CHAPTER NO

10

STATES OF MATTER
(SOLIDS ,LIQUIDS, GASES)

6 MK

MULTIPLE CHOICE QUESTIONS

LECTURE NO - 5

Q. What are the states of matter?

answer choices

- solid, liquid, and juice
- solid and liquid
- solid and gas
- solid, liquid, and gas

Q. Gases have...

answer choices

- A definite shape and volume
- A definite shape but no definite volume
- No definite shape but a definite volume
- No definite shape or volume

Q. Liquids have...

answer choices

- A definite shape and volume
- A definite shape but no definite volume
- No definite shape but a definite volume
- No definite shape or volume

Q. Solids have...

answer choices

- a definite shape and volume
- a definite shape but no definite volume
- No definite shape but a definite volume
- no definite shape or volume



Q. Liquid particles are...

answer choices

- tightly packed.
- loosely bonded and flowing.
- free to fly in all directions.
- so hot that the electrons are removed from the nucleus.



Q. Solid particles are...

answer choices

- tightly packed.
- loosely bonded and flowing.
- free to fly in all directions.
- so hot that the electrons are removed from the nucleus.



Q. Gas particles are...

answer choices

- tightly packed.
- loosely bonded and flowing.
- free to fly in all directions.
- so hot that the electrons are removed from the nucleus.

Q. Gas particles have the _____ energy.

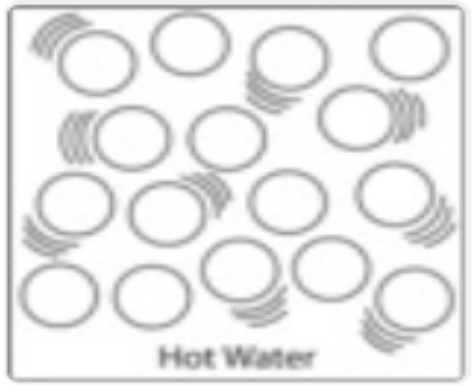
answer choices

- most
- middle amount of
- least

Q. Solid particles have the _____ energy.

answer choices

- most
- middle amount of
- least



Q. The speed of the molecules determines the _____.

answer choices

- Temperature
- density
- pressure

Q. The slower the particles in a substance move,

answer choices

- the colder it is.
- the warmer it is.

Q. Thermal energy is...

answer choices

- heat energy.
- the energy of motion
- energy of nuclear processes.
- an indication of physical change.

Q. Condensation is the change of state from _____ to _____ as a result of losing heat energy.

answer choices

- Solid, Liquid
- Solid, Gas
- Liquid, Gas
- Gas, LIquid

Q. Evaporation is a change of state from _____ to _____.

answer choices

- Solid, Liquid
- Gas, Solid
- Liquid, Gas
- Gas, Liquid

Q. Solids melt when solid particles _____ energy, liquids freeze when liquid particles _____ energy.

answer choices

- absorb, release
- release, absorb
- absorb, absorb
- release, release



Q. What is the change from a Solid to a Gas due to the gaining of energy?

answer choices

- Condensation
- Vaporization
- Sublimation
- Deposition

Q. This type of solid is made up of crystals and has a distinct melting point.

answer choices

- rock
- crystalline solid
- amorphous solid
- ice

Q. When the particles in a solid are NOT arranged in a regular repeating pattern?

answer choices

- Viscosity
- Amorphous
- Sublimation
- Crystalline

Q. Matter changes state when...

answer choices

- energy is added or removed
- energy is added
- energy is removed
- there is no energy

Q. Do all matter have the same boiling, melting, and freezing points

answer choices

- Yes
- No

Q. This type of vaporization takes place below the surface of a liquid and on the surface also

answer choices

- condensation
- boiling
- evaporization
- melting

Q. On a cold day, if a balloon is taken outside it's

answer choices

- volume increase
- volume decrease
- pressure increase
- pressure decrease

Q. On a hot day, a car's tires heat up which makes their

answer choices

- volume increase
- volume decrease
- pressure increase
- pressure decrease

Q. The container of a gas determines it's _____ and _____

answer choices

- weight, mass
- shape, volume
- shape, mass
- color, shape

Q. This always flows from a warmer substance to a cooler substance.

answer choices

- Heat
- Temperature
- Kinetic energy
- Thermal energy

Q. The particles of a _____ have the most thermal energy; while the particles of a _____ have the least thermal energy

answer choices

- solid, gas
- gas, solid
- liquid, solid
- liguid, gas



Q. When a solid changes into a liquid

answer choices

- melting
- freezing
- vaporization
- condensation

Q. When a liquid changes into a gas

answer choices

- sublimation
- freezing
- vaporization
- condensation

Q. When a liquid changes into a solid

answer choices

- sublimation
- freezing
- melting
- condensation

Q. Which example *best* describes a physical change?

answer choices

- baking a pie
- burning a candle
- making a paper airplane
- mixing vinegar with baking soda

Q. A glass of salt water is put on a windowsill. After several days the water has disappeared, and there is only a film of white crystals left in the bottom. Which *best* explains what has happened?

answer choices

- The salt caused the water to dry up.
- The water evaporated and left the salt behind.
- The water and the salt evaporated and left a film behind
- There is no explanation. Magic

Q. Which is an example of a chemical change?

answer choices

- melting ice to make water
- baking cake batter to make a cake
- putting cheese on bread to make a cheese sandwich
- cutting an orange into slices for a snack

Q. Wendy left her bike outside, buried in snow. In the spring, when the snow melted, she found her bike covered in rust. Which *best* describes the change to the bike?

answer choices

- It was a chemical change, because the bike was a different color.
- It was a chemical change, because the rubber tires were deflated.
- It was a chemical change, because rust can be removed from the metal.It was a chemical change, because rust is a new substance on the metal.
- It was a chemical change, because rust can be removed from the metal.

Q. Which of the following is CORRECT for both gases & liquids ?

A) Indefinite volume

B) Definite Shape

C) Indefinite shape

D) Definite Mass

D

Q. Intermolecular forces in liquid are_____

A) Greater than gases

B) Less than Solids

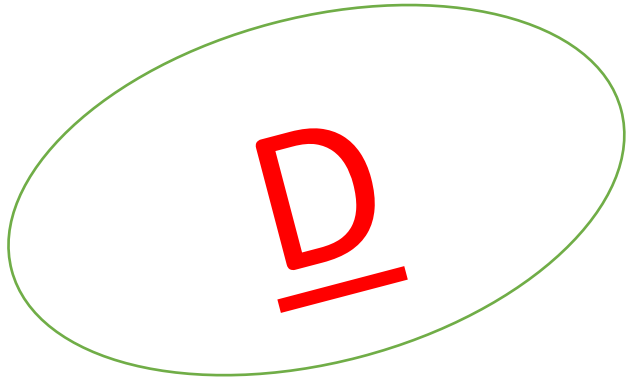
C) Both (A) & (B)

D) Greater than Solids

C

Q. Which pair of molecules has the strongest dipole-dipole interactions?

- **A.** NH_3 and CH_4
- **B.** CH_4 and CH_4
- **C.** CO_3 and CO_2
- **D.** NH_3 and NH_3

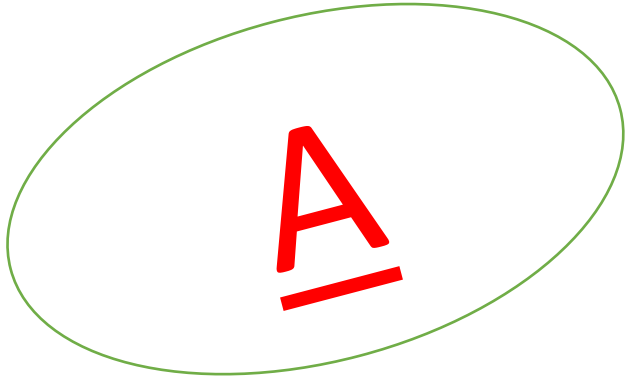


Solution:

NH_3 and NH_3. Both polar, asymmetric molecules. CH_4 is nonpolar. CO_2 is symetrical.

Intermolecular forces can be out of the following.

- **A.** van der Waals' forces
- **B.** Electrostatic forces existing between two oppositely charged ions
- **C.** Covalent bond between two like atoms
- **D.** Gravitational force



Solution:

Intermolecular force can only be Vaan der Waals force acting b/w two molecules.

Based on the following statements I & II select the correct answer from the codes given.

Statement I : Three states of matter are the result of balance between intermolecular forces and thermal energy of the molecules.

Statement II : Intermolecular forces tend to keep the molecules together but thermal energy of molecules tends to keep them apart.

- **A.** Both Statement I and Statement II are correct and Statement II is the correct explanation of Statement I
- **B.** Both Statement I and Statement II are correct and Statement II is not the correct explanation of Statement I
- **C.** Statement I is correct but Statement il is incorrect
- **D.** Statement II is correct but Statement I is incorrect

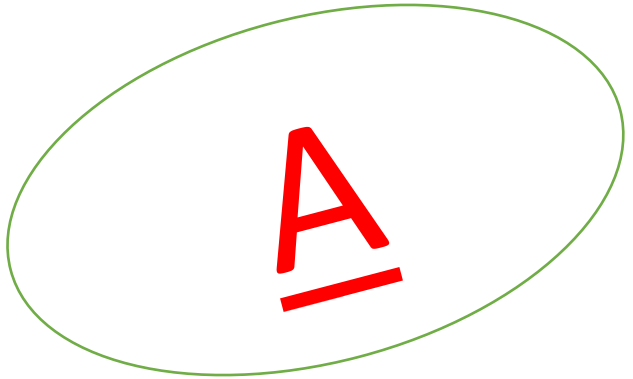
A

Solution:

Thermal energy is the energy of a body arising from motion of its atoms or molecules. It is directly proportional to the temperature of the substance. It is the measure of average kinetic energy of the particles of the matter and is thus responsible for movement of particles. This movement of particles is called thermal motion. We have already learnt that intermolecular forces tend to keep the molecules together but thermal energy of the molecules tends to keep them apart. Three states of matter are the result of balance between intermolecular forces and the thermal energy of the molecules.

In comparing gases with liquids , gases have ..... compressibility and.....density.

- **A.** greater, smaller
- **B.** greater, greater
- **C.** smaller, smaller
- **D.** smaller, greater



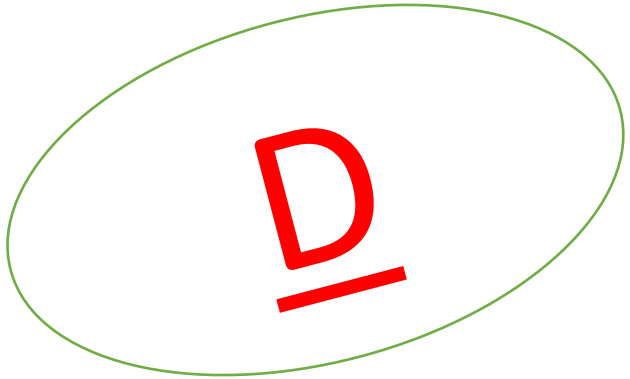
Solution:

In a gas, the distance between molecules, whether monatomic or polyatomic, is very large compared with the size of the molecules; thus gases have a low density and are highly compressible.

Density: The molecules of a liquid are packed relatively close together. Consequently, liquids are much denser than gases.

Van der waals forces include the following except

- A. London forces
- B. dipole - dipole forces
- C. dipole- include dipole forces
- D. chemical bonding forces



Solution:
In a gas, the distance between molecules, whether monatomic or polyatomic, is very large compared with the size of the molecules; thus gases have a low density and are highly compressible.
Density: The molecules of a liquid are packed relatively close together. Consequently, liquids are much denser than gases.

Stronger intermolecular forces result in higher boiling point. Strength of London forces increases with number of electrons in the molecule. Boiling point of

I. HF 293 K
II. HCl 189 K
III. HBr 206 K
IV. HI 238 K

Q.

HF has highest boiling point because of

- **A.** London interaction
- **B.** hydrogen bonding
- **C.** dipole-dipole interaction
- **D.** induced dipole

B

Solution:

It is because of hydrogen bonding . Since F is the most electronegative element , its hydrogen bonding tendency is strongest which makes boiling point of HF increase.

Dipole-dipole forces act between the molecules possessing permanent dipole. Ends of dipoles possess 'partial charges'. The partial charge is

- **A.** more than unit electronic charge
- **B.** equal to unit electronic charge
- **C.** less than unit electronic charge
- **D.** double the unit electronic charge

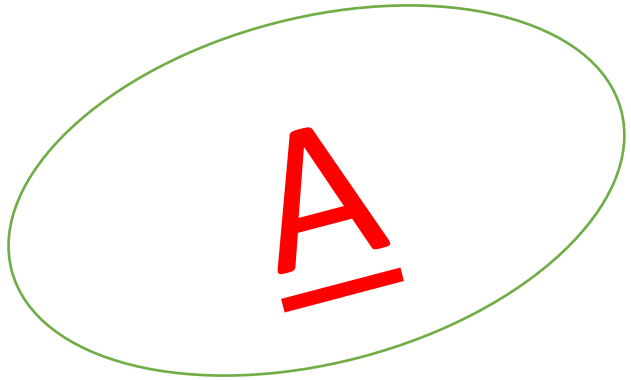
C

Solution:

Partial charge is a small charge developed by displacement of electrons. It is less than unit electronic charge and is represented as δ^+ or δ^-

Atom which must be present in hydrogen bonding is

- **A.** hydrogen
- **B.** sodium
- **C.** calcium
- **D.** sulphur

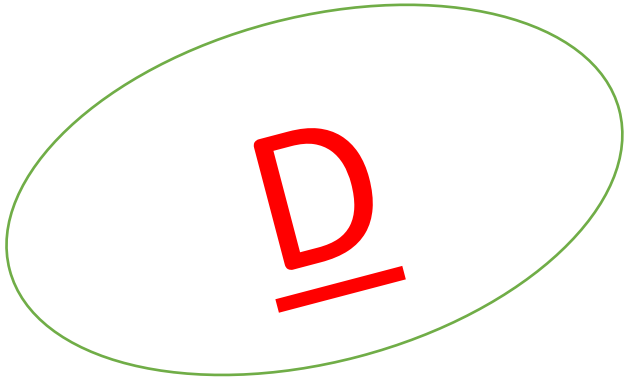


Solution:

A hydrogen bond is a partially electrostatic attraction b/w a hydrogen atom which is bound to a more electronegative atom such as N, O and F etc. And also hydrogen bonding occurs only b/w molecules in which H atom bounded to a electronegative atom.

Hydrogen bonding reduces the quality of water molecules to

- **A.** repel
- **B.** attract
- **C.** compactly arrange
- **D.** slide over each other



Solution:

The formation of hydrogen bonds is an important quality of the water molecules make hydrogen bonds with each other, water takes on some unique chemical characteristics compared to other liquids and, since living things have a high water content, understanding these chemical features is key to understanding life. In liquid water, hydrogen bonds are constantly formed and broken as the water molecules slide past each other.

The interaction energy of London force is inversely proportional to sixth power of the distance between two interacting particles but their magnitude depends upon

- A. charge of interacting particles
- B. mass of interacting particles
- C. strength of permanent dipoles in the particles
- D. polarisability of interacting particles

D

Solution:

London dispersion forces operate only over very short distance. The energy of interaction varies as

$1/(\text{distance between two interacting particles})^6$

Large or more complex the molecules, greater is the magnitude of London forces.

This is obviously due to the fact that the large electron clouds are easily distorted or polarised.

Hence, greater the polarisability of the interacting particles, greater is the magnitude of the interaction energy.

Q. Select the correct alternate(s).

- **A.** Gases can be compressed easily
- **B.** Lack of compressibility is a characteristic property of liquids and solids
- **C.** Oxygen can dissolve In water because a force of attraction exists between water's perm anent dipoie moment and the induced dipole in O_2
- **D.** London dispersion forces are the only intermolecular forces that allow non-poiar molecules to interact

Solution:

All of the above are the properties of gases.

MCQ: The interaction between highly electron-deficient hydrogen and highly electronegative atom is called

A. Covalent bond
B. ionic bond
C. dipole-dipole interaction
D. hydrogen bond

D

Answer

MCQ: When the partially positive end of one molecule is attracted weakly to partial negative end then force between them is

A. coulomb's force
B. electrostatic force
C. dipole-dipole interaction
D. ionic bond

C

Answer

MCQ: When two identical atoms share electron pairs and exert force on each other then the bond form is

A. non-polar covalent bond
B. polar covalent bond
C. double covalent bond
D. coordinate covalent bond

A

Answer

Determine the main type of intermolecular forces in ethanol C_2H_5OH.

A. London dispersion forces

B. Dipole-depole forces

C. Hydrogen bonding

D. Ion-ion oposite attractions

C

Determine the main type of intermolecular forces in PH_3.

Discuss

A. London Dispersion Forces

B. Ion-Dipole Forces

C. Dipole-Dipole Forces

D. Hydrogen Bonds

C

Determine the main type of intermolecular forces in CCl_4.

A. London Dispersion Forces

B. Ion-Dipole Forces

C. Dipole-Dipole Forces

D. Hydrogen Bonds

A

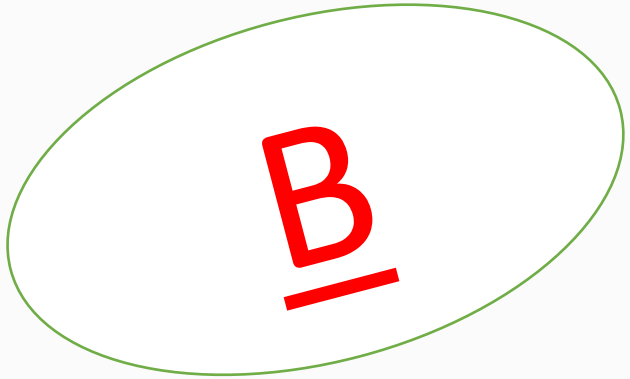
. A mixture contains hydrogen fluoride and ammonia. Identify a strong intermolecular force of attraction between hydrogen fluoride and ammonia.

A. Dipole-Dipole Forces

B. Hydrogen Bonding

C. Ion-Dipole Forces

D. London Dispersion Forces



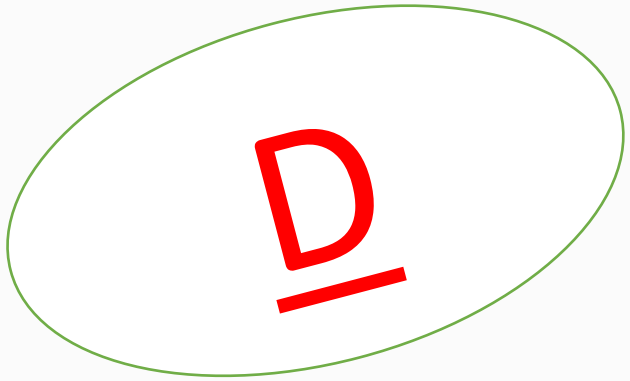
. Which element combines with hydrogen to form a compound with the strongest hydrogen bonding between its molecules?

A. Sulfur

B. Tellurium

C. Selenium

D. Oxygen



What type of intermolecular forces are due to the attraction between temporary dipoles and their induced temporary dipoles?

(a) metallic bond

(b) London dispersion

(c) hydrogen bond

(d) ionic bond

B

What type of interparticle forces holds liquid N_2 together?

(a) ionic bonding

(b) London forces

(c) hydrogen bonding

(d) dipole-dipole interaction

B

Which response includes only those compounds that can exhibit hydrogen bonding?

CH_4, AsH_3, CH_3NH_2, H_2Te, HF

(a) AsH_3, H_2Te

(b) AsH_3, CH_3NH_2

(c) CH_4, AsH_3, H_2Te

(d) CH_3NH_2, HF

D

Which of the following boils at the **highest** temperature?

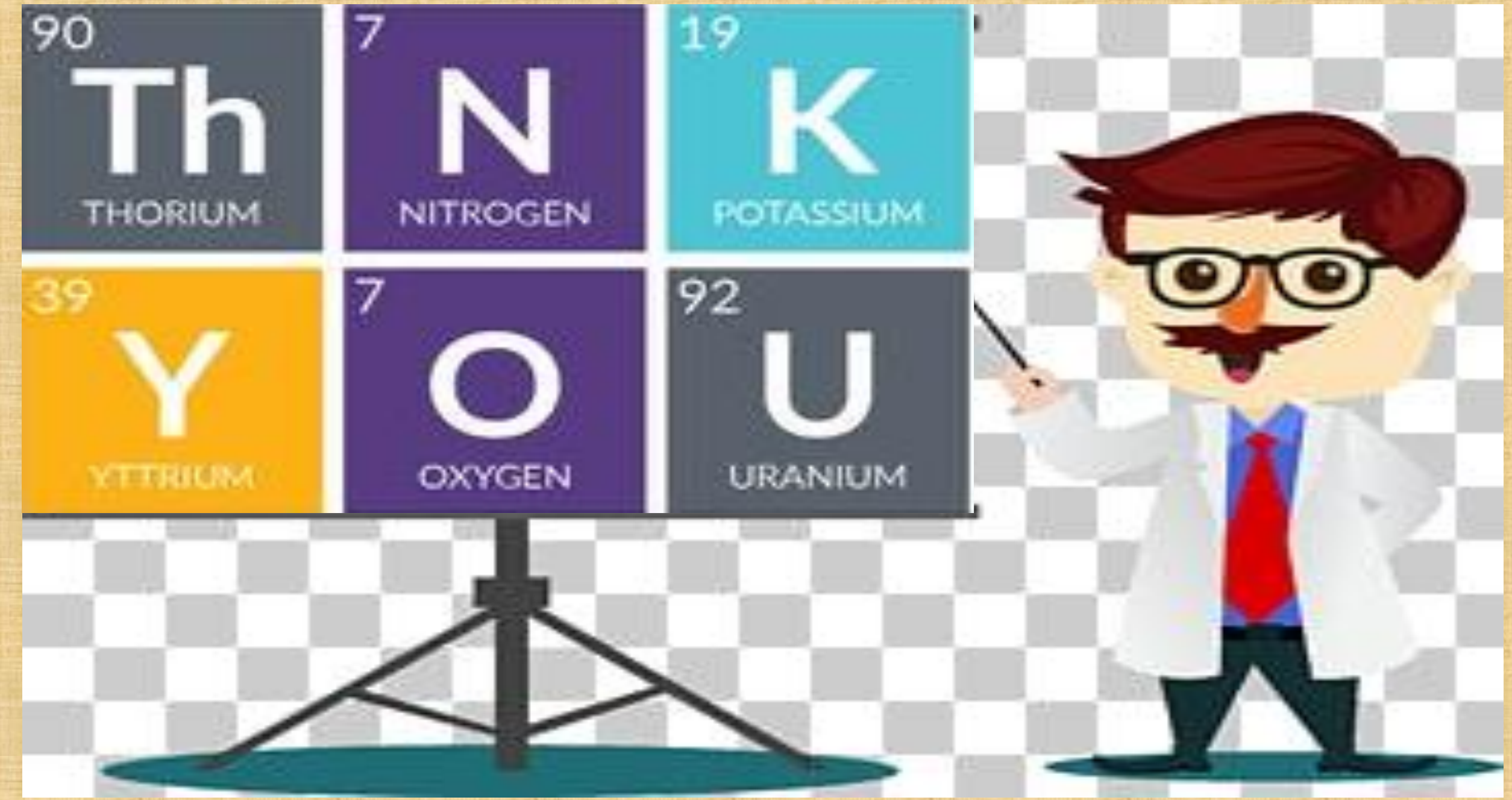
(a) CH_4

(b) C_2H_6

(c) C_3H_8

(d) C_4H_{10}

D


90
Th
THORIUM
7
N
NITROGEN
19
K
POTASSIUM
39
Y
YTTRIUM
7
O
OXYGEN
92
U
URANIUM