



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD
सीईएन ०२ / २०२५ - तकनीशियन ग्रेड I सिगनल और तकनीशियन ग्रेड III
CEN 02/2025 – Technician Grade I Signal and Technician Grade III



Test Date	13/03/2026
Test Time	9:00 AM - 10:30 AM
Subject	RRB Technician Grade I Signal

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : General Awareness

Q.1	Pandit Chhannulal Mishra, who passed away at the age of 89, was associated with which of the following Hindustani classical music gharanas?
Ans	<input checked="" type="checkbox"/> 1. Agra Gharana <input checked="" type="checkbox"/> 2. Gwalior Gharana <input checked="" type="checkbox"/> 3. Banaras Gharana <input checked="" type="checkbox"/> 4. Jaipur-Atrauli Gharana
Q.2	The Kol Uprising, which resisted British law and order intervention, took place in which region?
Ans	<input checked="" type="checkbox"/> 1. Mysore <input checked="" type="checkbox"/> 2. Awadh <input checked="" type="checkbox"/> 3. Chotanagpur <input checked="" type="checkbox"/> 4. Bengal
Q.3	In 2025, which Indian cricketer became the first Indian pacer to play 50 Test matches for the country?
Ans	<input checked="" type="checkbox"/> 1. Ishant Sharma <input checked="" type="checkbox"/> 2. Bhuvneshwar Kumar <input checked="" type="checkbox"/> 3. Mohammed Shami <input checked="" type="checkbox"/> 4. Jasprit Bumrah
Q.4	Which folk music tradition from West Bengal, associated with spiritual themes, is performed by wandering minstrels?
Ans	<input checked="" type="checkbox"/> 1. Baul <input checked="" type="checkbox"/> 2. Pandavani <input checked="" type="checkbox"/> 3. Alha <input checked="" type="checkbox"/> 4. Bhavai
Q.5	The Constitution of India prohibits which of the following types of citizenship?
Ans	<input checked="" type="checkbox"/> 1. Citizenship by registration under statutory provisions <input checked="" type="checkbox"/> 2. Dual citizenship of another country along with Indian citizenship <input checked="" type="checkbox"/> 3. Citizenship by birth within the territory of India <input checked="" type="checkbox"/> 4. Citizenship by naturalisation after fulfilling prescribed conditions

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Q.6	When and where did the first session of the Indian National Congress take place?
Ans	<p><input type="checkbox"/> 1. January 12, 1885, Calcutta</p> <p><input checked="" type="checkbox"/> 2. December 28, 1852, Poona</p> <p><input type="checkbox"/> 3. December 28, 1885, Bombay</p> <p><input type="checkbox"/> 4. December 28, 1885, Poona</p>

Q.7	As per Article 280(1) of the Constitution, the Finance Commission is to be constituted:
Ans	<p><input type="checkbox"/> 1. Every four years or earlier</p> <p><input checked="" type="checkbox"/> 2. Every three years</p> <p><input type="checkbox"/> 3. Every five years or earlier</p> <p><input type="checkbox"/> 4. Every seven years or earlier</p>

Q.8	Shri C. P. Radhakrishnan was sworn in as _____ Vice President of India.
Ans	<p><input type="checkbox"/> 1. 12th</p> <p><input checked="" type="checkbox"/> 2. 15th</p> <p><input type="checkbox"/> 3. 14th</p> <p><input type="checkbox"/> 4. 13th</p>

Q.9	Which of the following pairs of peaks and their approximate heights is matched INCORRECTLY?
Ans	<p><input type="checkbox"/> 1. Kanchenjunga - 8598 m</p> <p><input type="checkbox"/> 2. Dodabetta - 2637 m</p> <p><input type="checkbox"/> 3. Nanga Parbat - 7026 m</p> <p><input checked="" type="checkbox"/> 4. Anaimudi - 2695 m</p>

Q.10	Which of the following was NOT a key component of the 1991 industrial reforms in India?
Ans	<p><input type="checkbox"/> 1. Expansion of the public sector in key industries</p> <p><input type="checkbox"/> 2. Encouraging Foreign Direct Investment (FDI)</p> <p><input type="checkbox"/> 3. Abolition of the Monopolies and Restrictive Trade Practices (MRTP) Act</p> <p><input checked="" type="checkbox"/> 4. Delicensing of industries</p>

Section : General Intelligence and Reasoning

Q.11	What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
	297 x 11 - 17 ÷ 18 + 91 = ?
Ans	<p><input type="checkbox"/> 1. 242</p> <p><input type="checkbox"/> 2. 245</p> <p><input type="checkbox"/> 3. 248</p> <p><input checked="" type="checkbox"/> 4. 240</p>

<p>Q.12</p>	<p>A question is followed by two statements numbered I and II. You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.</p> <p>Six people, A, B, C, D, E and F, are sitting in a straight line, facing north. Who sits to the immediate left of E?</p> <p>I. B sits fourth to the right of C. Only one person sits between C and F. D sits third to the right of F.</p> <p>II. C sits at the extreme left end of the line. Only two people sit between C and E. A sits fourth to the left of D.</p>	
<p>Ans</p>	<p><input type="checkbox"/> 1. The data in both Statements I and II put together (and not independently) are sufficient to answer the question.</p>	
	<p><input checked="" type="checkbox"/> 2. The data in Statement I alone is sufficient to answer the question while data in Statement II is not.</p>	
	<p><input type="checkbox"/> 3. The data in Statement II alone is sufficient to answer the question while data in Statement I is not.</p>	
	<p><input type="checkbox"/> 4. The data in both Statements I and II put together are NOT sufficient to answer the question.</p>	

<p>Q.13</p>	<p>Seven people, C, D, E, F, W, X and Y, are sitting around a circular table facing the centre of the table. Only two people sit between C and D when counted from the left of D. X sits to the immediate right of D. Only three people sit between D and E. F sits to the immediate right of W. How many people sit between Y and F when counted from the right of F?</p>	
<p>Ans</p>	<p><input type="checkbox"/> 1. Three</p>	
	<p><input type="checkbox"/> 2. Zero</p>	
	<p><input type="checkbox"/> 3. One</p>	
	<p><input checked="" type="checkbox"/> 4. Two</p>	

<p>Q.14</p>	<p>Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.</p> <p>(Left) 1 3 € £ 7 4 6 ¥ 2 8 \$ 6 3 1 ◇ 1 3 9 ○ 2 5 ☆ 7 5 9 (Right)</p> <p>How many such symbols are there that are immediately preceded by an odd number but not immediately followed by an even number?</p>	
<p>Ans</p>	<p><input checked="" type="checkbox"/> 1. Four</p>	
	<p><input type="checkbox"/> 2. One</p>	
	<p><input type="checkbox"/> 3. Two</p>	
	<p><input type="checkbox"/> 4. Three</p>	

<p>Q.15</p>	<p>Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)</p>	
<p>Ans</p>	<p><input type="checkbox"/> 1. MHJ</p>	
	<p><input checked="" type="checkbox"/> 2. RMO</p>	
	<p><input type="checkbox"/> 3. TOQ</p>	
	<p><input type="checkbox"/> 4. KEH</p>	

<p>Q.16</p>	<p>In a certain code language,</p> <p>A + B means 'A is the son of B', A - B means 'A is the brother of B', A x B means 'A is the wife of B', and A ÷ B means 'A is the father of B'.</p> <p>Based on the above, how is L related to P if 'L + M ÷ N x O - P'?</p>	
<p>Ans</p>	<p><input type="checkbox"/> 1. Brother's wife's father</p>	
	<p><input type="checkbox"/> 2. Wife's father</p>	
	<p><input type="checkbox"/> 3. Wife's brother</p>	
	<p><input checked="" type="checkbox"/> 4. Brother's wife's brother</p>	

<p>Q.17</p>	<p>Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only. All numbers are single-digit numbers.</p> <p>(Left) 9 1 @ \$ 5 1 # 5 9 \$ 1 & 4 + 7 = ! 5 & 4 ? (Right)</p> <p>How many such symbols are there each of which is immediately preceded by a number and also immediately followed by another number?</p>
<p>Ans</p>	<p>✓ 1. THREE</p>
	<p>✗ 2. FIVE</p>
	<p>✗ 3. FOUR</p>
	<p>✗ 4. SIX</p>
<p>Q.18</p>	<p>Refer to the given letter, number and symbol series and answer the question that follows. Counting to be done from left to right only.</p> <p>(Left) F 5 @ £ T 7 Y € V D © 3 € 6 % X 1 Z £ € G * (Right)</p> <p>If all the numbers are dropped from the series, which of the following will be sixth from the left?</p>
<p>Ans</p>	<p>✗ 1. Y</p>
	<p>✓ 2. €</p>
	<p>✗ 3. £</p>
	<p>✗ 4. T</p>
<p>Q.19</p>	<p>In the following triad, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.</p> <p>MAKE – MEKA – AEMK LOAD – LDAO - ODLA</p>
<p>Ans</p>	<p>✗ 1. WIND – WDNI – IDWN</p>
	<p>✗ 2. VIEW – WVIE – EWIV</p>
	<p>✗ 3. RENT – RTEN – ENRT</p>
	<p>✓ 4. GROW – ROWG – ORGW</p>
<p>Q.20</p>	<p>Vijay starts from point A and drives 10 km towards North. He then takes a left turn, drives 4 km, turns left and drives 12 km. He then takes a left turn and drives 9 km. He takes a final left turn, drives 2 km and stops at point P. How far (shortest distance) and towards which direction should he drive in order to reach point A again? (All turns are 90 degrees turns only unless specified)</p>
<p>Ans</p>	<p>✗ 1. 5 km to the east</p>
	<p>✗ 2. 4 km to the east</p>
	<p>✗ 3. 4 km to the west</p>
	<p>✓ 4. 5 km to the west</p>
<p>Q.21</p>	<p>10 is related to 22 following a certain logic. Following the same logic, 24 is related to 50. To which of the given options is 6 related, following the same logic? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)</p>
<p>Ans</p>	<p>✗ 1. 18</p>
	<p>✗ 2. 16</p>
	<p>✗ 3. 14</p>
	<p>✓ 4. 12</p>

Q.22	Each of M, N, O, P, Q, R and S plays a game on a different day of a week starting from Monday and ending on Sunday of the same week. M plays the game on Wednesday. Only two persons play the games between M and Q. O plays the game on the day immediately before R but not on Thursday. Only two persons play the games between N and S. N does not play the game on the last day. On which day does P play the game?
Ans	<input checked="" type="checkbox"/> 1. Monday <input type="checkbox"/> 2. Tuesday <input type="checkbox"/> 3. Thursday <input type="checkbox"/> 4. Friday

Q.23	LF 58 is related to ID 49 in a certain way. In the same way, YK 36 is related to VI 27. To which of the following is RO 61 related, following the same logic?
Ans	<input type="checkbox"/> 1. OM 52 <input checked="" type="checkbox"/> 2. OV 53 <input type="checkbox"/> 3. OG 55 <input type="checkbox"/> 4. OH 59

Q.24	Select the triad which follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern. HN-JF-MO MS-OK-RT
Ans	<input type="checkbox"/> 1. PV-SN-UY <input type="checkbox"/> 2. PU-SN-WY <input checked="" type="checkbox"/> 3. PV-RN-UW <input type="checkbox"/> 4. OU-SM-WY

Q.25	19 is related to 64 following a certain logic. Following the same logic, 28 is related to 91. To which of the following is 44 related, following the same logic? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting / multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
Ans	<input type="checkbox"/> 1. 193 <input checked="" type="checkbox"/> 2. 131 <input type="checkbox"/> 3. 113 <input type="checkbox"/> 4. 139

Section : Basics of Computers and Application

Q.26	What is the difference between Reply and Forward in email?
Ans	<input checked="" type="checkbox"/> 1. Reply sends your response only to the original sender, while Forward sends the email to a new recipient. <input type="checkbox"/> 2. Reply sends the email to all contacts, Forward sends it to none. <input type="checkbox"/> 3. Reply deletes the original message, while Forward saves it. <input type="checkbox"/> 4. Reply encrypts the email, Forward does not.

Q.27	An email containing sensitive information is received from a client. It needs to be forwarded to a colleague for further action. What measures should be taken to safeguard the sensitive information during this process?
Ans	<input checked="" type="checkbox"/> 1. Forward the email as is. <input type="checkbox"/> 2. Redact the sensitive information before forwarding. <input type="checkbox"/> 3. Call your colleague and verbally share the sensitive information. <input type="checkbox"/> 4. Delete the mail containing sensitive information

Q.28	In a switched Ethernet LAN, which switching method begins forwarding a frame as soon as the destination MAC address is read, resulting in the lowest latency but higher risk of forwarding corrupted frames?
Ans	<p><input type="checkbox"/> 1. Cut-Through Switching</p> <p><input type="checkbox"/> 2. Token Passing</p> <p><input checked="" type="checkbox"/> 3. Store-and-Forward Switching</p> <p><input type="checkbox"/> 4. Fragment-Free Switching</p>
Q.29	Which of the following best describes the role of PCB in a computer system?
Ans	<p><input type="checkbox"/> 1. An input device for transferring data</p> <p><input type="checkbox"/> 2. A physical board connecting electronic components</p> <p><input type="checkbox"/> 3. A protocol used in wireless networks</p> <p><input checked="" type="checkbox"/> 4. A software tool for virus removal</p>
Q.30	In MS PowerPoint, which feature enables inserting tables from MS Word or MS Excel?
Ans	<p><input type="checkbox"/> 1. File > Import</p> <p><input type="checkbox"/> 2. Insert > Object</p> <p><input type="checkbox"/> 3. Insert > Table</p> <p><input checked="" type="checkbox"/> 4. Home > Table</p>
Q.31	<p>Consider the following statements regarding inserting and deleting rows and columns in tables in MS Word 2021:</p> <p>New rows can be inserted only at the end of a table using the Tab key.</p> <p>The Layout tab under Table Tools allows users to insert or delete rows and columns at any position within the table.</p> <p>The Right-click context menu provides quick options for inserting and deleting rows or columns.</p> <p>Which of the above statements is/are correct?</p>
Ans	<p><input type="checkbox"/> 1. Statement Only 2 and Statement 3</p> <p><input type="checkbox"/> 2. Statement 1, Statement 2, and Statement 3</p> <p><input type="checkbox"/> 3. Statement Only 1 and Statement 3</p> <p><input checked="" type="checkbox"/> 4. Statement Only 1 and Statement 2</p>
Q.32	In R1C1 reference style, how is the cell located at column E and row 8 represented in Microsoft Excel 2021?
Ans	<p><input checked="" type="checkbox"/> 1. 8R5C</p> <p><input type="checkbox"/> 2. R8C5</p> <p><input type="checkbox"/> 3. 8RC5</p> <p><input type="checkbox"/> 4. RC85</p>
Q.33	Which shortcut allows you to select an entire sentence in MS Word 365 without dragging the mouse?
Ans	<p><input type="checkbox"/> 1. Ctrl + Click</p> <p><input checked="" type="checkbox"/> 2. Ctrl + Shift + →</p> <p><input type="checkbox"/> 3. Ctrl + Shift + End</p> <p><input type="checkbox"/> 4. Ctrl + Click anywhere in the sentence</p>
Q.34	Where can you find options to change the design template of your presentation?
Ans	<p><input checked="" type="checkbox"/> 1. Home tab</p> <p><input type="checkbox"/> 2. View tab</p> <p><input type="checkbox"/> 3. Insert tab</p> <p><input type="checkbox"/> 4. Design tab</p>

Q.35	What shortcut key is used in Windows OS to navigate between open programs?
Ans	<p><input type="checkbox"/> 1. Alt + Del</p> <p><input type="checkbox"/> 2. Alt + F4</p> <p><input checked="" type="checkbox"/> 3. Alt + Tab</p> <p><input type="checkbox"/> 4. Alt + Ins</p>
Q.36	What factors should be considered for optimal document printing results?
Ans	<p><input type="checkbox"/> 1. Printer selection, paper type, print quality, color options, and page range settings affect printing outcomes and resource efficiency.</p> <p><input type="checkbox"/> 2. Printing settings have no impact on final results.</p> <p><input checked="" type="checkbox"/> 3. All documents print identically regardless of settings.</p> <p><input type="checkbox"/> 4. Default printing settings are always appropriate.</p>
Q.37	Which toolbar in Excel or Office applications allows you to draw shapes, arrows, and flowchart elements?
Ans	<p><input checked="" type="checkbox"/> 1. Formatting Toolbar</p> <p><input type="checkbox"/> 2. Standard Toolbar</p> <p><input type="checkbox"/> 3. Formula Toolbar</p> <p><input type="checkbox"/> 4. Drawing Toolbar</p>
Q.38	How can a user attach a file to an e-mail in most e-mail clients?
Ans	<p><input type="checkbox"/> 1. Go to the Edit menu and select 'Add File'</p> <p><input checked="" type="checkbox"/> 2. Click the 'Send' button and select a file</p> <p><input type="checkbox"/> 3. Click the 'Attach File' or paperclip icon and select a file</p> <p><input type="checkbox"/> 4. Press Ctrl + A to attach a file</p>
Q.39	Clip art includes:
Ans	<p><input checked="" type="checkbox"/> 1. Sound files</p> <p><input type="checkbox"/> 2. Only charts</p> <p><input type="checkbox"/> 3. Animated GIFs & drawings</p> <p><input type="checkbox"/> 4. Only videos</p>
Q.40	You have a large, comma-separated data set pasted into Word, where each line represents a new row and the commas (,) separate the data that should occupy individual cells. To accurately convert this text into a table while ensuring the data is parsed correctly, which sequence of actions must you take while using MS Word in Microsoft 365?
Ans	<p><input checked="" type="checkbox"/> 1. Select the entire text, go to the Insert tab, click Table, and select Quick Tables, then choose the appropriate style.</p> <p><input type="checkbox"/> 2. Select the entire text, go to the Insert tab, click Table, and select Convert Text to Table, then confirm that the separator character is set to Commas.</p> <p><input type="checkbox"/> 3. Select the entire text, open the Table Properties dialog box, navigate to the Row tab, and specify a fixed row height, which automatically triggers the conversion.</p> <p><input type="checkbox"/> 4. Select the entire text, go to the Layout tab (under Table Tools), select Text Direction, and choose the Convert Text to Table option.</p>
Q.41	Windows comes with a _____ that displays currently opened programs. It also allows users to access any specific programs.
Ans	<p><input checked="" type="checkbox"/> 1. task manager</p> <p><input type="checkbox"/> 2. taskbar</p> <p><input type="checkbox"/> 3. start menu</p> <p><input type="checkbox"/> 4. file explorer</p>

Q.42	The system software component _____ is responsible for booting up the computer system.
Ans	<input checked="" type="checkbox"/> 1. CLI/GUI <input checked="" type="checkbox"/> 2. BIOS/UEFI <input checked="" type="checkbox"/> 3. HDMI/VGA <input checked="" type="checkbox"/> 4. CGI/ETF

Q.43	Which of the following statements about Power Saving Mode in MS Word is TRUE?
Ans	<input checked="" type="checkbox"/> 1. MS Word automatically adjusts performance and reduces background operations when the computer's power-saving mode is enabled <input checked="" type="checkbox"/> 2. MS Word has a dedicated "Power Saving Mode" that reduces CPU usage and disables editing features <input checked="" type="checkbox"/> 3. Power Saving Mode in Word automatically converts all documents to plain text to save energy. <input checked="" type="checkbox"/> 4. Enabling Power Saving Mode in Word disables printing and spell-checking permanently

Q.44	In MS Excel, which option allows you to insert a new column between column B and C?
Ans	<input checked="" type="checkbox"/> 1. Right-click on Column C header → Insert <input checked="" type="checkbox"/> 2. Use "Clear Contents" option <input checked="" type="checkbox"/> 3. Right-click on Column B header → Delete <input checked="" type="checkbox"/> 4. Select Column C → Press Delete

Q.45	Which of the following is a correct combination of commonly used Internet services and their primary functions?
Ans	<input checked="" type="checkbox"/> 1. FTP – browsing websites; Email – live chatting; VoIP – printing files <input checked="" type="checkbox"/> 2. FTP – transferring files; VoIP – voice communication; Email – sending and receiving messages <input checked="" type="checkbox"/> 3. WWW – file transfer; Email – real-time video calling; Telnet – sending photos <input checked="" type="checkbox"/> 4. Email – remote access; WWW – file encryption; FTP – managing hardware drivers

Section : Mathematics

Q.46	Simplify: $[\{\sin^8\theta - \cos^8\theta\} \frac{1}{\sin^4\theta + \cos^4\theta}] + 2\cos^2\theta$
Ans	<input checked="" type="checkbox"/> 1. 1 <input checked="" type="checkbox"/> 2. 0 <input checked="" type="checkbox"/> 3. 2 <input checked="" type="checkbox"/> 4. -1

Q.47	If E and F are two mutually exclusive events such that $P(E) = \frac{1}{6}$ and $P(F) = \frac{1}{2}$, then find the $P(\text{not } E \text{ and not } F)$.
Ans	<input checked="" type="checkbox"/> 1. $\frac{2}{3}$ <input checked="" type="checkbox"/> 2. $\frac{5}{6}$ <input checked="" type="checkbox"/> 3. $\frac{1}{2}$ <input checked="" type="checkbox"/> 4. $\frac{1}{3}$

Q.48	The coordinates of the centroid of the triangle ABC whose vertices are A(-16, 13), B(-2, -9) and C(2, 13), is
Ans	<p>✗ 1. $\left(-\frac{14}{3}, \frac{18}{3}\right)$</p> <p>✗ 2. $\left(-\frac{16}{3}, \frac{15}{3}\right)$</p> <p>✗ 3. $\left(-\frac{17}{3}, \frac{17}{3}\right)$</p> <p>✓ 4. $\left(-\frac{16}{3}, \frac{17}{3}\right)$</p>
Q.49	Simplify $(2.5 \times 0.48 \div 0.6) + (3.5 + 1.6 \div 0.8) - (4.8 \times 0.25 \div 0.8)$.
Ans	<p>✗ 1. 8</p> <p>✗ 2. 6</p> <p>✗ 3. 7</p> <p>✓ 4. 5</p>
Q.50	The HCF of two numbers, each having three digits, is 19 and their LCM is 760. The number of such pairs is:
Ans	<p>✓ 1. 0</p> <p>✗ 2. 3</p> <p>✗ 3. 2</p> <p>✗ 4. 1</p>
Q.51	A hemispherical bowl has $\frac{992\pi}{3}$ cm ³ of water in it. If a ball of radius 2 cm is dropped into the bowl, the water level is raised up to the height of the bowl without any extra spillage of water out of the bowl. What is the radius of the bowl?
Ans	<p>✗ 1. 8 cm</p> <p>✗ 2. 6 cm</p> <p>✗ 3. 4 cm</p> <p>✓ 4. 2 cm</p>
Q.52	The angles of a triangle are $(2x + 5)^\circ$, x° and $(3x - 17)^\circ$. Find the value of x.
Ans	<p>✗ 1. 32</p> <p>✗ 2. 48</p> <p>✗ 3. 40</p> <p>✓ 4. 24</p>
Q.53	Triangle ABC is similar to triangle PQR. AM and PS are altitudes and AN and PT are medians. If $\frac{AM}{PS} = \frac{3}{5}$, the area of triangle PQR is 150 cm ² and BC = 6 cm, then the sum of the lengths of AM and QR is:
Ans	<p>✗ 1. 38 cm</p> <p>✗ 2. 28 cm</p> <p>✗ 3. 24 cm</p> <p>✓ 4. 36 cm</p>

Q.54 A cylindrical pillar is 28 cm in diameter and 25 m in height. Find the cost of painting the curved surface of the pillar at the rate of ₹50 per m².
(Use $\pi = \frac{22}{7}$)

Ans 1. ₹1100
 2. ₹1138
 3. ₹1080
 4. ₹1072

Q.55 Given that $112^{0.17} = x$, $112^{0.94} = y$ and $x^z = y^6$, then the value of z is close to:

Ans 1. 34.19
 2. 34.73
 3. 33.18
 4. 32.2

Q.56 The following table represents the marks obtained by six students in an aptitude test. Study the data carefully and answer the questions given below by matching the following types.

Student	A	B	C	D	E	F
Marks	48	50	52	55	60	65

Match the following (standard deviation values are rounded off to two decimal places):

A. Standard deviation of entire dataset	I. 5.88
B. Standard deviation of only the middle four values (B, C, D, E)	II. 3.77
C. Standard deviation of only first three values (A, B, C)	III. 4.08
D. Standard deviation of only last three values (D, E, F)	IV. 1.63

Ans 1. A - I, B - II, C - IV, D - III
 2. A - II, B - IV, C - III, D - I
 3. A - I, B - II, C - III, D - IV
 4. A - II, B - IV, C - I, D - III

Q.57 Find the product of all the possible values of 'a' for $a^2 x^2 + a^{3/2}x + 3 = 0$ to be a quadratic equation with discriminant 28a.

Ans 1. 0
 2. 14
 3. -12
 4. -28

Q.58 If the sum of the 8th and the 12th terms of an AP is 100, and the 20th term is 95, then what is the 7th term?

Ans 1. 37.5
 2. 38.5
 3. 39.5
 4. 36.5

Q.59 A kite is flying in the sky. A person is holding the kite with 40 m long tightly stretched string. Find the height of the kite (in meters) if the angle made by the string with the horizontal is 30 degrees.

Ans 1. 20
 2. 30
 3. 15
 4. 10

Q.60	If $a = 18$ and $d = 30$, then sum of first 6 terms of the A.P. is?
Ans	<input checked="" type="checkbox"/> 1. 555 <input checked="" type="checkbox"/> 2. 558 <input checked="" type="checkbox"/> 3. 559 <input checked="" type="checkbox"/> 4. 561

Q.61	<p>In a test, Chris has to answer two questions. The probability that he will answer the first question correctly is $\frac{1}{5}$. If he answers the first question correctly, the probability that he will answer the second question correctly is $\frac{5}{6}$. If Chris does not answer the first question correctly, the probability that he will answer the second question correctly is $\frac{1}{4}$. Find the probability that Chris will answer the second question INCORRECTLY.</p> <p>[Note: Assume that each question will be answered— either correctly or incorrectly.]</p>
Ans	<input checked="" type="checkbox"/> 1. $\frac{19}{30}$ <input checked="" type="checkbox"/> 2. $\frac{3}{5}$ <input checked="" type="checkbox"/> 3. $\frac{2}{3}$ <input checked="" type="checkbox"/> 4. $\frac{7}{10}$

Q.62	Find the coordinates of a point P on the x-axis which is equidistant from the points A(2,3) and B(-4,5).
Ans	<input checked="" type="checkbox"/> 1. (3,0) <input checked="" type="checkbox"/> 2. (-7,0) <input checked="" type="checkbox"/> 3. $(-\frac{7}{3}, 0)$ <input checked="" type="checkbox"/> 4. $(\frac{1}{4}, 0)$

Q.63	If X and Y are two sets such that $X \cup Y$ has 56 elements, X has 45 elements and Y has 33 elements, how many elements does $X \cap Y$ have ?
Ans	<input checked="" type="checkbox"/> 1. 13 <input checked="" type="checkbox"/> 2. 22 <input checked="" type="checkbox"/> 3. 19 <input checked="" type="checkbox"/> 4. 25

Q.64	If the roots of the equation $x^2 - 5x + 6 = 0$ are α and β , find the value of $\alpha^2 + \beta^2$:
Ans	<input checked="" type="checkbox"/> 1. 13 <input checked="" type="checkbox"/> 2. 6 <input checked="" type="checkbox"/> 3. 12 <input checked="" type="checkbox"/> 4. 5

Q.65	The number of elements in the Power set $P(S)$ of the set $S = \{1, 2, 3, 4, 5, 6, 7, 8\}$ is:
Ans	<input checked="" type="checkbox"/> 1. 250 <input checked="" type="checkbox"/> 2. 256 <input checked="" type="checkbox"/> 3. 247 <input checked="" type="checkbox"/> 4. 258

Section : Basic Science and Engineering

Q.66	Two transistor biasing circuits have stability factors $S_1 = 101$ and $S_2 = 15$. Which circuit offers better thermal stability?
Ans	<input checked="" type="checkbox"/> 1. Both have equal stability <input checked="" type="checkbox"/> 2. Circuit 1 <input checked="" type="checkbox"/> 3. Cannot be compared <input checked="" type="checkbox"/> 4. Circuit 2

Q.67	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:
Ans	<input checked="" type="checkbox"/> 1. Hole mobility increases in the collector region <input checked="" type="checkbox"/> 2. The collector resistance decreases due to depletion region expansion <input checked="" type="checkbox"/> 3. The emitter injection efficiency decreases <input checked="" type="checkbox"/> 4. The effective base width decreases with collector–base voltage

Q.68	If the potential difference across a resistor is doubled while resistance remains constant, the power consumed becomes _____.
Ans	<input checked="" type="checkbox"/> 1. four times <input checked="" type="checkbox"/> 2. double <input checked="" type="checkbox"/> 3. half <input checked="" type="checkbox"/> 4. one-fourth

Q.69	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 _____.
Ans	<input checked="" type="checkbox"/> 1. 1:4 <input checked="" type="checkbox"/> 2. 1:2 <input checked="" type="checkbox"/> 3. 4:1 <input checked="" type="checkbox"/> 4. 2:1

Q.70	When several resistors are connected in series, which physical quantity has an identical value across each resistor?
Ans	<input checked="" type="checkbox"/> 1. Power <input checked="" type="checkbox"/> 2. Voltage <input checked="" type="checkbox"/> 3. Current <input checked="" type="checkbox"/> 4. Resistance

Q.71	Which of the following statements correctly describes weight?
Ans	<input checked="" type="checkbox"/> 1. Weight is measured in kilograms <input checked="" type="checkbox"/> 2. Weight has both magnitude and direction <input checked="" type="checkbox"/> 3. Weight only shows how heavy something is <input checked="" type="checkbox"/> 4. Weight has no direction

Q.72	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 $R=10\Omega$.
Ans	<p><input type="checkbox"/> 1. 1.414A</p> <p><input type="checkbox"/> 2. 0.071A</p> <p><input checked="" type="checkbox"/> 3. 0.71 A</p> <p><input type="checkbox"/> 4. 0.14 A</p>
Q.73	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?
Ans	<p><input checked="" type="checkbox"/> 1. 2 AND gates and 1 NOT gate</p> <p><input type="checkbox"/> 2. 3 AND gates and 2 NOT gates</p> <p><input type="checkbox"/> 3. 3 AND gates and 3 NOT gates</p> <p><input type="checkbox"/> 4. 4 AND gates and 3 NOT gates</p>
Q.74	A 5 kg object experiences a gravitational force of about 49 N on Earth. This implies the value of g used is approximately:
Ans	<p><input type="checkbox"/> 1. 19.6 m/s^2</p> <p><input type="checkbox"/> 2. 9.8 m/s^2</p> <p><input type="checkbox"/> 3. 4.9 m/s^2</p> <p><input checked="" type="checkbox"/> 4. 2 m/s^2</p>
Q.75	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 _____.
Ans	<p><input type="checkbox"/> 1. $2\pi r^2 B$</p> <p><input type="checkbox"/> 2. $2\pi r B$</p> <p><input checked="" type="checkbox"/> 3. Br</p> <p><input type="checkbox"/> 4. $\pi r^2 B$</p>
Q.76	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?
Ans	<p><input type="checkbox"/> 1. 10 W</p> <p><input type="checkbox"/> 2. 30 W</p> <p><input type="checkbox"/> 3. 15 W</p> <p><input checked="" type="checkbox"/> 4. 5 W</p>
Q.77	In a parallel connection, if one resistor breaks (open circuit) then _____.
Ans	<p><input type="checkbox"/> 1. Other branches keep working</p> <p><input type="checkbox"/> 2. Battery gets damaged</p> <p><input type="checkbox"/> 3. Voltage becomes zero</p> <p><input checked="" type="checkbox"/> 4. The entire circuit stops working</p>
Q.78	The resistivity of a semiconductor decreases with the increase in temperature because:
Ans	<p><input checked="" type="checkbox"/> 1. Band gap increases</p> <p><input type="checkbox"/> 2. Lattice vibrations stop</p> <p><input type="checkbox"/> 3. More charge carriers are generated</p> <p><input type="checkbox"/> 4. Electrons lose energy</p>

Q.79	Port 0 of the 8051 microcontroller differs architecturally from the other ports primarily because:
Ans	<p><input type="checkbox"/> 1. It is reserved only for memory expansion</p> <p><input checked="" type="checkbox"/> 2. It does not contain internal pull-up resistors</p> <p><input type="checkbox"/> 3. It cannot function as an output port</p> <p><input type="checkbox"/> 4. It is not bit-addressable</p>
Q.80	Which of the following materials acts as a good insulator in electric circuits?
Ans	<p><input type="checkbox"/> 1. Plastic</p> <p><input type="checkbox"/> 2. Graphite</p> <p><input checked="" type="checkbox"/> 3. Iron rod</p> <p><input type="checkbox"/> 4. Mercury</p>
Q.81	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 _____.
Ans	<p><input type="checkbox"/> 1. 1.0 N</p> <p><input type="checkbox"/> 2. 0.04 N</p> <p><input type="checkbox"/> 3. 5.0 N</p> <p><input checked="" type="checkbox"/> 4. 0.2 N</p>
Q.82	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 _____.
Ans	<p><input type="checkbox"/> 1. 16 ms</p> <p><input type="checkbox"/> 2. 8 ms</p> <p><input checked="" type="checkbox"/> 3. 2 ms</p> <p><input type="checkbox"/> 4. 4 ms</p>
Q.83	Ohm's law may NOT hold true when _____.
Ans	<p><input checked="" type="checkbox"/> 1. The temperature of the conductor remains constant</p> <p><input type="checkbox"/> 2. The material obeys linear V-I relation</p> <p><input type="checkbox"/> 3. The temperature of the conductor increases</p> <p><input type="checkbox"/> 4. The conductor is metallic</p>
Q.84	The SI unit of specific resistance (resistivity) is _____.
Ans	<p><input type="checkbox"/> 1. ohm per square metre</p> <p><input checked="" type="checkbox"/> 2. ohm</p> <p><input type="checkbox"/> 3. ohm-metre</p> <p><input type="checkbox"/> 4. ohm per metre</p>
Q.85	Magnetic flux depends on :
Ans	<p><input type="checkbox"/> 1. Area, magnitude of B and its orientation</p> <p><input type="checkbox"/> 2. Only area</p> <p><input checked="" type="checkbox"/> 3. Only magnetic field</p> <p><input type="checkbox"/> 4. Only angle</p>
Q.86	Which of the following correctly defines the electric field at a point?
Ans	<p><input type="checkbox"/> 1. Energy per unit area</p> <p><input type="checkbox"/> 2. Energy available per unit charge</p> <p><input type="checkbox"/> 3. Force acting per unit charge</p> <p><input checked="" type="checkbox"/> 4. Force acting per unit mass</p>

Q.87	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 _____.
Ans	<p><input type="checkbox"/> 1. Tripled</p> <p><input checked="" type="checkbox"/> 2. Constant</p> <p><input type="checkbox"/> 3. Reduced to half</p> <p><input type="checkbox"/> 4. Doubled</p>
Q.88	One coulomb of charge is approximately equal to the charge of _____.
Ans	<p><input type="checkbox"/> 1. 6×10^6 electrons</p> <p><input type="checkbox"/> 2. 6×10^{18} electrons</p> <p><input type="checkbox"/> 3. 6×10^{12} electrons</p> <p><input checked="" type="checkbox"/> 4. 6×10^{10} electrons</p>
Q.89	The force on a current-carrying conductor in a magnetic field is maximum when _____.
Ans	<p><input checked="" type="checkbox"/> 1. The current is parallel to the magnetic field</p> <p><input type="checkbox"/> 2. The current is perpendicular to the magnetic field</p> <p><input type="checkbox"/> 3. The current is opposite to the magnetic field</p> <p><input type="checkbox"/> 4. The magnetic field is zero</p>
Q.90	Which of the following quantities remains the same at all locations in the universe?
Ans	<p><input checked="" type="checkbox"/> 1. Weight</p> <p><input type="checkbox"/> 2. Gravitational force</p> <p><input type="checkbox"/> 3. Mass</p> <p><input type="checkbox"/> 4. Apparent weight</p>
Q.91	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?
Ans	<p><input type="checkbox"/> 1. The average value of $v_D(t)$ becomes zero if the diode orientation is reversed.</p> <p><input checked="" type="checkbox"/> 2. The average values of $v_L(t)$ and $v_D(t)$ are equal in magnitude and opposite in sign.</p> <p><input type="checkbox"/> 3. The rms value of $v_D(t)$ equals the rms value of the source voltage.</p> <p><input type="checkbox"/> 4. The average value of $v_D(t)$ is zero because the diode conducts for half the cycle.</p>
Q.92	Which device converts mechanical energy into electrical energy through electromagnetic induction?
Ans	<p><input type="checkbox"/> 1. Battery</p> <p><input checked="" type="checkbox"/> 2. Electric motor</p> <p><input type="checkbox"/> 3. Electric generator</p> <p><input type="checkbox"/> 4. Capacitor</p>
Q.93	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?
Ans	<p><input type="checkbox"/> 1. $3 \frac{N}{C}$</p> <p><input checked="" type="checkbox"/> 2. $2 \frac{N}{C}$</p> <p><input type="checkbox"/> 3. $5 \frac{N}{C}$</p> <p><input type="checkbox"/> 4. $4 \frac{N}{C}$</p>

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Q.94	In 8051 microcontroller, PSEN is an _____ output signal used as a read strobe for accessing the _____ memory.
Ans	<p><input type="checkbox"/> 1. active high, internal ram</p> <p><input type="checkbox"/> 2. active low, external program</p> <p><input type="checkbox"/> 3. active low, internal ram</p> <p><input checked="" type="checkbox"/> 4. active high, external program</p>
Q.95	Which symbol is used to represent a resistor in a circuit diagram?
Ans	<p><input type="checkbox"/> 1. Circle with pointer</p> <p><input type="checkbox"/> 2. Arrow mark</p> <p><input checked="" type="checkbox"/> 3. Zig-zag line</p> <p><input type="checkbox"/> 4. Two parallel plates</p>
Q.96	Two resistors $6\ \Omega$ and $3\ \Omega$ are connected in parallel. The total resistance is:
Ans	<p><input checked="" type="checkbox"/> 1. $2\ \Omega$</p> <p><input type="checkbox"/> 2. $4\ \Omega$</p> <p><input type="checkbox"/> 3. $9\ \Omega$</p> <p><input type="checkbox"/> 4. $1\ \Omega$</p>
Q.97	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?
Ans	<p><input type="checkbox"/> 1. NOT gate (Inverter)</p> <p><input type="checkbox"/> 2. OR gate</p> <p><input checked="" type="checkbox"/> 3. AND gate</p> <p><input type="checkbox"/> 4. XOR gate</p>
Q.98	A resistor of $10\ \Omega$ 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 _____.
Ans	<p><input type="checkbox"/> 1. $15\ \Omega$</p> <p><input type="checkbox"/> 2. $10\ \Omega$</p> <p><input checked="" type="checkbox"/> 3. $5\ \Omega$</p> <p><input type="checkbox"/> 4. $20\ \Omega$</p>
Q.99	If a uniform magnetic field is parallel to the plane of a surface, the magnetic flux through the surface is _____.
Ans	<p><input type="checkbox"/> 1. infinite</p> <p><input type="checkbox"/> 2. zero</p> <p><input checked="" type="checkbox"/> 3. maximum</p> <p><input type="checkbox"/> 4. half of maximum</p>
Q.100	Which of the following is a fundamental (base) quantity in the SI system?
Ans	<p><input type="checkbox"/> 1. Work</p> <p><input type="checkbox"/> 2. Pressure</p> <p><input type="checkbox"/> 3. Force</p> <p><input checked="" type="checkbox"/> 4. Mass</p>