigid* ***or*** *stiff’*

*do* ***not*** *accept ‘it is strong’*

**1 (L4)**

(c)     they might melt

*accept ‘it makes a hole’* ***or*** *‘they burn’*

**1 (L3)**

(d)     accept any time from 45 to 60 seconds

**1 (L4)**

**[7]**

**Q# 6/ M20.**          (a)     copper oxide

**1 (L6)**

(b)     compound 

*if more than one box is ticked, award no mark*

**1 (L5)**

(c)     (i)      less solution **or** liquid **or** water

*answers may be in either order*

*accept ‘no liquid’* ***or*** *‘the liquid had gone’*

***or*** *‘liquid had evaporated’*

**1 (L5)**

crystals formed

*accept ‘solid copper sulphate formed’*

***or*** *‘a blue solid appeared’*

**1 (L5)**

(ii)     any **one** from

•    there would be more of the solution left

*accept ‘the solution would still be there’*

•    there would be fewer crystals

*accept ‘no crystals’*

*accept ‘no change in dish B’*

**1 (L5)**

any **one** from

•    it prevented the evaporation

*accept ‘it stopped the water leaving the dish’*

•    less water would have evaporated **or** gone

**1 (L5)**

**[6]**

**Q# 7/ M14.**          (a)     hydrogen

**1 (L6)**

(b)     (i)      region 3

**1 (L6)**

(ii)     region 1

**1 (L6)**

(iii)     region 2

**1 (L6)**

(c)     any **one** from

•    it is a compound

•    it is not an element

•    it is made up of more than one element

*do* ***not*** *accept ‘it is* ***not*** *a single substance’*

**1 (L5)**

(d)     (i)      copper + iron sulphate

*answers may be in either order*

***both*** *are required for the mark*

**1 (L6)**

(ii)     the nail becomes brown **or** pink **or** copper coloured

*accept ‘it is covered in copper’*

*accept ‘it is rust coloured’*

*do* ***not*** *accept ‘it goes rusty’*

**1 (L6)**

**[7]**

**Q# 8/ M12.**          (a)     (i)      C

**1 (L7)**

(ii)     D

**1 (L7)**

(iii)     A and B

*answers may be in either order*

***both*** *answers are required for the mark*

**1 (L7)**

(iv)    A and D

*answers may be in either order*

***both*** *answers are required for the mark*

**1 (L7)**

(v)     C

**1 (L7)**

(b)     (i)      the same

*accept ‘seven’*

**1 (L7)**

(ii)     a random, mixed arrangement of both types of molecule should be

drawn with the molecules not touching each other

**1 (L7)**

**[7]**

**Q# 9/ M16.**          (a)     changes from a solid to a gas

*accept ‘it sublimes’*

*accept ‘it remains solid’*

**1**

(b)     (i)      any temperature from –196°C to –210°C

**1**

(ii)     they would become solid **or** freeze

**1**

they would block the pipes

*accept ‘the pipes could burst’*

**1**

(c)     any **one** from

•    boil away the nitrogen

*accept ‘by fractional distillation’*

•    warm it to between –196°C and –183°C

*accept ‘warm it to above – 196°C’*

*accept ‘cool it to below –210°C’* ***or*** *‘freeze the nitrogen’*

**1**

(d) (iii)     any **one** from

•    distance is much larger than the size of the particles

*accept ‘it is larger’*

•    in the gas the volume includes the space between particles,

but in the liquid it is the volume of the particles only

**1**

**Q# 10/ M17.**          (a)     (i)      helium is less dense than air

*accept ‘helium is lighter than air’*

*accept ‘the upthrust on the helium balloon is*

*greater than the weight of the balloon’*

**1 (L7)**

(ii)     any **one** from

•    the air in the balloon is denser than the air in the room

*accept ‘the air in the balloon is compressed’*

•    the rubber has weight

*accept ‘rubber is heavier than air’*

*accept ‘the rubber is denser than air’*

*accept ‘the upthrust on the air balloon is*

*less than the weight of the balloon’*

**1 (L7)**

(b)     any **one** from

•    air is a mixture

*accept ‘air contains different gases’*

•    air is not a single element **or** compound

*‘air is not a single substance’ is not sufficient*

**1 (L7)**

(c)     (i)      B

**1 (L7)**

(ii)     C

**1 (L7)**

(iii)     G

**1 (L7)**

(d)     (i)      any **one** from

•    helium particles are smaller

*accept ‘molecules’ or ‘atoms’ for particles*

•    helium particles move faster

**1 (L7)**

(ii)     any **one** from

•    aluminium particles **or** atoms are closer together

•    rubber particles **or** molecules are further apart

*accept ‘rubber particles*

***or*** *molecules have bigger gaps between them’*

**1 (L7)**

**[8]**