2. COMPOSITION OF ATOM
SOLUTIONS

TEACHING TASK

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1. The charge of an electron is -1.6 x 10^{-19}C. The value of free charge on Li+ ion will be

a) 3.6 x 10^{-19}C b) 1x10^{-19}C c) 1.6 x10^{-19}C d) 2.6x10^{-19}C

Answer:c

Solution:Charge of an electron (e^-) = -1.6 × 10^{-19} C.

Li^+ ion has lost 1 electron, so its charge = +1.6 × 10^{-19} C.

2. The charge of an electron is 4.8 x 10^{-10} esu. What is the value of charge in Clion?

(a) 4.8 x 10^{-10} esu (b)9.6 x 10^{-10} esu (c)1.44 x 10^{-9}esu (d)2. 4 x 10^{-10} esu

Answer:a

Solution:Charge of an electron = 4.8 × 10^{-10}esu.

Cl^- ion has gained 1 electron, so its charge = -4.8 × 10^{-10} esu.

3. The increasing order (lowest first) for the values of e/m (charge/mass) for

(a)e, p, n, α (b)n, p, e, α (c)n, p, α , e (d)n, α , p, e

Answer: d

Solution:Order (Lowest e/m First):

Neutron (0) $\rightarrow$ Alpha (0.5) $\rightarrow$ Proton (1) $\rightarrow$ Electron (1836)

4. The specific charge of an α -particle is :

(a) 38.4 x10^7 C kg^{-1} (b) 19.2 x10 ^{7}C kg $^{-1}$(c) 2.4 x10 ^{7}C kg $^{-1}$(d) 4.8 x10 ^{7}C kg $^{-1}$

Answer:D

Solution:An a-particle is a helium nucleus: He^{2+} (2 protons + 2 neutrons).

Charge (q): +2e = +2 × 1.6 × 10^{-19} C = 3.2 × 10^{-19} C.

Mass (m): 4 atomic mass units (u) = 4 × 1.66 × 10^{-27} kg = 6.64 × 10^{-27} kg.

Specific charge (q/m): $\frac{q}{m} = \frac{3.2\times10^{-19}}{6.64\times10^{-27}} \approx 4.8\times10^{7}\, Ckg^{-1}$

5. The constancy of e/m ratio for electron shows that

a) Electrons mass is1/1837 th of the mass of proton

b) Electrons are universal particles of all matter

c) Electrons are produced in discharge tube only d) None of these

Answer:b

Solution:The e/m ratio (charge-to-mass) for electrons is always constant, regardless of the gas or electrode material in discharge tube experiments.

This constancy proves that electrons are universal fundamental particles present in all matter.

6. The nature of anode rays depends upon

a) Nature of gas filled in the discharge tube b) Nature of electrode

c) Nature of metal d) None of these

Answer:a

Solution:Anode rays are positive ions formed by ionization of gas atoms in the discharge tube.
Their nature (mass/charge) depends on the gas used (e.g., H^+ for hydrogen gas, O^+ for oxygen gas).
7. The e/m value of proton is
a) Less than e/m value of electron b) Equal to e/m value of electron
c) Greater than e/m value of electron d) All the above.
Answer:a
Solution:Proton (p^+):
Charge = $+1.6 \times 10^{-19}$ C
Mass = 1.67×10^{-27} kg
e/m = $(1.6 \times 10^{-19})/(1.67 \times 10^{-27}) \tilde{} 9.6 \times 10^{7}$ C kg^{-1}
Electron (e^-):Charge = -1.6×10^{-19} C (same magnitude as proton)
Mass = 9.11×10^{-31} kg (much lighter)
e/m = $(1.6 \times 10^{-19})/(9.11 \times 10^{-31}) \tilde{} 1.76 \times 10^{11}$ C kg^{-1}
The e/m ratio of a proton ($\sim 10^7$) is much smaller than that of an electron ($\sim 10^{11}$). This is because protons are ~1836 times heavier than electrons but have the same charge magnitude.
8. The charge to mass ratio of α - particle is approximately two the charge to mass ratio of proton is
a) Half b) Twice c) 4 times d) 6 times
Answer:B

Solution: $\frac{e}{m_{proton}} = \frac{1e}{1u} = 1$

$\frac{e}{m_{alpha}} = \frac{2e}{4u} = 0.5$

$\frac{\frac{e}{m_{proton}}}{\frac{e}{m_{alpha}}} = \frac{1}{0.5} = 2$

So, the e/m of proton is twice that of alpha particle).
9. The increasing order of specific charge of electron (e), proton (p), alpha particle (α) and neutron (n) is
a) e, p, n, α b) n, p, e, α c) n, α , p, e d) n, p, α , e
Answer:c
Solution:Neutron (0) $\rightarrow$Alpha (0.5) $\rightarrow$ Proton (1) $\rightarrow$ Electron (1836)
10. The e/m ratio of cathode rays is x unit, when hydrogen is filled in the dischargetube. What will be its value when deuterium (D_2) is filled in it?
a) x unit b) x/2 unit c) 2x unit d) x/4 unit
Answer:a
Solution:Cathode rays are electrons, so their e/m (x unit) is independent of the gas (H_2 or D_2) in the tube.
11. For cathode rays the value of e/m which of the following statements is incor-

rect
a) Is independent of the nature of the cathode and the gas filled in the discharge tube
b) Is constant c) Is -1.7588×10^8 coulombs/g
(D) Is lowest when hydrogen gas is filled in discharge tube.
Answer:D
Solution:Correct Statements:
(a) e/m is independent of cathode/gas.
(b) e/m is constant (~1.76×10^{11} C/kg).
(c) Value is -1.7588×10^8 C/g (converted units).
Incorrect Statement:
(d) e/m is not lowest for H_2 (it's constant for electrons).
12. The charge to mass ratio of α particle is approximately '2', the charge to mass ratio of proton
a) Twice b) Half c) Four times d) Six times
Answer:a

Solution: $\frac{e}{m_{proton}} = \frac{1e}{1u} = 1$

$\frac{e}{m_{alpha}} = \frac{2e}{4u} = 0.5$

$\frac{\frac{e}{m_{proton}}}{\frac{e}{m_{alpha}}} = \frac{1}{0.5} = 2$

So, the e/m of proton is twice that of alpha particle
MULTIPLE CORRECT ANSWER TYPE
13. Which of the following relations are correct ?
a) e/m order : neutron < α - particle < electron
b) mass : neutron < α - particle < electron
c) Megnitude of charge : neutron < electron = proton < α - particle
d) mass of Hydrogen - atom = mass of electron
Answer:a,c
Solution:Correct Options:
a) e/m order: neutron < a-particle < electron
Neutron (n): e/m = 0 (no charge).
α-particle (He^{2+}): e/m = 0.5 units (charge +2e, mass 4u).
Electron (e^-): e/m ~ 1836 units (highest).
c) Magnitude of charge: neutron < electron = proton < a-particle
Neutron: 0.
Electron/proton: ±1e.
a-particle: +2e.
Incorrect Options:
b) Mass: neutron < a-particle < electron
Actual order: electron (lightest) < proton/neutron < a-particle (heaviest).

d) Mass of H-atom = mass of electron
False: H-atom mass ~ proton mass (electron's mass is negligible).
14. Which of the following statement(s) is/are correct
a)e/m value of anode rays is depends on the nature of gas in discharge tube & is maximum when hydrogen gas is taken in discharge tube.
b) Neutrons are exist in all isotopes of every element
c) Neutron is discovered in the nuclear reaction of $_5B^{11}+_2He^4 \rightarrow {}_7N^{14}+{}_0n^1$
d) Neutrons deflects in external magnetic field
Answer:a
Solution:a) e/m of anode rays depends on gas and is maximum for H^+.
Anode rays are positive ions; H^+ (lightest) has the highest e/m.
b) Neutrons exist in all isotopes of every element.
Isotopes differ in neutron number, but all (except ^1H) have neutrons.
COMPREHENSION TYPE
15 Particles in cathode rays have same charge to mass ratio as:
a) α - particles b) β - particles c) γ - rays d) Protons
Answer:b
Solution:Cathode rays are electrons, and beta (ß$^-$) particles are also high-speed electrons emitted during radioactive decay.
Both have identical e/m ratio (1.76×10^8 C/g).
Other options:
α-particles (He^{2+}) and protons have much lower e/m.
Gamma rays are neutral photons (no charge/mass).
16. The ratio of specific charge of a proton and that of an α -particle is:
a) 1 : 2 b) 1 : 1 c) 2 : 1 d) 1 : 4
Answer:c
Solution:Proton (p^+): e/m = 9.55×10^4 C/g.
a-particle (He^{2+}):
Charge = +2e, Mass = 4u $\rightarrow$ e/m = 2/4 = 0.5 × proton's e/m.
Thus, α-particle's e/m = 4.775×10^4 C/g.

Ratio (Proton : α-particle): $\frac{9.55\times10^4}{4.775\times10^4} = 2:1$

17 Which of the following particles has maximum charge to mass ratio?
a) Electrons b) Protons c) α - particles d) Neutons
Answer:a
Solution:

Particle	e/m (C/g)
Electron	1.76×10^8 (Highest)
Proton	9.55×10^4
α-particle	~4.775×10^4
Neutron	0 (neutral)

Electrons win by a huge margin (~1840× higher than protons)!
MATRIX MATCHING TYPE
18. **Answer:A-Q,R,B-P,Q,R,S,C-P,R,D-P,R**
Solution:

Column-I	Column-II
A) Electron is present in	Q) Hydrogen atom ,R) Helium atom
B) Proton is present in	Q) Hydrogen atom,S) Hydrogen nucleus , R) Helium atom,P) Helium nucleus
C) Neutron is present in	P) Helium nucleus, R) Helium atom
D) α -particle is present in	P) Helium nucleus,R) Helium atom

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LEARNERS TASK

Conceptual Understanding Questions (CUQ's)

1. Cathode rays were discovered by

(a) William Crookes (b) G.J. Stoney (c)Rutherford (d)None of these

Answer:a

Solution:William Crookes (1870s) first observed cathode rays in discharge tubes. J.J. Thomson later identified them as electrons (1897).

2. Cathode rays are

(a) Protons (b)Electrons (c)Neutrons (d) α -particles

Answer:b

Solution:Cathode rays are streams of electrons emitted from the cathode in a discharge tube.

3. Anode rays were discovered by

(a)Goldstein (b) G.J. Stoney (c) Rutherford (d)J.J. Thomson

Answer:a

Solution:Eugen Goldstein (1886) discovered anode rays (positive ions) in modified discharge tubes.

4. Which of the following reactions led to the discovery of the neutron

a) ${}_6C^{14} + {}_1P^1 \rightarrow {}_7N^{14} + {}_0n^1$

b) ${}_5B^{11} + {}_1D^2 \rightarrow {}_6C^{12} + {}_0n^1$

c) ${}_4Be^9 + {}_2He^4 \rightarrow {}_6C^{12} + {}_0n^1$

d) ${}_4Be^8 + {}_2He^4 \rightarrow {}_6C^{11} + {}_0n^1$

Answer:c

Solution:James Chadwick (1932) identified neutrons in this reaction involving beryllium and alpha particles.

5. The discovery of neutron becomes very late because

(a)Neutrons are present in nucleus (b)Neutrons are highly unstable particles

(c)Neutrons are chargeless (d)Neutrons do not move

Answer:c

Solution:Neutrons have no charge, making them invisible to electric/magnetic fields and harder to detect than protons/electrons.

6. Which of the following is correct for cathode rays in discharge tube

a) Independent of the nature of the cathode

b) Independent of the nature of the gas

c) Deflection is observed in presence of electric and magnetic field

d) All the above

Answer:D

Solution:(a) Independent of cathode material.
(b) Independent of gas in the tube (always electrons).
(c) Deflect in electric/magnetic fields (due to charge).
7. The specific charge for a cathode ray.
a) Has the smallest value when the discharge tube is filled with H_2
b) Is constant
c) Varies with the atomic number of gas in the discharge tube
d) Varies with the atomic number of an element forming the cathode ray
Answer:b
Solution:Cathode rays are electrons, so their e/m ratio (1.76×10^8 C/g) is always the same, regardless of gas or cathode.
8. The specific charge for positive rays is much less than the specific charge for cathode rays. This is because:
a) Positive rays are positively charged
b) Charge on positive rays is less
c) Positive rays comprise ionised atoms whose mass is much higher
d) Experimental method for determination is wrong.
Answer:c
Solution:Positive rays are ions (e.g., H^+, O^+), which are heavier than electrons, reducing their e/m ratio.
9. Which is true to say about cathode rays?
(a) Their e/m ratio depends upon the nature of residual gas
(b) They are deflected by electrical and magnetic field
(c) Their e/m ratio is constant
(d) These are produced by ionization of molecules of the residual gas
Answer:b,c
Solution:(b) Deflected by electric/magnetic fields (proves they're charged).
(c) e/m ratio is constant (electrons are universal).
JEE MAIN LEVEL QUESTIONS
1. Which is false to say about anode rays ?
(a)Their e/m ratio depends upon the nature of residual gas
(b)They are deflected by electrical and magnetic field
(c)Their e/m ratio is constant
(d)These are produced by ionization of molecules of the residual gas
Answer:c
Solution:Anode rays are positive ions, so their e/m ratio depends on the gas (e.g., H^+ vs. O^+).
Only cathode rays (electrons) have a constant e/m ratio.
2. Nuclei tend to have more neutrons than protons at high mass numbers because
(a)Neutrons are neutral particles
(b)Neutrons have more mass than protons
(c)More neutrons minimize the coulomb repulsion
(d)Neutrons decrease the binding energy
Answer:C
Solution:Extra neutrons reduce proton-proton repulsion (Coulomb force) without

adding repulsive charge.
3. The specific charge for positive rays is much less than the specific charge for cathode rays. This is because
(a)Positive rays are positively charged (b)Charge on positive rays is less
(c)Positive rays comprise ionised atoms whose mass is much higher
(d)Experimental method for determination is wrong
Answer:c
Solution:Positive rays are ions (e.g., H^+, O^+), which are heavier than electrons, lowering their e/m.
4. Which of the following statements about the electron is incorrect?
a) It is a negatively charged particle.
b) The mass of electron is equal to the mass of neutron.
c) It is a basic constituent of all atoms.
d) It is a constituent of cathode rays.
Answer:b
Solution:Electrons are ~1836× lighter than neutrons/protons.
5. Magnitude of deflection of cathode rays in discharge tube is more when
a) Magnitude of charge of the particle is more
b)Greater interaction with the electric or magnetic field
c) Less mass of the particle d) All the above
Answer:d
Solution:Deflection depends on:
Charge magnitude (more charge = more deflection)
Interaction time with fields.
Lower mass (electrons deflect more than heavier particles).
6. When the speed of the electron increases, the specific charge
a) Decreases b) Increases c) Remains same d) None
Answer:c
Solution:e/m is an intrinsic property of electrons and independent of speed.
7. The nature of anode rays depends upon
1) Nature of gas filled in the discharge tube 2) Nature of electrode
3) Nature of metal 4) None of these
Answer:1
Solution:Anode rays are gas-dependent ions (e.g., H^+ for hydrogen, O^+ for oxygen).
8. The e/m value of proton is
a) Less than e/m value of electron b) Equal to e/m value of electron
c) Greater than e/m value of electron d) All the above
Answer:a
Solution:Proton e/m ˜ 9.6×10^7 C/kg vs. electron e/m ˜ 1.76×10^{11} C/kg.
9. The charge to mass ratio of α - particle is approximately two the charge to mass ratio of proton is
a) Half b) Twice c) 4 times d) 6 times
Answer:b
Solution: α = 2e / 4u = 0.5e/u
Proton = 1e / 1u = 1e/u
So, proton e/m is twice α

10. The increasing order of specific charge of electron (e), proton (p), alpha particle(α) and neutron (n) is
a) e, p, n, α b) n, p, e, α c) n, α, p, e d) n, p, α, e
Answer:c
Solution:Neutron (0) < α-particle (0.5) < Proton (1) < Electron (1836).
11. The e/m ratio of cathode rays is x unit, when hydrogen is filled in the discharge tube. What will be its value when deuterium (D_2) is filled in it?
a) x unit b) x/2 unit c) 2x unit d) x/4 unit
Answer:a
Solution:Cathode rays are electrons, independent of the gas in the tube.
So, e/m value remains constant no matter the gas.
12. Which has highest specific charge?
a) Na^+ (A =23) b) Mg^{2+}(A=24) c) Al^{3+}(A =27) d) Si^{4+}(A =28)
Answer:d
Solution:Na^+: Charge = +1,A = 23 $\rightarrow$ e/m = 1/23
Mg^{2+}: Charge = +2e, A = 24 $\rightarrow$e/m = 2/24 = 1/12
Al^{3+}: Charge = +3e, A = 27 $\rightarrow$ e/m = 3/27 = 1/9
Si^{4+}: Charge = +4e, A = 28 $\rightarrow$ e/m = 4/28 = 1/7
Highest e/m = Si^{4+}
13 When beryllium is bombarded with α-particles, extremely penetrating radiations are produced which can not be deflected by electrical or magnetic field. These are
a) Protons b) α -rays c) Neutrons d) X-rays
Answer:c
Solution:Chadwick discovered neutrons this way.
Neutrons have no charge, so no deflection in E or B field.
14. The mass to charge ratio (m/e) for a univalent cation is 1.5×10^{-8} Kg/c. Find mass of the atom.
a) 2.4×10^{-19}g b) 2.4×10^{-27}g c) 2.4×10^{-24}g d) None of these
Answer:C
Solution:Given m/e= 1.5×10^{-8} Kg/c e=$1.6x10^{-19}$C
m=m/e x e =1.5×10^{-8} $x1.6x10^{-19}$=$2.4x10^{-27}$Kg=$2.4x10^{-24}$ g
ADVANCED LEVEL QUESTIONS
MULTIPLE CORRECT ANSWER TYPE
15. For cathode rays the value of e/m
a) Is independent of the nature of the cathode and the gas filled in the discharge tube
b) Is constant
c) Is -1.7588×10^8 coulombs/g
d) Is lowest when hydrogen gas is filled in discharge tube.
Answer:a,b,c
Solution:Option a: The e/m ratio for cathode rays (electrons) is indeed independent of the nature of the cathode material or the gas in the discharge tube. This was a key discovery in the study of electrons, showing that electrons are universal constituents of matter$\rightarrow$This is correct.

Option b: The e/m ratio is a constant for electrons (cathode rays). This is a fundamental property of electrons. $\rightarrow$This is correct.

Option c: The accepted value of e/m for electrons is approximately –1.7588 × 108 C/g (the negative sign indicates the negative charge of the electron, but often the magnitude is considered) $\rightarrow$ This is correct.
Option d: The e/m ratio does not depend on the gas in the discharge tube (as stated in option a). Thus, it cannot be "lowest" for hydrogen $\rightarrow$This is incorrect
16. Which of the following statement(s) is/are incorrect
A) The volume of a proton is $\approx 1.5 \times 10^{-38}$ cm^3 ?
B) Neutron is an stable particle
C) Neutron is fundamental particle of all the atomic nucleus, except Duterium.
D) Mass of proton and mass of hydrogen atom are equal
Answer:b,c
Solution:Option A:
This is approximately correct (proton radius ~0.87 femtometer

$$V = \frac{4}{3}\pi r^3 = 10^{-38} cm^3$$

Option B:
A free neutron is not stable; it decays into a proton, electron, and antineutrino with a half-life of ~14.7 minutes.
However, neutrons inside nuclei can be stable.
Option C:This is incorrect.
Neutrons are present in almost all atomic nuclei except ordinary hydrogen (^1H), which has just a proton.
Deuterium (^2H or D) has 1 proton and 1 neutron.
The statement says "except Deuterium," which is wrong because Deuterium does have a neutron.
Option D:A hydrogen atom consists of 1 proton + 1 electron.
The mass of a proton ˜ 1.0073 u, and the mass of a hydrogen atom ˜ 1.0078 u (including the electron).They are not exactly equal, but very close.
STATEMENT TYPE
A) Both A & R are true and R is the correct explanation of A
B) Both A & R are true and R is not the correct explanation of A
C) A is true, R is false. D) A is false, R is true.
17. A : Electrons are negatively charged .
R : The application of electric and magnetic field deflected the rays in the discharge tube towards the cathode.
Answer:C
Solution:Assertion (A):True. Electrons are negatively charged (discovered by J.J. Thomson in cathode rays).
Reason (R):False. Cathode rays (electrons) were observed to deflect:
Towards the anode (positive plate) in an electric field (since negative charges are attracted to positive plates).
In a magnetic field, they follow the right-hand rule for negative charges.

However, the reason states "towards the cathode" (negative plate), which is incorrect for electric fields (they should deflect towards the anode).

18. A: Anode rays are deflected towards positive plate in an electrical feild
R: Anode rays consist of Protons.

Answer:D

Solution:A: Anode rays are deflected towards the positive plate in an electrical field.

False — Anode rays are positively charged, so they are deflected towards the negative plate, not the positive.

R: Anode rays consist of protons.

True — In the case of hydrogen gas, anode rays do consist of protons (H^+ ions). In general, they are positive ions of the gas.

COMPREHENSION

COMPREHENSION-I

Electron, proton & neutron are said to be fundamental particles the charge of fundamental particles calculated by mullikan oil drop experiment.

19. An oil drop has -6.39×10^{-19} coulomb change. The number of electrons in this oil drop is

a) 4 b) 3 c) 2 d) 1

Answer:a

Solution:The charge of a single electron is -1.6×10^{-19} C.

Given charge on the oil drop = -6.39×10^{-19} C.

Number of electrons = Total charge / Charge of one electron

$$n = \frac{-6.39 \times 10^{-19}}{-1.6 \times 10^{-19}} = \frac{6.39}{1.6} \approx 3.99 \approx 4$$

20. The total number of fundamental particle in ${}_8O^{17}$

a) 8 b) 17 c) 16 d) 25

Answer:d

Solution:Fundamental particles in an atom = Protons + Neutrons + Electrons.

For ${}_8O^{17}$

Atomic number (Z) = 8 $\rightarrow$ Protons = 8, Electrons = 8 (if neutral).

Mass number (A) = 17 $\rightarrow$ Neutrons = A - Z = 17 - 8 = 9.

Total fundamental particles = Protons + Neutrons + Electrons

8(p)+9(n)+8(e)=25

21. The isotope doesnot consists of neutron

a) ${}_1H^2$ b) ${}_1H^1$ c) ${}_2He^4$ d) None of these.

Answer:b

Solution:Neutrons = Mass number (A) - Atomic number (Z)

a) ${}_1H^2$:2 - 1 = 1 neutron

b) ${}_1H^1$:1 - 1 = 0 neutrons (only a proton)

c) ${}_2He^4$: 4 - 2 = 2 neutrons

Only ${}_1H^1$ (ordinary hydrogen) has no neutron.

INTEGER TYPE

22. The total charge present on 1 mole of phosphide ions is ____ Faraday

Answer:3

Solution:Phosphide ion = P^{3-}(each ion has 3 extra electrons).

Charge per mole of P^{3-} :1 mole×3 (charge per ion)=3 moles of electrons

1 mole of electrons = 1 Faraday (F).

Thus, 3 moles of electrons = 3 F.

23. Number of neutrons is heavy water molecule is _____

Answer:10

Solution:Heavy water = D_2O

Neutrons in:Deuterium ($_1^2H$): 2 (mass) - 1 (protons) = 1 neutron per D atom.

Oxygen ($_8^{16}O$): 16 - 8 = 8 neutrons per O atom.

Total neutrons in D_2O

2 D atoms×1 neutron+1 O atom×8 neutrons=10 neutrons

24. Mass of 1 mole of protons is approximately equal to_____grams

Answer:1

Solution:Mass of 1 proton ˜ 1.0073 u (atomic mass units).

1 mole of protons = 6.022×10^{23}protons.

Total mass:1.0073 g/mol (since 1 u = 1 g/mol)˜1 g

25. The no . of electrons in 8 gm of O^{-2} ion is xx10^{24} then x is _____

Answer:3

Solution:Molar mass of O=16 g/mol.

Moles of O^{2-} in 8 g: $\frac{8g}{16g/mol}=0.5moles$

Each O^{2-} ion has: 8 protons + 2 extra electrons = 10 electrons.

Total electrons:0.5 x 10 x 6.022 x10^{23}=3.011 x 10^{24}

xx10^{24} =3.011 x 10^{24}

x=3.011

26. How many grams of nitrogen (N^{14}) contains same number of neutrons as 6 gm of C^{12}

Answer:6

Solution:Neutrons in C^{12}:

C^{12} : 12 (mass) - 6 (protons) = 6 neutrons per atom.

Moles of C^{12} in 6 g: $\frac{6g}{12g/mol}=0.5moles$

Total neutrons:0.5 moles×6.022×10^{23} ×6=1.8066×10^{24}neutrons

Neutrons in N^{14} :

N^{14}:14 - 7 = 7 neutrons per atom.

Let x g of N^{14} have the same number of neutrons.

Moles of N^{14} : $\frac{xg}{14g/mol}$

Total neutrons: $\frac{x}{14}\times 7\times 6.022\times 10^{23}=\frac{x}{2}\times 6.022\times 10^{23}$

$$\frac{x}{2}\times 6.022\times 10^{23}=1.8066\times 10^{24}$$

Set equal to neutrons in 6 g C^{12}: $\frac{x}{2}=3\Rightarrow x=6g$

MATRIX MATCHING TYPE

27. **Answer:A-PP,R,B-Q,R,C-S,D-Q,R**

Solution:

Column-I	Column-II
A) electron	P) Negative charge, R) 1.6 x10^{-19} coulomb
B) proton	Q) positive charge, R) 1.6 x10^{-19} coulomb
C) Neutron	S) chargeless
D) positron	Q) positive charge, R) 1.6 x10^{-19} coulomb

KEY

				TEACHING TASK					
1	2	3	4	5	6	7	8	9	10
C	A	D	D	B	A	A	B	C	A
11	12	13	14	15	16	17	18		
D	A	A,C	A	B	C	A	A-Q,R,B-P,Q,R,S,C-P,R,D-P,R		
				LEARNERS TASK					
				CUQ'S					
1	2	3	4	5	6	7	8	9	
A	B	A	C	C	D	B	C	B,C	
				JEE MAIN	&ADVANCED LEVEL QUESTIONS				
1	2	3	4	5	6	7	8	9	10
C	C	C	B	D	C	1	A	B	C
11	12	13	14	15	16	17	18	19	20
A	D	C	C	A,B,C	B,C	C	D	A	D
21	22	23	24	25	26	27			
B	3	10	1	3	6	A-PR,R,B-Q,R,C-S,D-Q,R			