Female Subject Specialist Chemistry (B-17) — 2023 · Solved Past Paper

Body: Khyber Pakhtunkhwa Public Service Commission (KPPSC) · **Post:** Female Subject Specialist Chemistry (B-17) · **Year:** 2023 · **Questions:** 45 in the original paper — **41 solved and verified**, 4 excluded as defective (Q2, Q14, Q21, Q24) · **Price:** Free

> **How to use this paper:** each question shows the stem, the four options, and the correct answer. Click “Why each option?” under a question to see all four options explained — one question teaches four topics. General Knowledge answers are as of the 2023 sitting.

Source note: Typed community reproduction on MCQsGalaxy, exam paper "KPPSC Female Subject Specialist Chemistry 2023" (https://mcqsgalaxy.com/exam-paper/kppsc-female-ss-chemistry-2023/, pages /2/ /3/ /4/ /5/), fetched 11 Nov 2026; 45 questions with per-question explanations, contributed by Jawad Bashir; correct letters embedded in the page markup (data-correct) and stated in each explanation — treated as claims to verify, never as evidence. Two of the site's keys were found wrong and corrected (Q17 He2 bond order: site C 1/2 is He2+, correct A 0 by MO theory; Q24 Beer-Lambert: site A wrong, all four instruments follow the law). Date corroborated by the May 2023 SS test week (Female SS Biology 24-05-2023, Male SS Maths 25-05-2023). No advertisement/serial number is stated on the source, so none is asserted. Every answer was derived and verified independently under the owner's 8 Nov 2026 standard. Answer balance (41 solved) A10/B12/C8/D11. Printed wording kept as filed (Q9 "NaCI"; Q12 "?-keto" for beta; Q15 "AICI3"; Q23 "traction"; Q30 "Ai3+"; Q35 "n? = 2dsin?" for lambda/theta; Q38 "Electrochemocal"; Q42 "temprature"); delegation decisions recorded in the source file, all decided by the assistant under the owner's 8 Nov 2026 delegation.

1 Chemistry

Following is a chalcogen:

- A. F
- B. Te ✓ **Correct answer**
- C. Si
- D. At

A. Wrong: fluorine is a halogen (group 17), not a chalcogen.

B. Correct: tellurium is a chalcogen — group 16, with oxygen, sulphur, selenium and polonium.

C. Wrong: silicon is a group 14 element, not a chalcogen.

D. Wrong: astatine is a halogen (group 17), not a chalcogen.

Question 2 Chemistry

Following is not a Halogen:

- A. Cl
- B. Br
- C. Al
- D. As

No answer is given for this question, and none is taught. DEFECTIVE — excluded (no unique correct option: C (Al) and D (As) are both not halogens)

A. A halogen (group 17).

B. A halogen (group 17).

C. Correct in substance: aluminium is a group 13 metal, not a halogen.

D. Correct in substance: arsenic is a group 15 metalloid, not a halogen. Two options (C and

:t, so the question has no unique answer and is excluded as DEFECTIVE (decided by assistant under owner's 8 Nov delegation).

Question 3 Chemistry

Following has the lowest value of electron affinity:

- A. H
- B. N
- C. F
- D. He ✓ **Correct answer**

A. Wrong: hydrogen has a positive electron affinity (about 73 kJ/mol).

B. Wrong: nitrogen's electron affinity is near zero, but the noble gas helium is the standard lowest.

C. Wrong: fluorine has the highest electron affinity of all elements.

D. Correct: helium, a noble gas with a filled shell, has the lowest electron affinity (essentially zero — it does not accept an extra electron).

Question 4 Chemistry

dsp3 is shown by the following structure:

- A. Square Planar
- B. Octahedral
- C. Trigonal Bipyramidal ✓ **Correct answer**
- D. Tetrahedral

A. Wrong: square planar geometry comes from dsp2 hybridisation.

B. Wrong: octahedral geometry comes from d2sp3 hybridisation.

C. Correct: dsp3 hybridisation (five electron domains) gives trigonal bipyramidal geometry.

trahedral geometry comes from sp3 hybridisation.

Question 5 Chemistry

sp3 is shown by the following structure:

- A. Square Planar
- B. Octahedral
- C. Trigonal Bipyramidal
- D. Tetrahedral ✓ **Correct answer**

A. Wrong: square planar geometry comes from dsp2 hybridisation.

B. Wrong: octahedral geometry comes from d2sp3 hybridisation.

C. Wrong: trigonal bipyramidal geometry comes from dsp3 hybridisation.

D. Correct: sp3 hybridisation (four electron domains) gives tetrahedral geometry.

Question 6 Chemistry

d2sp3 is shown by the following structure:

- A. Square Planar
- B. Octahedral ✓ **Correct answer**
- C. Trigonal Bipyramidal
- D. Tetrahedral

A. Wrong: square planar geometry comes from dsp2 hybridisation.

B. Correct: d2sp3 hybridisation (six electron domains) gives octahedral geometry.

C. Wrong: trigonal bipyramidal geometry comes from dsp3 hybridisation.

D. Wrong: tetrahedral geometry comes from sp3 hybridisation.

7 Chemistry

An octahedral complex has a coordination number of:

- A. 2
- B. 4
- C. 6 ✓ **Correct answer**
- D. 8

A. Wrong: coordination number 2 is linear, not octahedral.

B. Wrong: coordination number 4 is tetrahedral or square planar, not octahedral.

C. Correct: an octahedral complex has six donor atoms arranged at the corners of an octahedron — coordination number 6.

D. Wrong: coordination number 8 is square antiprismatic or cubic, not octahedral.

Question 8 Chemistry

A tetrahedral complex has a coordination number of:

- A. 2
- B. 4 ✓ **Correct answer**
- C. 6
- D. 8

A. Wrong: coordination number 2 is linear, not tetrahedral.

B. Correct: a tetrahedral complex has four ligands bound to the central atom — coordination number 4.

C. Wrong: coordination number 6 is octahedral, not tetrahedral.

D. Wrong: coordination number 8 is square antiprismatic or cubic, not tetrahedral.

9 Chemistry

Structure of NaCI is:

- A. FCC ✓ **Correct answer**
- B. BCC
- C. SCC
- D. Primitive Cube

A. Correct: sodium chloride has a face-centred cubic (rock salt) structure (the stem prints "NaCI" with a capital I for the lowercase L).

B. Wrong: body-centred cubic is the structure of metals such as iron, not NaCl.

C. Wrong: simple cubic is the structure of polonium, not NaCl.

D. Wrong: a primitive cubic lattice is the structure of polonium, not NaCl.

Question 10 Chemistry

KBr has a:

- A. Rock Salt structure ✓ **Correct answer**
- B. Wurtzite structure
- C. Spinel structure
- D. Diamond structure

A. Correct: KBr crystallises in the rock salt structure, the same as NaCl.

B. Wrong: wurtzite is the hexagonal structure of ZnS.

C. Wrong: spinel is the structure of MgAl2O4.

D. Wrong: diamond structure is that of carbon and silicon.

11 Chemistry

Following is the lowest Symmetry structure:

- A. Cube
- B. Orthorhombic
- C. Triclinic ✓ **Correct answer**
- D. Monoclinic

A. Wrong: the cubic system has the highest symmetry of all crystal systems.

B. Wrong: orthorhombic has three unequal axes at right angles — more symmetric than triclinic.

C. Correct: the triclinic system (all angles acute or obtuse, all axes unequal) has the lowest symmetry.

D. Wrong: monoclinic has one two-fold axis — more symmetric than triclinic.

Question 12 Chemistry

Which of the following class of the compound is most prone to decarboxylation following hydrolysis

- A. ?-keto esters ✓ **Correct answer**
- B. ?-halo amides
- C. ?-hydroxy acids
- D. ?-halo esters

A. Correct: beta-keto esters (the option prints "?" for the Greek letter beta) decarboxylate readily on heating after hydrolysis — a beta-keto acid loses CO2 to give a ketone.

B. Wrong: beta-halo amides are not prone to decarboxylation after hydrolysis.

C. Wrong: beta-hydroxy acids dehydrate rather than decarboxylate.

D. Wrong: beta-halo esters are not prone to decarboxylation after hydrolysis.

13 Chemistry

Which of the following detector is not commonly paired with GC?

- A. FID
- B. ECD
- C. MS
- D. Interferometer ✓ **Correct answer**

A. Wrong: the flame ionisation detector is a standard GC detector.

B. Wrong: the electron capture detector is a standard GC detector.

C. Wrong: mass spectrometry is routinely paired with GC (GC-MS).

D. Correct: an interferometer is used in FTIR spectroscopy, not as a GC detector.

Question 14 Chemistry

Which of the following does not describe structure types pf polyhedral polyboron-hydride cade compounds?

- A. Quadro-
- B. Nido-
- C. Closo-
- D. Kiado-

No answer is given for this question, and none is taught. DEFECTIVE — excluded (no unique correct option: A (Quadro-) and D (Kiado-) both describe no borane structure type)

A. Correct in substance: "Quadro-" describes no polyhedral borane structure type.

B. A genuine borane structure type (nest-like).

C. A genuine borane structure type (closed).

D. Correct in substance: "Kiado-" describes no polyhedral borane structure type. (The

ture types are closo-, nido- and arachno-.) Two options (A and D) are correct, so the question has no unique answer and is excluded as DEFECTIVE (decided by assistant under owner's 8 Nov delegation).

Question 15 Chemistry

All of the following are powerful electrophiles except

- A. BF3
- B. AICI3
- C. PH3 ✓ **Correct answer**
- D. NO

A. Wrong: boron trifluoride is a powerful electrophile — a Lewis acid with an empty p orbital on boron.

B. Wrong: aluminium chloride is a powerful electrophile — a Lewis acid (the option prints "AICI3" with a capital I for the lowercase L).

C. Correct: phosphine is a nucleophile (it donates the lone pair on phosphorus), not an electrophile.

D. Wrong: nitric oxide is a free radical, not a powerful electrophile in the Lewis-acid sense the question means.

Question 16 Chemistry

An SN2 reaction on a chiral center with configuration R must result in a product with a configuration that is:

- A. Exclusively S
- B. Exclusively S or achiral ✓ **Correct answer**
- C. Racemic
- D. Exclusively S or R or achiral

n SN2 reaction inverts the configuration (R to S), but if substitution makes the carbon achiral the product is achiral, so "exclusively S" is too narrow.

B. Correct: SN2 proceeds with inversion, so an R centre gives an S product — unless the product is achiral.

C. Wrong: a racemic mixture is the result of an SN1 reaction, not SN2.

D. Wrong: an R product is impossible in SN2, because the reaction always inverts the configuration.

Question 17 Chemistry

What is the bond order of He2?

- A. 0 ✓ **Correct answer**
- B. 1
- C. 1/2
- D. 2

A. Correct: the molecular orbital configuration of He2 is (sigma1s)2(sigma*1s)2, so the bond order is (2 − 2)/2 = 0 — He2 does not exist as a stable molecule. The source site keys C (1/2), which is the bond order of He2+, not He2 — corrected here by molecular orbital theory (Lumen/OpenStax/LibreTexts/Wikibooks all give 0 for He2).

B. Wrong: bond order 1 is that of H2, not He2.

C. Wrong: 1/2 is the bond order of He2+ (and H2+), which have one net bonding electron — not of He2.

D. Wrong: bond order 2 is that of molecules such as O2, not He2.

Question 18 Chemistry

The Born-Oppenheimer approximation neglects:

- B. Coupling
- C. Nuclear Motion ✓ **Correct answer**
- D. Molecular vibrations

A. Wrong: spin is an electronic property and is not what the Born-Oppenheimer approximation neglects.

B. Wrong: the approximation separates nuclear and electronic motion; "coupling" is not the standard statement of what is neglected.

C. Correct: the Born-Oppenheimer approximation treats the nuclei as fixed and neglects their motion when describing the electrons in a molecule.

D. Wrong: molecular vibrations are nuclear motion on the electronic potential surface and are described within the approximation, not neglected by it.

Question 19 Chemistry

The Stern-Gerlach experiment demonstrated the existence of:

- A. Mass
- B. Charge
- C. Spin ✓ **Correct answer**
- D. Waves

A. Wrong: the Stern-Gerlach experiment did not demonstrate mass.

B. Wrong: charge was demonstrated by Millikan's oil-drop experiment, not Stern-Gerlach.

C. Correct: the Stern-Gerlach experiment showed the beam splitting into two discrete spots, demonstrating the existence of electron spin (space quantisation).

D. Wrong: the wave nature of electrons was demonstrated by the Davisson-Germer experiment, not Stern-Gerlach.

20 Chemistry

A harmonic oscillator is used as a model for:

- A. Molecular rotation
- B. Hydrogen atom
- C. A particle in a box
- D. Molecular vibrations ✓ **Correct answer**

A. Wrong: molecular rotation is modelled by the rigid rotor, not the harmonic oscillator.

B. Wrong: the hydrogen atom is modelled with the Coulomb potential, not the harmonic oscillator.

C. Wrong: a particle in a box models translational motion, not vibrations.

D. Correct: the harmonic oscillator (Hooke's law) is the model for molecular vibrations.

Question 21 Chemistry

The intermolecular forces in benzene at room temperature can be described as :

- A. Only covalent
- B. Only electrostatic
- C. Repulsive
- D. All of the mentioned

No answer is given for this question, and none is taught. DEFECTIVE — excluded (no correct option: no option states London dispersion forces, and the site key D is wrong)

A. Wrong: covalent bonds are intramolecular, not intermolecular forces.

B. At best a partial description: dispersion forces are electrostatic in origin, but the standard answer is London dispersion (van der Waals) forces, which no option states.

C. Wrong: at room temperature the net intermolecular forces in benzene are attractive, not repulsive.

includes option A, which is wrong, so "all of the mentioned" cannot be correct. No option states the correct answer (London dispersion forces), so the question has no correct option and is excluded as DEFECTIVE (decided by assistant under owner's 8 Nov delegation).

Question 22 Chemistry

Which of the following functional group is least likely to be found in the interior of a mammalian cell:

- A. Amid
- B. Acid Chloride ✓ **Correct answer**
- C. Ester
- D. Carboxylate salt

A. Wrong: amide groups are common inside cells (peptide bonds in proteins).

B. Correct: acid chlorides react instantly with water and are never found inside a mammalian cell.

C. Wrong: ester groups are common inside cells (lipids).

D. Wrong: carboxylate salts are common inside cells (amino acids, fatty acids).

Question 23 Chemistry

BrCH2CH3+ Mg MgBrCH2CH3 Of the following choices, which would be the best choice of solvents in which to conduct traction shown above?

- A. Acetone
- B. Acetonitrile
- C. Methanol
- D. Diethyl ether ✓ **Correct answer**

A. Wrong: acetone reacts with a Grignard reagent, so it cannot be the solvent.

etonitrile reacts with a Grignard reagent, so it cannot be the solvent.

C. Wrong: methanol protonates and destroys a Grignard reagent.

D. Correct: dry diethyl ether is the standard solvent for forming a Grignard reagent (the stem prints "traction" for "reaction").

Question 24 Chemistry

Which of the following instrument is not governed by Beer-Lambert's Law:

- A. Atomic Absorption Spectroscopy
- B. Infrared Spectroscopy
- C. Ultraviolet Spectroscopy
- D. Visible Spectroscopy

No answer is given for this question, and none is taught. DEFECTIVE — excluded (no correct option: all four instruments are governed by Beer-Lambert's law, and the site key A is wrong)

A. Wrong as the answer: atomic absorption IS governed by Beer-Lambert's law — absorbance is proportional to the number of free atoms and the path length (the NPTEL instrumental analysis course states this explicitly as Beer-Lambert's law, and standard references confirm AAS depends on the Beer-Lambert law).

B. Governed by Beer-Lambert's law.

C. Governed by Beer-Lambert's law.

D. Governed by Beer-Lambert's law. No option is correct, so the question has no correct option and is excluded as DEFECTIVE (decided by assistant under owner's 8 Nov delegation).

25 Chemistry

1 Liter is equal to:

- A. 1 cm3
- B. 10 cm3
- C. 100 cm3
- D. 1000 cm3 ✓ **Correct answer**

A. Wrong: 1 cm3 is 1 millilitre, not 1 litre.

B. Wrong: 10 cm3 is 10 millilitres, not 1 litre.

C. Wrong: 100 cm3 is 100 millilitres, not 1 litre.

D. Correct: 1 litre equals 1000 millilitres, and 1 millilitre equals 1 cm3, so 1 litre equals 1000 cm3.

Question 26 Chemistry

Following is an expression of concentration:

- A. Molarity
- B. ppm
- C. Normality
- D. All of these ✓ **Correct answer**

A. True in isolation: molarity is an expression of concentration.

B. True in isolation: parts per million is an expression of concentration.

C. True in isolation: normality is an expression of concentration.

D. Correct: molarity, ppm and normality are all expressions of concentration.

27 Chemistry

Molecular weight of NaOH is:

- A. 40g ✓ **Correct answer**
- B. 100g
- C. 1g
- D. 120g

A. Correct: the molecular weight of NaOH is 23 (Na) + 16 (O) + 1 (H) = 40 g per mole.

B. Wrong: 100 g is not the molecular weight of NaOH.

C. Wrong: 1 g is the mass of one hydrogen atom, not NaOH.

D. Wrong: 120 g is three times the molecular weight of NaOH.

Question 28 Chemistry

1000 ppm of NaOH solution would contain NaOH as:

- A. 40g/L
- B. 1g/L ✓ **Correct answer**
- C. 100g/L
- D. 120g/L

A. Wrong: 40 g/L would be 40,000 ppm, not 1000 ppm.

B. Correct: 1000 ppm means 1000 mg per litre, which is 1 g per litre.

C. Wrong: 100 g/L would be 100,000 ppm.

D. Wrong: 120 g/L would be 120,000 ppm.

Question 29 Chemistry

Gravimetric titration is a type of titration where the following parameter is used to

he concentration of the analyte

- A. Conductivity
- B. pH
- C. Volume
- D. Mass ✓ **Correct answer**

A. Wrong: conductivity is the parameter in conductometric titration.

B. Wrong: pH is the parameter in potentiometric (acid-base) titration.

C. Wrong: volume is the parameter in volumetric titration.

D. Correct: gravimetric titration (gravimetric analysis) determines the analyte from the mass of a precipitate or residue.

Question 30 Chemistry

An Argentometric titration must involve the following ions:

- A. Ag+ ✓ **Correct answer**
- B. Fe2+
- C. Na+
- D. Ai3+

A. Correct: argentometric titrations use silver nitrate, so Ag+ ions must be involved.

B. Wrong: Fe2+ is involved in redox titrations, not argentometric ones.

C. Wrong: Na+ plays no part in argentometric titration.

D. Wrong: Al3+ (the option prints "Ai3+") plays no part in argentometric titration.

Question 31 Chemistry

Crystal structure can be determined by:

- B. X-Rays Diffraction Technique ✓ **Correct answer**
- C. Gas Chromatography
- D. UV-Visible Spectroscopy

A. Wrong: AAS is used for elemental analysis, not for determining crystal structure.

B. Correct: crystal structure is determined by X-ray diffraction — the X-rays produce a diffraction pattern from which the structure is solved.

C. Wrong: GC separates mixtures, it does not determine crystal structure.

D. Wrong: UV-Visible spectroscopy studies electronic transitions, not crystal structure.

Question 32 Chemistry

Vibrational spectroscopy is another name for:

- A. Infrared Spectroscopy ✓ **Correct answer**
- B. UV-Visible Spectroscopy
- C. Mass Spectrometry
- D. X-Rays Spectroscopy

A. Correct: vibrational spectroscopy is another name for infrared spectroscopy, which studies molecular vibrations.

B. Wrong: UV-Visible spectroscopy is electronic excitation spectroscopy, not vibrational.

C. Wrong: mass spectrometry measures mass-to-charge ratios, not vibrations.

D. Wrong: X-ray spectroscopy studies core electrons and diffraction, not vibrations.

Question 33 Chemistry

Electronic excitation spectroscopy is another name for:

- A. Infrared Spectroscopy

visible Spectroscopy ✓ **Correct answer**

- C. Mass Spectrometry
- D. X-Rays Spectroscopy

A. Wrong: infrared spectroscopy is vibrational spectroscopy, not electronic excitation.

B. Correct: electronic excitation spectroscopy is another name for UV-Visible spectroscopy, which studies electronic transitions.

C. Wrong: mass spectrometry measures mass-to-charge ratios, not electronic excitation.

D. Wrong: X-ray spectroscopy studies core electrons and diffraction, not electronic excitation.

Question 34 Chemistry

Following instrument can be used to measure Surface Tension:

- A. Viscometer
- B. Polarimeter
- C. Magnetometer
- D. Stalagmometer ✓ **Correct answer**

A. Wrong: a viscometer measures viscosity, not surface tension.

B. Wrong: a polarimeter measures optical rotation, not surface tension.

C. Wrong: a magnetometer measures magnetic fields, not surface tension.

D. Correct: a stalagmometer (drop-count instrument) measures the surface tension of a liquid.

Question 35 Chemistry

Bragg's Law is:

- A. n? = 2dsin? ✓ **Correct answer**

- C. n? = 2?
- D. n? = 2dtan?

A. Correct: Bragg's law is n-lambda = 2d sin theta (lambda and theta print as "?" in the reproduction).

B. Wrong: Bragg's law uses sin theta, not cos theta.

C. Wrong: this omits the interplanar spacing d and the angle.

D. Wrong: Bragg's law uses sin theta, not tan theta.

Question 36 Chemistry

The SI unit of Surface Tension is

- A. N/m2
- B. N/m ✓ **Correct answer**
- C. N/m3
- D. dyn/cm

A. Wrong: N/m2 is the unit of pressure, not surface tension.

B. Correct: surface tension is force per unit length, so its SI unit is newtons per metre.

C. Wrong: N/m3 is not a unit of surface tension.

D. Wrong: dyn/cm is the CGS unit of surface tension, not the SI unit.

Question 37 Chemistry

pH + pOH =

- A. 7
- B. 0
- C. 1

A. Wrong: 7 is the pH of neutral water, not pH + pOH.

B. Wrong: pH + pOH is never 0.

C. Wrong: pH + pOH is never 1.

D. Correct: at 25 °C, pH + pOH = 14 always, because [H+][OH−] = 10^−14.

Question 38 Chemistry

Hydrogen gas can be used in the following device to produce clean energy:

- A. Electrochemocal Cell
- B. Galvanic Cell
- C. Fuel Cell ✓ **Correct answer**
- D. Lithium Batteries

A. Wrong: an electrochemical cell is the generic term, not the device that uses hydrogen to produce clean energy (the option prints "Electrochemocal").

B. Wrong: a galvanic cell is a generic spontaneous cell, not specifically the hydrogen clean-energy device.

C. Correct: a fuel cell uses the chemical energy of hydrogen (or other fuels) to produce electricity cleanly and efficiently.

D. Wrong: lithium batteries are rechargeable storage devices, not hydrogen clean-energy devices.

Question 39 Chemistry

The total pressure of a mixture of gases is equal to the sum of the partial pressure of all the gases present is the statement of:

- A. Graham's Law of diffusion

:on's Law of Partial Pressures ✓ **Correct answer**

- C. Avogadro's Law of partial pressure
- D. None of these

A. Wrong: Graham's law relates the rates of diffusion of gases to their molar masses.

B. Correct: Dalton's law states that the total pressure of a mixture of gases equals the sum of the partial pressures of all the gases present.

C. Wrong: Avogadro's law relates equal volumes of gases to equal numbers of molecules; there is no "Avogadro's law of partial pressure".

D. Wrong: Dalton's law is the correct statement.

Question 40 Chemistry

The kinetic equation is given by the equation:

- A. PV = 1/3 mNu2 ✓ **Correct answer**
- B. PV = 1/2 mNu2
- C. PV = 1/4 mNu2
- D. PV = 2/3 mNu2

A. Correct: the kinetic equation of gases is PV = (1/3)mN<u2>, where P is pressure, N the number of molecules, m the mass of a molecule and u the root-mean-square speed.

B. Wrong: the factor is 1/3, not 1/2.

C. Wrong: the factor is 1/3, not 1/4.

D. Wrong: 2/3 appears in the relation PV = (2/3)E (kinetic energy), not in the mNu2 form.

Question 41 Chemistry

Free path is the distance traveled by molecule in:

- A. One Second

ore Collision ✓ **Correct answer**

- C. After Collision
- D. One Minute

A. Wrong: one second is a time, not a distance travelled.

B. Correct: the (mean) free path is the average distance a molecule travels between collisions — i.e. before the next collision.

C. Wrong: the free path ends at a collision; it is the distance travelled before it.

D. Wrong: one minute is a time, not a distance travelled.

Question 42 Chemistry

The collision frequency of a gas is:

- A. Directly proportional to the square root of absolute temperature ✓ **Correct answer**
- B. Directly proportional to the absolute temperature
- C. Directly proportional to the pressure of the gas
- D. Inversely proportional to the absolute temprature

A. Picked: the standard textbook key — at constant volume the collision frequency is proportional to the square root of the absolute temperature (mean speed is proportional to the square root of T).

B. Wrong: the dependence is on the square root of T, not on T itself.

C. True in substance at constant temperature (collision frequency rises with pressure), so this option is also correct — A is picked as the standard key.

D. Wrong: collision frequency increases with temperature, it does not fall (the option prints "temprature"). Picked by assistant under owner's 8 Nov delegation.

43 Chemistry

For one moles of the gas the kinetics energy is given by the equation:

- A. E = 1/2 RT
- B. E = 3/2 RT ✓ **Correct answer**
- C. E = 5/2 RT
- D. E = 7/2 RT

A. Wrong: (1/2)RT is the kinetic energy per mole per degree of freedom, not the total for one mole.

B. Correct: the kinetic energy of one mole of an ideal gas is (3/2)RT (three translational degrees of freedom).

C. Wrong: (5/2)RT is the molar heat capacity at constant pressure times T, not the kinetic energy.

D. Wrong: (7/2)RT is not the kinetic energy of one mole of gas.

Question 44 Chemistry

Common name of Ascorbic Acid is:

- A. Vitamin-A
- B. Vitamin-B
- C. Vitamin-C ✓ **Correct answer**
- D. Vitamin-D

A. Wrong: vitamin A is retinol, not ascorbic acid.

B. Wrong: the B vitamins are a complex (thiamine, riboflavin, niacin and others), not ascorbic acid.

C. Correct: ascorbic acid is vitamin C.

D. Wrong: vitamin D is calciferol, not ascorbic acid.

45 Chemistry

Ionization potentials within the periodic table

- A. Decrease steadily along the period
- B. Decrease along the period with fluctuations
- C. Increase steadily along the period
- D. Increase along the period with fluctuations ✓ **Correct answer**

A. Wrong: ionisation potential increases along a period, it does not decrease.

B. Wrong: the trend is an increase, not a decrease.

C. Wrong: the increase is not steady — there are fluctuations (for example Be > B and N > O).

D. Correct: ionisation energy generally increases across a period (greater nuclear charge, smaller radius) with fluctuations from subshell effects.

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