



AHMAD IBRAHIM SECONDARY SCHOOL
TERM 1 WEIGHTED ASSESSMENT 1 2023

SECONDARY 3 EXPRESS

Name:	Class:	Register No.:
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CHEMISTRY

6092
2 March 2023
45 minutes

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write down your name, class and register number in the spaces at the top of this page.

This paper consists of **TWO** sections.

Section A – 10 marks

Section B – 20 marks

Section A consists of 10 multiple choice questions. Answer **ALL** questions.

For each question, four suggested answers are given. You are to choose the most appropriate one and indicate it in the boxes provided.

Answer **ALL** questions in **Section B** in the spaces provided on the **Question Paper**.

The number of marks is given in brackets [] at the end of each question or part question.

The use of calculator is allowed in this examination.

A copy of Periodic Table is provided at the last page.

FOR EXAMINER'S USE	
Section A	/ 10
Section B	/ 20
TOTAL	/ 30

This question paper consists of **15** printed pages

[Turn over

Section A

Answer **ALL** questions and write your answers in the boxes below.

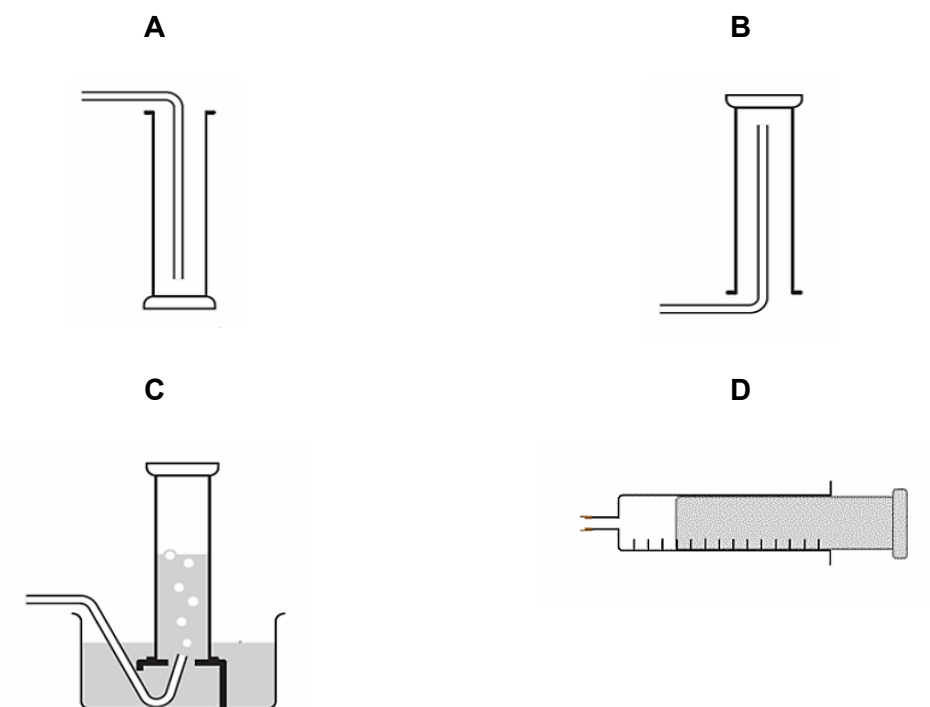
Qns	1	2	3	4	5	6	7	8	9	10
Ans	B	B	C							

1 Which apparatus can be used for the accurate measurement of 25.0 cm³ of a solution?

- I 25 cm³ pipette
- II 50 cm³ burette
- III 50 cm³ beaker
- IV 50 cm³ measuring cylinder

- A II only
- B I and II only
- C II and III only
- D II and IV only

- 2 Which apparatus **cannot** be used to collect a gas that is denser than air and is insoluble in water?

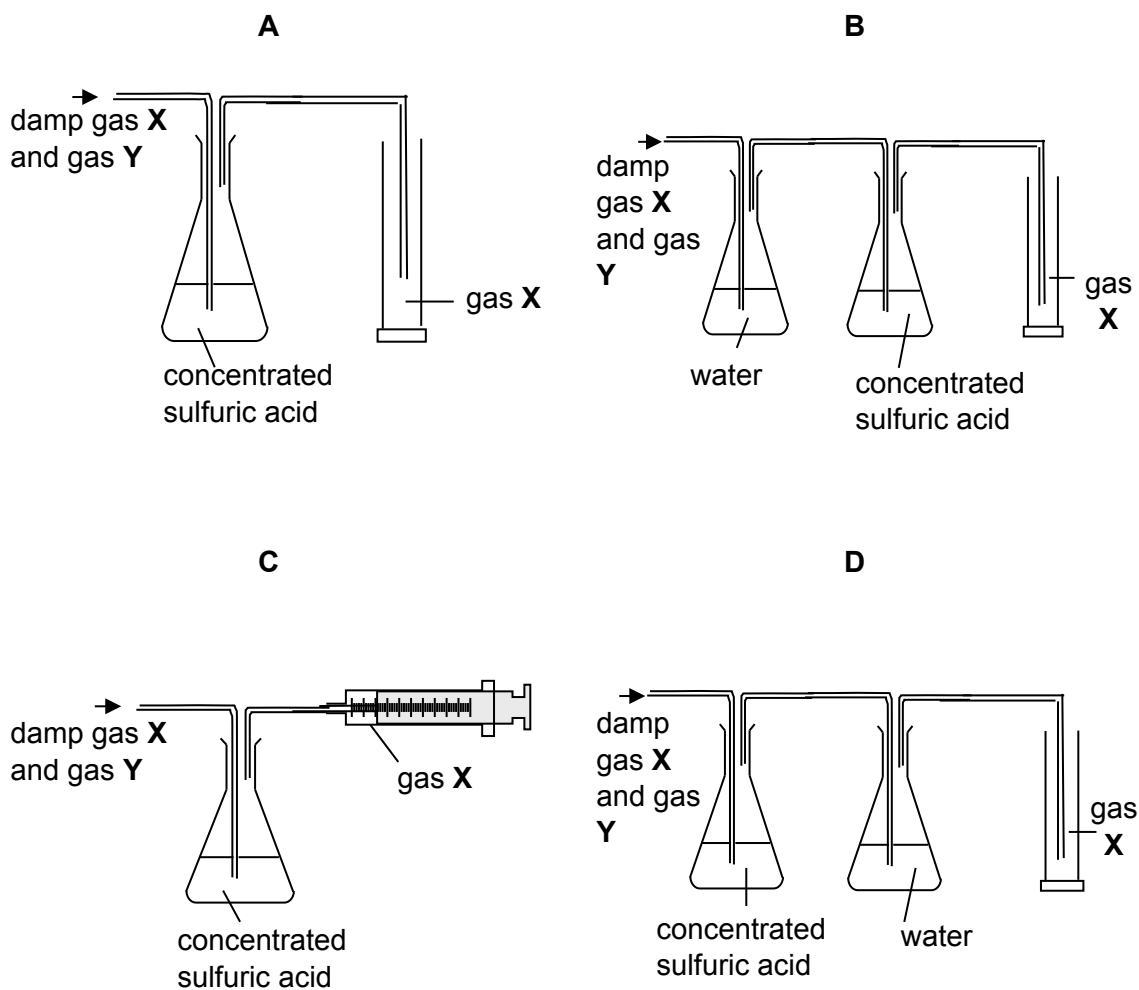


- 3 Which method is used to obtain copper(II) chloride crystals from a solution of copper(II) chloride?
- A evaporation
 - B distillation
 - C crystallisation
 - D paper chromatography

- 4 Some properties of gas X, gas Y and concentrated sulfuric acid are given in the table below.

substance	properties
gas X	<ul style="list-style-type: none"> insoluble in water neutral gas
gas Y	<ul style="list-style-type: none"> very soluble in water acidic gas
concentrated sulfuric acid	<ul style="list-style-type: none"> very corrosive pungent, colourless liquid powerful dehydrating agent

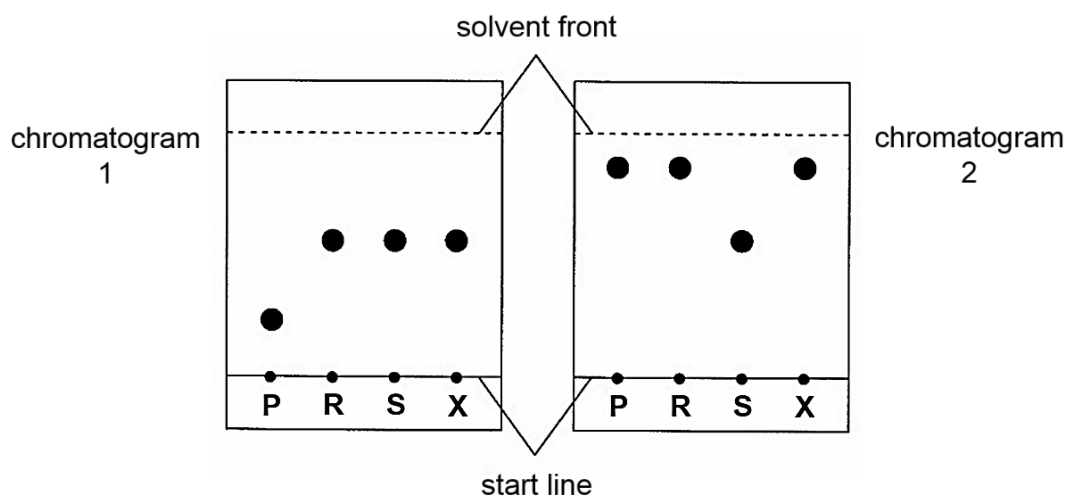
Which diagram shows the correct set-up to collect pure, dry sample of gas X from a sample of damp gas X contaminated with gas Y?



- 5 Ink **X** was suspected to contain one or more of the dyes **P**, **R** and **S**.

Spots of each dye were placed on the starting lines of two pieces of chromatography paper.

One paper was placed into water (chromatogram 1) and the other with ethanol (chromatogram 2).



What is the identity of **X**?

- A **R** only
 - B **P** only
 - C either **P** or **R** only
 - D **P**, **R** and **S**
- 6 A sample of a compound, allyl isocyanide, was made from an experiment.
- This compound has been patented as a non-lethal weapon as it has an extremely penetrating and foul smell.
- Which property of the compound can be used to check its purity?
- A colour
 - B pH value
 - C boiling point
 - D solubility in water

- 7 Dry ice is solid carbon dioxide which sublimates readily at room temperature.

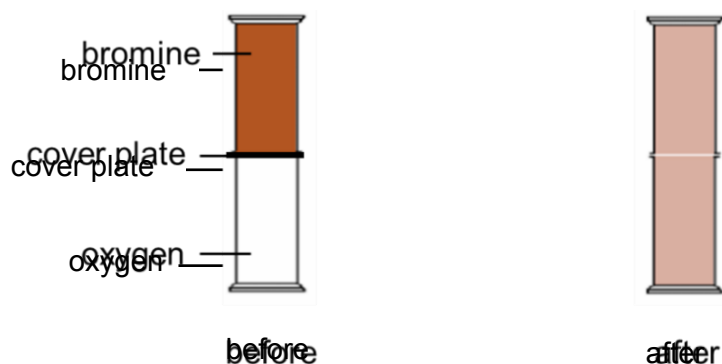
Which statement best describes what happens when dry ice sublimates?

- A Particles start to become bigger.
- B Stationary particles start to vibrate vigorously.
- C Distance between particles increases.
- D Vibrating particles start to slide over each other.

- 8 Two gas jars containing separate samples of bromine gas and oxygen gas are separated by the cover plate as shown in the diagram.

The cover plate is then removed from the gas jars.

After several days, the colour of the gas is the same in both jars as shown below.



Which statement explains this change?

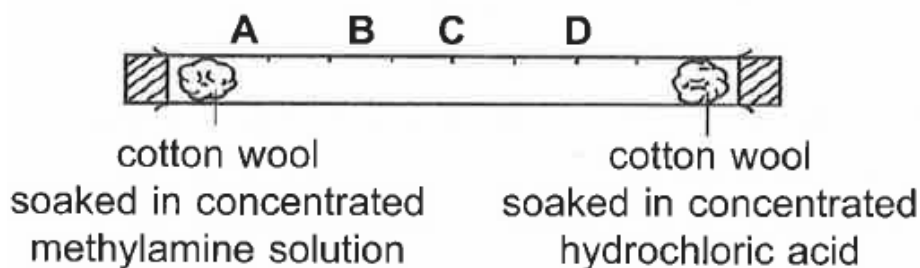
- A Bromine gas is denser than oxygen gas.
- B Bromine and oxygen molecules are in random motion.
- C Bromine and oxygen molecules diffuse at the same rate.
- D Bromine and oxygen molecules reacted with each other.

- 9 Methylamine, CH_3NH_2 ($M_r = 31$), and hydrogen chloride, HCl ($M_r = 36.5$) are both gases which are soluble in water.

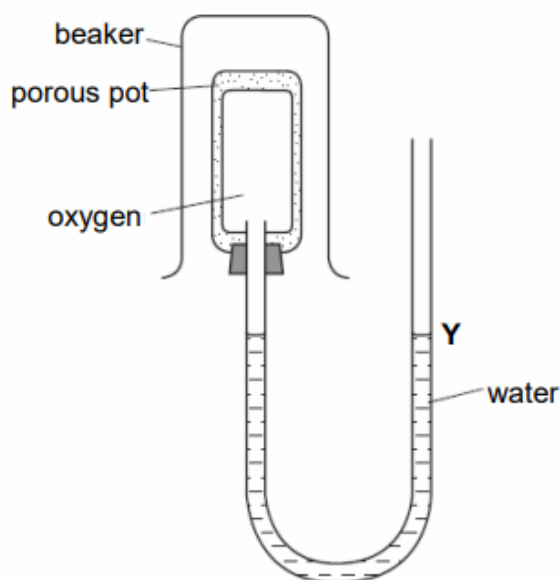
The gases react together to form a white solid, methylammonium chloride.

An experiment to demonstrate rates of diffusion is being set up as seen below.

At which location, **A**, **B**, **C** or **D**, will the white solid be seen?



- 10 The diagram shows an experiment on diffusion.



The water level does **not** move and remains at point **Y**.

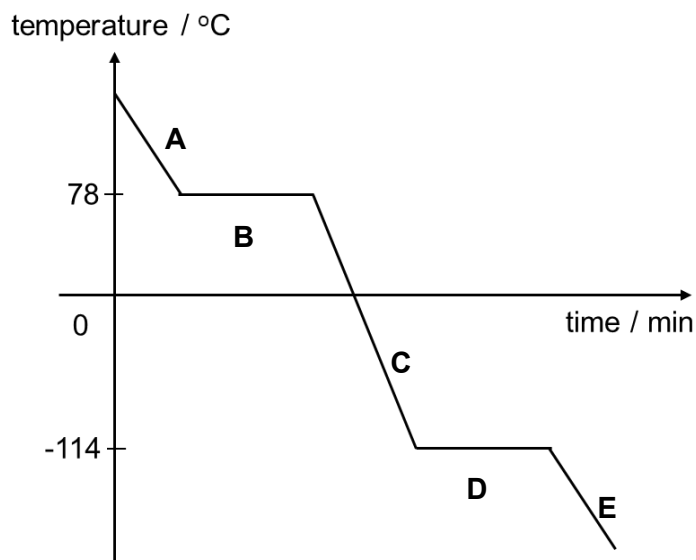
Which statement explains this?

- A** Gas **A** is unreactive.
- B** Gases **A** and **B** are insoluble in water.
- C** Gases **A** and **B** have equal molecular masses.
- D** Gas **B** has a larger molecular mass than gas **A**.

Section B

Answer **ALL** questions in the spaces provided.

- 1 The graph below shows the cooling curve of ethanol.



- (a) Which region, **A**, **B**, **C**, **D** or **E**, shows ethanol in both liquid and gaseous state?

..... [1]
...

- (b) Draw the arrangement of particles at 80 °C. [1]



- (c) Describe how the **arrangement and movement of particles** in ethanol changes when its temperature decreases from 0 °C to -120 °C.

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

..... [2]
...

- (d) Explain, in terms of the kinetic particle theory, what happens to the particles of ethanol as it is heated from -100°C to 100°C .

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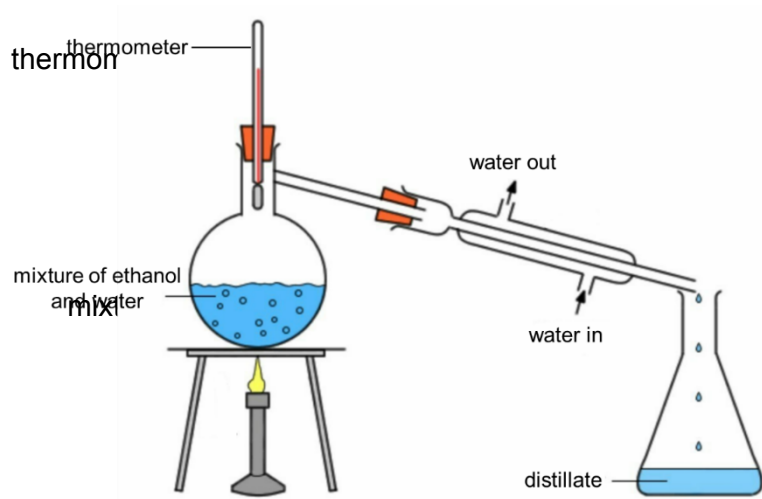
..... [3]
...

- (e) In a practical assessment, students were tasked to design and conduct an experiment to separate a mixture of dichloromethane, ethanol and water. These are miscible liquids.

Upon collecting her sample, Emily noticed pieces of plastic in her sample.

- (i) Draw a **labelled** diagram, indicating the apparatus and substances, to show how Emily can remove the pieces of plastic from her sample.

After removing the plastic pieces from her sample, Emily set up the apparatus as shown below to separate the mixture.



The boiling points of the components in a mixture are shown below.

component	boiling point / °C
dichloromethane	41

ethanol	78
water	100

- (ii) Suggest what apparatus could Emily add to her set-up for a more efficient separation of mixture.

..... [1]

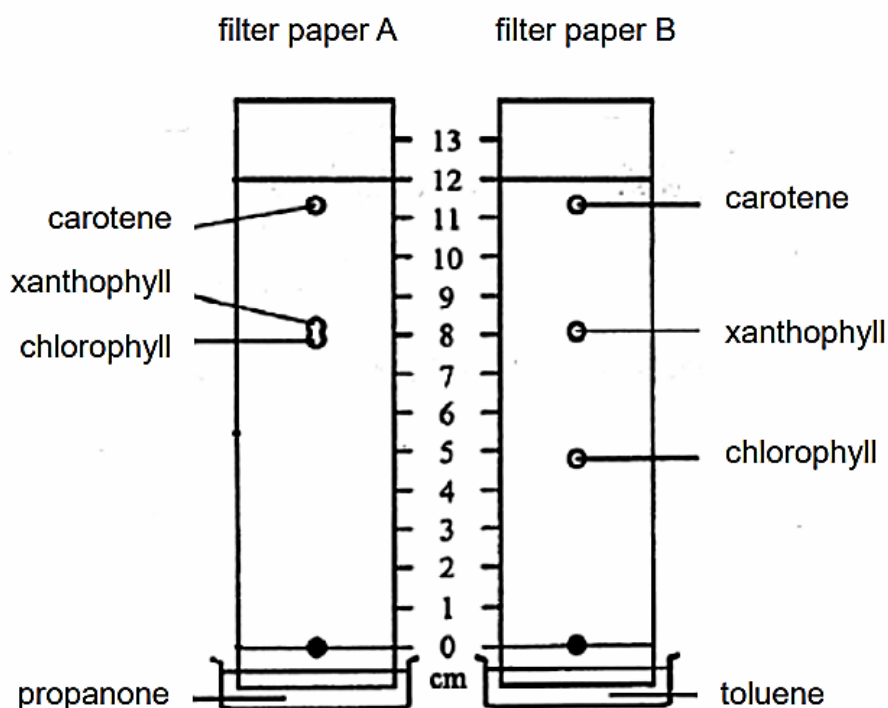
- (iii) State which liquid would be collected last as the distillate. Explain why.

.....
.

..... [1]

[Total: 11]

- 2 Chromatography was carried out on a sample of pigments extracted from some leaves of a green plant. Two different solvents, propanone and toluene, were used at the same time and under the same conditions. The chromatograms are shown below.



- (a) Explain why must the solvent level be below the sample spot at the start of the experiment.

.....
 [1]
 ...

- (b) The spots of xanthophyll and chlorophyll overlap as shown in the chromatogram on filter paper X.

- (i) Explain why the spots of xanthophyll and chlorophyll overlapped on filter paper X.

.....
 [1]
 .

- (ii) Suggest a modification to the chromatography, **without** changing the solvent used, to obtain a better separation of these 2 spots.

.....

[1]

- (c) Calculate the R_f value for carotene with toluene as the solvent.
Show all calculations.

[1]

- (d) Phaeophytin is another pigment found in leaves of green plants.
It has an R_f value of 0.90 with propanone as a solvent.
On the diagram, draw and label the spot for this pigment on filter paper **X**.
Show all calculations.

[1]

[Total: 5]

- 3 (a) A student was tasked to obtain sugar from a mixture of salt and sugar.

Information about sugar and salt given to the student is as seen below:

	sugar	salt
Soluble in water?	Yes	Yes
Soluble in ethanol?	Yes	No

Below shows the procedural steps that this student has written for the task.

1. *Add water to the sugar and salt mixture and stir.*
2. *Filter the mixture.*
3. *Heat the filtrate till it is saturated.*
4. *Leave it to cool and crystallise.*
5. *Filter to collect the crystals.*
6. *Wash the crystals with warm distilled water to remove impurities.*

In the table below, state **two** mistakes that she has made in the procedural write up and suggest the correct rectifications.

	Mistake	Rectifications to the experiment
1.	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
2.	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>

[2]

- (b) This student observes that the perfume sprayed on her Chemistry teacher can be
) smelled in other parts of the classroom within a shorter time on hot days, compared to the colder rainy days.

Explain this observation.

.....

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.....

..... [2]

...

[Total: 4]

END OF PAPER

Setter: Mrs Silia Goh

The Periodic Table of Elements

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actinoids	104 Rf rutherfordium 261	105 Db dubnium 262	106 Sg seaborgium 266	107 Bh bohrium 264	108 Hs hassium 277	109 Mt meitnerium 268	110 Ds darmstadtium 271	111 Rg roentgenium 272	112 Cn copernicium 285	113 Nh nihonium 286	114 Fl flerovium 289	115 Mc moscovium 288	116 Lv livermorium 293	117 Ts tennessium 294	118 Og oganesson 294	119 Uue unbinilium 293	120 Ubn unbinilium 294	121 Ubu unbinilium 295	122 Ubn unbinilium 296	123 Ubn unbinilium 297	124 Ubn unbinilium 298	125 Ubn unbinilium 299	126 Ubn unbinilium 300	127 Ubn unbinilium 301	128 Ubn unbinilium 302	129 Ubn unbinilium 303	130 Ubn unbinilium 304	131 Ubn unbinilium 305	132 Ubn unbinilium 306	133 Ubn unbinilium 307	134 Ubn unbinilium 308	135 Ubn unbinilium 309	136 Ubn unbinilium 310	137 Ubn unbinilium 311	138 Ubn unbinilium 312	139 Ubn unbinilium 313	140 Ubn unbinilium 314	141 Ubn unbinilium 315	142 Ubn unbinilium 316	143 Ubn unbinilium 317	144 Ubn unbinilium 318	145 Ubn unbinilium 319	146 Ubn unbinilium 320	147 Ubn unbinilium 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unbinilium 626	453 Ubn unbinilium 627	454 Ubn unbinilium 628	455 Ubn unbinilium 629	456 Ubn unbinilium 630	457 Ubn unbinilium 631	458 Ubn unbinilium 632	459 Ubn unbinilium 633	460 Ubn unbinilium 634	461 Ubn unbinilium 635	462 Ubn unbinilium 636	463 Ubn unbinilium 637	464 Ubn unbinilium 638	465 Ubn unbinilium 639	466 Ubn unbinilium 640	467 Ubn unbinilium 641	468 Ubn unbinilium 642	469 Ubn unbinilium 643	470 Ubn unbinilium 644	471 Ubn unbinilium 645	472 Ubn unbinilium 646	473 Ubn unbinilium 647	474 Ubn unbinilium 648	475 Ubn unbinilium 649	476 Ubn unbinilium 650	477 Ubn unbinilium 651	478 Ubn unbinilium 652	479 Ubn unbinilium 653	480 Ubn unbinilium 654	481 Ubn unbinilium 655	482 Ubn unbinilium 656	483 Ubn unbinilium 657	484 Ubn unbinilium 658	485 Ubn unbinilium 659	486 Ubn unbinilium 660	487 Ubn unbinilium 661	488 Ubn unbinilium 662	489 Ubn unbinilium 663	490 Ubn unbinilium 664	491 Ubn unbinilium 665	492 Ubn unbinilium 666	493 Ubn unbinilium 667	494 Ubn unbinilium 668	495 Ubn unbinilium 669	496 Ubn unbinilium 670	497 Ubn unbinilium 671	498 Ubn unbinilium 672	499 Ubn unbinilium 673	500 Ubn unbinilium 674	501 Ubn unbinilium 675	502 Ubn unbinilium 676	503 Ubn unbinilium 677	504 Ubn unbinilium 678	505 Ubn unbinilium 679	506 Ubn unbinilium 680	507 Ubn unbinilium 681	508 Ubn unbinilium 682	509 Ubn unbinilium 683	510 Ubn unbinilium 684	511 Ubn unbinilium 685	512 Ubn unbinilium 686	513 Ubn unbinilium 687	514 Ubn unbinilium 688	515 Ubn unbinilium 689	516 Ubn unbinilium 690	517 Ubn unbinilium 691	518 Ubn unbinilium 692	519 Ubn unbinilium 693	520 Ubn unbinilium 694	521 Ubn unbinilium 695	522 Ubn unbinilium 696	523 Ubn unbinilium 697	524 Ubn unbinilium 698	525 Ubn unbinilium 699	526 Ubn unbinilium 700	527 Ubn unbinilium 701	528 Ubn unbinilium 702	529 Ubn unbinilium 703	530 Ubn unbinilium 704	531 Ubn unbinilium 705	532 Ubn unbinilium 706	533 Ubn unbinilium 707	534 Ubn unbinilium 708	535 Ubn unbinilium 709	536 Ubn unbinilium 710	537 Ubn unbinilium 711	538 Ubn unbinilium 712	539 Ubn unbinilium 713	540 Ubn unbinilium 714	541 Ubn unbinilium 715	542 Ubn unbinilium 716	543 Ubn unbinilium 717	544 Ubn unbinilium 718	545 Ubn unbinilium 719	546 Ubn unbinilium 720	547 Ubn unbinilium 721	548 Ubn unbinilium 722	549 Ubn unbinilium 723	550 Ubn unbinilium 724	551 Ubn unbinilium 725	552 Ubn unbinilium 726	553 Ubn unbinilium 727	554 Ubn unbinilium 728	555 Ubn unbinilium 729	556 Ubn unbinilium 730	557 Ubn unbinilium 731	558 Ubn unbinilium 732	559 Ubn unbinilium 733	560 Ubn unbinilium 734	561 Ubn unbinilium 735	562 Ubn unbinilium 736	563 Ubn unbinilium 737	564 Ubn unbinilium 738	565 Ubn unbinilium 739	566 Ubn unbinilium 740	567 Ubn unbinilium 741	568 Ubn unbinilium 742	569 Ubn unbinilium 743	570 Ubn unbinilium 744	571 Ubn unbinilium 745	572 Ubn unbinilium 746	573 Ubn unbinilium 747	574 Ubn unbinilium 748	575 Ubn unbinilium 749	576 Ubn unbinilium 750	577 Ubn unbinilium 751	578 Ubn unbinilium 752	579 Ubn unbinilium 753	580 Ubn unbinilium 754

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).
The Avogadro constant, $L = 6.02 \times 10^{23} \text{ mol}^{-1}$.