

RRB Technician Grade I Signal 2025

Technician Grade I Signal · CEN 02/2025 · BasicSci · Question Paper Compilation

English

Single Shift (Set) · BasicSci Section · Official Answer Key

About this Compilation

This booklet compiles all **1 shift papers** of the **RRB Technician Grade I Signal 2025** examination (CEN 02/2025) in **English** (**BasicSci** section only), 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 in shift order, numbered 1 onward within each set.
- Diagram and wide-table questions appear at full width at the end of their set.
- The correct answer is highlighted in green with a tick.

More from QMaths

Check your marks, normalized score and zone-wise rank free at rank.qmaths.in. Master English vocabulary with the **Blackbook** app.



Blackbook:
English Vocabulary



Toppers' Choice, *Blackbook of English Vocabulary*, Now available in App format : DOWNLOAD NOW

Index — All Sets (click to open)

Set 1

13 Mar 2026

9:00 AM - 10:30 AM

BasicSci

35 Questions • Answer Key

Q1 BasicSci

When several resistors are connected in series, which physical quantity has an identical value across each resistor?

- A. Current
- B. Resistance
- C. Power
- D. Voltage



Q2 BasicSci

The resistivity of a semiconductor decreases with the increase in temperature because:

- A. Lattice vibrations stop
- B. More charge carriers are generated
- C. Electrons lose energy
- D. Band gap increases



Q3 BasicSci

If the mobility of the holes is reduced to half its original value, keeping other parameters constant, then the conductivity of a p-type semiconductor is _____.

- A. Constant
- B. Tripled
- C. Reduced to half
- D. Doubled



Q4 BasicSci

One coulomb of charge is approximately equal to the charge of _____.

- A. 6×10^6 electrons
- B. 6×10^{12} electrons
- C. 6×10^{10} electrons
- D. 6×10^{18} electrons



Q5 BasicSci

An ideal half-wave rectifier supplies a purely resistive load from a sinusoidal source. Let $v_L(t)$ be the load voltage and $v_D(t)$ be the diode voltage, measured with reference to the anode. Which of the following statements is always true over one complete cycle?

- A. The rms value of $v_D(t)$ equals the rms value of the source voltage.
- B. The average value of $v_D(t)$ becomes zero if the diode orientation is reversed.
- C. The average value of $v_D(t)$ is zero because the diode conducts for half the cycle.
- D. The average values of $v_L(t)$ and $v_D(t)$ are equal in magnitude and opposite in sign.



Q6 BasicSci

Which of the following statements correctly describes weight?

- A. Weight has both magnitude and direction
- B. Weight has no direction
- C. Weight only shows how heavy something is
- D. Weight is measured in kilograms



Q7 BasicSci

The force on a current-carrying conductor in a magnetic field is maximum when _____.

- A. The current is perpendicular to the magnetic field
- B. The current is parallel to the magnetic field
- C. The current is opposite to the magnetic field
- D. The magnetic field is zero



Q8 BasicSci

Two conductors of the same material have lengths L and $2L$ and equal resistance. The ratio of their cross-sectional areas ($A_1:A_2$) is _____.

- A. 1:4
- B. 4:1
- C. 2:1
- D. 1:2



Q9 BasicSci

In a parallel connection, if one resistor breaks (open circuit) then ____.

A. The entire circuit stops working



B. Voltage becomes zero

C. Other branches keep working

D. Battery gets damaged

Q10 BasicSci

A straight conductor of length 1 m carrying a current of 5 A is placed perpendicular to a magnetic field of 0.2 T. The force acting on the conductor is ____.

A. 0.2 N



B. 5.0 N

C. 0.04 N

D. 1.0 N

Q11 BasicSci

A logic function is given by $F = ABC + DE$. You are allowed to use only two input AND gates and NOT gates. How many minimum number of two input AND gates and how many minimum number of NOT gates are required to implement this function?

A. 3 AND gates and 3 NOT gates

B. 4 AND gates and 3 NOT gates

C. 2 AND gates and 1 NOT gate



D. 3 AND gates and 2 NOT gates

Q12 BasicSci

Two resistors $6\ \Omega$ and $3\ \Omega$ are connected in parallel. The total resistance is:

A. $9\ \Omega$

B. $4\ \Omega$

C. $2\ \Omega$



D. $1\ \Omega$

Q13 BasicSci

The SI unit of specific resistance (resistivity) is ____.

A. ohm-metre

B. ohm



C. ohm per metre

D. ohm per square metre

Q14 BasicSci

Which of the following is a fundamental (base) quantity in the SI system?

A. Force

B. Pressure

C. Work

D. Mass

**Q15 BasicSci**

Two transistor biasing circuits have stability factors $S_1 = 101$ and $S_2 = 15$. Which circuit offers better thermal stability?

A. Both have equal stability

B. Circuit 2

C. Cannot be compared

D. Circuit 1

**Q16 BasicSci**

If a uniform magnetic field is parallel to the plane of a surface, the magnetic flux through the surface is ____.

A. half of maximum

B. infinite

C. zero

D. maximum

**Q17 BasicSci**

Which of the following quantities remains the same at all locations in the universe?

A. Gravitational force

B. Mass

C. Weight



D. Apparent weight

Q18 BasicSci

For a R-L-C series circuit connected to the input signal $4V_p$ -p, 1KHz periodic sinusoidal ac signal and the voltage drop across the resistor R measured with the help of CRO displays a sine wave occupying 2 units total height and volts/div knob at 1V, then the RMS current for the circuit is approximately _____ if $R=10\ \Omega$.

A. 0.071A

B. 0.14 A

C. 1.414A

D. 0.71 A



Q19 BasicSci

Which symbol is used to represent a resistor in a circuit diagram?

- A. Arrow mark
- B. Zig-zag line ✓
- C. Two parallel plates
- D. Circle with pointer

Q20 BasicSci

Magnetic flux depends on :

- A. Only magnetic field ✓
- B. Area, magnitude of B and its orientation
- C. Only area
- D. Only angle

Q21 BasicSci

A 5 kg object experiences a gravitational force of about 49 N on Earth. This implies the value of g used is approximately:

- A. 2 m/s² ✓
- B. 9.8 m/s²
- C. 4.9 m/s²
- D. 19.6 m/s²

Q22 BasicSci

Which of the following correctly defines the electric field at a point?

- A. Energy per unit area
- B. Energy available per unit charge
- C. Force acting per unit mass ✓
- D. Force acting per unit charge

Q23 BasicSci

Ohm's law may NOT hold true when ____.

- A. The temperature of the conductor increases
- B. The material obeys linear V-I relation
- C. The temperature of the conductor remains constant ✓
- D. The conductor is metallic

Q24 BasicSci

Port 0 of the 8051 microcontroller differs architecturally from the other ports primarily because:

- A. It cannot function as an output port
- B. It does not contain internal pull-up resistors ✓
- C. It is reserved only for memory expansion
- D. It is not bit-addressable

Q25 BasicSci

If the potential difference across a resistor is doubled while resistance remains constant, the power consumed becomes ____.

- A. four times
- B. double
- C. one-fourth
- D. half ✓

Q26 BasicSci

If a charge of 3 C is moved across a potential difference of 15 V in 3 seconds, what is the power developed in the process?

- A. 30 W
- B. 10 W
- C. 5 W ✓
- D. 15 W

Q27 BasicSci

When the two inputs of a 2-input NAND gate are tied together to form a single input A, the resulting circuit behaves as which logic gate?

- A. AND gate ✓
- B. OR gate
- C. XOR gate
- D. NOT gate (Inverter)

Q28 BasicSci

In a PNP transistor, an increase in collector-base reverse bias causes a slight increase in collector current even when the emitter current is held constant. This occurs primarily because:

- A. The collector resistance decreases due to depletion region expansion
- B. The emitter injection efficiency decreases ✓
- C. Hole mobility increases in the collector region
- D. The effective base width decreases with collector-base voltage



Q29 BasicSci

If the time/div knob of the CRO is on 2 ms/div and the positive half cycle of the periodic triangular signal occupies 2 unit of the X-axis, then the time period of the signal is _____.

- A. 4 ms
- B. 2 ms
- C. 8 ms
- D. 16 ms

**Q30 BasicSci**

In 8051 microcontroller, PSEN is an _____ output signal used as a read strobe for accessing the _____ memory.

- A. active high, external program
- B. active high, internal ram
- C. active low, internal ram
- D. active low, external program

**Q31 BasicSci**

Which device converts mechanical energy into electrical energy through electromagnetic induction?

- A. Battery
- B. Capacitor
- C. Electric motor
- D. Electric generator

**Q34 BasicSci**

A circular loop of radius r is placed in a uniform magnetic field $\vec{B}$. If the plane of the loop is perpendicular to the field, the magnetic flux through the loop is _____.

- A. $2\pi rB$
- B. $B\pi r^2$
- C. πr^2B
- D. $2\pi r^2B$

**Q35 BasicSci**

If a charge of 2 C placed in an electric field experiences a force of 10 N, what is the magnitude of the electric field at that point?

- A. $4 \frac{N}{C}$
- B. $5 \frac{N}{C}$
- C. $2 \frac{N}{C}$
- D. $3 \frac{N}{C}$

**Q32 BasicSci**

A resistor of 10Ω is connected to a constant voltage source. When another resistor is connected in series with it, the current in the circuit becomes half of its initial value. Assuming the supply voltage remains unchanged, the resistance of the second resistor is _____.

- A. 15Ω
- B. 10Ω
- C. 20Ω
- D. 5Ω

**Q33 BasicSci**

Which of the following materials acts as a good insulator in electric circuits?

- A. Plastic
- B. Graphite
- C. Mercury
- D. Iron rod

