YAKEEN NEET 2.0

2026

Some Basic Concept of Chemistry

Physical Chemistry | Lecture -03

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Topics to be covered

1. Revision of Last Class
2. Mass of Sub atomic Particles
3. Relative Atomic Mass, Absolute Atomic Mass, Gram Atomic Mass
4.  Trick for fast calculation
5. MPQ (Magarmach Practice Questions)

Rules to Attend Class

1. Always sit in a peaceful environment with headphone and be ready with your copy and pen.
2. Never ever attend a class from in between or don't join a live class in the middle of the chapter.
3. Make sure to revise the last class before attending the next class & always complete your home work.
4. Never ever engage in chat whether live or recorded on the topic which is not being discussed in current class as by doing so u can be blocked by the admin team or your subscription can be cancelled.

Rules to Attend Class

5. Try to make maximum notes during the class if something is left then u can use the notes pdf after the class to complete the remaining class.
6. Always ask your doubts in doubt section to get answer from faculty. Before asking any doubt please check whether same doubt has been asked by someone or not.
7. It does not matter whatever situation you are in NEVER EVER CREATE A BACKLOG BECAUSE IT MAY RESULT IN BACKLOG FOR YOUR DREAM COLLEGE.


There is one big flaw in your Preparation that's name is Backlog ? What do we say to Backlog ?
NOT TODAY !!!

Revision of Last class

Mass of Sub Atomic Particles

mass of p ≈ mass of n = 1 a.m.u.

no. of p + no. of n = nucleons

(find inside nucleus)

Atom → proton (p)

Atom → neutron (n)

Atom → electron (e^-)

mass e^- <<<< mass p or mass n

∴ atom mass = total mass p + total mass n

= no. of p × (mass of 1 p) + no. of neutrons (n) × (mass of 1 n)

= 1 a.m.u. (no. of p + no. of n)

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mass of 1 atom = 1 a.m.u. × no. of nucleons = 1 a.m.u × A

Mass of Subatomic Particles

Particle	Mass
proton	(1 a.m.u.) 1.67×10^{-27} kg
neutron	(1 a.m.u.) 1.67×10^{-27} kg
electron	9.11×10^{-31} kg

$1\,kg = 1000\,g$

$1\,a.m.u = 1.67 \times 10^{-27}\ kg$

$= 1.67 \times 10^{-27} \times 1000\ g$

$= 1.67 \times 10^{-27} \times 10^{3}\ g$

$= 1.67 \times 10^{-27+3} = 1.67 \times 10^{-24}\ g$

$^{A}_{Z}X$

A = mass no. = no. of p + no. of n.

mass of 1 atom

$1\,a.m.u \times 1 = 1\,a.m.u = 1.67 \times 10^{-24}\ g$

$^{1}_{1}H$

$1\,a.m.u \times 4 = 4\,a.m.u$

$= 4 \times 1.67 \times 10^{-24}\ g$

$^{4}_{2}He$

mass of 1 atom

$16\,a.m.u = 16 \times 1.67 \times 10^{-24}\ g$

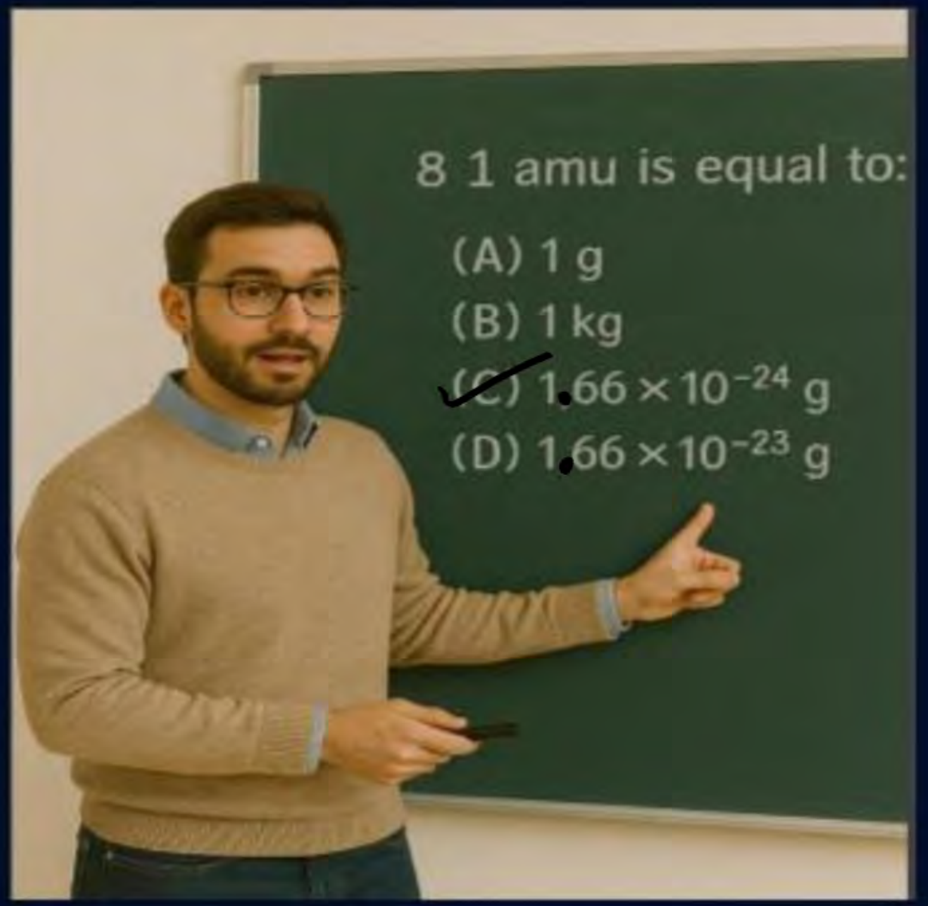
$^{16}_{8}O$

$14\,a.m.u = 14 \times 1.67 \times 10^{-24}\ g$

$^{14}_{7}N$

$12\,a.m.u = 12 \times 1.67 \times 10^{-24}\ g$

$^{12}_{6}C$


8 1 amu is equal to:
(A) 1 g
(B) 1 kg
(C) 1.66×10^{-24} g
(D) 1.66×10^{-23} g

1 a.m.u.

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(1) mass no. in g = Gram atomic mass (G·A·M.)

(2) avogadro no. of atoms mass = Gr. A. M.)
(N_A or N_0)

$N_A = 6.022 \times 10^{23}$

$\approx 6 \times 10^{23}$

(3) 1 a.m.u. (atomic mass unit) or 1 u (unified mass) or 1 Da (Dalton) $= \frac{1}{N_A} = 1.67 \times 10^{-24}$ g

1 a.m.u. = mass of $\frac{1}{12}$ of 1 atom of C-12

	G.A.M.	no. of atoms
^{16}O	16g.	N_A
^{14}N	14g	N_A
^{4}He	4g.	N_A
^{1}H	1g	N_A
^{12}C	12g	N_A

N_A atoms of C-12 has mass = 12g

1 atom $= \frac{12}{N_A}$ g

mass of $\frac{1}{12}$th of 1 atom of C-12 $= \frac{1}{12} \times \frac{12}{N_A} = \frac{1}{N_A} = 1$ a.m.u.

N_A atom C-12 mass = 12 g

1 ~~~~ $= \frac{12}{N_A}$ g

$\frac{1}{12}^{th}$ of 1 ~~~~ $= \frac{1}{12} \times \frac{12}{N_A} = \frac{1}{N_A} = \frac{1}{6.022 \times 10^{23}} = 1.67 \times 10^{-24}$ g = 1 a.m.u.

Absolute Atomic Mass (A.A.M.)

absolute mass of 1 atom

	absolute mass
$_{4}He$	4 a.m.u.
$_{1}H$	1 a.m.u
$_{12}C$	12 a.m.u.
$_{14}N$	14 a.m.u.

Q find no. of atoms in

(a) 12 a.m.u. of He

4 a.m.u. = 1 atom

12 a.m.u. = $\frac{1}{4} \times 12$ = 3 atoms

(b) 28 a.m.u. of N

14 a.m.u = 1 atom

28 ⇝ $\frac{1}{14} \times 28$ = 2 atoms

(c) 10 Da of H

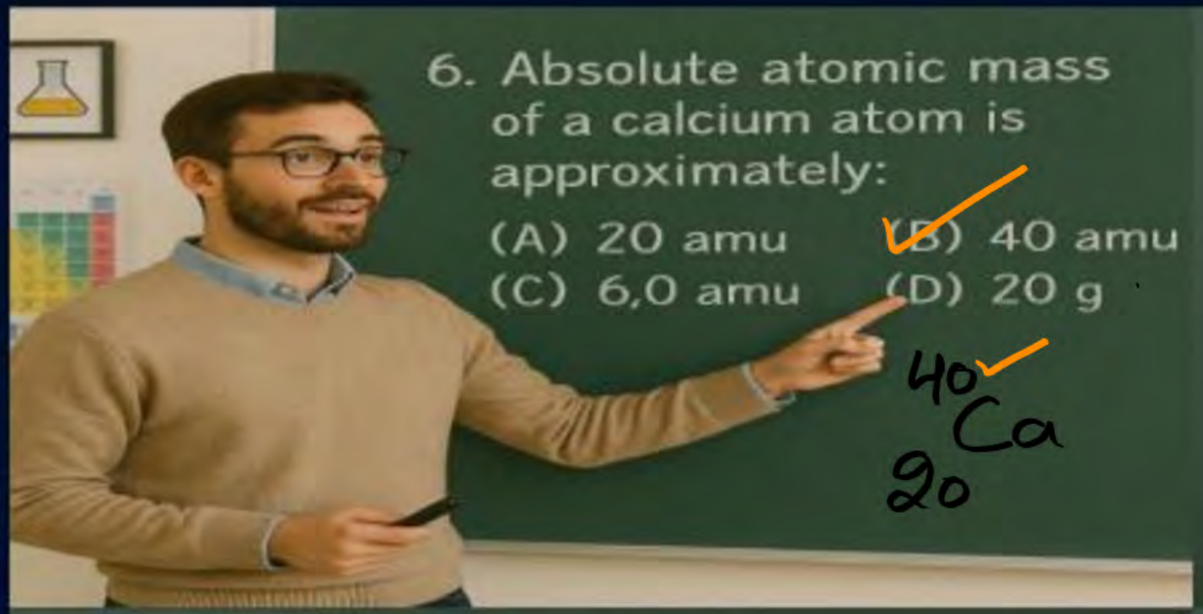
1 Da = 1 atom

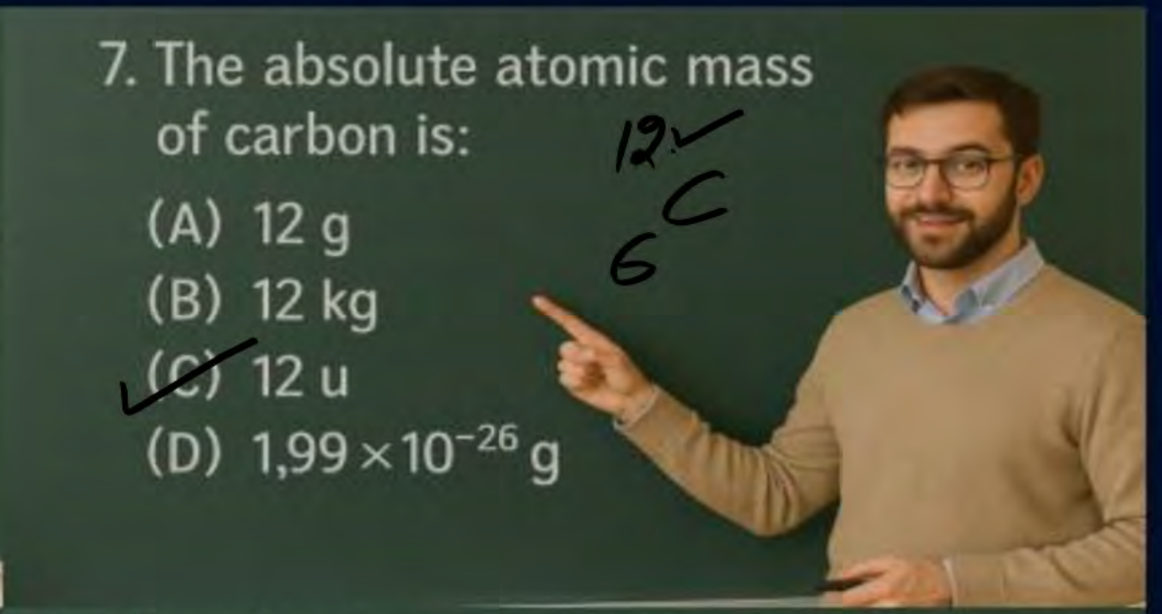
10 Da = 10 atom

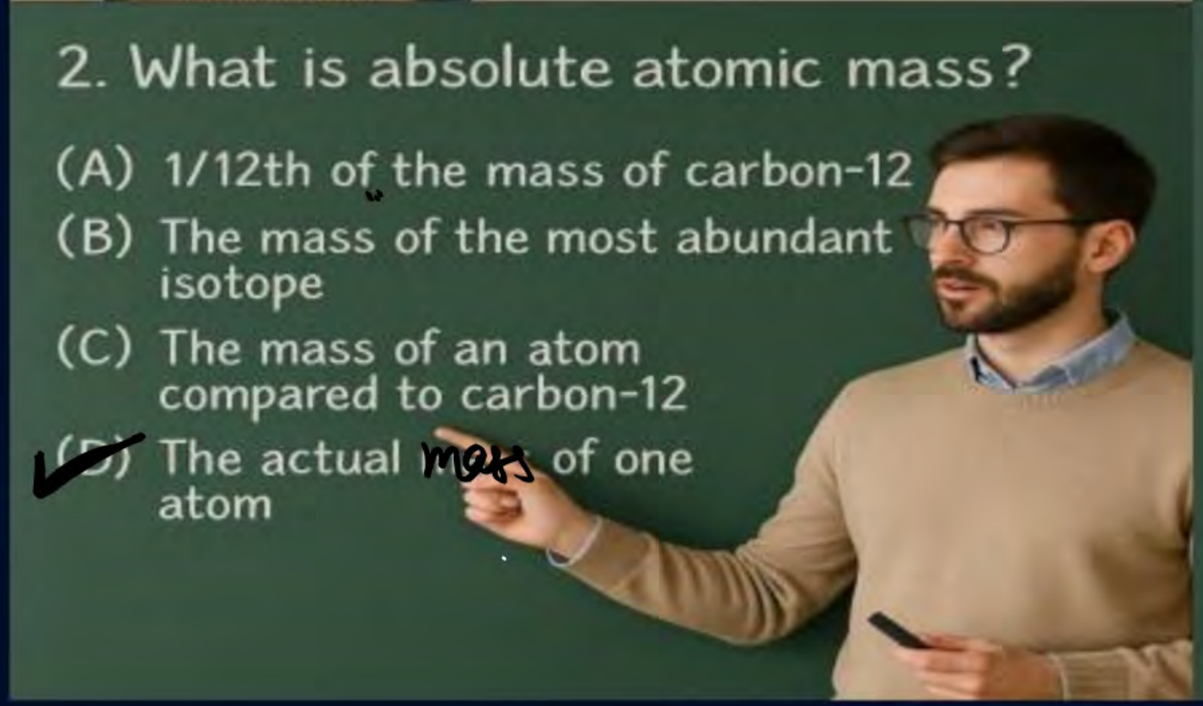
(d) 24 u of C

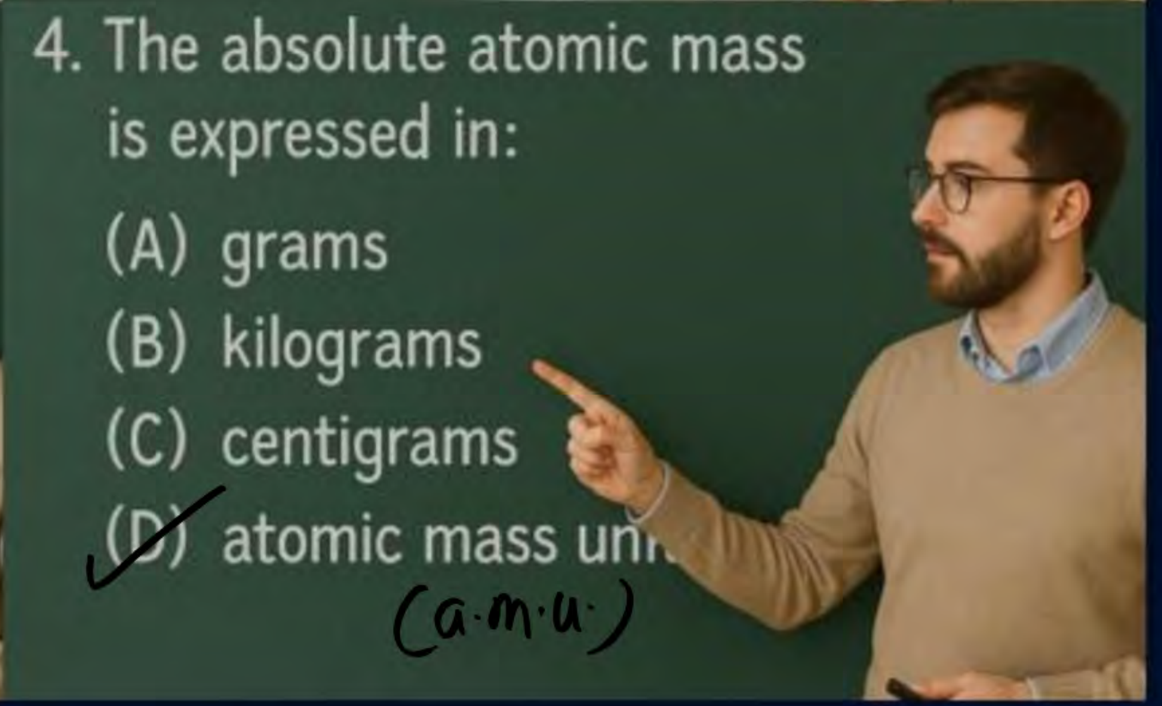
12 u = 1 atom

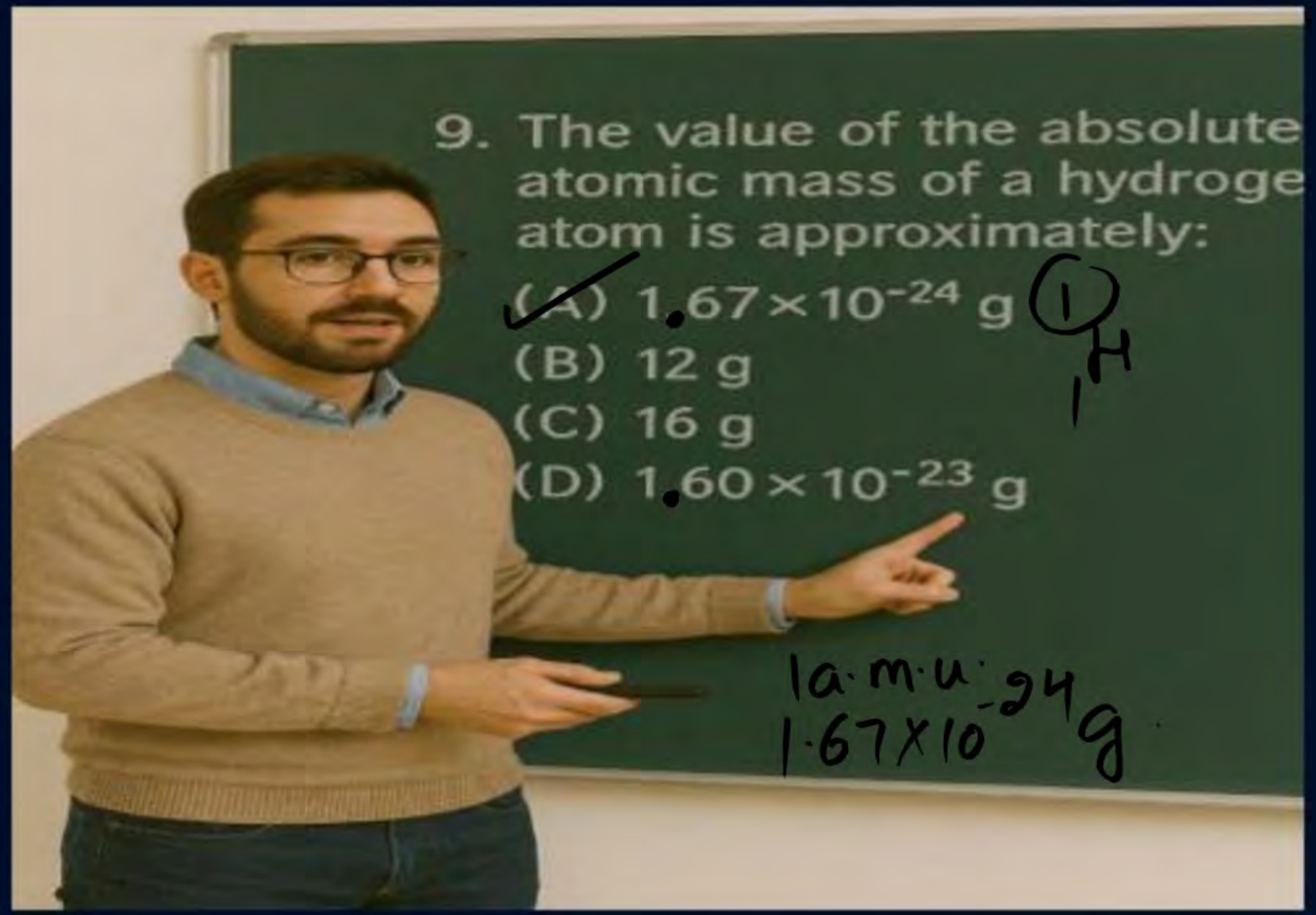
24 u = $\frac{1}{12} \times 24$ = 2 atoms

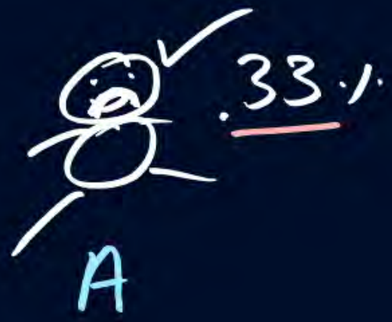

6. Absolute atomic mass of a calcium atom is approximately:
(A) 20 amu
(B) 40 amu
(C) 6,0 amu
(D) 20 g
40
Ca
20


7. The absolute atomic mass of carbon is:
(A) 12 g
(B) 12 kg
(C) 12 u
(D) 1,99 × 10⁻²⁶ g
12
C
6


2. What is absolute atomic mass?
(A) 1/12th of the mass of carbon-12
(B) The mass of the most abundant isotope
(C) The mass of an atom compared to carbon-12
(D) The actual mass of one atom


4. The absolute atomic mass is expressed in:
(A) grams
(B) kilograms
(C) centigrams
(D) atomic mass unit
(a.m.u.)


9. The value of the absolute atomic mass of a hydroge atom is approximately:
(A) 1.67×10^{-24} g
(B) 12 g
(C) 16 g
(D) 1.60×10^{-23} g
1a.m.u 1.67×10^{-24} g



Relative marks of B w.r.t. A $= \frac{\text{marks of B}}{\text{A}} = \frac{99}{33} = 3$

B marks 3 times Compared to A

Relative Atomic Mass (R.A.M.)

He 1 atom 4 times heavy as 1 amu
O ~ 16
N ~ 14
C ~ 12

↓

relative mass of 1 atom

① $R.A.M. = \frac{\text{absolute mass of 1 atom}}{\text{mass of } \frac{1}{12}\text{th of 1 atom C-12}}$

$= \frac{\text{absolute mass of 1 atom}}{1\ a.m.u.}$

② R.A.M has no unit.

	R.A.M.
^{4}He	$\frac{4\ a.m.u.}{1\ a.m.u.} = 4$
^{16}O	$\frac{16\ x}{1\ x} = 16$
^{14}N	$\frac{14\ x}{1\ x} = 14$
^{12}C	$\frac{12\ x}{1\ x} = 12$
^{1}H	$\frac{1\ x}{1\ x} = 1$

	R·A·M·	atoms	A·A·M·	atoms	G·A·M·	atoms
^{4}He	4	1	4 u	1	4g	N_A
^{14}N	14	1	14 u	1	14g	N_A
^{27}Al	27	1	27u	1	27g	N_A
^{12}C	12.	1	12u	1	12g	N_A
^{16}O	16	1	16u	1	16g	N_A

R.A.M.	atoms	A.A.M.	atoms	G.A.M.	atoms
23	1	23u	1	23g	N_A

Q

atom.

$p = 11$ ✓

$n = 12$ ✓

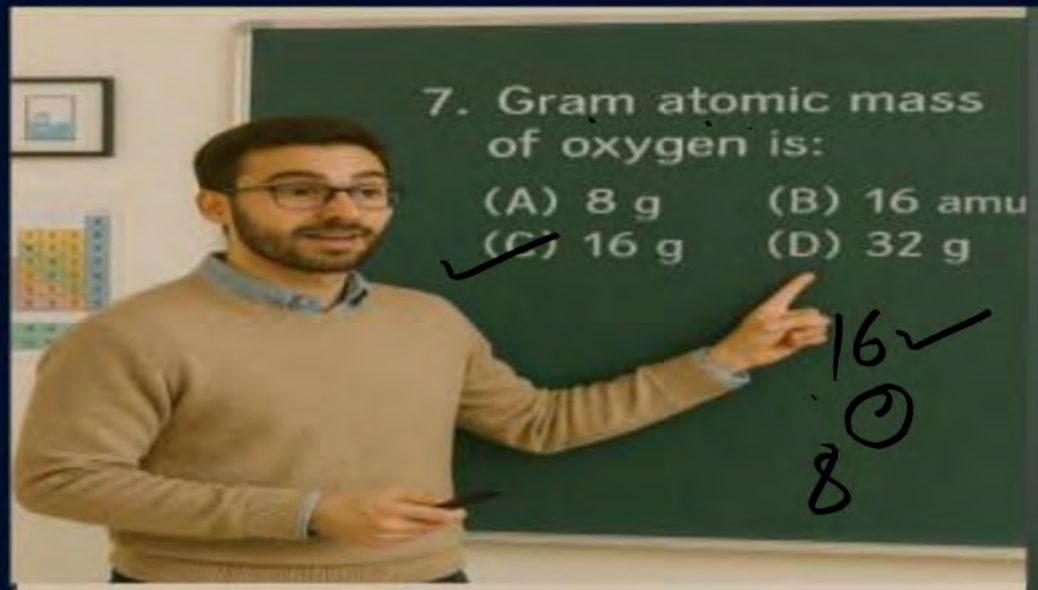
$e^- = 11$

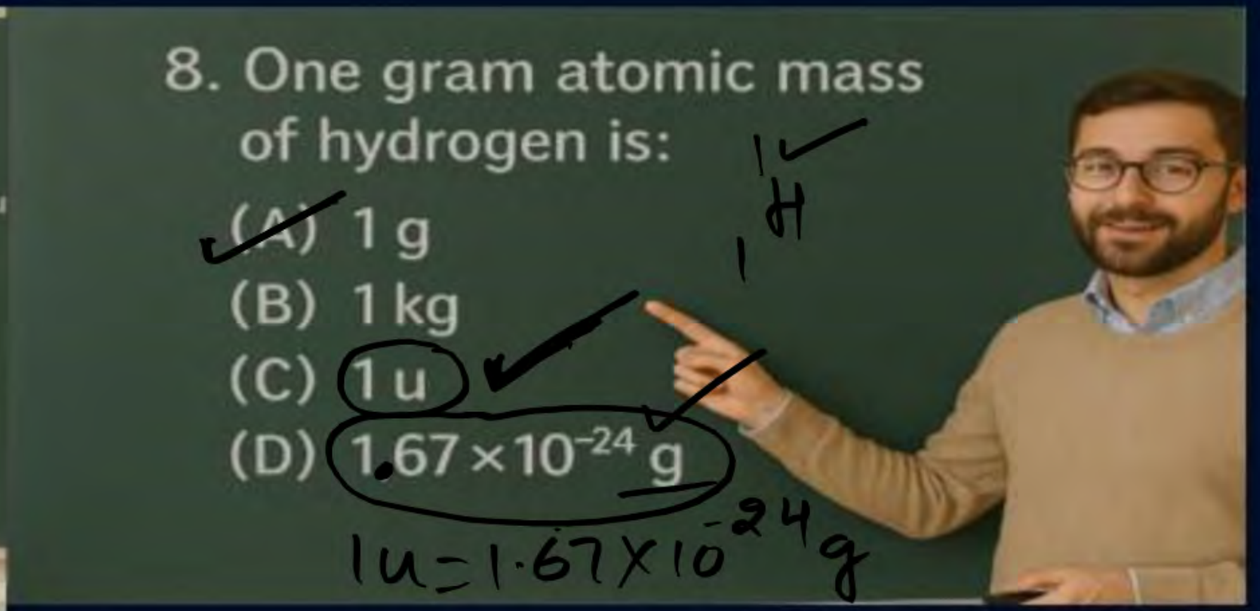
$p + n = 11 + 12 = 23$

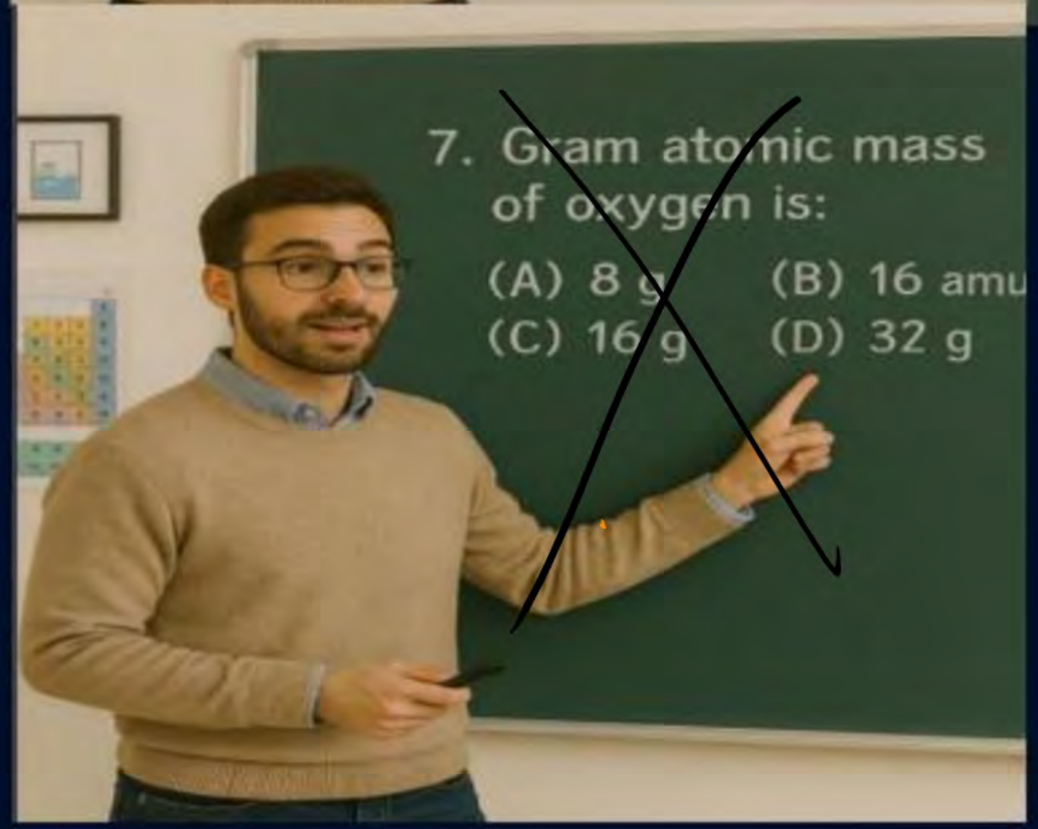
Gram Atomic Mass (G.A.M.)

↓

absolute mass of N_A atoms in g.


7. Gram atomic mass of oxygen is:
(A) 8 g
(B) 16 amu
(C) 16 g
(D) 32 g
16
8


8. One gram atomic mass of hydrogen is:
(A) 1 g
(B) 1 kg
(C) 1 u
(D) 1.67×10^{-24} g
1
H
1
1u = 1·67 X 10 -24 g


7. Gram atomic mass of oxygen is:
(A) 8 g
(B) 16 amu
(C) 16 g
(D) 32 g

A.M.M. , R.M.M. & G.M.M.

^{14}N

atom

N_2 Absolute molecular mass (A·M·M·) — molecule — 1

$N_2 \rightarrow 2 \times 14 = 28\ u$

Abslt at· mass (A·A·M·) — N — 1

14 u — 14u

N_2 Relative molecular mass (R·M·M·) — molecule — 1

$N_2 \rightarrow 28$

Rel· at· mass (R·A·M·) — N — 1

14 — 14

N_2 Gram molecular mass (G·M·M·) — molecule — N_A

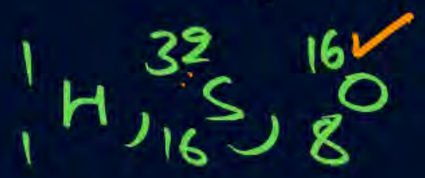
$N_2 \rightarrow 28\ g$

Gram at· mass (G·A·M·) — N — N_A

14g

R.M.M. | A.M.M. | Gr.A.M

H_2SO_4 | $1\times2+1\times32+4\times16 = 98$ | 98 u | 98 g



HNO_3 | $1\times1+1\times14+3\times16=63$ | 63 u | 63 g

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A_xB_y

$$\text{G.M.M.} = \sum \text{no. of atoms} \times \text{at. mass}$$

A.F.M., R.F.M. & G.F.M. → ions

SO_4^{2-} (2−) 32 16 O S 16 8

Absolute formula mass ÷ (A·F·M·) → ions

SO_4^{2-} ↓ absolute mass of 1 ions

$1 \times 32 + 4 \times 16 = 96\ u$

Relative formula mass ÷ (R·F·M·) → ions

SO_4^{2-} ↓ relative mass of 1 ions

96

Gram formula mass ÷ (Gr·F·M·) → ions

SO_4^{2-} ↓ absolute mass of N_A ions

96 g

Na & Na^+ both mass same → True

Cl & Cl^- → True

H^-, H & H^+ → True

O^{2-}, O^{2+}, O & O_2 all mass same → False

	marks obt.
A	10
B	20
C	30
D	40
E	50
F	60
G	70
H	80

Relative marks of H w.r.t. B $= \frac{80}{20} = 4$

H marks 4 times more as compared to B

Relative marks of H w.r.t. D $= \frac{80}{40} = 2$

H marks 2 times more as compared to D

absolute marks H will not change

Effect on R.A.M. , R.M.M. & R.F.M. if definition of 1 a.m.u. is changed

Conventional scale

$1\ a.m.u. = \left(\frac{1}{12}\right) \times \frac{12}{N_A}$

$$R.A.M.(A) = \frac{\text{mass of 1 atom}}{\frac{1}{12} \times \frac{12}{N_A}} \quad -(1)$$

non-Conventional scale

$1\ a.m.u. = \left(\frac{1}{x}\right) \times \frac{12}{N_A}$

$$\text{new } R.A.M.(A') = \frac{\text{mass of 1 atom}}{\frac{1}{x} \times \frac{12}{N_A}} \quad -(2)$$

Divide eq. (2) by eq (1)

$$\frac{A'}{A} = \frac{\text{mass of 1 atom}}{\frac{1}{x} \times \frac{12}{N_A}} \Big/ \frac{\text{mass of 1 atom}}{\frac{1}{12} \times \frac{12}{N_A}} = \frac{\text{mass of 1 atom} \times \frac{1}{12} \times \frac{12}{N_A}}{\frac{1}{x} \times \frac{12}{N_A} \times \text{mass of 1 atom}} = \frac{x}{12}$$

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$$\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a \times d}{b \times c}$$

$$A' = A \times \frac{x}{12}$$

A' = new R.A.M.

A = R.A.M. on Conventional scale

definition of new a.m.u. → 1 a.m.u. is $\frac{1}{x^{th}}$ of 1 atom of C-12

Question

Find new relative atomic mass of sodium if 1 a.m.u. is defined as 1/48 *th* of 1 atom of C-12. If Relative atomic mass on conventional scale is 23 .

A 96

B 48

C 92

D 46

$A' = ?$

$A' = A \times \frac{x}{12}$

$= 23 \times \frac{48}{12}$ (4)

$A' = 92$

$\frac{1}{x} = \frac{1}{48}$ $x = 48$

$A = 23$

Q. find new R.A.M. of ^{4}He if 1 a.m.u. is defined as $\frac{1}{24}$ of 1 atom of C-12.

Ans $A' = ?$

$A' = A \times \frac{x}{12}$

$= 4 \times \frac{24^{2}}{12} = 8$

Q@ find new R.A.M. of ^{16}O if 1 a.m.u. $\frac{1}{60}$ of 1 atom of C-12

(b) find new A.A.M.

Ans (a) $A' = A \times \frac{x}{12}$

$= 16 \times \frac{60^{5}}{12} = 80$

(b) new A.A.M. = old A.A.M. = 16 u

Q. (a) find new R.M.M. of O_2 if 1 a.m.u. $= \frac{1}{36}$ of 1 atom of C-12.

16 ✓

①

(b) find new A.M.M

$A = 2 \times 16 = 32$

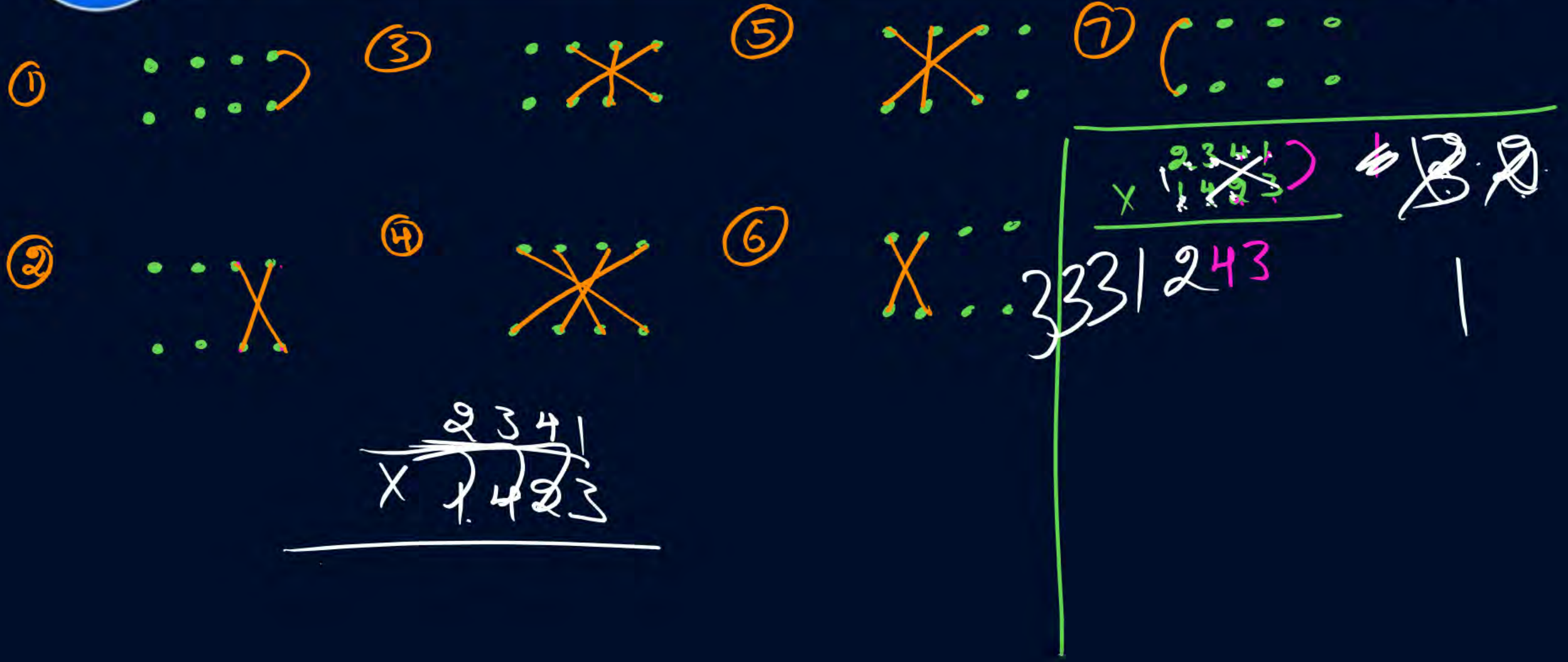
Ans (a) $A' = A \times \frac{x}{12}$

$= 32 \times \frac{3}{\cancel{36}\ \cancel{12}}$

$= 96$

(b) new A.M.M = old A.M.M. $= 32u$

Tricks for fast Calculations



Magarmach Practice Questions (MPQ)

Question

What is the unit of absolute atomic mass?

A amu

B grams

C kg

D g/mol

Question

Relative atomic mass is the ratio of the average mass of atoms of an element to:

A 1 amu

B 1 gram

C $1/12^{th}$ of mass of C-12 atom

D 1 mole

Question

What is the relative atomic mass of oxygen?

A 16

B 32

C 8

D 12

Question

What is the absolute atomic mass of hydrogen approximately?

A 1 g

B 1.67×10^{-24} g

C 1.67×10^{-27} kg

D Both b and c

Question

The gram atomic mass of nitrogen is :

A 14 g

B 7 g

C 28 g

D 1 g

Question

Which of the following is true for relative atomic mass?

A. It has units

B. It is a ratio and has no units

C. Measured in grams

D. Measured in kilograms

Question

Which is the correct value for Avogadro's number?

A 6.022×10^{22}

B 6.022×10^{24}

C 6.022×10^{23}

D 3.011×10^{23}

Question

The gram atomic mass of an element is numerically equal to its:

A Absolute mass

B Molecular mass

C Relative atomic mass

D Molar mass

Question

The absolute atomic mass of carbon is approximately:

A 12 g

B 1.99×10^{-23} g

C 1.99×10^{-22} g

D 12 amu

Question

What is the gram atomic mass of sulfur?

A 16 g

B 32 g

C 64 g

D 12 g

THANK YOU