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Participant ID	
Participant Name	
Test Center Name	
Test Date	03/11/2022
Test Time	3:30 PM - 6:30 PM
Subject	SCIENTIFIC ASSISTANT (CHEMISTRY) Post Code 022

Section : **SCIENTIFIC ASSISTANT (CHEMISTRY) Post Code 022**

Q.1

Which among the following set of quantum numbers is **NOT** possible

a. $n = 2, l = 1, m = -1, m_s = -1/2$

b. $n = 2, l = 1, m = 0, m_s = 1/2$

c. $n = 2, l = 1, m = 0, m_s = -1/2$

d. $n = 1, l = 1, m = 0, m_s = 1/2$

Ans
✗ A. a
✗ B. b
✗ C. c
✓ D. d

Question ID : **1703224596**
Status : **Answered**
Chosen Option : **D**

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Q.2

In which among the following, release of energy is due to **nuclear fusion**?

(i) Nuclear reactor (ii) Atom bomb (iii) Sun and stars (iv) hydrogen bomb

a. (i) only

b. (iii) only

c. Both (iii) and (iv)

d. Both (i) and (ii)

Ans

✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224605**
Status : **Answered**
Chosen Option : **C**

Q.3

Various isotopes of a given element have same.....

a. Number of protons

b. Number of neutrons

c. Molar mass

d. Thermodynamic stability

Ans

✓ A. a

✗ B. b

✗ C. c

✗ D. d

Question ID : **1703224648**
Status : **Answered**
Chosen Option : **A**

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Q.4

Hydrogen fluoride is a liquid unlike other hydrogen halides because

a. F-atom is small in size
b. Hydrogen bonding is present
c. H-F bond is strong
d. HF is a weak acid

Ans
✗ A. a
✓ B. b
✗ C. c
✗ D. d

Question ID : **1703224617**
Status : **Answered**
Chosen Option : **B**

Q.5

Blue vitriol is

a. $CuSO_4.5H_2O$
b. $MgSO_4.7H_2O$
c. $Na_2SO_4.10H_2O$
d. $FeSO_4.7H_2O$

Ans
✓ A. a
✗ B. b
✗ C. c
✗ D. d

Question ID : **1703224620**
Status : **Answered**
Chosen Option : **A**

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Q.6

An example of a tridentate ligand

a. Diethylene triamine
b. Ethylene diamine tetra acetate
c. Ethylene diamine
d. Oxalate ion

Ans
✔ A. a
✗ B. b
✗ C. c
✗ D. d

Question ID : **1703224645**
Status : **Answered**
Chosen Option : **A**

Q.7

Material that produce electricity when a pressure or mechanical stress is applied on them are referred to as

a. Pyro electric
b. Piezo electric
c. Ferro electric
d. Antiferro electric

Ans
✗ A. a
✔ B. b
✗ C. c
✗ D. d

Question ID : **1703224616**
Status : **Answered**
Chosen Option : **B**

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Q.8

When one *s* and one *p* orbitals are hybridized the result is

a. three orbitals in a plane

b. two orbitals at 180 degrees

c. two mutually perpendicular orbitals

d. four orbitals directed tetrahedrally

Ans

✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224650**
Status : **Answered**
Chosen Option : **B**

Q.9

Ziegler-Natta catalyst is used in

a. Addition polymerisation

b. Condensation polymerisation

c. Vulcanisation

d. None of the above

Ans

✓ A. a

✗ B. b

✗ C. c

✗ D. d

Question ID : **1703224633**
Status : **Answered**
Chosen Option : **A**

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Q.10

The type of isomerism shown by cis-$[PtCl_2(NH_3)_2]$ and trans-$[PtCl_2(NH_3)_2]$

a. Linkage isomerism

b. Position isomerism

c. Geometrical isomerism

d. Optical isomerism

Ans

✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224646**
Status : **Answered**
Chosen Option : **C**

Q.11

Calculate the crystal field stabilization energy for a d^5 ion in a strong octahedral field

a. $0.0\ \Delta_0$

b. $2.0\ \Delta_0$

c. $0.8\ \Delta_0$

d. $0.4\ \Delta_0$

Ans

✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224613**
Status : **Answered**
Chosen Option : **B**

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Q.12 According to VSEPR (Valence Shell Electron Pair Repulsion) theory which is the correct order of repulsive interactions?

a. Lone pair-Lone pair < Bond pair- Bond pair < Lone pair-Bond pair

b. Lone pair-Lone pair > Bond pair- Bond pair > Lone pair-Bond pair

c. Lone pair-Lone pair <Lone pair-Bond pair < Bond pair-Bond pair

d. Lone pair-Lone pair >Lone pair-Bond pair > Bond pair- Bond pair

Ans ✗ A. a
✗ B. b
✗ C. c
✓ D. d

Question ID : **1703224611**
Status : **Answered**
Chosen Option : **D**

Q.13 In the phase diagram of water system, the triple point is

a. Monovariant

b. Bivariant

c. Invariant

d. Cannot say

Ans ✗ A. a
✗ B. b
✓ C. c
✗ D. d

Question ID : **1703224602**
Status : **Not Answered**
Chosen Option : **--**

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Q.14

Orlon is a polymer of

a. Styrene
b. Vinyl chloride
c. Tetrafluoroethylene
d. Acrylonitrile

Ans
✗ A. a
✗ B. b
✗ C. c
✓ D. d

Question ID : **1703224631**
Status : **Not Answered**
Chosen Option : **--**

Q.15

In Clemmensen reduction reagent used is

a. Zn-Hg/HCl
b. $LiAlH_4$
c. N_2H_4/KOH
d. Red P/HI

Ans
✓ A. a
✗ B. b
✗ C. c
✗ D. d

Question ID : **1703224629**
Status : **Answered**
Chosen Option : **A**

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Q.16

The Chemical formula of Urea is

a. $(NH_4)_2CO_2$

b. $(NH_2)CO$

c. $(NH_4)_2CO$

d. $(NH_2)_2CO$

Ans

✗ A. a

✗ B. b

✗ C. c

✓ D. d

Question ID : **1703224640**
Status : **Answered**
Chosen Option : **D**

Q.17

Which of the following statements is true in SN2 reaction?

a. SN2 reaction proceeds with complete chemical inversion and follows second order kinetics

b. SN2 reaction proceeds with complete chemical inversion and follows first order kinetics

c. SN2 reaction proceeds with racemisation and follows first order kinetics

d. SN2 reaction proceeds with racemisation and follows second order kinetics

Ans

✓ A. a

✗ B. b

✗ C. c

✗ D. d

Question ID : **1703224637**
Status : **Not Answered**
Chosen Option : **--**

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Q.18

Which of the following is a biodegradable polymer?

a. PGA

b. PVC

c. PTFE

d. Bakelite

Ans

✔ A. a

✘ B. b

✘ C. c

✘ D. d

Question ID : **1703224625**
Status : **Answered**
Chosen Option : **A**

Q.19

In a first order reaction, it takes the reactant 230.3 minutes to be 90% decomposed.
Calculate the rate constant of the reaction

a. 0.1 min^{-1}

b. 0.01 min^{-1}

c. 0.001 min^{-1}

d. 0.0001 min^{-1}

Ans

✘ A. a

✔ B. b

✘ C. c

✘ D. d

Question ID : **1703224598**
Status : **Answered**
Chosen Option : **B**

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Q.20

If a graph is plotted between temperature on x-axis and volume on y-axis for 1 mole of gas at constant pressure then we get a straight line which cuts the temperature axis at

a. 0 °C

b. 273.16 K

c. -273.16 K

d. -273.16 °C

Ans

✗ A. a

✗ B. b

✗ C. c

✓ D. d

Question ID : **1703224609**
Status : **Not Answered**
Chosen Option : **--**

Q.21

Which compound in CH_3Br, CH_3Cl, CH_3I, CH_3F will respond faster towards SN2 reaction?

a. CH_3Br

b. CH_3Cl

c. CH_3I

d. CH_3F

Ans

✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224638**
Status : **Answered**
Chosen Option : **C**

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Q.22

A substance whose electrical conductivity decreases with increase in temperature

a. A metallic conductor
b. An electrolytic conductor
c. A semiconductor
d. An insulator

Ans
✔ A. a
✘ B. b
✘ C. c
✘ D. d

Question ID : **1703224644**
Status : **Not Answered**
Chosen Option : **--**

Q.23

Modern periodic law states that physical and chemical properties of the elements are periodic functions of their _____

a. Atomic number
b. Mass number
c. Atomic weight
d. Atomic radius

Ans
✔ A. a
✘ B. b
✘ C. c
✘ D. d

Question ID : **1703224618**
Status : **Answered**
Chosen Option : **A**

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Q.24

Consider the following Lindemann mechanism for the unimolecular decomposition of a molecule A in the presence of a species M to form the product P.

$$A + M \xrightarrow{k_1} A^* + M \qquad (Activation)$$
$$A^* + M \xrightarrow{k_2} A + M \qquad (Deactivation)$$
$$A^* \xrightarrow{k_3} P \qquad (Reaction)$$

Using steady state approximation, derive the rate law for the formation of the product

a. $r = k_1 \frac{[A][M]}{k_2[M]+k_3}$

b. $r = k_1 k_3 \frac{[A][M]}{k_2[M]+k_3}$

c. $r = k_1 k_3 \frac{[A][M]}{k_2[A]+k_3}$

d. $r = k_1 k_2 \frac{[A][M]}{k_2[M]+k_3}$

Ans
✗ A. a
✓ B. b
✗ C. c
✗ D. d

Question ID : **1703224599**
Status : **Not Answered**
Chosen Option : **--**

Q.25

Aromatic molecules satisfy which among the following characteristics

a. Cyclic and planar
b. Conjugated all around ring
c. (4n+2)π electrons
d. All of the above

Ans
✗ A. a
✗ B. b
✗ C. c
✓ D. d

Question ID : **1703224641**
Status : **Answered**
Chosen Option : **D**

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Q.26

In a close packed structure, anions B form the lattice and cations A occupy alternate tetrahedral voids. Formula of the compound is

a. AB_2

b. A_2B

c. A_3B

d. AB

Ans

✗ A. a

✗ B. b

✗ C. c

✓ D. d

Question ID : **1703224647**
Status : **Not Answered**
Chosen Option : **--**

Q.27

In a Lambert-Beer law cell, the absorbance of an aqueous solution of a substance of known concentration is "A". What will be the absorbance of the solution of the same substance with half the concentration in a cell five times as long?

a. 5 A

b. 10 A

c. 2/5 A

d. 5/2 A

Ans

✗ A. a

✗ B. b

✗ C. c

✓ D. d

Question ID : **1703224593**
Status : **Answered**
Chosen Option : **D**

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Q.28

Sodium tetraborate decahydrate is also known as _____

a. Epsom salt
b. Gypsum
c. Borax
d. Galena

Ans
✗ A. a
✗ B. b
✓ C. c
✗ D. d

Question ID : **1703224642**
Status : **Answered**
Chosen Option : **C**

Q.29

What is measured in Hertz?

a. Frequency
b. Energy
c. Heat
d. Power

Ans
✓ A. a
✗ B. b
✗ C. c
✗ D. d

Question ID : **1703224649**
Status : **Answered**
Chosen Option : **A**

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Q.30

Identify Wilkinson's catalyst used in hydrogenation of alkenes

a. $K[PtCl_3(\eta^2\text{-}C_2H_4)]$

b. $[(C_6H_5)_3P]_3RhCl$

c. $[Fe(\eta^5\text{-}C_5H_5)]$

d. $Cr(C_6H_6)_2$

Ans ✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224615**
Status : **Answered**
Chosen Option : **B**

Q.31

Isoelectric point in amino acid is used for

a. Crystallisation

b. Precipitation

c. Solubility

d. None of the above

Ans ✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224639**
Status : **Not Answered**
Chosen Option : **--**

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Q.32

In spectroscopy, a shift of λ_{max} to longer wavelength is referred to as

a. Bathochromic Shift

b. Hypsochromic Shift

c. Hyperchromic Shift

d. Hypochromic Shift

Ans
✔ A. a
✘ B. b
✘ C. c
✘ D. d

Question ID : **1703224608**
Status : **Answered**
Chosen Option : **A**

Q.33

Laughing gas is

a. N_2O
b. NO
c. NO_2
d. N_2O_4

Ans
✔ A. a
✘ B. b
✘ C. c
✘ D. d

Question ID : **1703224626**
Status : **Answered**
Chosen Option : **A**

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Q.34

Which among the following has the highest electron affinity?

a. Fluorine

b. Chlorine

c. Bromine

d. Iodine

Ans

✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224610**
Status : **Answered**
Chosen Option : **B**

Q.35

Consider a primitive cubic unit cell with a=150 picometer. Determine the spacing between the (122) planes

a. 50 picometer

b. 100 picometer

c. 150 picometer

d. 200 picometer

Ans

✓ A. a

✗ B. b

✗ C. c

✗ D. d

Question ID : **1703224603**
Status : **Answered**
Chosen Option : **A**

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Q.36

Correct order of decreasing acidic strength is

a. Phenol > Ethanol > Chloroacetic acid > Acetic acid

b. Chloroacetic acid > Acetic acid > Phenol > Ethanol

c. Chloroacetic acid > Phenol > Acetic acid > Ethanol

d. Acetic acid > Chloroacetic acid > Phenol > Ethanol

Ans

✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224627**
Status : **Answered**
Chosen Option : **B**

Q.37

Calculate the maximum efficiency of a heat engine operating between 111° C and 15° C

a. 15 %

b. 25%

c. 30 %

d. 35 %

Ans

✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224600**
Status : **Answered**
Chosen Option : **B**

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Q.38

Which among the following is the correct expression for Van't Hoff reaction isotherm which shows the relation between equilibrium constant K_p and standard free energy change ΔG^o?

a. $\Delta G^o = - RT \ln K_p$

b. $\Delta G^o = RT \ln K_p$

c. $\Delta G^o = K_p e^{RT}$

d. $\Delta G^o = RT \log K_p$

Ans ✔ A. a
✗ B. b
✗ C. c
✗ D. d

Question ID : **1703224601**
Status : **Not Answered**
Chosen Option : **--**

Q.39

The ESR (Electron Spin Resonance) spectrum of methyl radical, $\bullet CH_3$ is a

a. Doublet

b. Quartet

c. Triplet

d. Singlet

Ans ✗ A. a
✔ B. b
✗ C. c
✗ D. d

Question ID : **1703224643**
Status : **Not Answered**
Chosen Option : **--**

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Q.40

The oxidation number of nickel in $Ni(CO)_4$ is

a. 0
b. +2
c. +4
d. +6

Ans
✔ A. a
✘ B. b
✘ C. c
✘ D. d

Question ID : **1703224621**
Status : **Answered**
Chosen Option : **A**

Q.41

Enzyme that converts starch to maltose

a. Zymase
b. Maltase
c. Amylase
d. Invertase

Ans
✘ A. a
✘ B. b
✔ C. c
✘ D. d

Question ID : **1703224634**
Status : **Not Answered**
Chosen Option : **--**

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Q.42

The number of ions produced by the complex $[CoCl_2(NH_3)_4]Cl_2$

a. 0

b. 1

c. 2

d. 3

Ans

✗ A. a

✗ B. b

✗ C. c

✓ D. d

Question ID : **1703224614**
Status : **Answered**
Chosen Option : **D**

Q.43

A mixture of benzoic acid and phenol is separated by treatment with

a. $NaHCO_3$

b. NaOH

c. NH_3 solution

d. KOH

Ans

✓ A. a

✗ B. b

✗ C. c

✗ D. d

Question ID : **1703224635**
Status : **Answered**
Chosen Option : **A**

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Q.44

Which among the following indicators is best suitable for the titration of a weak acid with a strong base?

a. Phenolphthalein

b. Methyl Orange

c. Methyl red

d. Thymol Blue

Ans

✔ A. a

✘ B. b

✘ C. c

✘ D. d

Question ID : **1703224606**
Status : **Not Answered**
Chosen Option : **--**

Q.45

Peptide linkage is an

a. Amide linkage

b. Ester linkage

c. Ether linkage

d. Imide linkage

Ans

✔ A. a

✘ B. b

✘ C. c

✘ D. d

Question ID : **1703224632**
Status : **Answered**
Chosen Option : **A**

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Q.46

Which of the following factors facilitate the formation of an ionic bond between a metal and a non-metal

a. Low ionization energy of metal

b. High electron affinity of non- metal

c. High lattice energy

d. All of the above

Ans ✗ A. a

✗ B. b

✗ C. c

✓ D. d

Question ID : **1703224597**
Status : **Answered**
Chosen Option : **D**

Q.47

Which of the following statements about Fullerene is **NOT** correct?

a. It is one of the purest forms of carbon

b. All carbon atoms undergo sp^2 hybridization

c. A six membered ring is fused with six membered rings only

d. A five membered ring is fused with six membered rings only

Ans ✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224623**
Status : **Not Answered**
Chosen Option : **--**

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Q.48

Which among the following radioactive series does not end with an isotope of lead?

a. Uranium Series

b. Thorium Series

c. Neptunium Series

d. Actinium Series

Ans

✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224604**
Status : **Not Answered**
Chosen Option : **--**

Q.49

The number of gram equivalents of the component present in one litre of the solution is known as

a. Molarity

b. Molality

c. Normality

d. Mole Fraction

Ans

✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224594**
Status : **Answered**
Chosen Option : **C**

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Q.50

The brown ring test for nitrates involves

a. Reduction of ferrous sulphate to iron

b. Reduction of nitrates to nitric oxide

c. Conversion of nitrates to nitrogen dioxide

d. Oxidizing action of Con. Sulphuric acid

Ans

✗ A. a

✓ B. b

✗ C. c

✗ D. d

Question ID : **1703224624**
Status : **Answered**
Chosen Option : **D**

Q.51

Calculate the boiling point of a 1 molal aqueous solution of a non-volatile solute if the ebullioscopic constant of water is 0.52K kg mol^{-1}

a. 373.52 K

b. 100.52 K

c. 273.52 K

d. 173.52 K

Ans

✓ A. a

✗ B. b

✗ C. c

✗ D. d

Question ID : **1703224595**
Status : **Answered**
Chosen Option : **A**

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Q.52

Mathematical expression for root mean square velocity of molecules in a gas is:

a. $\sqrt{\frac{2\,RT}{M}}$

b. $\sqrt{\frac{8RT}{\pi M}}$

c. $\sqrt{\frac{3\,RT}{M}}$

d. $\sqrt{\frac{2\,RT}{\pi M}}$

Ans ✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224592**
Status : **Answered**
Chosen Option : **C**

Q.53

The magnetic susceptibility is **negative** for which type of solid?

a. Diamagnetic

b. Paramagnetic

c. Ferromagnetic

d. Antiferromagnetic

Ans ✓ A. a

✗ B. b

✗ C. c

✗ D. d

Question ID : **1703224607**
Status : **Not Answered**
Chosen Option : **--**

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Q.54

Reaction mechanism in Markownikov's rule follows

a. Carbo-cation intermediate
b. Carb-anion intermediate
c. Free radical intermediate
d. None of the above

Ans ✔ A. a
✗ B. b
✗ C. c
✗ D. d

Question ID : **1703224628**
Status : **Answered**
Chosen Option : **A**

Q.55

_____ gets converted to phosgene, when exposed to sunlight.

a. Chloroform
b. Acetone
c. Benzene
d. Propylene

Ans ✔ A. a
✗ B. b
✗ C. c
✗ D. d

Question ID : **1703224622**
Status : **Answered**
Chosen Option : **A**

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Q.56

Which one of the following compounds is a non-reducing sugar?

a. Glucose
b. Fructose
c. Sucrose
d. Galactose

Ans
✗ A. a
✗ B. b
✓ C. c
✗ D. d

Question ID : **1703224630**
Status : **Answered**
Chosen Option : **C**

Q.57

Product formed in the reaction $CH_3CN \xrightarrow{CH_3MgCl\ /\ H_2O,\ H^+}$

a. Acetaldehyde
b. Acetone
c. Acetic Acid
d. Acetyl acetone

Ans
✗ A. a
✓ B. b
✗ C. c
✗ D. d

Question ID : **1703224636**
Status : **Answered**
Chosen Option : **B**

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Q.58

Zeolites are basically

a. Metal Silicides

b. Organo silicon compounds

c. Alumino Phosphates

d. Alumino Silicates

Ans
✗ A. a
✗ B. b
✗ C. c
✓ D. d

Question ID : **1703224612**
Status : **Answered**
Chosen Option : **D**

Q.59

The compound in which nitrogen has an oxidation state of +5 is
(i) NO_2 (ii) N_2O_5 (iii) HNO_3 (iv) Mg_3N_2

a. (ii) only

b. (iv) only

c. (ii) and (iii)

d. (iii) and (iv)

Ans
✗ A. a
✗ B. b
✓ C. c
✗ D. d

Question ID : **1703224651**
Status : **Answered**
Chosen Option : **C**

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Q.60

Isotope of hydrogen having 2 neutrons in the nucleus

a. Protium

b. Deuterium

c. Tritium

d. Hydronium

Ans

✗ A. a

✗ B. b

✓ C. c

✗ D. d

Question ID : **1703224619**
Status : **Answered**
Chosen Option : **C**

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