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सत्यमेव जयते

# रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD
## सीईएन ०२/२०२६ - तकनीशियन ग्रेड I सिगनल और तकनीशियन ग्रेड III
## CEN 02/2026 - Technician Grade I Signal and Technician Grade III

| | |
|---|---|
| Test Date | 09/10/2026 |
| Test Time | 4:30 PM - 6:00 PM |
| 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 Which of the following is NOT a constitutional function of the Vice-President of India?**

**Ans**
✗ A. Serving as the ex officio Chairman of the Rajya Sabha
✗ B. Performing the functions of the President during the latter's absence
✓ C. Presiding over joint sittings of Parliament
✗ D. Acting as the President during a vacancy in that office

**Q.2 Which one of the following sets consists only of Sushir Vadya (wind instruments)?**

**Ans**
✓ A. Flute, Shehnai, Nadaswaram
✗ B. Manjira, Kartal, Jal Tarang
✗ C. Veena, Sitar, Sarod
✗ D. Tabla, Pakhawaj, Dholak

**Q.3 Who is the author of the book 'Karuna: The Power of Compassion', published in 2026?**

**Ans**
✗ A. Chetan Bhagat
✗ B. Shashi Tharoor
✓ C. Kailash Satyarthi
✗ D. Amartya Sen

**Q.4 Which British Act first made it compulsory to set aside a specific amount of funds for the development of education in India?**

**Ans**
✗ A. Indian Councils Act, 1892
✗ B. Regulating Act, 1773
✗ C. Charter Act, 1853
✓ D. Charter Act, 1813

**Q.5 Where was the 68th Session of the Asian Productivity Organization (APO) Governing Body held in May 2026?**

**Ans**
✗ A. Kochi
✗ B. Bengaluru
✗ C. Bhopal
✓ D. New Delhi

**Q.6 Which of the following was the theme of the 20th Statistics Day observed by the Ministry of Statistics and Programme Implementation on 29 June 2026?**

**Ans**
✗ A. Data for Sustainable Development
✓ B. Unlocking the Potential of Administrative Data
✗ C. Statistics for Nation Building
✗ D. Digital India Through Data

**Q.7** **Which policy instrument most directly drives the structural expansion of Rural Non-Farm Employment (RNFE) in India?**

**Ans**
- ✗ A. Food security through Public Distribution System
- ✗ B. Stabilization of farm product prices via MSP
- ✓ C. Promotion of self-employment under NRLM
- ✗ D. Provision of input subsidies to farmers

**Q.8** **Which of the following Indian states shares an international border with Pakistan?**

**Ans**
- ✓ A. Gujarat
- ✗ B. Bihar
- ✗ C. Uttar Pradesh
- ✗ D. Haryana

**Q.9** **Which policy/mechanism enabled the Portuguese to control maritime trade in the Indian Ocean during the early 16th century?**

**Ans**
- ✗ A. Subsidiary Alliance
- ✗ B. Doctrine of Lapse
- ✓ C. Cartaz System
- ✗ D. Forward Policy

**Q.10** **Which incident prompted Mahatma Gandhi to suspend the Non-Cooperation Movement in 1922?**

**Ans**
- ✗ A. Simon Commission's arrival
- ✗ B. Jallianwala Bagh massacre
- ✗ C. Bardoli Satyagraha
- ✓ D. Chauri Chaura incident

Section : **General Intelligence and Reasoning**

**Q.11** **Refer to the following letter, symbol series and answer the question. Counting to be done from left to right only.**
**(Left) $ C $ @ M * Y @ * Z A £ & C $ % © F M % % $ (Right)**
**How many such symbols are there each of which is immediately preceded by a letter and also immediately followed by a letter?**

**Ans**
- ✗ A. 2
- ✓ B. 1
- ✗ C. 4
- ✗ D. 3

**Q.12** **What should come in place of the question mark (?) in the given series?**

**277 232 191 154 121 92 ?**

**Ans**
- ✗ A. 71
- ✗ B. 63
- ✓ C. 67
- ✗ D. 76

**Q.13** **If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', what will come in place of question mark '?' in the following equation?**
**11 B 3 C 6 D 4 A 2 = ?**

**Ans**
- ✗ A. 36
- ✓ B. 37
- ✗ C. 38
- ✗ D. 35

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**Q.14** **Select the pair which follows the same pattern as that followed by the two set of pairs given below. Both pairs follow the same pattern.**
**BDK - FGM**
**RJL - VMN**

**Ans**
- ✗ A. SVV - YXW
- ✗ B. SWV - VRY
- ✗ C. SWV - WYX
- ✓ D. SVV - WYX

**Q.15** **In a certain code language,**
**A @ B means 'A is the daughter of B',**
**A # B means 'A is the brother of B',**
**A $ B means 'A is the wife of B',**
**A % B means 'A is the father of B'.**

**Based on the above, how is Cori related to Vishal if 'Cori @ Gagan % Yasha # Jagriti $ Vishal'?**

**Ans**
- ✗ A. Wife's mother
- ✓ B. Wife's sister
- ✗ C. Sister
- ✗ D. Mother

**Q.16** **32 is related to 129 following a certain logic. Following the same logic, 44 is related to 177. To which of the following is 82 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**
- ✗ A. 327
- ✓ B. 329
- ✗ C. 342
- ✗ D. 334

**Q.17** **Based on the English alphabetical order, three of the following four letter cluster pairs are alike in a certain way and thus form a group. Which is the one that 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.)**

**Ans**
- ✗ A. KM – SU
- ✗ B. BD – JL
- ✓ C. AC – HI
- ✗ D. HL – PT

**Q.18** **Raghav starts from Point A and drives 7 km towards west. He then takes a right turn, drives 4 km, turns right and drives 11 km. He then takes a right turn and drives 10 km. He takes a final right turn, drives 4 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°turns only unless specified.)**

**Ans**
- ✗ A. 7 km to the north
- ✗ B. 7 km to the south
- ✓ C. 6 km to the north
- ✗ D. 6 km to the south

**Q.19** **In a certain code language, 'angle skill add' is coded as 'ep ba zl' and 'snake cow angle' is coded as 'ba eu cp'. How is 'angle' coded in the given language?**

**Ans**
- ✗ A. ep
- ✓ B. ba
- ✗ C. zl
- ✗ D. eu

**Q.20** **Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?**

**VSU 28 TQS 36 ROQ 44 PMO 52 ?**

**Ans**
✔ A. NKM 60
✘ B. NJL 59
✘ C. NJL 60
✘ D. NKM 59

**Q.21** **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 decide the appropriate answer.**
**Question: Among five rods, M, N, O, P and Q, each having a different length, which rod is the shortest?**
**Statements:**
**(I) P is longer than N but shorter than Q. O is shorter than only one rod.**
**(II) Q is not the shortest.**

**Ans**
✘ A. Data in both statements I and II together are NOT sufficient to answer the question.
✘ B. Data in statement I alone is sufficient to answer the question while data in statement II is not.
✘ C. Data in statement II alone is sufficient to answer the question while data in statement I is not.
✔ D. Data in both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question.

**Q.22** **This question is based on the following words.**
**RUN NET SEE DEN**
**How many letters are there in the English alphabetical order between the first letter of the second word from the right and the second letter of the first word from the left?**

**Ans**
✘ A. 2
✘ B. 6
✘ C. 4
✔ D. 1

**Q.23** **Each of P, Q, R, S, T, U and V play a game on different days of a week, starting from Monday and ending on Sunday of the same week. Q plays the game on Thursday. Only one person plays between Q and S, but S does not play on Saturday. Only V plays between T and R, but T does not play on the last day. Only two persons play between V and U. On which day does U play the game?**

**Ans**
✘ A. Monday
✘ B. Tuesday
✘ C. Friday
✔ D. Wednesday

**Q.24** **In a certain code,**
**'students attends online classes' is coded as 'ul pv um ji',**
**'learning classes improves skills' is coded as 'ly np pv ci' and**
**'online meeting communication learning' is coded as 'um bh gh np'.**
**(All the codes are two-letter codes only.)**

**What is the possible code for 'skills'?**

**Ans**
✔ A. Either 'ci' or 'ly'
✘ B. Either 'ci' or 'pv'
✘ C. Either 'um' or 'ci'
✘ D. Either 'pv' or 'np'

**Q.25** **Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of :: ?**
**# : TDO :: PZK : %**

**Ans**
✘ A. # = NWH; % = WGR
✘ B. # = MWH; % = WGO
✘ C. # = MUH; % = WGR
✔ D. # = MWH; % = WGR

Section : **Basics of Computers and Application**

**Q.26** **If you want to rename a file without changing its location using a graphical interface, what would you typically do?**

**Ans**
- ✔ A. Right-click the file and select 'Rename'
- ✘ B. Drag the file to a new folder
- ✘ C. Delete the file and create a new one
- ✘ D. Open the file and click 'Save As'

**Q.27** **Which menu in MS PowerPoint allows you to insert a Word Table or an Excel Worksheet into a slide?**

**Ans**
- ✘ A. Design
- ✘ B. View
- ✔ C. Insert
- ✘ D. Review

**Q.28** **Lata wants to quickly copy all objects in her graphic editing tool using only keyboard shortcuts. Which Ctrl key combination should she try with the keys Tab, C, V, S, or F?**

**Ans**
- ✘ A. Ctrl + V
- ✘ B. Ctrl + Tab
- ✘ C. Ctrl + F
- ✔ D. Ctrl + C

**Q.29** **Which security practice is most effective for preventing unauthorized network access in a corporate environment?**

**Ans**
- ✘ A. Regularly updating all operating systems
- ✔ B. Implementing multi-factor authentication for all users
- ✘ C. Using only strong passwords for all accounts
- ✘ D. Segmenting the network into isolated subnets

**Q.30** **A regional news agency plans to launch a digital reporting platform for field journalists using tablets and mobile phones. The agency needs an operating system that can seamlessly coordinate real-time voice dictation, offline data storage, and integration with custom geo-tagging software, while ensuring that periodic OS updates do not disrupt these specialized functions. Which strategy is most likely to ensure long-term reliability and functional stability for their field devices?**

**Ans**
- ✘ A. Rely on a cloud-based OS interface accessed from browser apps
- ✘ B. Use standard consumer mobile OS with automatic updates enabled
- ✔ C. Deploy devices running a customizable open-source mobile OS with enterprise-level update controls
- ✘ D. Select proprietary tablet OS optimized for gaming applications

**Q.31** **Which method ensures that sensitive files cannot be read by unauthorized users even if the files are copied?**

**Ans**
- ✔ A. Encryption
- ✘ B. Antivirus software
- ✘ C. Password protection
- ✘ D. Firewall

**Q.32** **Which situation most clearly demonstrates the consequence of weak cyber security in a business?**

**Ans**
- ✔ A. A retailer's customer credit card details are stolen in a data breach
- ✘ B. Employees receive training in customer service
- ✘ C. Computers run slowly due to outdated equipment
- ✘ D. Staff turnover increases due to workplace stress

**Q.33** **Which feature distinguishes e-commerce from traditional retail most directly?**

**Ans**
- ✔ A. Ability to conduct transactions over the internet
- ✘ B. Exclusive in-store product advertising
- ✘ C. Use of paper-based customer service forms
- ✘ D. Manual management of inventory records

**Q.34** **A student wants to secure their laptop used in public spaces. Which action provides the most effective protection against physical theft?**

**Ans**
- ✗ A. Installing updated antivirus software
- ✗ B. Enabling guest accounts for visitors
- ✗ C. Creating regular backups of important files
- ✓ D. Using a security cable lock attached to the laptop

**Q.35** **During a mail merge in MS Word, a team wants to send personalized invitations to event attendees, each including a custom seat number. Which step ensures the seat numbers appear correctly for every recipient?**

**Ans**
- ✗ A. Add the seat number manually for every recipient
- ✗ B. Select the print option before merging the data
- ✓ C. Insert the seat number field from the data source into the main document
- ✗ D. Insert a static seat number in the main document

**Q.36** **A small non-profit organization wants to generate customized mailing labels for donors using MS Word, but needs to ensure that each label pulls the correct address from an imported spreadsheet. Which step is essential to correctly link the spreadsheet data so that each label displays the right donor information?**

**Ans**
- ✗ A. Copying and pasting each donor's address into the label template manually
- ✗ B. Printing a test page before inserting any donor information
- ✗ C. Opening the spreadsheet in Word before starting the label mail merge
- ✓ D. Inserting merge fields into the label template after connecting the spreadsheet data source

**Q.37** **Where can you access the option to add a header or footer to your PowerPoint slides?**

**Ans**
- ✗ A. In the Review tab
- ✓ B. In the Insert tab
- ✗ C. In the Transitions tab
- ✗ D. In the Design tab

**Q.38** **A student wants search results free from personalized tracking and based on aggregated results from multiple sources. Which search engine best fits this description?**

**Ans**
- ✗ A. Bing
- ✗ B. Google
- ✗ C. Yahoo
- ✓ D. DuckDuckGo

**Q.39** **In a spreadsheet for managing a complex scheduling system, a user sets up a custom sequence for project codes starting with Z9A, incrementing alphabetically in the third character while resetting to A after Z (e.g., Z9A, Z9B, ..., Z9Z, Z9AA, ...). After dragging the fill handle to extend this pattern, the resulting series unexpectedly jumps from Z9Z to Z10A instead of Z9AA. Which underlying setup error most likely caused this deviation in the series progression?**

**Ans**
- ✗ A. The cell range selected for autofill was too short, leading Excel to repeat the last value rather than continue the series.
- ✓ B. The sequence generation treated the numeric part as incrementable instead of recognizing the intended alphanumeric pattern.
- ✗ C. The cell formatting for the series was set to Text instead of General, causing the fill handle to misinterpret the pattern.
- ✗ D. A custom list for the series was not configured in the spreadsheet settings, so Excel reverted to its default number increment rule.

**Q.40** **While overseeing a team developing specialized software for tracking wildlife rehabilitation data, a project manager must select the most suitable type of application software for this purpose. Which approach best aligns with the project's needs, considering factors such as adaptability, data specificity, and integration with existing databases?**

**Ans**
- ✗ A. Adapting a standard accounting package to track animal records
- ✗ B. Using a generic office suite with templates for manual data entry
- ✗ C. Relying on open-source media editing software for record storage
- ✓ D. Commissioning a custom-built data management application designed for wildlife rehabilitation workflows

**Q.41** **While editing a confidential report in a spreadsheet, Jayne wants to move a selected block of text from one sheet to another, then immediately undo the move and instead duplicate the same block in a third sheet. If she uses only keyboard shortcuts involving Ctrl, Tab and the letters C, V, S, X, Z and F (and no mouse or menu), in what sequence must she apply these shortcuts to complete this task correctly without data loss?**

**Ans**
- ✗ A. First Ctrl+S, then Ctrl+X, next Ctrl+F, and finally Ctrl+Tab followed by Ctrl+V
- ✓ B. First Ctrl+X, then Ctrl+V, next Ctrl+Z, and finally Ctrl+C followed by Ctrl+V
- ✗ C. First Ctrl+V, then Ctrl+C, next Ctrl+Tab, and finally Ctrl+F followed by Ctrl+V
- ✗ D. First Ctrl+C, then Ctrl+V, next Ctrl+S, and finally Ctrl+X followed by Ctrl+V

**Q.42** **Which type of virus is most likely to spread through shared USB devices?**

**Ans**
- ✓ A. Boot sector virus
- ✗ B. Network worm
- ✗ C. File-infecting virus
- ✗ D. Macro virus

**Q.43** **What is the result of double-clicking the boundary between two row numbers in MS Excel?**

**Ans**
- ✗ A. The column width changes to fit the longest entry
- ✗ B. The selected row is deleted
- ✓ C. The row height automatically adjusts to fit the tallest content
- ✗ D. The selected rows are merged

**Q.44** **Which feature in MS PowerPoint allows you to display repeating information such as page numbers or date on all slides while maintaining a cohesive design?**

**Ans**
- ✗ A. Using separate title slides
- ✗ B. Inserting text boxes on individual slides
- ✗ C. Changing background images on each slide
- ✓ D. Adding headers and footers to the slide master

**Q.45** **A team leader asks you to format a project summary in Word so that all numbered lists instantly change their indentation settings whenever you adjust the corresponding icon below the menu bar. Which sequence of actions most directly achieves this objective without affecting other paragraph styles or manually updating each list?**

**Ans**
- ✓ A. First, select the numbered lists, then use the increase indent icon below the menu bar.
- ✗ B. First, select the numbered lists, then use the paragraph alignment icon below the menu bar.
- ✗ C. First, select the numbered lists, then use the bold icon below the menu bar.
- ✗ D. First, select the numbered lists, then use the decrease indent icon below the menu bar.

Section : **Mathematics**

**Q.46** **A set X has 5 elements; find the number of proper subsets of X.**

**Ans**
- ✗ A. 25
- ✗ B. 64
- ✓ C. 31
- ✗ D. 32

**Q.47** **The product of two consecutive positive natural numbers is 156. The greater of the two numbers is:**

**Ans**
- ✗ A. 23
- ✗ B. 27
- ✗ C. 7
- ✓ D. 13

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**Q.48** **In a survey of 3125 people, 863 like tea and 2561 like coffee. The minimum number of people who like both tea and coffee, given that each of the surveyed people like at least one drink between tea and coffee, is:**

**Ans**
- ✗ A. 308
- ✗ B. 294
- ✗ C. 305
- ✓ D. 299

**Q.49** **The midpoint of a line segment joining two points P(-14, 4) and Q(2, -4) is:**

**Ans**
- ✗ A. (-4, 1)
- ✓ B. (-6, 0)
- ✗ C. (-7, 0)
- ✗ D. (-6, -2)

**Q.50** **Find the greatest number that exactly divides 294, 210, and 378.**

**Ans**
- ✗ A. 28
- ✗ B. 63
- ✗ C. 21
- ✓ D. 42

**Q.51** **The angle of elevation of the top of a tower at a point P on the ground is 30°. On walking 36 m towards the tower, the angle of elevation becomes 60°. The height of the tower is:**

**Ans**
- ✓ A. $18\sqrt{3}$ m
- ✗ B. $6\sqrt{3}$ m
- ✗ C. $12\sqrt{3}$ m
- ✗ D. $36\sqrt{3}$ m

**Q.52** **A solid cone has a height of 24 cm and a base radius of 7 cm. It is cut by a plane parallel to the base at a point 16 cm from the vertex. After removing the smaller cone, the remaining frustum is obtained. Find the total surface area of the frustum.**

**Ans**
- ✗ A. 300 $cm^2$
- ✓ B. 168π $cm^2$
- ✗ C. 140π $cm^2$
- ✗ D. 336 $cm^2$

**Q.53** If the sum of the roots of the equation $2x^4 - kx^3 + 4x^2 + 5x - 8 = 0$ is 3, find k.

**Ans**
- ✓ A. 6
- ✗ B. 4
- ✗ C. 5
- ✗ D. 3

**Q.54** If $\tan^2 x = 1 - a^2$, then the value of $\sec x + \tan^3 x \operatorname{cosec} x$ is:

**Ans**
- ✗ A. $(1 - a^2)^{\frac{3}{2}}$
- ✓ B. $(2 - a^2)^{\frac{3}{2}}$
- ✗ C. $(2 + a^2)^{\frac{3}{2}}$
- ✗ D. $(1 + a^2)^{\frac{3}{2}}$

**Q.55** **The area of a square field is 6561 $m^2$. Its perimeter (in m) is:**

**Ans**
- ✗ A. 306
- ✗ B. 288
- ✗ C. 342
- ✓ D. 324

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**Q.56** **Choose the true statement representing union distributing over intersection.**

**Ans**
- ✗ A. ∩(U)=(∩)∩(∩)
- ✗ B. AU(B∩C)=(A∩B)U(A∩C)
- ✗ C. A∩(BUC)=(AUB)∩(A∩C)
- ✓ D. AU(B∩C)=(AUB)∩(AUC)

**Q.57** **The salaries (in ₹1,000) of 6 employees are 30, 35, 40, 50, 60, and 200. The range of this data is recorded. If the highest salary (₹200,000) is removed, what will be the difference between the new range and the original range?**

**Ans**
- ✗ A. 170 (in ₹1,000)
- ✗ B. 60 (in ₹1,000)
- ✗ C. 80 (in ₹1,000)
- ✓ D. 140 (in ₹1,000)

**Q.58** **Ram and Shyam are two candidates seeking admission to a coaching institute. Assume that their selections are independent. The probability that Ram is selected is 0.8, and the probability that exactly one of them is selected is 0.7. Find the probability that Shyam is selected.**

**Ans**
- ✓ A. $\frac{1}{6}$
- ✗ B. $\frac{4}{9}$
- ✗ C. $\frac{2}{9}$
- ✗ D. $\frac{3}{8}$

**Q.59** **The weights of 5 ear-heads of sorghum are 100, 102,118,124,126 grams. Find the standard deviation.**
**(Round off your answer to two decimal places.)**

**Ans**
- ✗ A. 14.15 grams
- ✗ B. 12.25 grams
- ✗ C. 11.22 grams
- ✓ D. 10.95 grams

**Q.60** **The sides of two similar triangles are in the ratio 3 : 5. If the area of the smaller triangle is 108 $cm^2$, then find the area of the larger triangle.**

**Ans**
- ✗ A. 230 $cm^2$
- ✗ B. 260 $cm^2$
- ✓ C. 300 $cm^2$
- ✗ D. 320 $cm^2$

**Q.61** **A line passes through the point (4,3) and intercepts the x-axis at 8. Find its y-intercept.**

**Ans**
- ✗ A. 3 units
- ✗ B. 1 unit
- ✗ C. 4 units
- ✓ D. 6 units

**Q.62** **Two fair dice are rolled. What is the probability that the sum is a prime number?**

**Ans**
- ✗ A. $\frac{1}{3}$
- ✗ B. $\frac{7}{18}$
- ✗ C. $\frac{1}{2}$
- ✓ D. $\frac{5}{12}$

**Q.63** **The 36th term of an arithmetic progression whose first and second terms are 35 and 50, respectively, is:**

**Ans**
- ✗ A. 545
- ✗ B. 575
- ✓ C. 560
- ✗ D. 525

**Q.64** **If the ratio of two numbers is 4 : 1, and their HCF is 47, then their LCM is:**

**Ans**
- ✗ A. 376
- ✓ B. 188
- ✗ C. 94
- ✗ D. 47

**Q.65** **If 3 arithmetic means are inserted between 8 and 24, then the second arithmetic mean is:**

**Ans**
- ✗ A. 18
- ✗ B. 12
- ✗ C. 14
- ✓ D. 16

Section : **Basic Science and Engineering**

**Q.66** **Why does Ohm's Law fail for a filament bulb as it heats up?**

**Ans**
- ✓ A. The resistance increases with temperature
- ✗ B. The current always decreases
- ✗ C. The bulb turns off at high voltage
- ✗ D. The resistance stays constant

**Q.67** **An electron moves perpendicular to a magnetic field of 0.5 T with a speed of $2 \times 10^6$ m/s. If the magnitude of the electronic charge is $1.6 \times 10^{-19}$ C, what is the magnetic force acting on the electron?**

**Ans**
- ✗ A. $3.2 \times 10^{-13}$ N
- ✓ B. $1.6 \times 10^{-13}$ N
- ✗ C. $6.4 \times 10^{-13}$ N
- ✗ D. $8.0 \times 10^{-14}$ N

**Q.68** **Which property of a test system does NOT influence the intrinsic electric field vector created by a stationary source charge at a given observation point?**

**Ans**
- ✓ A. The magnitude of the charge carried by the test particle
- ✗ B. The permittivity of the surrounding dielectric medium
- ✗ C. The radial distance from the source charge location
- ✗ D. The algebraic sign of the stationary source charge

**Q.69** **For two equal positive point charges, what is the direction of the individual electric field components created by each charge in the region between them?**

**Ans**
- ✗ A. Toward each charge
- ✗ B. Zero everywhere between them
- ✗ C. Circling both charges
- ✓ D. Away from each charge

**Q.70** **A spring is compressed and stores 50 J of elastic potential energy. It is attached to a block resting on a frictionless horizontal surface. After the spring is released, what is the maximum kinetic energy gained by the block?**

**Ans**
- ✓ A. 50 J
- ✗ B. 75 J
- ✗ C. 100 J
- ✗ D. 25 J

**Q.71** **A straight conductor carrying a current is placed along the positive x-axis. If a uniform magnetic field is applied in the direction of the positive z-axis, in which direction will the magnetic force act on the conductor?**

**Ans**
- ✗ A. Along the negative x-axis
- ✗ B. Along the positive y-axis
- ✗ C. Along the positive z-axis
- ✓ D. Along the negative y-axis

**Q.72** **Ampere's circuital law relates the line integral of the magnetic field around a closed path to:**

**Ans**
- ✗ A. The resistance enclosed by the path.
- ✓ B. The net current enclosed by the path.
- ✗ C. The electric field enclosed by the path.
- ✗ D. The magnetic flux through the path.

**Q.73** **A constant force acts on a particle during three successive equal displacements. The angles between the force and the displacement are 0°, 60°, and 180°, respectively. Which statement correctly describes the nature of the work done?**

**Ans**
- ✗ A. The work done is maximum during the second displacement.
- ✗ B. The work done is zero during the third displacement.
- ✗ C. The work done is the same during all three displacements.
- ✓ D. The work done is positive during the first two displacements and negative during the third.

**Q.74** **A person holds a suitcase while standing motionless at a bus stop for five minutes. Since the suitcase remains at the same position throughout, what is the work done by the person on the suitcase?**

**Ans**
- ✓ A. Zero
- ✗ B. Negative
- ✗ C. Positive
- ✗ D. Equal to the weight of the suitcase

**Q.75** **A programmer writes a subroutine that calls another subroutine. To ensure that the 8085 microprocessor returns to the correct location after execution, which register plays the most important role?**

**Ans**
- ✗ A. Accumulator
- ✓ B. Stack Pointer
- ✗ C. Instruction Register
- ✗ D. Register B

**Q.76** **If the potential at a point due to a charge is 100 volts, what will be the potential at double the distance from the same charge?**

**Ans**
- ✗ A. 100 volts
- ✗ B. 25 volts
- ✓ C. 50 volts
- ✗ D. 200 volts

**Q.77** **An astronaut carries a metal block from the Earth to the Moon. Which physical quantity of the block remains the same throughout the journey?**

**Ans**
- ✗ A. Weight
- ✗ B. Gravitational force acting on it
- ✓ C. Mass
- ✗ D. Atmospheric pressure acting on it

**Q.78** **A digital panel meter displays readings in decimal form. What is a key advantage of using BCD coding instead of pure binary?**

**Ans**
- ✗ A. It provides built-in error correction for each digit.
- ✓ B. It avoids complex binary-to-decimal conversion logic for display circuits.
- ✗ C. It increases memory efficiency for large numbers.
- ✗ D. It reduces the number of wires needed for each digit.

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**Q.79** **How does the peak inverse voltage requirement of a full-wave bridge rectifier compare to that of a center-tapped full-wave rectifier for a given transformer secondary voltage?**

**Ans**
- ✗ A. The bridge rectifier requires a higher PIV rating per diode
- ✓ B. The bridge rectifier requires a lower PIV rating per diode
- ✗ C. The bridge rectifier does not require any PIV rating
- ✗ D. Both require the same PIV rating per diode

**Q.80** **At which location on the line joining two equal positive (like) point charges is the net electric field intensity equal to zero?**

**Ans**
- ✗ A. At a point closer to the positive charge
- ✗ B. At a point far from both charges
- ✗ C. At the location of either charge
- ✓ D. At the midpoint between the charges

**Q.81** **Which of these changes would decrease the resistance of a metallic conductor?**

**Ans**
- ✓ A. Increasing the thickness of the conductor
- ✗ B. Increasing the length of the conductor
- ✗ C. Increasing the temperature of the conductor
- ✗ D. Decreasing the thickness of the conductor

**Q.82** **A point charge of 2 μC is placed 0.5 m away from another point charge in air. What is the magnitude of the electric field intensity at this point?**

**Ans**
- ✗ A. $3.6 \times 10^4$ N/C
- ✗ B. $4.5 \times 10^4$ N/C
- ✓ C. $7.2 \times 10^4$ N/C
- ✗ D. $1.8 \times 10^4$ N/C

**Q.83** **In a laboratory, a researcher rotates a non-circular conductive frame with variable angular speed through a spatially non-uniform magnetic field. Which outcome below most accurately describes how the induced electromotive force (emf) would behave during a complete rotation?**

**Ans**
- ✗ A. The emf will remain constant throughout the rotation, unaffected by the frame's speed or field changes.
- ✓ B. The emf will display irregular peaks and troughs reflecting both the changing angular speed and the field's spatial variation.
- ✗ C. The emf will drop to zero at regular intervals regardless of the frame's speed or the field's properties.
- ✗ D. The emf will be sinusoidal with uniform amplitude and frequency throughout the rotation.

**Q.84** **Which statement best describes the function of the MOV instruction in the 8051 microcontroller?**

**Ans**
- ✗ A. It performs arithmetic operations between two registers
- ✗ B. It shifts bits in the accumulator register
- ✗ C. It enables external interrupts in the microcontroller
- ✓ D. It transfers data from a source to a destination register or memory location

**Q.85** **A 0–200 V voltmeter has a guaranteed accuracy of ±1% of full-scale reading. If the instrument indicates 50 V, the actual voltage being measured lies between:**

**Ans**
- ✗ A. 47.5 V and 52.5 V
- ✗ B. 49.0 V and 51.0 V
- ✗ C. 49.5 V and 50.5 V
- ✓ D. 48.0 V and 52.0 V

**Q.86** **Which statement correctly describes the binary number system?**

**Ans**
- ✗ A. It uses ten symbols to represent values
- ✓ B. It uses only two symbols 0 and 1
- ✗ C. It uses symbols other than 0 and 1
- ✗ D. It is the same as the decimal system

**Q.87** **Two equal forces act on two particles moving with equal speeds. Force $F_1$ is directed along the velocity of Particle P, whereas force $F_2$ acts at 60° to the velocity of Particle Q. Which statement is correct?**

**Ans**
- ✔ A. Particle P receives twice the instantaneous power of Particle Q.
- ✘ B. Particle Q receives twice the instantaneous power of Particle P.
- ✘ C. Both forces deliver the same power.
- ✘ D. The power ratio is sqrt3:1.

**Q.88** **In a uniform electric field, how does the potential difference between two points depend on the distance separating them?**

**Ans**
- ✘ A. The potential difference decreases as distance increases
- ✔ B. The potential difference increases linearly with the distance
- ✘ C. The potential difference remains constant regardless of distance
- ✘ D. The potential difference changes non-linearly with distance

**Q.89** **A charged particle moves in a circular path in a uniform magnetic field. Which physical quantity remains constant throughout the motion?**

**Ans**
- ✘ A. Direction of velocity
- ✘ B. Momentum direction
- ✘ C. Magnetic force
- ✔ D. Speed

**Q.90** **A center-tapped full-wave rectifier has a transformer secondary voltage of 200 $V_{RMS}$ per half winding. Which of the following minimum diode Peak Inverse Voltage (PIV) ratings should be selected for reliable operation?**

**Ans**
- ✘ A. 550 V
- ✘ B. 200 V
- ✔ C. 600 V
- ✘ D. 400 V

**Q.91** **Which parameter primarily determines the maximum possible drain current ($I_{dss}$) in a JFET's transfer characteristic?**

**Ans**
- ✘ A. The magnitude of drain-source voltage above pinch-off
- ✘ B. The threshold voltage of the device
- ✘ C. The resistance between source and ground
- ✔ D. The physical properties of the channel and $V_{GS}$=0 V

**Q.92** **An electric field of 100 N/C points to the right. What is the electric force on a +2 C charge placed in this field?**

**Ans**
- ✘ A. 100 N to the left
- ✘ B. 100 N to the right
- ✘ C. 200 N to the left
- ✔ D. 200 N to the right

**Q.93** **A student determines the density of a liquid and then compares it with the density of water to calculate its relative density. Which statement correctly distinguishes these two quantities?**

**Ans**
- ✘ A. Both density and relative density have the SI unit kg/m³.
- ✔ B. Density has units, whereas relative density is a dimensionless quantity.
- ✘ C. Relative density is always numerically greater than density.
- ✘ D. Density is obtained by dividing the density of a substance by the density of water.

**Q.94** **A horizontal conducting rail carries a current from east to west in a uniform magnetic field directed vertically downward. If the rail is free to move, in which direction does the magnetic force act?**

**Ans**
- ✘ A. The rail will accelerate directly upward, along the direction of the magnetic field.
- ✘ B. The rail will accelerate directly westward, along the direction of the current flow.
- ✔ C. The rail accelerates southward, perpendicular to both the current and the magnetic field.
- ✘ D. The rail will accelerate directly downward, parallel to the magnetic field.

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**Q.95** **What happens to the resistance of a photoresistor when the intensity of incident light increases?**

**Ans**
- ✗ A. The resistance increases
- ✗ B. The resistance remains constant
- ✗ C. The resistance becomes zero
- ✓ D. The resistance decreases

**Q.96** **An engineer compares two voltmeters. If Voltmeter A has higher sensitivity than Voltmeter B, what is the most likely practical implication?**

**Ans**
- ✗ A. Voltmeter A is less affected by electrical noise than Voltmeter B.
- ✗ B. Voltmeter A can measure larger voltages than Voltmeter B.
- ✗ C. Voltmeter A is more accurate in all measurements than Voltmeter B.
- ✓ D. Voltmeter A can detect smaller voltage changes than Voltmeter B.

**Q.97** **What is the function of a fuse in a simple electric circuit?**

**Ans**
- ✓ A. It breaks the circuit if the current is too high
- ✗ B. It increases the voltage in the circuit
- ✗ C. It converts current into light
- ✗ D. It stores electrical energy for future use

**Q.98** **The magnetic field inside a long solenoid is $4 \times 10^{-3}$ T when it carries a current of 2 A. If the current is increased to 6 A, the magnetic field becomes:**

**Ans**
- ✗ A. $4 \times 10^{-3}$ T
- ✓ B. $1.2 \times 10^{-2}$ T
- ✗ C. $8 \times 10^{-3}$ T
- ✗ D. $2.4 \times 10^{-2}$ T

**Q.99** **A coil has 100 turns. If the magnetic flux linked with each turn changes by 0.05 Wb in 1 s, the induced emf is:**

**Ans**
- ✗ A. 20 V
- ✗ B. 10 V
- ✗ C. 2.5 V
- ✓ D. 5 V

**Q.100** **A spring is compressed to one-third of its original compression. Compared with the energy stored initially (18 J), the new stored energy is _____.**

**Ans**
- ✓ A. 2 J
- ✗ B. 6 J
- ✗ C. 8 J
- ✗ D. 4 J

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