



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS
सीईएन - 05/25 - जेई, डीएमएस, सीएमए - CEN - 05/25 - JE, DMS, CMA



RRB JE 2025 CBT-2 DMS/CMA

Junior Engineer · DMS / CMA · CEN 05/2025 · CBT-2 · Question Paper

English

Complete Paper · 150 Questions · Official Answer Key

About this Compilation

This booklet contains the complete question paper of the **RRB JE 2025 CBT-2 (DMS / CMA)** examination in **English**, with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

How to use

- Use the **Index** page to jump directly to any set (clickable).
- Questions appear section by section in the order of the paper, numbered 1 onward.
- Diagram and wide-table questions appear at full width at the end of their section.
- The correct answer is highlighted in green with a tick.

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Index — All Sets (click to open)

Set 1

02 Jul 2026

9:00 AM - 11:00 AM

General Abilities

50 Questions • Answer Key

Q1 General Abilities

Which of the following is a primary mission under India's National Action Plan on Climate Change (NAPCC)?

- A. National Highway Development Project
- B. National Nutrition Mission
- C. National Solar Mission ✓
- D. National Rural Livelihood Mission

Q2 General Abilities

According to Thomson's model, how are electrons arranged in an atom?

- A. Randomly placed inside the nucleus
- B. Embedded in a positively charged sphere like seeds in a watermelon ✓
- C. Orbiting around neutrons in elliptical paths
- D. Moving in fixed orbits around the nucleus

Q3 General Abilities

What is the main reason sulfur dioxide irritates the upper respiratory mucous membrane?

- A. It combines with other pollutants and polymerizes in the lungs
- B. It combines with haemoglobin and effect the oxygen transport
- C. It oxidizes to sulphur trioxide and inhaled deep into lung
- D. It dissolves in moisture in upper respiratory tract and forms irritant ✓

Q4 General Abilities

Which of the following best describes how sound travels through air?

- A. The air particles remain stationary while the wave moves through
- B. The air particles vibrate up and down perpendicular to the direction of the wave
- C. The air particles vibrate back and forth parallel to the direction of the wave ✓
- D. The air particles move in circular paths as the wave passes

Q5 General Abilities

The Mappila Uprisings of the 19th century occurred mainly in which region of India?

- A. Sunderbans region of West Bengal
- B. Malabar region of Kerala ✓
- C. Konkan region of Maharashtra
- D. Coromandel Coast of Tamil Nadu

Q6 General Abilities

Which of the following best describes the velocity-time graph for an object moving with uniform velocity?

- A. A straight line sloping upwards from the time axis
- B. A line starting from the origin and sloping upwards
- C. A straight horizontal line parallel to the time axis ✓
- D. A curved line above the time axis

Q7 General Abilities

A farmer applies large amounts of chemical fertilizers over several years. Which consequence most likely results from this practice leading to soil pollution?

- A. Faster plant growth every season
- B. Accumulation of toxic substances in soil ✓
- C. Erosion of surface soil layers
- D. Increase in earthworm population

Q8 General Abilities

How can we locate a file with a known extension but an unknown name in a large directory?

- A. Using the dir command
- B. Checking the Recycle Bin
- C. Through File Explorer
- D. Using the Search box in File Explorer with *.ext ✓



Q9 General Abilities

A student accidentally spills some hydrochloric acid on a table. Which substance should be used to neutralise the acid safely?

- A. Vinegar
- B. Sugar solution
- C. Baking soda solution ✓
- D. Lemon juice

Q10 General Abilities

On which date is National Handloom Day observed in India?

- A. 7 August ✓
- B. 2 October
- C. 18 August
- D. 5 September

Q11 General Abilities

The Kol Rebellion (1831–32) mainly affected which plateau region?

- A. Deccan Plateau
- B. Chotanagpur Plateau ✓
- C. Malwa Plateau
- D. Meghalaya Plateau

Q12 General Abilities

A student pushes a heavy box that is already moving across a rough floor. If the force applied by the student is exactly equal to the frictional force opposing the motion, what will happen to the box?

- A. The box will accelerate forward
- B. The box will gradually come to rest
- C. The box will move at a constant speed ✓
- D. The box will move at increasing speed

Q13 General Abilities

Consider the following statements regarding chemical reactions and choose the correct option.

Statement I: Every reaction in which two or more reactants combine to form a single product is classified as a combination reaction regardless of heat change.
Statement II: The reaction $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)} + \text{heat}$ is both a combination reaction and an exothermic reaction.

- A. Only Statement II is correct
- B. Both statements are incorrect
- C. Both statements are correct ✓
- D. Only Statement I is correct

Q14 General Abilities

Which of the following statements best describes how the power of accommodation enables the human eye to focus on both near and distant objects?

- A. The eye lens changes its focal length by altering its shape through ciliary muscle action ✓
- B. The cornea provides all the focusing power required for clear vision
- C. The retina moves forward and backward to adjust the focus
- D. The iris controls the amount of light entering and helps to focus

Q15 General Abilities

If 10 grams of salt are dissolved in 100 mL of water, which component is the solute?

- A. Salt only ✓
- B. Water only
- C. Neither
- D. Both salt and water

Q16 General Abilities

What is the general formula of alkenes?

- A. $\text{C}_n\text{H}_{2n+2}$
- B. C_nH_n
- C. C_nH_{2n} ✓
- D. $\text{C}_n\text{H}_{2n-2}$



Q17 General Abilities

The atmospheric component that remains largely unreactive is _____.

- A. Oxygen
- B. Methane
- C. Argon
- D. Carbon dioxide

Q18 General Abilities

Which Quick Style type is applied only to selected words or individual characters within a paragraph in MS Word 2010?

- A. Character styles
- B. Page styles
- C. Linked styles
- D. Paragraph styles

Q19 General Abilities

Which of the following statements best describes the behavior of magnetic field lines around a straight current-carrying conductor?

- A. They form concentric circles centered on the conductor.
- B. They change direction randomly along the wire.
- C. They radiate straight outward from the wire.
- D. They are parallel straight lines along the wire.

Q20 General Abilities

Which condition is required for a displacement reaction between a metal and salt solution?

- A. Metal must be higher in reactivity series
- B. Reaction must be endothermic
- C. Salt must be insoluble in water
- D. Metal must be same as salt constituent

Q21 General Abilities

You want to automatically advance slides with narration and animations during a presentation. Which MS PowerPoint feature should you use to achieve this?

- A. Slide Sorter
- B. Presenter View
- C. Action Buttons
- D. Rehearse Timings

Q22 General Abilities

Which of the following options must be DISABLED before manually setting the date and time in Windows?

- A. Night Light
- B. Enable multiple clocks
- C. Set time zone globally
- D. Set time automatically

Q23 General Abilities

Biomedical waste handlers in a hospital are at risk of occupational hazards. The most effective way to protect them from exposure to infectious materials is:

- A. Vaccination against common infections
- B. Segregation of waste into color-coded bins
- C. Use of protective equipment and safe handling
- D. Regular medical check-ups

Q24 General Abilities

Which function returns the smallest value?

- A. MIN()
- B. MAX()
- C. AVERAGE
- D. COUNT()

Q25 General Abilities

The term 'smog' is a combination of _____.

- A. Fog and clouds
- B. Smoke and haze
- C. Smoke and fog
- D. Smog and mist

Q26 General Abilities

A factory plans to install a powerful electromagnet for lifting metal scraps. To maximize the magnetic field strength around the coil, which of the following combinations would be most effective?

- A. Using a soft iron core, increasing coil turns, and increasing current through the coil
- B. Using a steel core, decreasing coil turns, and lowering current
- C. Using a copper core, increasing coil turns, and lowering current
- D. Using an air core, decreasing coil turns, and keeping current constant



Q27 General Abilities

Which of the following Articles states about the right of individual to form associations or unions or co-operative societies?

A. Article 19 (1) (b)

B. Article 19 (1) (c) ✓

C. Article 19 (1) (d)

D. Article 19 (1) (a)

Q28 General Abilities

A field exposed to excessive pesticide use shows a sharp decline in earthworm population. The resulting effect on soil is:

A. Enhanced decomposition

B. Reduced soil fertility ✓

C. Improved aeration

D. Increased water retention

Q29 General Abilities

Which of the following indicators is NOT typically used to measure sustainable development?

A. Ecological Footprint

B. Biocapacity

C. Gross Domestic Product (GDP) growth rate ✓

D. Human Development Index (HDI)

Q30 General Abilities

The primary goal of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to:

A. Enhance telecommunication services in cities

B. Provide rural connectivity through road construction ✓

C. Develop urban infrastructure

D. Promote renewable energy usage

Q31 General Abilities

Which British colonial building in Mumbai, completed in 1888, showcases a blend of Victorian Gothic and Indian architectural elements?

A. Bombay Town Hall

B. Gateway of India

C. Rajabai Clock Tower

D. Chhatrapati Shivaji Maharaj Terminus ✓

Q32 General Abilities

Which of the following is/are the primary reasons to fall in the trap of Email fraud or phishing?

A) Paying attention to lucrative offers.

B) Not checking on links or attachments from unknown senders

C) Providing official information via email

D) Paying attention to the company logo sent in the email

A. A, B, C Only ✓

B. A, B, D Only

C. A only

D. A, B Only

Q33 General Abilities

What file extension is used to save an MS PowerPoint 2021 presentation?

A. .xlsx

B. .docx

C. .pptx ✓

D. .pdf

Q34 General Abilities

The Atal Bhujal Yojana 2020 focused on improving water resources management of how many states?

A. eight

B. five

C. ten

D. seven ✓

Q35 General Abilities

Who won the maximum number of medals at the 38th National Games of India?

A. Manu Bhaker

B. Bajrang Punia

C. Neeraj Chopra

D. Dhinidhi Desinghu ✓

Q36 General Abilities

Which experimental discovery contradicted Thomson's model of the atom and led to its rejection?

A. Discovery of the neutron by James Chadwick

B. Measurement of atomic radius using X-ray diffraction

C. Observation of line spectra of hydrogen by Bohr

D. Alpha particle scattering showing deflection at large angles ✓



Q37 General Abilities

Which new warship was commissioned by the Indian Navy in November, 2025, to strengthen anti-submarine and coastal defence capabilities?

- A. INS Arnala
- B. INS Vikrant
- C. INS Mahe
- D. INS Ikshak

**Q38 General Abilities**

Which of the following satellites was launched on November 2, 2025, to enhance the Indian Navy's secure communication network and maritime surveillance capabilities?

- A. CMS-03 (GSAT-7R)
- B. GSAT-6A
- C. RISAT-2B
- D. Cartosat-3

**Q39 General Abilities**

Match the following columns.

Pardoning power	Function
1. Commutation	a. Removes both sentence and the conviction.
2. Reprieve	b. Lesser sentence than originally given, in special cases.
3. Respite	c. Reducing the period of sentence without changing the character of the sentence.
4. Remission	d. Temporary stay on the execution of a sentence.
5. Pardon	e. Substitution of one form of punishment to a lighter one.

- A. 1-d, 2-b, 3-e, 4-c, 5-a
- B. 1-c, 2-e, 3-b, 4-a, 5-d
- C. 1-a, 2-c, 3-d, 4-e, 5-b
- D. 1-e, 2-d, 3-b, 4-c, 5-a

**Q40 General Abilities**

A construction worker needs to lift a heavy metal beam using a lever but has a limited length of plank. Which adjustment would allow the worker to lift the beam with the least effort if the position of the fulcrum can be changed but the plank length remains constant?

- A. Move the fulcrum closer to the worker
- B. Place the fulcrum at the center of the plank
- C. Keep the fulcrum fixed at any point
- D. Move the fulcrum closer to the beam

**Q41 General Abilities**

Which type of computer virus attaches itself to executable files and gets activated when the file is run?

- A. File Infector Virus
- B. Boot Sector Virus
- C. Worm
- D. Macro Virus

**Q42 General Abilities**

According to the Article 75 of the Indian Constitution, the total number of ministers (including the Prime Minister) in the Council of Ministers shall NOT exceed what percentage of the total members of the House of the People, i.e., Lok Sabha?

- A. 20%
- B. 25%
- C. 10%
- D. 15%

**Q43 General Abilities**

The pollutant group commonly associated with oil spills in oceans is _____.

- A. agricultural pesticides
- B. petroleum products
- C. synthetic detergents
- D. chemical fertilizers



Q44 General Abilities

In a real-life scenario, a chemist discovers a compound with the formula $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$. What is the correct IUPAC name for this compound?

- A. 4-methylpentanol
- B. 2-methylhexanol
- C. 3-methylhexanol
- D. 3-methylpentan-1-ol

**Q45 General Abilities**

Which of the following rivers forms a delta along the eastern coastal plains?

- A. Ganga
- B. Tapi
- C. Godavari
- D. Narmada

**Q46 General Abilities**

Which pair of sectors is commonly addressed together in State Action Plan on Climate Change (SAPCC) adaptation planning?

- A. Water resources and health systems
- B. Information technology and space research
- C. Heavy industry and entertainment
- D. Textile design and fashion marketing

**Q47 General Abilities**

When was the 11th National Handloom Day celebrated across India under the coordination of the Ministry of Textiles?

- A. November 7, 2025
- B. September 7, 2025
- C. October 7, 2025
- D. August 7, 2025

**Q48 General Abilities**

If cell A1 = 10 and B1 = 20, what will `=A1+B1` return?

- A. 1020
- B. 200
- C. Error
- D. 30

**Q49 General Abilities**

The primary method of managing biodegradable domestic waste after collection is _____.

- A. throwing into sewers
- B. sending for recycling
- C. conversion into compost
- D. burnt in open air

**Q50 General Abilities**

Which of the following statements is true about the Outbox?

- A. It is used to receive incoming emails.
- B. It holds emails that have been successfully sent.
- C. It temporarily stores emails that are queued for sending.
- D. It contains emails that are currently being drafted.

**Technical Abilities**

100 Questions • Answer Key

Q51 Technical Abilities

According to the Aufbau principle, how are electrons distributed among atomic orbitals?

- A. Electrons occupy orbitals randomly without any energy order
- B. Filling occurs in order of increasing energy of orbitals
- C. Orbital filling is independent of relative energy levels
- D. Electrons fill highest energy orbitals before lower ones

**Q52 Technical Abilities**

A mixture contains two non-reacting gases A and B. If the partial pressures of A and B are 3 bar and 5 bar, respectively, what is the total pressure of the mixture?

- A. 8 bar
- B. 2 bar
- C. 5 bar
- D. 15 bar



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Q53 Technical Abilities

The amplified output signal in a common emitter transistor amplifier is usually taken from _____.

- A. Base terminal only
- B. Collector-emitter circuit ✓
- C. Emitter terminal only
- D. Base-emitter circuit

Q54 Technical Abilities

The electric field outside a uniformly charged spherical shell behaves as if the _____.

- A. Entire charge was concentrated at the center ✓
- B. Electric fields were always zero everywhere
- C. Charges were uniformly spread in surrounding space
- D. Field lines became circular around shell

Q55 Technical Abilities

Which process uses oil and water to separate valuable minerals from impurities during ore concentration?

- A. Froth flotation method ✓
- B. Electrolytic refining method
- C. Magnetic separation method
- D. Leaching process

Q56 Technical Abilities

Which of the following correctly explains a precipitation reaction?

- A. Breaking down of a compound into simpler substances
- B. Formation of a single product from two reactants
- C. Formation of gas during a chemical reaction
- D. Formation of an insoluble solid when two solutions are mixed ✓

Q57 Technical Abilities

A food processing company must select materials for storage tanks used for acidic foods. Which approach is most suitable to minimize corrosion and ensure long-term safety?

- A. Attaching aluminum strips to the tank walls
- B. Using stainless steel for constructing the tanks ✓
- C. Painting the interior with non-metallic colors
- D. Placing silica gel packets inside the tanks

Q58 Technical Abilities

Proton discovery is associated with which observation in discharge tube experiments?

- A. Canal rays contain neutral particles identified as neutrons
- B. Cathode rays contain negatively charged particles identified as protons
- C. Canal rays contain positively charged particles identified as protons ✓
- D. Cathode rays contain photons emitted from metal electrodes

Q59 Technical Abilities

A particle moves 8 m east, then 15 m north, and finally 8 m west. What is the ratio of the total distance travelled to the magnitude of the net displacement?

- A. 31:8
- B. 31:15 ✓
- C. 16:15
- D. 15:31

Q60 Technical Abilities

Which combination of environmental factors would most likely accelerate the corrosion of an unprotected iron bridge?

- A. Cold temperatures and low atmospheric pressure
- B. Continuous sunlight with dry air exposure
- C. Low humidity and absence of pollutants
- D. High humidity and presence of acidic pollutants ✓

Q61 Technical Abilities

Which of the following best explains why radio waves are suitable for long-distance communication compared to other regions of the electromagnetic spectrum?

- A. Radio waves are the exclusive electromagnetic signals generated by electronic circuits.
- B. Radio waves travel at significantly higher velocities through dense atmospheric layers.
- C. Radio waves exhibit much higher energy per photon than optical frequency signals.
- D. Radio waves are less likely to be absorbed or scattered by Earth's atmosphere. ✓



Q62 Technical Abilities

Which of the following correctly describes the gaseous state of matter?

- A. Particles are close but can move around
- B. Particles are very close and fixed in position
- C. Particles are far apart and move freely ✓
- D. Particles have definite shape and volume

Q63 Technical Abilities

Which of the following best explains how the thermal conductivity of a metal rod can be determined experimentally?

- A. By enclosing the metallic structure inside a vacuum chamber and monitoring the resulting thermal radiation emissions over time.
- B. By measuring the steady rate of heat flow through the metal rod when its boundaries are maintained at two distinct temperatures. ✓
- C. By tracking the localized color variations along the metal rod surface when it undergoes direct heating at one focal terminal.
- D. By evaluating the absolute volumetric mass density shifts of the metal rod samples before and after a prolonged thermal exposure.

Q64 Technical Abilities

What does the Aufbau principle state about electron filling in orbitals?

- A. Lower energy orbitals filled before higher energy orbitals ✓
- B. Energy levels do not affect electron filling order
- C. Orbitals filled randomly without energy consideration
- D. Higher energy orbitals filled before lower energy orbitals

Q65 Technical Abilities

Isotopes of the same element possess different atomic masses because they contain different numbers of _____.

- A. Neutrons inside nucleus ✓
- B. Protons inside nucleus
- C. Positive ions in orbit
- D. Electrons in outer shell

Q66 Technical Abilities

Which of the following statements is INCORRECT regarding combination reactions?

- A. CaO reacts with H_2O to form Ca(OH)_2 with release of heat
- B. Combination reactions form a single product from two or more reactants
- C. All combination reactions are endothermic in nature ✓
- D. Burning of coal is an example of a combination reaction

Q67 Technical Abilities

A molecule containing a hydroxyl group attached to a saturated carbon atom is most appropriately classified under which category?

- A. It is an amide
- B. It is an aldehyde
- C. It is an ether
- D. It is an alcohol ✓

Q68 Technical Abilities

The stability of the nucleus is mainly due to the balance between _____.

- A. Gravitational force and magnetic flux
- B. Atomic volume and electric current
- C. Nuclear attraction and proton repulsion ✓
- D. Electron attraction and neutron decay

Q69 Technical Abilities

Which statement best explains why exchange energy stabilizes half-filled subshell configurations?

- A. Exchange energy has no role in determining electronic stability
- B. Opposite spins create stronger exchange interactions increasing stability
- C. Stability depends only on nuclear attraction to electrons
- D. Parallel spins allow exchange interactions increasing configuration stability ✓



Q70 Technical Abilities

Why is molality preferred over molarity in colligative property calculations under varying temperature conditions?

- A. Molality depends directly on solution volume changes with temperature
- B. Both molality and molarity remain unaffected by temperature variations
- C. Molarity remains unaffected by temperature changes unlike molality values
- D. Molality remains unaffected by temperature changes unlike molarity values ✓

Q71 Technical Abilities

Which statement correctly explains the relationship between pH and hydronium ion concentration?

- A. Higher the hydronium ion concentration, lower is the pH ✓
- B. Higher the hydronium ion concentration, higher is the pH
- C. pH is independent of ion concentration
- D. Lower the hydronium ion concentration, lower is the pH

Q72 Technical Abilities

Two circular current-carrying loops carry the same current but have different radii. Which loop produces the stronger magnetic field at its center?

- A. The loop with smaller radius produces a smaller magnetic field
- B. The magnetic field at the center is zero
- C. Both loops produce the same magnetic field
- D. The loop with smaller radius produces a larger magnetic field ✓

Q73 Technical Abilities

Read the below Assertion and Reason and choose the correct option.

Assertion (A): Bleaching powder is used as an oxidising agent in chemical industries.

Reason (R): Bleaching powder is produced by the action of chlorine on dry slaked lime.

- A. A is true, but R is false
- B. Both A and R are true, but R is not the correct explanation of A ✓
- C. Both A and R are true, and R is the correct explanation of A
- D. A is false, but R is true

Q74 Technical Abilities

A student observes that diamond and graphite are both made of the same element but have different properties. What is the element that makes up both substances?

- A. Nitrogen
- B. Hydrogen
- C. Carbon ✓
- D. Oxygen

Q75 Technical Abilities

If the frequency of a sound wave increases while its speed in the medium remains unchanged, what happens to its wavelength?

- A. Its wavelength becomes zero.
- B. Its wavelength increases.
- C. Its wavelength remains the same.
- D. Its wavelength decreases. ✓

Q76 Technical Abilities

Which of the following observations confirm a double displacement reaction?

- A. Formation of a precipitate when two solutions are mixed ✓
- B. Release of hydrogen gas when metal reacts with acid
- C. Colour change due to displacement of metal
- D. Formation of a single product from two reactants

Q77 Technical Abilities

Which of the following equations is dimensionally consistent?

- A. Energy = mass $\times$ velocity
- B. Force = mass $\times$ acceleration ✓
- C. Velocity = mass $\times$ time
- D. Power = force $\times$ time

Q78 Technical Abilities

For an sp^3 molecule with one lone pair, how and why does the bond angle change compared to the ideal tetrahedral angle?

- A. The bond angle will decrease due to lone pair-bond pair repulsion ✓
- B. The bond angle will increase due to electron sharing
- C. The bond angle will decrease due to increased nucleus attraction
- D. The bond angle will remain unchanged due to stable geometry



Q79 Technical Abilities

Which of the following statements correctly describe similarities between a bar magnet and a current-carrying solenoid?

1. Both have North and South poles.
2. Both produce a nearly uniform magnetic field inside.
3. Both require permanent magnetic material only.
4. Both follow the right-hand rule for determining the direction of the magnetic field.

A. 2 and 3 only

B. 1 and 3 only

C. 1 and 2 only



D. 1, 2, 3 and 4

Q80 Technical Abilities

Two objects, one made of copper and the other of aluminum, are placed in thermal contact. Both have equal masses and are initially at different temperatures. Considering their specific heat capacities, which statement best describes what happens as they approach thermal equilibrium?

A. Neither interacting object experiences any measurable variation in absolute temperature.

B. Both interacting objects experience entirely identical magnitudes of temperature shifts.

C. The object with higher specific heat experiences larger temperature shifts.

D. The object with lower specific heat experiences larger temperature shifts.

**Q81 Technical Abilities**

Two vectors have equal magnitudes. If the magnitude of their resultant is equal to the magnitude of either vector, what is the angle between the two vectors?

A. 180°

B. 120°



C. 60°

D. 30°

Q82 Technical Abilities

When a hot metal block is placed in a cooler liquid inside a calorimeter, which property of the metal primarily determines how readily heat is conducted through the block to its surface?

A. The specific heat capacity of the metal block

B. The thermal conductivity of the metal block



C. The internal density profile of the metal block

D. The absolute volume metrics of the metal block

Q83 Technical Abilities

Before breakdown, increasing reverse voltage causes reverse saturation current to _____.

A. Change into forward current

B. Become exactly zero

C. Increase rapidly from the beginning

D. Remain approximately constant

**Q84 Technical Abilities**

A scientist is designing a concert hall to optimize acoustics. She wants the audience to perceive louder sounds without increasing the energy input from the speakers. Which characteristic of sound should she focus on modifying within the hall's design?

A. Frequency of the sound waves

B. Wavelength of the sound waves

C. Amplitude of the sound waves



D. Speed of sound in air

Q85 Technical Abilities

Which of the following options best describes the behaviour of a transistor in the transition regions?

A. The transistor does not conduct at all.

B. The collector current remains constant.

C. The transistor has a perfectly linear response.

D. The transistor shows non-linear behaviour due to gradual switching.

**Q86 Technical Abilities**

What determines the reactivity of elements in chemical reactions?

A. Reactivity remains constant for all chemical elements

B. Reactivity depends only on nuclear properties of atoms

C. Reactivity independent of electron transfer in reactions

D. Reactivity depends on ease of electron loss or gain



Q87 Technical Abilities

The spectral lines in a hydrogen series become closer together because the energy levels at higher n values _____.

- A. Disappear completely
- B. Remain equally spaced
- C. Become closer together ✓
- D. Become farther apart

Q88 Technical Abilities

Why does high-density polythene exhibit greater tensile strength than low-density polythene?

- A. Low-density polythene contains extensive cross-linked structures
- B. Low-density polythene contains more amorphous chain regions
- C. High-density polythene contains linear and closely packed chains ✓
- D. High-density polythene is manufactured at higher temperatures

Q89 Technical Abilities

Beta decay helps unstable nuclei achieve stability mainly by adjusting the _____.

- A. Electron orbital speed only
- B. Nuclear volume to infinity
- C. Neutron-proton ratio ✓
- D. Atomic radius only

Q90 Technical Abilities

A satellite is placed in a circular orbit around Earth at a fixed orbital radius. If the mass of the satellite is doubled while keeping the orbital radius unchanged, how does the gravitational force between Earth and the satellite change according to Newton's law of gravitation?

- A. The gravitational force halves
- B. The gravitational force quadruples
- C. The gravitational force remains the same
- D. The gravitational force doubles ✓

Q91 Technical Abilities

Which statement correctly explains the modern periodic law of elements?

- A. Properties repeat periodically with increasing atomic number values ✓
- B. Atomic number has no effect on chemical properties
- C. Properties depend only on atomic mass values of elements
- D. Properties vary randomly without any periodic trend observed

Q92 Technical Abilities

A vehicle manufacturer is designing engines compatible with both petrol and alcohol-based fuels. What challenge must be addressed to ensure efficient engine performance with alcohol blends?

- A. Alcohol remains completely immiscible with petroleum-based fuels
- B. Alcohol shows complete resistance to combustion inside engines
- C. Alcohol tends to absorb water and corrode metallic engine parts ✓
- D. Alcohol tends to freeze easily under normal room conditions

Q93 Technical Abilities

The Bohr radius increases in higher orbits because the electron _____.

- A. Moves farther from nucleus ✓
- B. Stops revolving completely
- C. Gains positive charge
- D. Loses all kinetic energy

Q94 Technical Abilities

Which scenario best demonstrates the cost-effective nature of green chemistry in industrial operations?

- A. Lower raw material usage and increased waste generation during manufacturing
- B. Higher raw material usage and increased waste generation during manufacturing
- C. Higher raw material usage and reduced waste generation during manufacturing
- D. Lower raw material usage and reduced waste generation during manufacturing ✓



Q95 Technical Abilities

Which of the following situations can represent non-uniform motion of a particle?

- A. A curved distance–time graph** ✓
- B. A horizontal line in a velocity–time graph
- C. Equal distances covered in equal intervals of time.
- D. A straight-line distance–time graph with constant slope

Q96 Technical Abilities

A body of mass m is dropped from a height h . When it has fallen through a distance of $2h/3$, the ratio of its kinetic energy to potential energy is _____.

- A. 3:1
- B. 2:1** ✓
- C. 1:1
- D. 1:2

Q97 Technical Abilities

Which statement best explains origin of spectral lines from quantized electronic transitions in atoms?

- A. Transitions occur between levels without any exchange of energy with surroundings
- B. Spectral lines are independent of electronic configuration of atoms
- C. Electrons move continuously between levels without defined quantized energy states
- D. Electrons jump between levels emitting or absorbing photons of specific energies** ✓

Q98 Technical Abilities

Which functional group is commonly found in vinegar and gives it acidic properties?

- A. Hydroxyl group
- B. Carboxyl group** ✓
- C. Amino group
- D. Ester group

Q99 Technical Abilities

Which of the following statements correctly describe magnetic field lines around a bar magnet?

1. Outside the magnet, field lines go from North to South.
2. Inside the magnet, field lines go from North to South.
3. Magnetic field lines always form closed loops.
4. Magnetic field lines are discontinuous at the poles.

- A. 1 and 3 only** ✓

- B. 2 and 3 only

- C. 1, 2, 3 and 4

- D. 1, 2 and 4 only

Q100 Technical Abilities

Which process is mainly responsible for ozone layer depletion in the stratosphere?

- A. Industrial dust particles in the air
- B. Urban heat island effect
- C. Reactions involving chlorofluorocarbons** ✓
- D. Acid rain due to sulfur emissions

Q101 Technical Abilities

What happens to a plane wavefront after reflecting from a concave mirror whose principal axis is perpendicular to the incident wavefront?

- A. It undergoes a shape transition to emerge as a spherical wavefront expanding outward toward infinity.

- B. It undergoes a shape transition to emerge as a spherical wavefront converging toward a focal point.** ✓

- C. It retains its structural orientation to emerge as a flat plane wavefront moving along the parallel axis.

- D. It breaks apart into irregular fragments to emerge as a highly scattered wave moving in random paths.

Q102 Technical Abilities

A car is at rest with its horn continuously sounding. If a person walks toward the car, how does the frequency of the sound heard by the person change?

- A. The frequency increases** ✓

- B. The frequency fluctuates continuously

- C. The frequency decreases

- D. The frequency remains unchanged



Q103 Technical Abilities

The charge of an electron is best described as:

- A. Sometimes positive charge under certain environmental conditions
- B. Variable charge depending on speed and energy conditions
- C. Constant negative charge independent of external physical conditions ✓
- D. Charge depending on surrounding magnetic field conditions

Q104 Technical Abilities

A student wants to compare the magnetic field patterns produced by a straight current-carrying wire and a current-carrying circular loop. Which experimental setup would best demonstrate the difference in their magnetic field lines?

- A. Measuring the force between two parallel wires carrying current in the same direction
- B. Using iron filings around both the straight wire and the circular loop to visualize their magnetic field patterns ✓
- C. Using a compass to detect direction of magnetic field at various points near the wire only
- D. Placing a bar magnet near both conductors to observe attraction or repulsion

Q105 Technical Abilities

Which of the following correctly describes a homogeneous mixture?

- A. It has uniform composition throughout ✓
- B. It forms separate layers on standing
- C. It has visible particles that settle on standing
- D. It contains only solid components

Q106 Technical Abilities

A copper ore is heated in the presence of air during metal extraction. What property of copper makes this process effective?

- A. Copper readily combines with chlorine gas
- B. Copper forms soluble carbonates easily
- C. Copper's low reactivity allows simple heating ✓
- D. Copper requires strong reducing agents

Q107 Technical Abilities

In the output characteristics of a transistor, the nearly horizontal curves indicate that collector current is _____.

- A. Highly dependent on V_{CE}
- B. Zero for all voltages
- C. Nearly constant for fixed base current ✓
- D. Alternating continuously

Q108 Technical Abilities

Two atoms having the same number of nucleons but different atomic numbers are called _____.

- A. Isobars only ✓
- B. Isotones only
- C. Isolectronic particles only
- D. Isotopes only

Q109 Technical Abilities

A compass needle placed in a uniform magnetic field oscillates about its equilibrium position. What is the main reason for this behavior?

- A. It experiences a torque ✓
- B. It gains energy from the field continuously
- C. It experiences a net force
- D. The magnetic field is non-uniform

Q110 Technical Abilities

In the formation of sp hybrid orbitals, what is the geometry adopted by a molecule such as BeCl_2 ?

- A. Trigonal planar
- B. Linear ✓
- C. Octahedral
- D. Tetrahedral

Q111 Technical Abilities

Which of the following correctly identifies an acid using litmus paper?

- A. Turns blue litmus red ✓
- B. Turns red litmus blue
- C. No change in red litmus
- D. Turns blue litmus green



Q112 Technical Abilities

Which statement best defines electron gain enthalpy for an isolated gaseous atom?

- A. Energy released or absorbed when isolated gaseous atom gains electron ✓
- B. Energy released when atoms combine to form stable molecules
- C. Energy required to remove electron from isolated gaseous atom completely
- D. Energy required to break bonds present in chemical compounds

Q113 Technical Abilities

What do electron shells represent in atomic structure?

- A. Electrons occupy fixed energy level shells ✓
- B. Electrons move randomly without defined shells
- C. All electrons have identical energy values
- D. Electron shells do not exist in atoms

Q114 Technical Abilities

Read the following Assertion (A) and Reason (R) carefully and choose the correct option.

Assertion (A): Dry HCl gas does not show acidic behaviour.

Reason (R): HCl produces hydrogen ions only in the presence of water.

- A. A is true, but R is false
- B. A is false, but R is true
- C. Both A and R are true, and R is the correct explanation of A ✓
- D. Both A and R are true, but R is not the correct explanation of A

Q115 Technical Abilities

Which of the following statements best explains how the speed of sound changes when it travels from air into water?

- A. Sound cannot travel through water at all because it is a liquid and not a gas.
- B. Sound travels faster in water than in air because water particles are closer together, enabling quicker transmission of vibrations. ✓
- C. Sound travels slower in water than in air because water particles are further apart, making transmission more difficult.
- D. Sound travels at the same speed in both air and water because both are fluids with similar properties.

Q116 Technical Abilities

According to the Heisenberg uncertainty principle, what happens when the precision in measuring position increases?

- A. Uncertainty decreases for both variables simultaneously
- B. Measurements remain unaffected by uncertainty principle limits
- C. Greater precision in one variable leads to greater uncertainty in other ✓
- D. Both variables can be measured accurately simultaneously always

Q117 Technical Abilities

A sealed container holds equal masses of hydrogen and oxygen at the same temperature. Using the kinetic interpretation of temperature, what can be concluded about the average kinetic energies and speeds of the two types of gas molecules?

- A. Both gases possess matching mean kinetic energies, but heavier oxygen molecules maintain higher average velocities.
- B. Both gases possess matching mean kinetic energies, but lighter hydrogen molecules maintain higher average velocities. ✓
- C. Hydrogen molecules possess greater mean kinetic energies and simultaneously maintain higher average velocities.
- D. Hydrogen molecules possess greater mean kinetic energies but simultaneously maintain matching average velocities.

Q118 Technical Abilities

According to the Kossel-Lewis approach, what is the main reason atoms form chemical bonds?

- A. To increase their atomic mass significantly
- B. To share electrons regardless of stability
- C. To achieve stable octets in their outermost shells ✓
- D. To maximize their energy states always

Q119 Technical Abilities

A chemist is analyzing an unknown organic sample. If the compound contains a benzene ring directly attached to a methyl group, how should the compound be classified based on its structure?

- A. Cyclic ether
- B. Aromatic hydrocarbon ✓
- C. Aliphatic alcohol
- D. Open-chain alkene



Q120 Technical Abilities

Which statement correctly describes the strength of the bond in terms of orbital overlap?

- A. Partial orbital overlap forms an ionic bond
- B. Greater orbital overlap forms a stronger covalent bond ✓
- C. Lesser orbital overlap forms a stronger covalent bond
- D. Equal orbital overlap forms a weaker covalent bond

Q121 Technical Abilities

You have three test tubes: one with dilute HCl, one with NaOH solution, and one with distilled water. Using both red and blue litmus papers, which observation correctly identifies the test tube containing the acidic solution?

- A. Turns both red and blue litmus blue
- B. Turns red litmus blue
- C. No change in both red and blue litmus
- D. No change in red, turns blue litmus red ✓

Q122 Technical Abilities

Which statement best explains how ionic radius varies with charge and electronic configuration of ions?

- A. Ionic radius remains constant regardless of ionic charge or structure
- B. Electronic configuration plays no role in determining ionic size
- C. Higher positive charge leads to smaller ionic radius due to attraction ✓
- D. Ionic charge has no influence on magnitude of ionic radius

Q123 Technical Abilities

Which observation confirms a displacement reaction when an iron nail is placed in copper sulphate solution?

- A. Blue solution turns colourless with no change in iron
- B. A white precipitate is formed in the solution
- C. No colour change and no reaction occurs
- D. Blue solution turns green and brown coating forms on iron ✓

Q124 Technical Abilities

Which combination of objective and eyepiece focal lengths will result in the highest magnifying power for a simple astronomical telescope?

- A. Short focal length eyepiece and long focal length objective ✓
- B. Long focal length eyepiece and short focal length objective
- C. Long focal length eyepiece and long focal length objective
- D. Short focal length eyepiece and short focal length objective

Q125 Technical Abilities

A new physical quantity 'Y' is defined by the equation $Y = \text{Power} \times \text{Time} / \text{Area}$. Which one of the following expressions correctly represents the dimensions of 'Y'?

- A. $M T^{-2}$ ✓
- B. $M L^{-2} T$
- C. $M T^{-1}$
- D. $M L^2 T^{-2}$

Q126 Technical Abilities

Which of the following is most relevant when discussing health-based international standards for drinking water?

- A. Permissible limits for minerals present in drinking water
- B. Permissible limits for contaminants in water ✓
- C. Permissible limits for water storage used in households
- D. Permissible limits for temperature in drinking water

Q127 Technical Abilities

A community water supply contains fluoride at 3 ppm. Which health effect is most likely to appear first among long-term consumers of this water?

- A. Increased tooth decay due to inadequate fluoride exposure
- B. Severe skeletal deformities due to chronic fluoride exposure
- C. Brown mottling of teeth due to excess fluoride exposure ✓
- D. Loss of tooth enamel due to complete fluoride absence



Q128 Technical Abilities

Which of the following statements correctly describes electric circuit diagrams?

1. They help in analyzing paths of electric current.
2. They provide a simplified representation of a circuit.
3. The symbols used in them should be standardized.
4. They eliminate the need for actual electrical components.

A. 2 and 4 only

B. 1, 2, 3 and 4

C. 1, 2 and 3 only



D. 1 and 4 only

Q129 Technical Abilities

A diamond ($n=2.42$) is immersed in a transparent liquid. A light ray inside the diamond is incident at the critical angle at the diamond-liquid interface. If the refractive index of the liquid increases, what happens to the critical angle?

A. The critical angle increases as the refractive index of the liquid increases



B. The critical angle decreases as the refractive index of the liquid increases

C. Total internal reflection occurs at all angles as the refractive index of the liquid increases

D. The critical angle remains unchanged as the refractive index of the liquid increases

Q130 Technical Abilities

Plaster of Paris is prepared by heating which of the following substances?

A. Calcium hydroxide

B. Gypsum



C. Sodium chloride

D. Calcium carbonate

Q131 Technical Abilities

The magnetic field lines around an infinitely long straight current-carrying wire are _____.

A. Elliptical closed trajectories

B. Concentric circular paths



C. Straight parallel lines only

D. Radially outward directed lines

Q132 Technical Abilities

A company is designing a heating element and wants to reduce the resistance of a conductor. The material, temperature, and length of the conductor must remain unchanged. Which modification will most effectively decrease the resistance?

A. Increasing the cross-sectional area of the conductor



B. Raising the resistivity of the conductor

C. Decreasing the cross-sectional area of the conductor

D. Decreasing the resistivity of the conductor.

Q133 Technical Abilities

Which molecule contains a central atom that has an incomplete octet in its Lewis structure and completes the octet by accepting a lone pair through coordinate bonding?

A. In the formation of the hydronium ion from water

B. In the formation of the tetrafluoroborate ion from Boron trifluoride



C. In the formation of carbonate ion from carbon dioxide

D. In the formation of the ammonium ion from ammonia

Q134 Technical Abilities

Radioactive decay cannot be predicted exactly for a single nucleus because the process is _____.

A. Controlled by temperature only

B. Completely deterministic

C. Dependent on chemical state always

D. Random in nature

**Q135 Technical Abilities**

A copper plate and an aluminum plate of equal thickness and area are maintained at the same temperature difference. If the thermal conductivity of copper is twice that of aluminum, what will be the ratio of heat flow through copper to that through aluminum?

A. The ratio will be 1:1 for copper to aluminum.

B. The ratio will be 4:1 for copper to aluminum.

C. The ratio will be 1:2 for copper to aluminum.

D. The ratio will be 2:1 for copper to aluminum.



Q136 Technical Abilities

Three resistors of $2\ \Omega$, $3\ \Omega$, and $5\ \Omega$ are connected in series. What is their equivalent resistance?

- A. $8\ \Omega$
- B. $12\ \Omega$
- C. $10\ \Omega$ ✓
- D. $9\ \Omega$

Q137 Technical Abilities

The existence of cut-in voltage in a diode is mainly due to the presence of _____.

- A. Infinite conductivity
- B. Neutral atoms without charges
- C. Depletion barrier potential ✓
- D. External magnetic field only

Q138 Technical Abilities

Which equation below is NOT dimensionally consistent?

- A. $s = ut^2 + (1/2) at$ ✓
- B. $s = ut + (1/2) at^2$
- C. $s = vt$
- D. $s = (v^2 - u^2)/2a$

Q139 Technical Abilities

Electric potential at a point is defined as the work done in bringing a unit positive charge from infinity to that point _____.

- A. Without changing kinetic energy ✓
- B. Along a circular closed path
- C. Only in magnetic fields
- D. With infinite acceleration always

Q140 Technical Abilities

In the parallelogram method of vector addition, two vectors are drawn from the same point as adjacent sides of a parallelogram. What does the diagonal passing through the common point represent?

- A. The resultant vector in both magnitude and direction ✓
- B. The difference between the two vectors
- C. The average of the two vectors
- D. The scalar sum of the two vectors

Q141 Technical Abilities

A cylinder fitted with a frictionless movable piston contains 2 moles of an ideal gas at 27°C and a volume of 10 L. The gas is heated to 127°C while maintaining constant pressure. What will be the final volume of the gas?

- A. 15.0 L
- B. 10.8 L
- C. 12.0 L
- D. 13.3 L ✓

Q142 Technical Abilities

If a hydrocarbon undergoes oxidation in the laboratory and a sweet-smelling liquid is produced, which class of compound is most likely formed?

- A. An alkene is most likely formed during the reaction
- B. An amide is most likely formed during the reaction
- C. A ketone is most likely formed during the reaction
- D. An ester is most likely formed during the reaction ✓

Q143 Technical Abilities

A chemistry student is asked to explain why ethanoic acid is often stored in tightly sealed bottles. Which property of ethanoic acid best justifies this storage practice?

- A. Ethanoic acid solidifies at room temperature when exposed to air
- B. Ethanoic acid reacts with plastic to form toxic gases
- C. Ethanoic acid is volatile and can evaporate if not sealed tightly ✓
- D. Ethanoic acid decomposes into water and carbon dioxide quickly

Q144 Technical Abilities

Cathode rays observed in discharge tubes are best described as:

- A. Streams of electrons moving from cathode toward anode ✓
- B. Streams of photons emitted from heated metal electrodes
- C. Streams of neutrons moving randomly inside the tube
- D. Streams of protons moving from anode toward cathode



Q145 Technical Abilities

Why is the net magnetic flux through any closed surface always zero?

- A. Magnetic field is weak
- B. Electric charges cancel magnetic field
- C. Magnetic monopoles do not exist ✓
- D. Magnetic field lines are straight

Q146 Technical Abilities

Stoichiometry in chemistry is mainly concerned with calculation of which of the following?

- A. Calculations ignoring mole concept in chemical reaction analysis
- B. Physical properties of substances without chemical reaction calculations
- C. Reactions without using balanced chemical equation relationships
- D. Reactant and product amounts using balanced chemical equations ✓

Q147 Technical Abilities

Why are half-filled orbitals considered more stable?

- A. Stability does not depend on electron arrangement
- B. Unequal electron distribution increases atomic instability
- C. Equal electron distribution reduces repulsion in orbitals ✓
- D. Half-filled orbitals are always less stable

Q148 Technical Abilities

A metal rod is tightly fitted between two rigid walls at room temperature. If the temperature increases, which outcome is most likely due to thermal expansion of solids?

- A. The rod will remain unaffected by the temperature change.
- B. The rod will be under tensile stress and stretch.
- C. The rod will freely increase in length without stress.
- D. The rod will experience compressive stress and may buckle. ✓

Q149 Technical Abilities

A particle moves with uniform acceleration and has an initial velocity u . It covers distances s and $2s$ in two successive equal time intervals t . What is the acceleration of the particle?

A. $\frac{s}{t^2}$ ✓

B. $\frac{2s}{t^2}$

C. $\frac{3s}{4t^2}$

D. $\frac{2s}{3t^2}$

Q150 Technical Abilities

A particle of mass m starts from rest and moves with constant acceleration ' a '. After travelling a distance ' s ', what is its kinetic energy?

A. $2mas$

B. mas ✓

C. $\frac{1}{2}mas$

D. $\frac{1}{2}ma^2$

