Guide to participation in Mawhoob Competition - Chemisrty Track

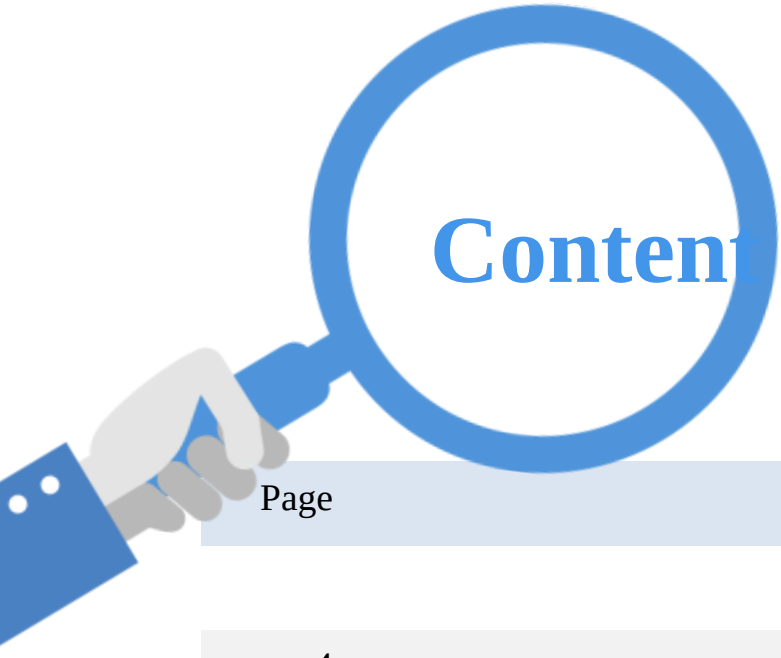
مؤسسة الملك عبدالعزيز ورجاله للموهبة والإبداع
King Abdulaziz & his Companions Foundation for Giftedness & Creativity
موهبة

دليل المشاركة في مسابقة موهوب

تخصص الكيمياء

mawhiba.org
Mawhiba
"موهبة ... حيث تنتمي"

Prepared by: Saudi chemistry team



Content

Introduction

In line with the Kingdom's determination to achieve vision 2030 objectives that are primarily concerned with transforming into an innovative knowledgeable society and the strategic plans directed to achieve the goals of sustainable national development and given that scientific competitions that are no longer an indispensable luxury, but rather have become an objective equation for excellence and progress in scientific fields. For the reason that it is with the momentum the competition to ascend the podiums, everyone who wants to achieve this must take all the means that allow them not only to access those platforms but to reserve a permanent place on them.

There is no doubt that many countries rely on local competitions as one of the methods for developing and raising the rates of scientific creativity and innovative capabilities and discovering the scientific talents of their students to provide them with the necessary scientific care. That fact has been perceived by the world around us for a long time.

Hungary, for instance, held the first mathematics competition in 1894, i.e. 119 years ago. Whereas more than 79 local competitions are organized at all levels and regions in the United States. Perhaps everyone agrees here that the mobility that these competitions do on all the elements of the educational process goes beyond solely winning a competition, but rather deepens on the positive impact, which aims at raising the professional competencies of teachers and achieving the ambition of our distinguished sons and daughters to obtain ideas that are much deeper than the ones provided by a school curriculum.

The methods of implementing these competitions vary according to the different goals and aspirations of the organizing countries. It is perhaps agreed upon by everyone here that the movement that these competitions make on all elements of the educational process goes beyond just winning a competition, but deepens the positive impact, which is aimed at raising the professional competencies of teachers and achieving the ambition of our distinguished sons and daughters. To get deeper ideas than what the school curriculum offers.

King Abdul Aziz and His Companions Foundation for Giftedness and Creativity "Mawhiba" have always been the forerunner to such challenges. From which it always aims to discover the nation's talents in scientific disciplines, and keen to find different sources to improve the quality of selection.

Along with the National Program for Gifted Students Identification, "Mawhoob" Mathematics Competition And science competition was established to delves deeply in search of these creative national competencies and capabilities to find them early. Allowing us to refine, nurture, and train them for a sufficient period to achieve the standards of participation in the International Olympiad programs.

What is a

It is a scientific competition in mathematics, science, physics, chemistry, biology, and informatics.

Implementing agency for Mawhoob competition

King Abdulaziz & His Companions Foundation for Giftedness and Creativity "Mawhiba", in cooperation with the Ministry of Education.

Target group

Saudi male and female students from grades six to the 10th grade.

Competition stages:

The competition will take place in two stages:

first: It is carried out remotely and the target is to participate in 15,000 students.

II: It is done in writing**** for students nominated from the first stage at the headquarters specified by the education departments to which the students are affiliated. (Exceptionally done this year remotely as well).

Competition

1- Pushing the educational field towards more efforts to develop mathematics and science education.
2- Discover the distinguished elements of our male and female students at an early stage to develop their capabilities.
3- Discovering distinguished teachers interested in the field of work on Olympic problems.
4- Spreading the culture of the Olympiad.
5- Raising the spirit of competition between the elements of the educational process.

Competition

The competition targets male and female students who have a passion for the scientific disciplines below, according to the following criteria:

1. The student must be a Saudi national.
2. The student must register in one scientific major only.
3. The student must register in the required specialization according to his grade, provided that the student is in one of the following grades at the beginning of the school year 1442H

Class	Subject					
	Mathematics.	Science	Physics	Chemistry	Biology	Informatics
6th Grade	✓	✓				
7th Grade	✓	✓				✓
8th Grade			✓	✓	✓	✓
9th Grade			✓	✓	✓	✓
10th Grade						✓

4. Complete the competition in its two phases.

Test Instructions

1. The only reference to the subjects of the competition is the mathematics and science syllabus from the Ministry of Education.
2. The student can access the system and take the pilot test directly after receiving the account activation message from the e-learning management system on the e-mail registered in the portal.
3. The test duration is 90 min only.
4. The calculator is allowed to be used in all stages of the competition except for mathematics majors.

(You can use the guide for the competition on our website to obtain samples of questions for each major)

The schedule for the 2020 talent competition

Program	Date		Length in Days	Scientific Disciplines
Register for gifted test	July 8, 2020	September 21, 2020	76	All Specialities
the first stage of Mawhoob test: "Performing an e-test"	September 28, 2020	September 28, 2020	1	Chemistry - Physics - Biology
	September 29, 2020	September 29, 2020	2	Mathematics - Informatics - Sciences
Announcing the results of the first phase	October 1, 2020	October 1, 2020		All Specialities
The second stage of the gifted test: "Performing an e-test"	October 4, 2020	October 4, 2020	2	Chemistry - Physics - Biology
	October 5, 2020	October 5, 2020		Mathematics - Informatics - Sciences
Announcement of phase II results	October 8, 2020	October 8, 2020	1	All Specialities

Exam entry

1. Availability of a computer operating system (Windows or IOS)
2. Connecting the computer device to the internet (making sure that no other device is connected to the network during the testing period to ensure the stability of the connection).
3. Only use Google Chrome (Google Chrome)and make sure that it is updated to the latest version and not to use any other browser to perform the test, including Microsoft Internet Explorer or Microsoft Edge or Safari.
4. Just keep the Google Chrome browser running and make sure that all other programs and windows are closed during the test.

Entry Instructions:

Enter on the link: https://mawhiba.classera.com
Then enter the login data as follows:

1. In the Username field: The email with which the student was registered in Mawhiba portal
2. In the password field: Password sent to you.
3. Click on the blue login button to enter the test

If you encounter difficulty:

What to do if you encounter one of the following problems?

1. Machine restarting problem
2. Close the browser
3. Internet disconnection during the test

We hope that you will follow the steps below to get back for testing

1. Open the browser again and enter the test linkhttps://mawhiba.classera.com
2. Then enter the login data
3. Press the start test button
4. Navigating between the test questions is by clicking on the Previous and Next button located in the top left of the screen, above the question in the Arabic interface, and in the upper right of the screen in the English interface.

Test Delivery

Upon completion of answering the test questions:

1. Click on the Submit button located at the bottom of the screen in the last question in the test.
2. When you click on it and confirm the delivery, the test will end and the result will appear to you, and you will not be able to enter it again.

Competition registration link:

https://www.mawhiba.org/Ar/programs/competitions/mawhoob/Pages/Registration.aspx

Note: The student who does not have an account in Mawhiba is directed to create an account through the link:

https://login.mawhiba.org/Check/RegisterationPage.aspx

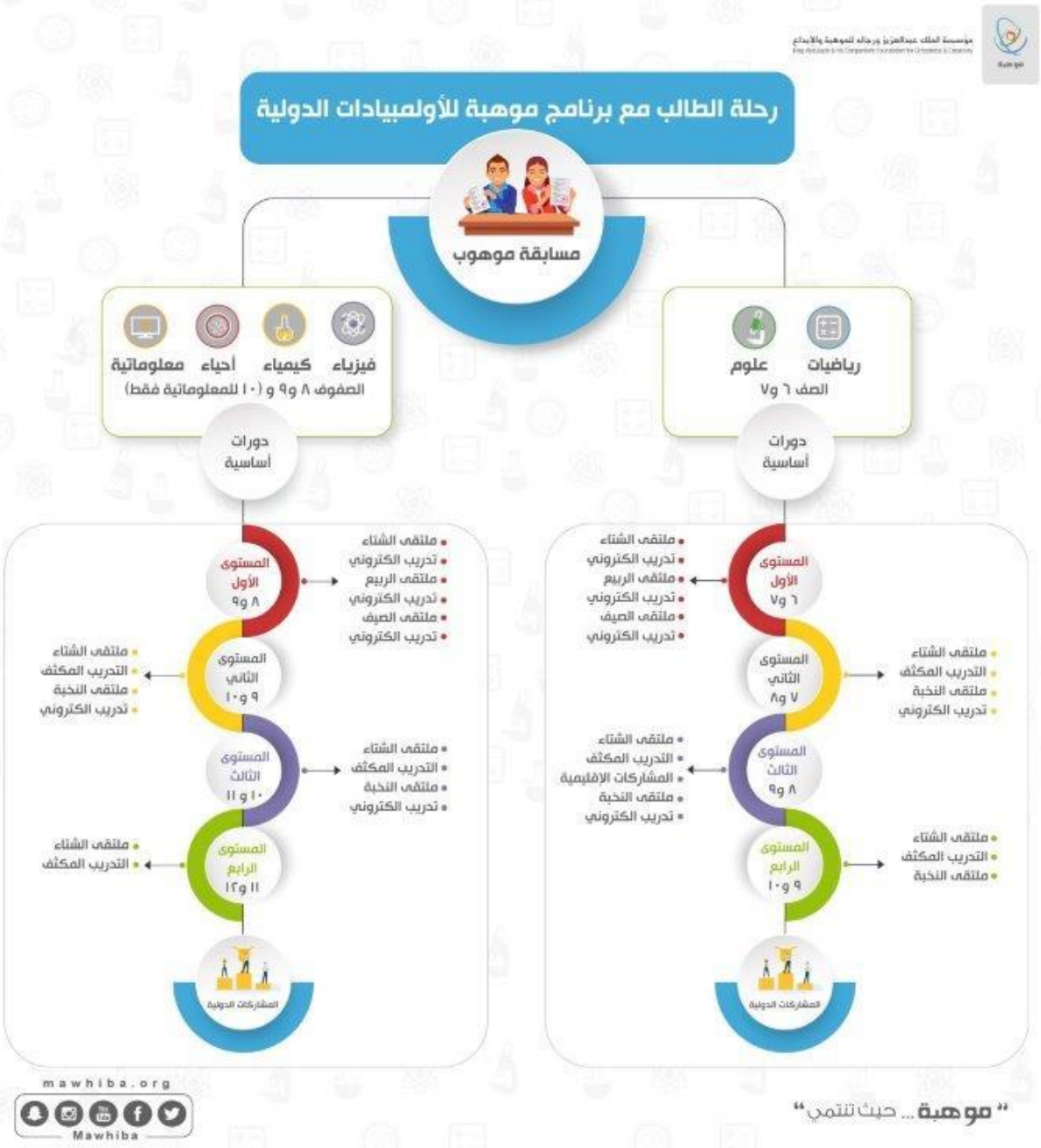
And then register for the competition.

Important

1. Mawhiba website has introductory guides for each of the six contest tracks, and each guide contains several experimental questions that explain to the student the type of questions.

https://www.mawhiba.org/Ar/programs/competitions/mawhoob/Pages/library.aspx

2. 1- Ensure that you are connected to the internet before the test date.
3. Verify the test login data (username: the remote mail with which the student is registered in Mawhiba portal and the password that will be sent to you later)
4. 3- Entering the test site 15 min before the test time.
5. Avoid closing the browser during the test.
6. 5- Pay attention to the remaining time for the test.
7. 6- There is only one submission attempt for the test.
8. 7- Avoid clicking the Submit button unless you are sure that all questions have been answered and the test has been completed.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مسابقة موهوب
رياضيات
علوم
الصف ٦ و٧
دورات أساسية
المستوى الأول ٦ و٧
ملتقى الشتاء
تدريب الكتروني
ملتقى الربيع
تدريب الكتروني
ملتقى الصيف
تدريب الكتروني
المستوى الثاني ٧ و٨
ملتقى الشتاء
التدريب المكثف
ملتقى النخبة
تدريب الكتروني
المستوى الثالث ٨ و٩
ملتقى الشتاء
التدريب المكثف
المشاركات الاقليمية
ملتقى النخبة
تدريب الكتروني
المستوى الرابع ٩ و١٠
ملتقى الشتاء
التدريب المكثف
ملتقى النخبة
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معلوماتية
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دورات أساسية
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ملتقى الربيع
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Training exercises

Chemistry Track

Exercise 1

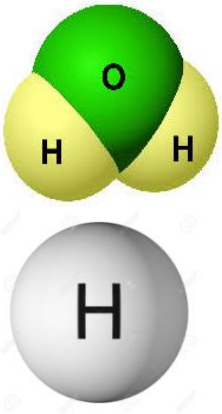
The ability of metal to be changed into thin sheets is called .....

A. Ductility
B. Malleability
C. Gloss property
D. Construction work
E. Withdrawability

Exercise 2

Hydrogen (H) is considered an element, while water (H_2O) is considered a compound and Sodium (Na^+) is an Ione.choose the right phrases.:

A. Hydrogen has acquired an electron
B. Water made of two different elements
C. Sodium is a neutral atom
D. Hydrogen has lost an electron
E. Sodium has acquired an electron



Exercise 3

In the equation below, how many atoms are in the oxygen molecule?

$$2\ Mg + O_2 \rightarrow 2\ MgO$$

A 2
B 0
C 1
D 3
E 4

Exercise 4

The elements Argon, Krypton, and Xenon are all non-metals. What property would these elements have in common?

A Soft and malleable.
B Poor conductor of electricity.
C Shiny and lustrous surface.
D Good conductor of thermal energy.
E They do not exist in nature as an element.

Exercise 5

Which of these processes is NOT a chemical reaction?

A. Mixing Two liquids to give a new colour
B. Two gases react to make a liquid
C. Mixing liquid and a solid to make a gas
D. Mixing sodium with chlorine gas to produce salt
E. Melting an aluminum can.

Exercise 6

If you put a metal spoon and a wooden spoon into a pot of boiling water, one will become too hot to touch. This is because:

A. Metals conduct heat better than wood
B. Wood conducts heat better than metals.
C. Metals pull in heat because heat is attracted to metals.
D. Wood isn't as strong as metals.
E. The metal spoon takes heat from the wooden spoon.

Exercise 7

In the reaction shown below, 252 grams of $FeCl_2$ and 70 grams of Cl_2 are consumed. How many grams of $FeCl_3$ are produced?

$$2FeCl_2 + Cl_2 \rightarrow 2FeCl_3$$

A 161g
B 182g
C 322g
D 92g
E 225g

Exercise 8

What will happen if a piece of wood that is less dense than water is placed in a cup of water?

A The wood sinks about halfway into the water.
B The wood displaces a quantity of water greater than its volume.
C The wood settles to the bottom of the water.
D The wood floats on top of the water.
E The wood is submerged with twice its size.

Exercise 9

A student tested the conductivity of five elements using an incomplete electrical circuit. When the element is placed in the circuit, the bulb lights up brightly, lights up dimly, or does not light up at all based on the element's ability to conduct electricity. The table below shows the results of her investigation. Based on the results of the conductivity test, which element is classified as a metal?

Element	Conductivity
Hydrogen	Bulb did not light
Arsenic	Bulb light dimly
Krypton	Bulb did not light
Copper	Bulb light brightly
Sulfur	Bulb light dimly

A. Hydrogen
B. Arsenic
C. Krypton
D. Copper
E. Sulfur

Exercise 10

Arrange the next solutions in order from most dense (on the left) to less dense (on the right).

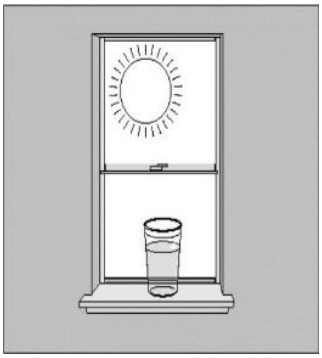
Solution A has a density of 61 g/ 50 mL
Solution B has a density of 42 g/ 100 mL
Solutions C has a density of 41 g/ 50 mL

A. A, B, C
B. A, C, B
C. C, B, A
D. C, A, B
E. B, A, C

Exercise 11

When water disappears from the cup on a sunny summer day. The operations that took place are _____ and _____.

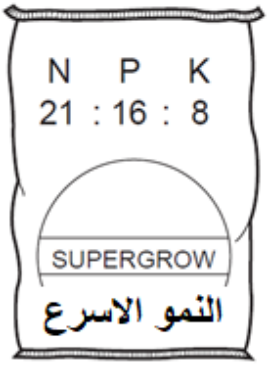
A. Condense, loss of heat
B. Melt, heat absorption
C. Evaporation, heat absorption
D. Freezing, loss of heat
E. Sublimation, loss of heat



Exercise 12

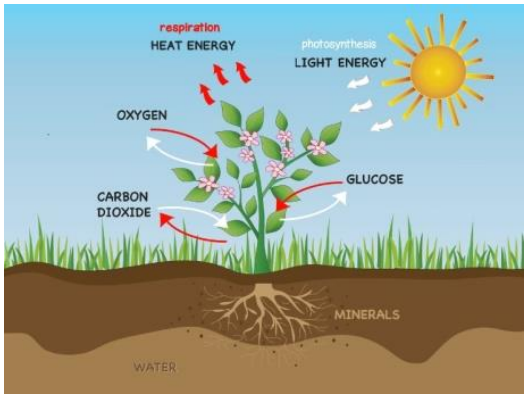
Which combination of chemical compounds could be used to produce the fertiliser shown?

A. NH_4NO_3, $Ca_3(PO_4)_2$
B. NH_4NO_3, $CO(NH_2)_2$
C. NH_4NO_3, K_2SO_4, $(NH_4)_2SO_4$
D. $(NH_4)_3PO_4$, KCl
E. NH_4NO_3, $(NH_4)_2SO_4$



Exercise 13

Plants use O_2 and CO_2 gases during photosynthesis and respiration. How many atoms a plant can use from one molecule of both gases.



A 7
B 4
C 2
D 5
E 9

Exercise 14

What types of changes have occurred on the agricultural land shown below?


(X)


(Y)


(Z)

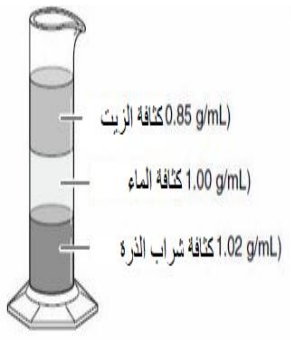

(W)

	(X)	(Y)	(Z)	(W)
A	Physical	Physical	Chemical	Physical
B	Chemical	Physical	Chemical	Physical
C	Chemical	Physical	Physical	Physical
D	Chemical	Physical	Chemical	Chemical
E	Physical	Chemical	Chemical	Physical

Exercise 15

Students measured and recorded the density of five samples. Using the density column and the data table shown below, which of the samples will probably float on top of the oil?

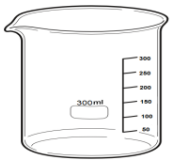
A 2
B 3
C 4
D 5
E 1



Sample	Density (g/mL)
1	1.02
2	0.96
3	1.15
4	0.82
5	0.99

Exercise 16

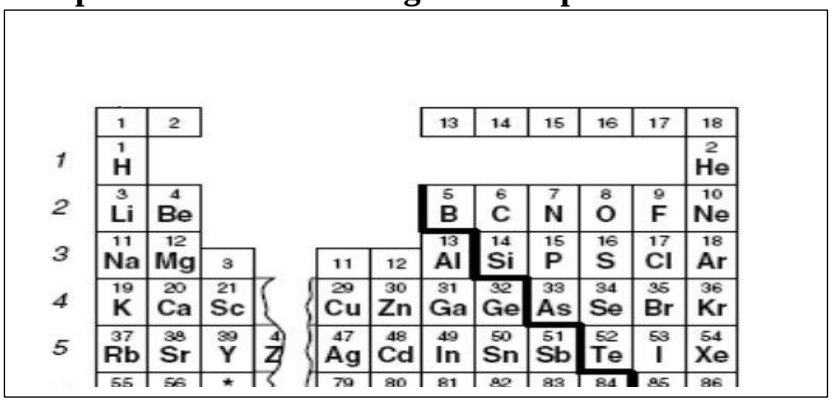
Which set of equipment would be most useful to determine the density of a liquid?

				
Thermometer	Balance	Graduated cylinder	Periodic table	Beaker

A Graduated cylinder and Thermometer
B Periodic table and Thermometer
C Balance and Periodic table
D Balance and Graduated cylinder
E Beaker and Periodic table

Exercise 17

Which of the following lists show the elements in order from those having the most protons to those having the least protons in the atoms?



A. Li, Na, K, Rb

B. Te, Se, S, O

C. Li, B, N, O

D. Cl, Al, S, Na

E. F, Ne, C, B

Exercise 18

Liquid hydrogen is used as fuel for some rockets. This results in the production of water vapor according to the equation below. If 100 kg of oxygen gas was used, and 275 kg of water vapor was produced. What is the mass of hydrogen gas used?

$$2H_2 + O_2 \rightarrow 2H_2O$$

A. 100 kg

B. 200 kg

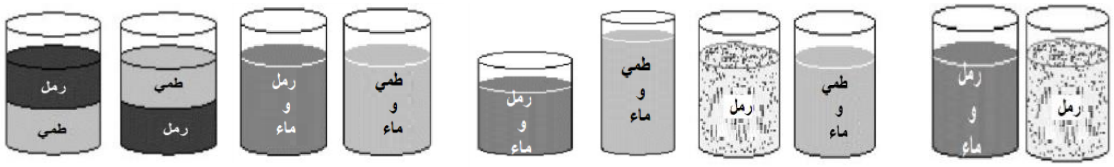
C. 175 kg

D. 375 kg

E. 35 kg

Exercise 19

Which of the following images illustrates the correct way to know if sand or mud will deposit faster when mixed with water?



(X) (Y) (Z) (W) (T)

A X

B Y

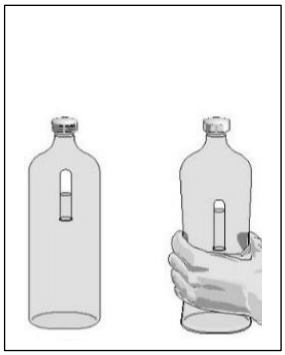
C Z

D W

E T

Exercise 20

The picture shows a Cartesian diver made from a plastic bottle filled with water and an inverted test tube partially filled with water. What causes the diver to sink as the bottle is squeezed?



A. The Cartesian diver becomes denser than the surrounding fluid.

B. The air that dissolved in the water escaped the solution.

C. The water in the Cartesian diver decreases.

D. The pressure within the entire bottle and Cartesian diver is decreased.

E. The volume of air trapped inside the Cartesian diver increases.

Exercise 21

Four substances have the following electrical properties.

Substance	Property
W	Does not conduct under any conditions
X	Conducts only in aqueous solution
Y	Conducts in both the molten and solid states.
Z	Conducts in both the molten and aqueous states.

What are these four substances?

	(X)	(Y)	(Z)	(W)
A	HCl	S	NaCl	Pb
B	Pb	HCl	NaCl	S
C	S	HCl	Pb	NaCl
D	S	NaCl	HCl	Pb
E	NaCl	Pb	S	HCl

Exercise 22

Suppose you pour a glass of ice water and set it on the kitchen table. After a few minutes, you noticed that the glass was covered with drops of water. Why do you think this happened?

A. Oxygen in the air-cooled and condensed onto the cold glass.

B. Water vapour in the air-cooled and evaporated onto the cold glass

C. Water vapour in the air-cooled and condensed onto the cold glass.

D. Water leaks through pores in the glass

E. Water expanded inside the glass

Exercise 23

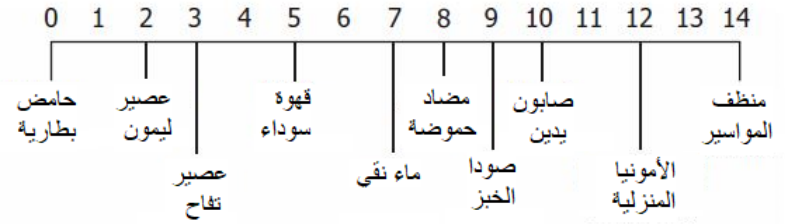
The difference between two heterogeneous mixtures solutions is that the ------- solution will eventually settle; while in the -------- solution will not.

Milk	Flour in water	Salt in water

A. colloids; suspensions
B. suspensions; colloids
C. homogeneous; suspensions
D. suspensions; homogeneous
E. homogeneous ; colloids

Exercise 24

According to the pH scale, which substance is slightly acidic?

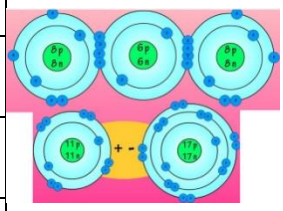


A. Battery acid
B. Baking soda
C. Black coffee
D. Drain cleaner
E. Apple juice

Exercise 25

An ionic bond is formed by:

A	Electron sharing between metals and non-metals
B	Electron sharing between non-metals.
C	Electron transfer between non-metals.
D	Electron transfer from metals to non-metals.
E	Electron sharing between metals.



Exercise 26

Which of these materials cannot be separated into its parts by an ordinary chemical or physical process?

A C

B Salt NaCl

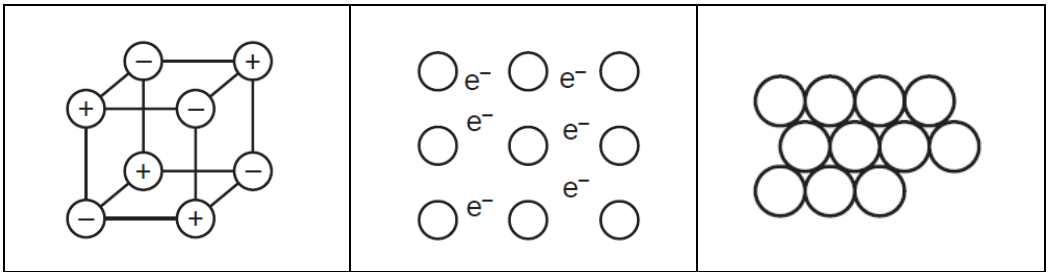
C Ammonia NH3

D C and NH3

E HCl

Exercise 27

The diagrams show the arrangement of particles in three solids: krypton, potassium, and sodium chloride.

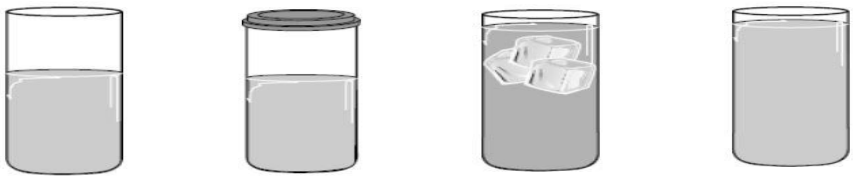


In which order in the above figure are the solids shown (ordered from left to right)?

A. Krypton; potassium; sodium chloride
B. Krypton; sodium chloride; potassium
C. Sodium chloride; krypton; potassium
D. Sodium chloride; potassium; krypton
E. Potassium; krypton; Sodium chloride

Exercise 28

Which of these bottles will lose the most amount of water vapour if supplied with the same amount of heat for the same period of time?



X Y W Z

A. X
B. Y
C. Z
D. W
E. It cannot be defined

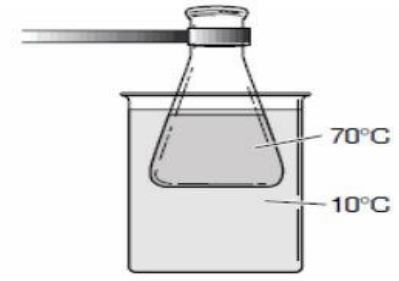
Exercise 29

Cooking gas is produced during the process of either refining crude oil, or during the extraction of natural gas which mainly contains butane and propane with small amounts of other gases.
Describe the component material of the gas cylinder?

A Mixture
B Atoms
C Compound
D Element
E Ions

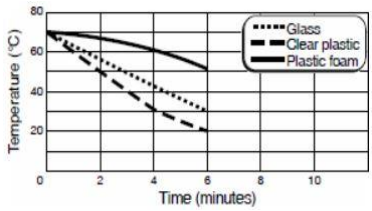
Exercise 30

Time (minutes)	Temperature) ^{0} C)		(^{0} C)
	Glass	Clear Plastic	Plastic Foam
0	70	70	70
2	55	50	68
4	43	30	60
6	30	20	51

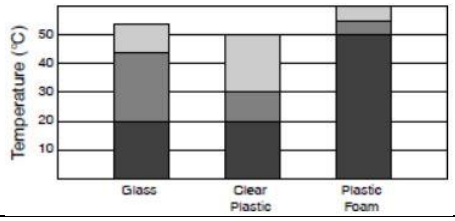


The picture above shows a flask of hot water in a container of cooler water. This test was carried out to find out which type of container (glass or clear plastic or plastic foam) would hold heat the longest as shown in the table (temperature changes versus time). Which of these graphs best shows all of the data from this experiment?

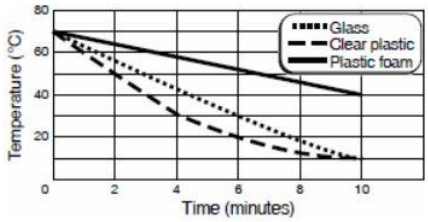
A



B



C



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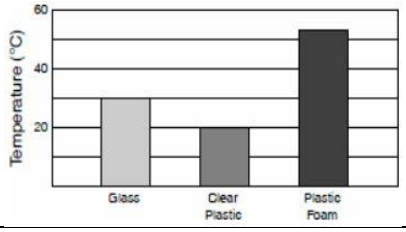

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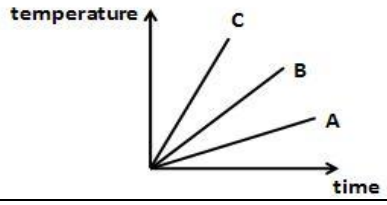
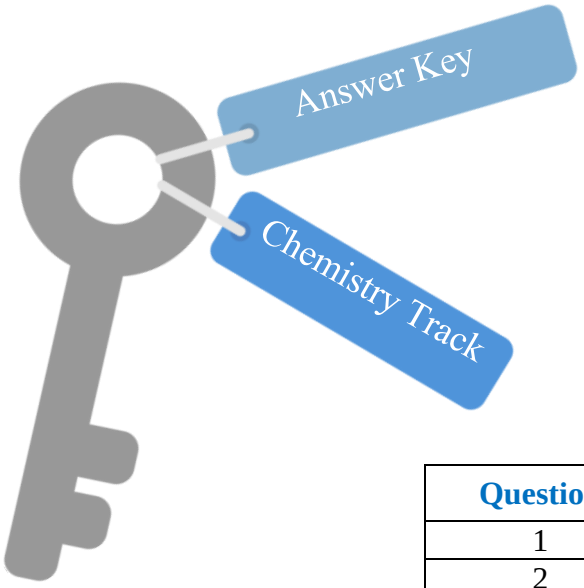


Answer Key



Question	Correct Answer
1	B
2	B
3	A
4	B
5	E
6	A
7	C
8	D
9	D
10	B
11	C
12	D
13	D
14	C
15	C
16	D
17	B
18	C
19	B
20	A
21	C
22	C
23	B
24	C
25	D
26	A
27	D
28	A
29	A
30	A

prepare

Bader Al-Majrithi

Done