RRB NTPC Graduate Level CBT-I Official Paper (Held On: 24 Jun, 2025 Shift 2) (Previous Year Paper)

RRB Group D • 2025 • 100 questions • 90 minutes • Answer key and solutions

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Q1. Find the greatest number by which when the numbers 176 and 273 are divided, it leaves remainders 5 and 3, respectively.

(a) 10
(b) 9
(c) 12
(d) 14

Q2. The volume (in cm^3) of a wire of diameter 14 cm and length 12 m is: Take $\pi = 22/7$

(a) 1,84,400
(b) 1,84,800
(c) 1,84,700
(d) 1,84,300

Q3. Which of the following Articles of the Indian Constitution states about the appointment of the Comptroller and Auditor General of India?

(a) Article 148
(b) Article 147
(c) Article 145
(d) Article 146

Q4. Construction is classified under which sector in India?

(a) Primary
(b) Tertiary
(c) Quaternary
(d) Secondary

Q5. Within the cardiac conduction system, which structure is recognised as the primary pacemaker responsible for initiating each heartbeat?

(a) Sinoatrial (SA) node
(b) Bundle of His
(c) Purkinje fibers
(d) Atrioventricular (AV) node

Q6. Refer to the following number and symbol series and answer the question that follows. (Counting to be done from the left right only) (Note: All numbers are single digit numbers only.)

(Left) 3 3 & 7 * € 2 6 8 £ % 5 6 £ © 1 6 & % 8 # # (Right)

How many such numbers are there, each of which is immediately preceded by a number and also immediately followed by a symbol?

(a) 5
(b) 4
(c) 3
(d) 6

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Q7. Which of the following methods is the easiest way to sort files by name in File Explorer in Windows 11 OS?

(a) Use the Ctrl + S shortcut
(b) Click the Name column header in File Explorer
(c) Right-click -> Select Group by -> Name
(d) Drag files into alphabetical order manually

Q8. 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 '::'?

: QLO :: QLO : %

(a) # = LLP, % = VOY
(b) = LPU, % = VPY
(c) = KJJ, % = MYT
(d) = LGJ, % = VQT

Q9. ABCD is a trapezium in which BC || AD and AC = CD. If angle ABC = 13º and angle BAC = 164º, then what is the measure of angle ACD?

(a) 161 °
(b) 188 °
(c) 164 °
(d) 174 °

Q10. The Indo-Afghanistan border is officially referred to as _____.

(a) Line of Control
(b) McMahon Line
(c) Durand Line
(d) Radcliffe Line

Q11. Seven boxes, G, H, I, J, O, P and Q are kept one over the other but not necessarily in the same order. Only G is kept above J. Only Q is kept between J and H. Only I is kept below P. How many boxes are kept between O and I?

(a) Three
(b) One
(c) Four
(d) Two

Q12. Who is popularly known as the 'Father of Indian Unrest' for his active role in the Indian Independence movement?

(a) Subhash Chandra Bose
(b) Jawaharlal Nehru
(c) Mahatma Gandhi
(d) Bal Gangadhar Tilak

Q13. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

QTM ORK MPI KNG ?

(a) ILE
(b) ILF
(c) IKF
(d) IKE

Q14. What happens if a minister is not a member of the Parliament for six consecutive months?

(a) The minister ceases to hold office.
(b) The minister must be re-elected within three months.
(c) The minister can continue with special permission from the President.
(d) The Prime Minister can grant an extension.

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Q15. David's salary was first reduced by 17% and subsequently raised by 10%. How much percentage was his final salary lower compared to his initial salary?

(a) 17%
(b) 1.7 %
(c) 10%
(d) 8.7%

Q16. What is the name of the SpaceX mission 2025 that will take astronauts directly over Earth's polar regions?

(a) Antarctic Odyssey
(b) Fram2
(c) Arctic Quest
(d) Polar Explorer

Q17. What will come in place of 'A' in the given ratio? 138/A=4/50

(a) 1724
(b) 1725
(c) 1726
(d) 1723

Q18. The mean proportional between $4 + 2\sqrt{3}$ and $16 - 8\sqrt{3}$

(a) 8
(b) 14
(c) 9
(d) 4

Q19. Vinay starts from Point A and drives 3 km towards the North. He then takes a right turn, drives 2 km, then left and drives 3 km. He then takes a left turn and drives 6 km. He takes a final left turn, drives 6 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).

(a) 4 km to the West
(b) 5 km to the East
(c) 4 km to the East
(d) 6 km to the East

Q20. Cylinder is surmounted by a cone at one end and a hemisphere at the other end. The common radius is 7 cm, the height of the cylinder is 6 cm and the total height of the structure is 32 cm. Find the volume (in cm^3) of the structure. Use $\pi = 22/7$

(a) 2,621
(b) 2,616
(c) 2,620
(d) 2,618

Q21. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

AZB 3, ZYA 9, YXZ 27, XWY 81, ?

(a) WWX729
(b) VWX729
(c) WVX729
(d) WVX243

Q22. If $x^2+y^2 - 12x + 18y + 117 = 0$, then the value of $x^2+ y^2$ is:

(a) 121
(b) 109
(c) 116
(d) 117

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Q23. Who among the following took oath as the 26^(th) Director General of the Indian Coast Guard in October 2024?

(a) Ajit Kumar Saxena
(b) Vijaya Ketu Rathore
(c) Parmesh Sivamani
(d) Manoj Kumar Dubey

Q24. The profit made on a product is 66%. What is the loss percentage (rounded off to two decimal places) incurred on the sale if the figures of both the cost price and the selling price are interchanged?

(a) 38.57%
(b) 39.76%
(c) 38.40%
(d) 41.12%

Q25. What should come in place of the question mark (?) in the given series?

4 10 19 34 58 ?

(a) 72
(b) 94
(c) 76
(d) 99

Q26. Which of the following is a window provided by the Reserve Bank of India (RBI) for banks to borrow overnight funds at a higher interest rate than the repo rate?

(a) Open market operation
(b) Standing deposit facility
(c) Marginal standing facility
(d) Off-budget financing

Q27. A and B invested money in a business in the ratio of 8 : 5. If 35% of the total profit goes for charity, and A's share in the profit is Rs. 7,770, what is the total profit?

(a) Rs. 19,423
(b) Rs. 19,426
(c) Rs. 19,422
(d) Rs. 19,425

Q28. Srirangam Srinivasa Rao (Sri Sri), who received the Sahitya Akademi Award in 1972, primarily wrote poetry in which language?

(a) Kannada
(b) Malayalam
(c) Tamil
(d) Telugu

Q29. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements: All cats are bills.

No snake are bills.

All snakes are dolls.

Conclusions:

(I) Some dolls are not cats.

(II) No bills are dolls

(a) Neither conclusion (I) nor (II) follows
(b) Both conclusions (I) and (II) follow.
(c) Only conclusion (II) follows.
(d) Only conclusion (I) follows.

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Q30. The capital of Harshavardhana's empire was:

(a) Pataliputra
(b) Thanesar
(c) Kannauj
(d) Agra

Q31. Refer to the following number and symbol series and answer the question that follows. [Counting to be done from left to right only. (Note: All numbers are single digit numbers only)]

(Left) 3 © 3 # 1 & & 5 £ 9 3 4 * & 2 2 % 2 2 7 © @ (Right)

How many such symbols are there, each of which is immediately preceded by a number and also immediately followed by a symbol

(a) 2
(b) 3
(c) 4
(d) 5

Q32. The 1991 reforms led to major tax policy changes to boost efficiency and compliance. Which tax reform, implemented in 2017, aimed to unify India's indirect tax structure?

(a) VAT
(b) GST
(c) Service Tax
(d) Excise Duty

Q33. The population of a village was 1,20,000. It increased by 15% in the first year and increased by 20% in the second year. Its population after two years is _____.

(a) 1,65,600
(b) 1,62,000
(c) 1,44,000
(d) 1,38,000

Q34. Which region in India is known for experiencing 'Norwesters' during the pre-monsoon season?

(a) Southern India
(b) Northern India
(c) Western India
(d) Eastern India

Q35. The Moplah Uprising (also known as the Mappilar Rebellion) of 1921, which was against British rule and Hindu landlords, took place in which of the following locations?

(a) Kerala
(b) Uttar Pradesh
(c) Bengal
(d) Bombay

Q36. India's Green Revolution began with experimental programmes. What was the first such initiative called?

(a) Operation Green
(b) Rural Employment Programme
(c) Intensive Agriculture District Programme
(d) National Seed Plan

Q37. In this question, a group of number/symbol is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions apply, then codes for the respective number/symbol are to be followed directly as given in the table.

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Number/Symbol	8	6	•	%	9	&	3	•	@	5	$	7	4
Code	W	C	E	J	F	A	D	Q	G	P	R	B	U

Conditions: (i) If the first element is a number and the last a symbol, the codes for these two (the first and the last elements) are to be interchanged.

(ii) If the first element is an even number and the last an even number, the first and last elements are to be coded as 0.

(III) If the third element is a perfect cube, the second element is to be coded as the code for the third element.

What will %987 be coded as?

(a) JWFB
(b) JWWB
(c) BFWJ
(d) JFWB

Q38. In the following blanks, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one that follows the same logic.

SAME - AEMS-EMAS

GOAL - OLAG-LAOG

(a) SINK-IKNS-KNIS
(b) LEAN - ELAN-NEAL
(c) YEAK -YAEK- KAEY
(d) RIPE - EPRI-EIPR

Q39. Who was the Saka Kshatrapa king defeated by Chandragupta II?

(a) Rudrasena
(b) Rudrasimha III
(c) Rudradaman
(d) Nahapana

Q40. If $x = 2 + \sqrt{3}$, what is the value of $x^2 + 1/(x^2)$?

(a) 30
(b) 26
(c) 14
(d) 16

Q41. Liberalisation enabled more autonomy and competition in the banking sector. Which of the following was the first private bank to be set up in India after the 1991 reforms?

(a) HDFC Bank
(b) ICICI Bank
(c) Axis Bank
(d) IndusInd Bank

Q42. Which country will host the 2025 FIFA Club World Cup featuring the world's top football clubs?

(a) United States
(b) Qatar
(c) Saudi Arabia
(d) Spain

Q43. Who among the following has been elected as the Vice President of Institute of Chartered Accountants of India for the term 2025-26 in February 2025?

(a) Charanjot Singh Nanda
(b) Vivek Joshi
(c) V Anantha Nageswaran

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(d) Prasanna Kumar D

Q44. Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations on the given set? [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 to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.]

10 - 20 - 25 - 50,

3 - 6 - 11 - 22

(a) 15 - 15 - 30 - 35
(b) 12 - 14 - 18
(c) 18 - 21 - 22 - 44
(d) 5 - 10 - 15 - 30

Q45. The Bagh caves, which contain Buddhist mural paintings, are located in which of the following states of India?

(a) Karnataka
(b) Maharashtra
(c) Orissa
(d) Madhya Pradesh

Q46. What sum (in Rs.) will earn an interest of Rs. 420 in 2 years at 5% simple interest per year?

(a) Rs. 4,350
(b) Rs. 4,200
(c) Rs. 4,400
(d) Rs. 4,000

Q47. This question is based on the five, three-digit numbers given below:

(Left) 617 335 930 489 671 (Right)

(Example: 697 - First digit = 6; second digit = 9 and third digit = 7) (Note: All operations to be done from left to right).

What will be the resultant if the first digit of the highest number is added to the third digit of the lowest number?

(a) 13
(b) 12
(c) 14
(d) 15

Q48. Each of the digits in the number 4319286 is arranged in descending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

(a) Three
(b) Two
(c) None
(d) One

Q49. Which type of memory is non-volatile and is used to store essential system instructions in a computer?

(a) ROM
(b) RAM
(c) Registers
(d) Cache Memory

Q50. The average of Sachin's marks in 7 subjects is 76. His average in six subjects excluding English is 70. How many marks did he get in English?

(a) 111
(b) 114
(c) 113
(d) 112

Q51. 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.)

(a) KQN
(b) NTP
(c) QWS
(d) TZV

Q52. Find the nature of the roots of the quadratic equation 2x2+x+3=0.

(a) Distinct real roots
(b) Real roots and equal
(c) Rational roots
(d) Imaginary roots

Q53. Simplify (√(1 + sin A))/(√(1 - sin A)) + (√(1 - sin A))/(√(1 + sin A))

(a) 2sec A
(b) 2sinA
(c) 2cosA
(d) 2cosecA

Q54. T is the wife of S. L is the daughter of T. K is the sister of S. W is the mother of L's father. P is the son of S. How is P related to K?

(a) Husband's brother
(b) Daughter's husband
(c) Husband's father
(d) Brother's son

Q55. Which of the following is NOT found in every Gram Panchayat in India?

(a) Panchayat Secretary
(b) Elected President (Sarpanch) of the Panchayat
(c) Elected Treasurer of the Panchayat
(d) Vice President (Upsarpanch) of the Panchayat

Q56. If Ojasvita received the following marks in five assignments: 82, 86, 92, 75 and 95, what is her average score?

(a) 87
(b) 89
(c) 84
(d) 86

Q57. What major future-focused initiative was discussed during the 67th GBM of the Asian Productivity Organization APO?

(a) Smart Cities 2030
(b) Green Productivity 2.0 Ecosystem
(c) Asia-Pacific Free Trade Agreement
(d) Digital Governance Network

Q58. Who started the Ramakrishna Mission?

(a) Ramakrishna Paramahamsa
(b) Swami Vivekananda
(c) Gopal Ganesh Agarkar
(d) Keshub Chandra Sen

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Q59. Pipe A can fill an empty cistern alone in 26 hours and pipe B can fill the same cistern alone in 36 hours. The time taken by them to fill half of the cistern by operating together will be:

(a) 717/31
(b) 1117/31
(c) 1517/31
(d) 1617/31

Q60. A grocer marked his goods 40% above their cost price and sold them at a discount of X%. If he gained 33% profit, then find the value of X.

(a) 5
(b) 4
(c) 3
(d) 2

Q61. Rakesh ranked 24th from the top and 34th from the bottom in his class. How many students are there in his class?

(a) 56
(b) 57
(c) 59
(d) 58

Q62. Which of the following devices processes data in the computer system?

(a) RAM
(b) FDD
(c) HDD
(d) CPU

Q63. In a laboratory thermometer, what is the usual temperature range?

(a) 0 °C to 100 °C
(b) 212 °F to 442 °F
(c) -10 °C to 110 °C
(d) 94 °F to 108 °F

Q64. As per February 2023 data, how many sports infrastructure projects have been approved under the Khelo India programme?

(a) 223
(b) 123
(c) 423
(d) 323

Q65. Which smallest number should be added to 25553 so that the sum is completely divisible by 38?

(a) 21
(b) 18
(c) 22
(d) 23

Q66. Seven boxes D, E, F, G, I, J and K are kept one over the other but not necessarily in the same order. No box is kept above F. Only three boxes are kept between F and K. Only one box is kept between D and E. E is kept immediately above K. Only four boxes are kept between D and G. J is kept at some place above I. Which box is kept second below J?

(a) D
(b) K
(c) F
(d) G

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Q67. Which of the following letter-clusters should replace IP 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 ::?

: YFI :: LSV : %

(a) = VBE, % = PWZ
(b) = ZBE, % = BWZ
(c) = UBE, % = PWQ
(d) = UBE, % = PWZ

Q68. Hemant and Vian can complete a certain piece of work in 6 and 10 days, respectively. They started to work together, and after 2 days, Vian left. In how many days will Hemant complete the remaining work?

(a) 9/5
(b) 11/5
(c) 14/5
(d) 17/5

Q69. simpllify (15/18)/(15/3) ÷ (3/6 × 12/9 + 2/6) + 3/8 ÷ 18/15 of 15/8

(a) 7/13
(b) 2/9
(c) 1/3
(d) 5/7

Q70. What should come in place of the question mark (?) in the given series?

28, 39, 61, 94, 138 ?

(a) 173
(b) 183
(c) 163
(d) 193

Q71. Which of the following can be settled in a Lok Adalat?

(a) Murder cases
(b) Constitutional matters
(c) Public interest litigation
(d) Compoundable offences

Q72. In Microsoft PowerPoint, which view is best suited for reorganizing slides and getting an overview of the entire presentation structure?

(a) Slide Show View
(b) Normal View
(c) Slide Sorter View
(d) Reading View

Q73. Anushka walks to her office 5 km away from home. In the morning she covers the distance in 1 hour, whereas while returning home in the evening, she takes 15 more minutes to cover the same distance. Find her average speed (in km/hr) during the two-way journey.

(a) 40/9
(b) 38/9
(c) 40/11
(d) 41/9

Q74. Which of the following statements related to the Namo Drone Didi scheme launched during 2024 are correct?

(I) It is a central sector scheme aimed at empowering women-led SHGs through drone-based agricultural services.

(II) The scheme is primarily implemented by the Ministry of Electronics and Information Technology.

(III) The scheme aims to enhance the income of women SHGs by providing drones for use in agriculture.

(a) 1, 2 and 3
(b) Only 2 and 3

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(c) Only 1 and 3
(d) Only 1 and 2

Q75. Anuj gets double the amount in 10 years when invested at compound interest, compounded annually. In how many years will the amount become four times itself?
(a) 39
(b) 40
(c) 20
(d) 19

Q76. The government of India decided that Medium-term and Long-Term Government Deposit (MLTGD) components of Gold Monetisation Scheme (GMS) shall be discontinued from:
(a) 26 March 2025
(b) 26 January 2022
(c) 26 February 2023
(d) 26 December 2024

Q77. Each of the digits in the number 1538672 is arranged in ascending order from left to right. What will the sum of the digits which are second from the left and second from the right in the new number thus formed be?
(a) 11
(b) 8
(c) 9
(d) 12

Q78. If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', what will come in place of the question mark (?) in the following equation?
63 D 19 C 6 B 9 D (56 A 4) = ?
(a) 84
(b) 62
(c) 96
(d) 120

Q79. Steve starts from Point A and drives 10 km towards north. He then takes a right turn, drives 7 km, turns right and drives 3 km. He then takes a left turn and drives 5 km. He takes a final right turn, drives 7 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)
(a) 10 km towards west
(b) 12 km towards west
(c) 12 km towards east
(d) 10 km towards south

Q80. A group of numbers/symbols is coded using letter codes as per the codes given below 0 and the conditions that follow. If none of the conditions apply, then codes for the respective number/symbol to be followed directly as given in the table.
Note: If none of the conditions apply, then codes for the respective number/symbol are to be followed directly as given in the table.

Number/Symbol	**2**	**9**	**6**	**7**	**4**	**#**	**3**	**@**	**1**
Code	Y	A	L	B	S	D	E	Z	C

Conditions – (i) If the first element is a symbol and the last a number, the codes for these two (the first and the last elements) are to be interchanged.
(ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©
(iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

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What will be the code for the following group?

9 4 @ 1

(a) ASZC
(b) LZSC
(c) AZSC
(d) DSZD

Q81. Wet farming is typically practised in which type of soil?

(a) Laterite soil
(b) Alluvial soil
(c) Red soil
(d) Black soil

Q82. Which of the following tribal groups is associated with the Hornbill Festival inNagaland?

(a) Mizo
(b) Naga
(c) Ao
(d) Garo

Q83. Two years ago, the average age of A, B and C was 66 years. Two years from now, the average age of A and C will be 89 years. What will be the age (in years) of B, four years from now?

(a) 37
(b) 30
(c) 31
(d) 34

Q84. Each of the digits in the number 3178456 is arranged in ascending order from left to right. What will be the sum of the digits which are first from the left and second from the right in the new number thus formed?

(a) 10
(b) 4
(c) 14
(d) 8

Q85. A retailer allows a 10% discount on the marked price. What price (in Rs.) must be marked on an item whose cost price is Rs. 626 to make a profit of 35%?

(a) 942
(b) 937
(c) 938
(d) 939

Q86. In a certain code language, 'shirt milk vow' is coded as 'sh dx rt' and 'pia vow fork' is coded as 'gg ne sh'. How is 'vow' coded in the given language?

(a) gg
(b) rk
(c) dx
(d) sh

Q87. Amita, Babita, Geeta, Kavita, Meeta, Sarita, Vinita are sitting in a straight line, facing north. Geeta sits third to the right of Kavita. Sarita sits third to the left of Amita, who is third to the left of Meeta. Neither Sarita nor Babita sit immediately next to Kavita. Three of the following four are alike in a certain way based on the given arrangement and thus form a group. Which of the following does NOT belong to that group?

(a) Sarita and Kavita
(b) Babita and Meeta
(c) Vinita and Amita
(d) Amrita and Babita

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Q88. In one hour, a boat goes 46 km/hr in the direction of the stream and 36 km/hr against the direction of the stream. What will be the speed of the current?

(a) 2 km/hr
(b) 4 km/hr
(c) 11 km/hr
(d) 5 km/hr

Q89. VAGL is related to PUAF in a certain way based on the English alphabetical order. In the same way, XCIN is related to RWCH. To which of the following options is FKQV related. following the same logic?

(a) ZPEK
(b) ZPKE
(c) ZEKP
(d) ZEPK

Q90. In 2024, which state was selected for the establishment of India's first commercial semiconductor fabrication plant under the India Semiconductor Mission?

(a) Tamil Nadu
(b) Maharashtra
(c) Uttar Prades
(d) Gujarat

Q91. Find the median from the following data.

Age in years	15-25	25-35	35-45	45-55	55-65	65-75	75-85
No. of patients	37	11	26	10	39	25	18

(a) 72
(b) 59
(c) 68
(d) 54

Q92. Yoko Ogawa's novel 'Mina's Matchbox' was translated into English and released in 2 August 2024. What is the original language of the novel?

(a) Vietnamese
(b) Chinese
(c) Korean
(d) Japanese

Q93. Seven people, A, B, C, D, S, T, and U are sitting in a row, facing north. Only two people sit between T and C. Only D sits to the right of U. Only one person sits between C and U. B sits at some place to the right of S but at some place to the left of A.

How many people sit between A and S?.

(a) One
(b) Three
(c) Four
(d) Two

Q94. When did the central office of the Reserve Bank of India shift to Mumbai?

(a) 1937
(b) 1947
(c) 1935
(d) 1949

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Q95. Which of the following accurately explains why a touchscreen can be considered both an input and an output device?

(a) It allows users to interact with visual data and sends touch signals to the computer.
(b) It only displays images but responds to voice commands
(c) It processes user data internally and sends it to memory
(d) It stores programs and lets users write directly to memory.

Q96. According to the NITI Aayog's discussion paper released in January 2024, which state recorded the highest number of people escaping multidimensional poverty between 2013-14 and 2022-23?

(a) Uttar Pradesh
(b) Jharkhand
(c) Rajasthan
(d) Bihar

Q97. Which force arises when a body is immersed in a fluid and displaces the fluid?

(a) Spring force
(b) Buoyant force
(c) Tension
(d) Normal reaction

Q98. 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 is the letter-cluster that DOES NOT belong to that group? (NB: The odd one out is not based on the number of consonants/vowels or their positions in the letter-cluster.)

(a) SXU
(b) IGL
(c) UZW
(d) NSP

Q99. What is the mode of the following data?

49, 54, 54, 43, 52, 49, 51, 46, 53, 43, 53, 44, 49, 45, 44, 40, 52, 54, 49

(a) 49
(b) 54
(c) 52
(d) 43

Q100. The ratio of an exterior angle to the interior angle of a regular polygon is 1 : 4. Find the number of sides of A.

(a) 9
(b) 12
(c) 8
(d) 10

ANSWER KEY

1	b	2	b	3	a	4	d	5	a	6	b	7	b	8	d	9	d	10	c
11	b	12	d	13	a	14	a	15	d	16	b	17	b	18	d	19	c	20	d
21	d	22	d	23	c	24	b	25	b	26	c	27	d	28	d	29	d	30	c
31	b	32	b	33	a	34	d	35	a	36	c	37	b	38	a	39	b	40	c
41	a	42	a	43	d	44	d	45	d	46	b	47	c	48	c	49	a	50	d
51	a	52	d	53	a	54	d	55	c	56	d	57	b	58	b	59	a	60	a
61	b	62	d	63	c	64	d	65	a	66	b	67	d	68	c	69	c	70	d
71	d	72	c	73	a	74	c	75	c	76	a	77	c	78	a	79	b	80	a
81	b	82	b	83	d	84	d	85	d	86	d	87	d	88	d	89	c	90	d
91	d	92	d	93	d	94	a	95	a	96	a	97	b	98	b	99	a	100	d

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SOLUTIONS

Q1. Answer: (b) 9

Shortcut Trick

Subtract the remainders from the respective numbers.

176 − 5 = 171

273 − 3 = 270

Find the HCF of 171 and 270.

171 = 9 × 19 and 270 = 9 × 30.

Therefore The correct answer is 9.

Alternate Method

Given:

Numbers: 176 and 273

Remainders: 5 and 3

Formula Used:

Required number = HCF of (Number1 − Remainder1) and (Number2 − Remainder2)

Calculations:

=> First number = 176 − 5 = 171

=> Second number = 273 − 3 = 270

=> Prime factorization of 171 = 3 × 3 × 19 = 3^2 × 19

=> Prime factorization of 270 = 2 × 3 × 3 × 3 × 5 = 2 × 3^3 × 5

=> HCF (171, 270) = 3^2 = 9

Therefore The correct answer is 9.

Additional Information

Highest Common Factor (HCF)

HCF is the greatest divisor that divides two or more numbers without leaving a remainder.

HCF with same remainder

To find the greatest number that leaves the same remainder 'r' in each case, calculate HCF(x − r, y − r, z − r).

HCF with unknown same remainder

If the remainder is not given but is same, find the HCF of the differences between the numbers: HCF(|x−y|, |y−z|, |z−x|).

Q2. Answer: (b) 1,84,800

Shortcut Trick

Volume of cylindrical wire = $\pi r^2 h$

Convert Length to cm: 12 m = 1200 cm.

Radius (r) = Diameter ÷ 2 = 14 ÷ 2 = 7 cm.

Volume = (22/7) × 7 × 7 × 1200 = 154 × 1200 = 1,84,800 cm^3.

Therefore The correct answer is 1,84,800 cm^3.

Alternate Method

Given:

Diameter of wire = 14 cm

Length (Height) of wire = 12 m

Formula Used:

Volume of Cylinder = $\pi r^2 h$

1 m = 100 cm

Calculations:

=> Radius (r) = 14 ÷ 2 = 7 cm

=> Height (h) = 12 × 100 = 1200 cm

=> Volume = (22/7) × 7^2 × 1200

=> Volume = (22/7) × 49 × 1200

=> Volume = 22 × 7 × 1200

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=> Volume = 154 × 1200

=> Volume = 1,84,800 cm^3

Therefore The correct answer is 1,84,800 cm^3.

Additional Information

Total Surface Area of Cylinder

The total area including the curved surface and two circular bases: TSA = $2\pi r(h + r)$.

Curved Surface Area (CSA)

The area of the side surface of the cylinder: CSA = $2\pi rh$.

Unit Conversion

1 m^3 = 10,00,000 cm^3 and 1 liter = 1000 cm^3.

Q3. Answer: (a) Article 148

The correct answer is Article 148.

Key Points

• Article 148 of the Indian Constitution provides for the appointment of the Comptroller and Auditor General (CAG) of India.

• The President of India appoints the CAG, who performs an independent audit of accounts related to the Union and State governments.

• The CAG holds office for a term of six years or until the age of 65, whichever is earlier, ensuring independence and accountability.

• The CAG's duties include auditing all expenditures from the Consolidated Fund of India, state funds, and Union Territory accounts.

• The salary and conditions of service of the CAG are determined by the Indian Parliament and cannot be varied to their disadvantage during their tenure.

Additional Information

• Consolidated Fund of India:

• It is the most significant fund of the Government of India, into which all revenues and loans raised by the government are deposited.

• Expenditures from this fund require parliamentary approval and are audited by the CAG.

• Role of Comptroller and Auditor General (CAG):

• The CAG audits government accounts and ensures transparency and accountability in financial management.

• Acts as a guardian of public funds, reporting irregularities to the Parliament and State Legislatures.

• Removal Process:

• The CAG can only be removed from office in the same manner as a Supreme Court judge, ensuring security of tenure.

• This process requires a special majority in Parliament based on proven misbehavior or incapacity.

• Article 149:

• Defines the duties and powers of the CAG related to auditing accounts of the government and public authorities.

Q4. Answer: (d) Secondary

The correct answer is Secondary.

Key Points

• Construction activities are categorized under the Secondary sector in India, as they involve manufacturing, processing, and infrastructure development.

• The Secondary sector includes industries such as manufacturing, construction, and utilities, which transform raw materials into finished products or services.

• Construction contributes significantly to India's GDP and is one of the largest employment-generating sectors.

• This sector is critical for the development of infrastructure, such as roads, bridges, buildings, power plants, and industrial facilities, which are essential for economic growth.

• Construction in India falls under the purview of policies and regulations governed by the Ministry of Housing and Urban Affairs and other related government bodies.

Additional Information

• Primary Sector: Focuses on the extraction of raw materials directly from nature, such as agriculture, forestry, fishing, and mining.

• Secondary Sector: Involves industries that process raw materials into finished goods, including manufacturing, construction, and energy production.

• Tertiary Sector: Provides services, such as retail, education, healthcare, tourism, and financial services, which support primary

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and secondary sectors.

• Quaternary Sector: Encompasses knowledge-based activities, such as research, development, information technology, and innovation.

• The construction industry's growth in India is driven by government initiatives like Smart Cities Mission, Pradhan Mantri Awas Yojana, and Bharatmala Pariyojana.

Q5. Answer: (a) Sinoatrial (SA) node

The correct answer is Sinoatrial (SA) node.

Key Points

• The Sinoatrial (SA) node is a specialized group of cells located in the right atrium of the heart, specifically near the opening of the superior vena cava.

• It acts as the primary pacemaker of the heart, generating electrical impulses that initiate each heartbeat.

• The SA node fires at an intrinsic rate of approximately 60-100 beats per minute under normal physiological conditions.

• The electrical signals from the SA node propagate through the atria, causing them to contract and pump blood into the ventricles.

• The activity of the SA node is influenced by the autonomic nervous system, with the sympathetic system increasing heart rate and the parasympathetic system (via the vagus nerve) decreasing it.

Additional Information

• Atrioventricular (AV) node

• The AV node is located at the junction between the atria and ventricles and acts as a secondary pacemaker of the heart.

• It delays the electrical signal from the SA node to ensure that the atria fully contract before the ventricles are activated.

• If the SA node fails, the AV node can generate impulses at a slower rate of 40-60 beats per minute.

• Bundle of His

• The Bundle of His is a collection of cardiac muscle fibers that conduct electrical impulses from the AV node to the Purkinje fibers in the ventricles.

• It plays a crucial role in ensuring synchronized contraction of the ventricles.

• Purkinje Fibers

• Purkinje fibers are specialized conducting fibers located in the walls of the ventricles.

• They rapidly transmit electrical impulses to the ventricular muscle, causing the ventricles to contract and eject blood to the lungs and the rest of the body.

• Cardiac Conduction System

• The cardiac conduction system is a network of nodes and specialized conduction fibers that coordinate the heartbeat.

• It includes the SA node, AV node, Bundle of His, and Purkinje fibers.

• This system ensures the heart contracts in a synchronized and efficient manner to maintain optimal blood flow.

Q6. Answer: (b) 4

Given series:

(Left) 3 3 & 7 * € 2 6 8 £ % 5 6 £ @ 8 1 6 & % 8 # # (Right)

Condition to be checked:

Number → Number → Symbol

3 3 & 7 * € 2 6 8 £ % 5 6 £ @ 8 1 6 & % 8 # #

There are four such numbers in the above arrangement (3 3 &, 6 8 £, 5 6 £, 1 6 &).

Hence, the correct answer is "Option 2".

Q7. Answer: (b) Click the Name column header in File Explorer

The correct answer is Click the Name column header in File Explorer.

Key Points

• Sorting files by name in Windows File Explorer is easiest by clicking the Name column header, which automatically arranges the files alphabetically.

• This feature is available in the Details view of File Explorer, where columns like Name, Date Modified, Type, and Size are displayed.

• Clicking the Name column toggles between ascending and descending alphabetical order, allowing flexibility in sorting.

• This method is quick, intuitive, and requires no additional effort or manual rearrangement.

• It is a built-in feature of Windows File Explorer and does not require any keyboard shortcuts or menu navigation.

Additional Information

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• File Explorer Views:

• Windows File Explorer offers multiple view options, such as Details, List, Tiles, Content, and Large Icons, to display files differently.

• The Details view is ideal for sorting files by attributes like Name, Date Modified, Type, and Size.

• Sorting Files:

• Files in File Explorer can be sorted by various parameters, including Name, Date Modified, Type, and Size.

• Sorting is accessible via column headers in Details view or by right-clicking in File Explorer and choosing the Sort by option.

• Keyboard Shortcuts:

• While there's no direct shortcut for sorting by name, keyboard shortcuts like Ctrl + Shift + E can expand the navigation pane for quicker file access.

• Other shortcuts like Alt + D focus on the address bar for navigation but do not affect sorting.

• Group By vs Sort By:

• The Group by option categorizes files into groups, such as by Name or Type, whereas Sort by arranges files in a specific order.

• Grouping creates clusters of files, while sorting provides a linear arrangement.

Q8. Answer: (d) = LGJ, % = VQT

Given:

: QLO :: QLO : %

Option 1) # = LLP, % = VOY

For # (LLP) to QLO

For QLO to % (VOY)

Option 2) # = LPU, % = VPY

For # (LPU) to QLO

For QLO to % (VPY)

Option 3) # = KJJ, % = MYT

For # (KJJ) to QLO

For QLO to % (MYT)

Option 4) # = LGJ, % = VTQ

For # (LGJ) to QLO

The pattern derived from LGJ to QLO is: (+5, +5, +5).

For QLO to % (VQT)

The pattern derived from QLO to VTQ is: (+5, +5, +5).

Hence, the correct answer is "Option 4".

Q9. Answer: (d) 174 °

Shortcut Trick

In ΔABC, the third angle is angle ACB = 180º − (164º + 13º) = 3º.

Since BC || AD, the alternate interior angle angle CAD = angle ACB = 3º.

In ΔACD, since AC = CD, the base angles are equal: angle ADC = angle CAD = 3º.

Therefore, the vertex angle angle ACD = 180º − (3º + 3º) = 174º.

Therefore The correct answer is 174°.

Alternate Method

Given:

=> ABCD is a trapezium where BC || AD

=> AC = CD

=> angle ABC = 13º

=> angle BAC = 164º

Formula Used:

=> Angle sum property of a triangle: The sum of all interior angles in a triangle is 180º.

=> Alternate interior angles are equal when two parallel lines are intersected by a transversal line.

=> Isosceles triangle property: Angles opposite to equal sides are equal.

Calculations:

In ΔABC:

=> angle ABC + angle BAC + angle ACB = 180º

=> 13º + 164º + angle ACB = 180º

=> 177º + angle ACB = 180º

=> angle ACB = 180º − 177º = 3º

Since BC || AD and AC is a transversal line:

=> angle CAD = angle ACB = 3º (Alternate interior angles)

In ΔACD, since AC = CD:

=> angle ADC = angle CAD = 3º (Angles opposite to equal sides are equal)

Now, applying the angle sum property in ΔACD:

=> angle CAD + angle ADC + angle ACD = 180º

=> 3º + 3º + angle ACD = 180º

=> 6º + angle ACD = 180º

=> angle ACD = 180º − 6º = 174º

Option Analysis:

=> Option (1) 161° is incorrect because it does not satisfy the angle sum property of ΔACD with the calculated base angles of 3° each.

=> Option (2) 188° is incorrect because the sum of angles in any triangle cannot exceed 180°.

=> Option (3) 164° is incorrect because it is the value of angle BAC, not angle ACD.

=> Option (4) 174° is correct as verified by the step-by-step geometric calculations.

Therefore The correct answer is 174°.

Additional Information

Properties of a Trapezium

A trapezium is a quadrilateral with at least one pair of parallel sides. The consecutive angles sharing a non-parallel side are supplementary (sum to 180º).

Isosceles Triangle Theorem

If two sides of a triangle are equal, then the angles opposite to those sides are also equal. Conversely, if two angles of a triangle are equal, the sides opposite to them are equal.

Alternate Interior Angles

When two parallel lines are cut by a transversal, the alternate interior angles formed are equal in measure.

Q10. Answer: (c) Durand Line

The correct answer is Durand Line.

Key Points

• The Durand Line is the demarcation line established in 1893, which serves as the international border between Afghanistan and India.

• It was drawn as part of an agreement between the British diplomat Sir Mortimer Durand and the then Afghan ruler, Amir Abdur Rahman Khan.

• The Durand Line stretches over 2,670 kilometers (1,660 miles), making it one of the longest borders in South Asia.

• Though officially recognized internationally, Afghanistan has historically contested the legitimacy of the Durand Line.

• The border traverses rugged terrains, including the Khyber Pass, which has been strategically significant in history.

Additional Information

• Line of Control (LoC)

• It refers to the military control line between India and Pakistan in the region of Jammu and Kashmir.

• It was established after the Simla Agreement in 1972.

• Unlike an international border, the LoC is not legally recognized and is a ceasefire line.

• McMahon Line

• This is the boundary line between India and China, drawn in 1914 during the Simla Convention.

• It is recognized by India but not by China, leading to disputes in regions like Arunachal Pradesh.

• Radcliffe Line

• The Radcliffe Line is the boundary demarcation line between India and Pakistan, created during the partition in 1947.

• It was named after Sir Cyril Radcliffe, who was responsible for its creation.

• Afghanistan-Pakistan Relations

• The Durand Line remains a contentious issue in Afghanistan-Pakistan relations, with Afghanistan refusing formal recognition of

the border.

• Cross-border movement and tribal affiliations in the region complicate governance and security.

Q11. Answer: (b) One

Given: Seven boxes, G, H, I, J, O, P and Q are kept one over the other. The lowermost box is numbered 1 and the topmost is numbered 7.

1) Only G is kept above J.

7	**G**
6	J
5	
4	
3	
2	
1	

2) Only Q is kept between J and H.

7	**G**
6	J
5	Q
4	H
3	
2	
1	

3) Only I is kept below P.

7	**G**
6	J
5	Q
4	H
3	
2	P
1	I

4) The only remaining box is O, and the only remaining position is 3.

7	**G**
6	J
5	Q
4	H
3	O
2	P
1	I

Therefore, One box is kept between O and I.

Hence, the correct answer is "Option 2".

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Q12. Answer: (d) Bal Gangadhar Tilak

The correct answer is Bal Gangadhar Tilak.

Key Points

• Bal Gangadhar Tilak, a prominent leader of the Indian Independence Movement, was given the title "Father of Indian Unrest" by British colonial authorities.

• He was one of the first leaders to advocate for "Swarajya" (self-rule), making it a mass movement among Indians.

• Tilak was a founding member of the Indian National Congress (INC) and played a key role in the rise of the Extremist faction within the party.

• Through his newspapers like "Kesari" (in Marathi) and "The Mahratta" (in English), Tilak inspired Indians to resist British rule.

• He was associated with the famous slogan, "Swaraj is my birthright, and I shall have it," which became a rallying cry for the independence movement.

Additional Information

• Extremist vs. Moderate Factions in INC:

• Moderates believed in petitions, prayers, and peaceful negotiations with the British government.

• Extremists, led by Tilak, Bipin Chandra Pal, and Lala Lajpat Rai (Lal-Bal-Pal), advocated for direct action and mass mobilization to achieve Swaraj.

• Home Rule Movement (1916):

• Bal Gangadhar Tilak and Annie Besant launched the movement to demand self-governance within the British Empire.

• The movement strengthened the demand for Swaraj and laid the groundwork for future independence struggles.

• Ganesh Chaturthi and Shivaji Festivals:

• Tilak popularized these festivals to unite Indians and instill a sense of pride in their culture and history.

• These public celebrations became platforms for anti-colonial propaganda.

• Imprisonment and Writings:

• Tilak was imprisoned multiple times for his revolutionary writings and speeches.

• While in Mandalay Jail (Burma), he wrote the famous book "Gita Rahasya," interpreting the Bhagavad Gita as a call to action.

Q13. Answer: (a) ILE

The logic followed here is:

Thus, the missing letter in the series is ILE.

Hence, the correct answer is "Option 1".

Q14. Answer: (a) The minister ceases to hold office.

The correct answer is The minister ceases to hold office..

Key Points

• According to Article 75(5) of the Indian Constitution, a minister who is not a member of the Parliament can hold office for a maximum of six consecutive months.

• If the minister is unable to get elected to either the Lok Sabha or the Rajya Sabha within this period, they must vacate their office.

• The provision ensures accountability and parliamentary oversight of ministers in the government.

• This clause applies uniformly to all ministers, including the Prime Minister.

• The rule highlights the importance of representation and democratic legitimacy for holding ministerial office.

Additional Information

• Article 75 of the Indian Constitution:

• Deals with the appointment, tenure, and responsibilities of ministers in the Union Government.

• States that the Prime Minister is appointed by the President, and other ministers are appointed by the President on the advice of the Prime Minister.

• Role of Parliament:

• Ensures ministers are accountable to the legislature and maintain their democratic legitimacy.

• Ministers must be part of either the Lok Sabha or Rajya Sabha to participate in parliamentary proceedings and debates.

• Concept of Parliamentary Democracy:

• India follows a parliamentary system where the executive is accountable to the legislature.

• Ministers must derive their authority through parliamentary approval and representation.

• Temporary Appointment as Minister:

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• Non-parliament members can be appointed as ministers temporarily but must secure membership within six months.
• Failure to do so results in the automatic cessation of their ministerial post.

Q15. Answer: (d) 8.7%

Shortcut Trick
Apply the successive percentage change formula: a + b + (a × b)/100
Where reduction a = −17 and increase b = +10
Net change = −17 + 10 + (−17 × 10)/100 = −7 − 1.7 = −8.7%
Negative sign indicates a decrease in salary.
Therefore The correct answer is 8.7%.
Alternate Method
Let David's initial salary be 100 units.
Step-by-step Calculation:
=> Initial Salary = 100
=> Salary after 17% reduction = 100 − 17 = 83
=> 10% raise on 83 = 83 × (10/100) = 8.3
=> Final Salary = 83 + 8.3 = 91.3
=> Total decrease = 100 − 91.3 = 8.7
=> Percentage decrease = (8.7/100) × 100 = 8.7%
Therefore The correct answer is 8.7%.
Additional Information
Successive Percentage Change
When a value is changed by x% and then y%, the net effective change is given by [x + y + (xy/100)]%.
Multiplying Factor Method
Final Value = Initial Value × (1 − r1/100) × (1 + r2/100). This is useful for multiple successive changes.
Base Change Rule
If salary is reduced by x%, to return to the original salary, it must be increased by [x/(100−x)] × 100%.

Q16. Answer: (b) Fram2

The correct answer is Fram2.
Key Points
• Fram2 is SpaceX's planned mission for 2025 to fly astronauts directly over Earth's polar regions.
• The mission aims to study unique atmospheric, environmental, and magnetic phenomena present near polar regions.
• It will utilize SpaceX's Starship spacecraft, known for its advanced capability to perform long-duration crewed missions.
• This mission is expected to contribute significantly to understanding Earth's climate systems and potential space-weather impacts on polar areas.
• The name "Fram2" is inspired by the polar exploration vessel "Fram," used in historical Arctic and Antarctic expeditions.
Additional Information
• Polar Regions and Scientific Importance:
• Earth's polar regions are critical for studying climate change due to their sensitivity to global warming.
• Unique phenomena such as auroras and polar vortexes occur in these areas, offering insights into Earth's magnetosphere and atmosphere.
• Polar regions contain vast ice caps that help regulate global temperature and sea levels.
• SpaceX's Starship Program:
• Starship is SpaceX's fully reusable spacecraft designed for long-duration missions to destinations like the Moon, Mars, and beyond.
• The spacecraft features advanced thermal protection systems for extreme environments, making it suitable for polar exploration missions.
• Starship has a payload capacity of over 100 metric tons, enabling extensive scientific experiments onboard.
• Historical Polar Exploration:
• The vessel "Fram," led by renowned explorer Fridtjof Nansen, was used for groundbreaking Arctic expeditions in the late 19th century.
• Polar exploration has historically contributed to advancements in navigation, meteorology, and geography.

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• Modern missions like Fram2 carry forward the legacy of using cutting-edge technology to explore Earth's extremities.
• Space Weather and Polar Areas:
• Polar regions are highly impacted by space weather events due to their proximity to Earth's magnetic poles.
• Solar winds and geomagnetic storms can cause disruptions in satellite communication and navigation systems over these areas.
• Fram2 will study the interaction between solar activity and Earth's magnetosphere to improve predictions and mitigation strategies.

Q17. Answer: (b) 1725

Shortcut Trick

Apply Cross Multiplication directly: A = (138 × 50) ÷ 4.

Simplify the fraction: A = 138 × (50 ÷ 4) = 138 × 12.5.

Calculation: 138 × 10 + 138 × 2.5 = 1380 + 345 = 1725.

Therefore The correct answer is 1725.

Alternate Method

Given:

Ratio Equation: 138/A = 4/50

Formula Used:

In a proportion a/b = c/d, the value of the unknown variable is found by Cross Multiplication: a × d = b × c.

Calculations:

=> 138 × 50 = 4 × A

=> 6900 = 4A

=> A = 6900 ÷ 4

=> A = 1725

Therefore The correct answer is 1725.

Additional Information

Ratio and Proportion

A proportion is an equation that states that two ratios are equal. If a/b = c/d, then product of extremes (a×d) equals product of means (b×c).

Cross Multiplication Rule

To solve for an unknown in a fraction-based linear equation, multiply the numerator of one side by the denominator of the other side.

Q18. Answer: (d) 4

Shortcut Trick

Mean Proportional (MP) = √(a × b)

Factorize terms: 4 + 2√3 = (1 + √3)² and 16 − 8√3 = 8(2 − √3)

Alternatively, multiply directly: (4 + 2√3)(16 − 8√3) = 64 − 32√3 + 32√3 − 16(3) = 64 − 48 = 16

MP = √16 = 4

Therefore The correct answer is 4.

Alternate Method

Given: First number (a) = 4 + 2√3, Second number (b) = 16 − 8√3

Formula: Mean Proportional = √(a × b)

=> Mean Proportional = √[(4 + 2√3) × (16 − 8√3)]

=> Mean Proportional = √[4(16) − 4(8√3) + 2√3(16) − 2√3(8√3)]

=> Mean Proportional = √[64 − 32√3 + 32√3 − 16 × 3]

=> Mean Proportional = √[64 − 48]

=> Mean Proportional = √16

=> Mean Proportional = 4

Therefore The correct answer is 4.

Additional Information

Third Proportional

For two numbers a and b, the third proportional c is given by the relation a:b :: b:c, which means c = b²/a.

Fourth Proportional

For three numbers a, b, and c, the fourth proportional d is given by a:b :: c:d, which means d = (b × c)/a.

Surds Conjugate Multiplication

The product of (x + √y) and (x − √y) is always a rational number $x^2 - y$, following the identity $(a+b)(a-b) = a^2-b^2$.

Q19. Answer: (c) 4 km to the East

Given:

Vinay starts from Point A and drives 3 km towards the North.

He then takes a right turn, drives 2 km, then left and drives 3 km.

He then takes a left turn and drives 6 km.

He takes a final left turn, drives 6 km and stops at Point P.

He should drive 4 km to the East in order to reach Point A again.

Hence, the correct answer is "Option 3".

Q20. Answer: (d) 2,618

Shortcut Trick

Common Radius (r) = 7 cm and Height of Cylinder (h_(cy)) = 6 cm.

Height of Hemisphere = Radius = 7 cm.

Height of Cone (h_(co)) = Total Height − Cylinder Height − Hemisphere Radius = 32 − 6 − 7 = 19 cm.

Total Volume = $\pi r^2 \times [h_{(cy)} + (1/3)h_{(co)} + (2/3)r] = (22/7) \times 7^2 \times [6 + 19/3 + 14/3] = 154 \times [6 + 11] = 154 \times 17$.

Therefore The correct answer is 2618 cm^3.

Alternate Method

Given: Radius (r) = 7 cm, Cylinder height (h1) = 6 cm, Total height = 32 cm.

Formula Used: Volume of Cylinder = $\pi r^2 h$ | Volume of Cone = $(1/3)\pi r^2 h$ | Volume of Hemisphere = $(2/3)\pi r^3$

=> Height of Cone (h2) = 32 − (Height of Cylinder + Radius of Hemisphere) = 32 − (6 + 7) = 19 cm.

=> Volume of Cylinder = $(22/7) \times 7 \times 7 \times 6 = 154 \times 6 = 924$ cm^3.

=> Volume of Cone = $(1/3) \times (22/7) \times 7 \times 7 \times 19 = (1/3) \times 154 \times 19 = 2926/3 = 975.33$ cm^3.

=> Volume of Hemisphere = $(2/3) \times (22/7) \times 7 \times 7 \times 7 = (2/3) \times 154 \times 7 = 2156/3 = 718.67$ cm^3.

=> Total Volume = $924 + (2926 + 2156)/3 = 924 + 5082/3 = 924 + 1694 = 2618$ cm^3.

Therefore The correct answer is 2618 cm^3.

Additional Information

Total Surface Area of the Structure

TSA = CSA of Cone (πrl) + CSA of Cylinder ($2\pi rh$) + CSA of Hemisphere ($2\pi r^2$), where slant height $l = \sqrt{(r^2 + h_{(cone)}^2)}$.

Volume Calculation Tip

When components share a common radius, factor out πr^2 or $(1/3)\pi r^2$ to simplify calculations and reduce steps.

Q21. Answer: (d) WVX243

The pattern followed here is.

Thus, the missing term in the series is WVX243.

Hence, the correct answer is "Option 4."

Q22. Answer: (d) 117

Shortcut Trick

Identify the equation as a sum of perfect squares: $(x - 6)^2 + (y + 9)^2 = 0$.

For the sum of non-negative squares to be zero, each term must be zero.

=> x = 6 and y = −9.

Substitute these values into the required expression: $6^2 + (-9)^2 = 36 + 81 = 117$.

Therefore The correct answer is 117.

Alternate Method

Given: $x^2 + y^2 - 12x + 18y + 117 = 0$

To find the values of x and y, we use the method of completing the square for both variables.

Rearranging the equation to group x and y terms:

=> $(x^2 - 12x) + (y^2 + 18y) + 117 = 0$

Adding and subtracting $(12/2)^2$ and $(18/2)^2$ to complete the squares:

=> $(x^2 - 12x + 36) - 36 + (y^2 + 18y + 81) - 81 + 117 = 0$

=> $(x - 6)^2 + (y + 9)^2 - 117 + 117 = 0$

=> $(x - 6)^2 + (y + 9)^2 = 0$

Since the square of any real number is always ≥ 0, the sum of two squares is zero only if both are zero:

=> $(x - 6)^2 = 0$ => $x = 6$

=> $(y + 9)^2 = 0$ => $y = -9$

Calculating the required value:

=> $x^2 + y^2 = 6^2 + (-9)^2$

=> $x^2 + y^2 = 36 + 81$

=> $x^2 + y^2 = 117$

Therefore The correct answer is 117.

Additional Information

Perfect Square Property

If $a^2 + b^2 + c^2 + ... = 0$ for real numbers, then $a = b = c = ... = 0$.

Completing the Square

To convert $ax^2 + bx$ into a perfect square, add $(b/2)^2$ to the expression when $a = 1$.

Equation of a Circle

The general equation $x^2 + y^2 + 2gx + 2fy + c = 0$ represents a point if $g^2 + f^2 - c = 0$.

Q23. Answer: (c) Parmesh Sivamani

The correct answer is Parmesh Sivamani.

Key Points

• Parmesh Sivamani took oath as the 26th Director General of the Indian Coast Guard in October 2024.

• He succeeded the outgoing Director General to lead the Indian Coast Guard, which is the fourth-largest Coast Guard in the world.

• Parmesh Sivamani is a seasoned officer with extensive experience in maritime security, search and rescue operations, and coastal surveillance.

• Under his leadership, the Indian Coast Guard is expected to focus on strengthening its operational capabilities amidst evolving maritime challenges.

• The Indian Coast Guard, established in 1978, is responsible for safeguarding India's maritime interests and enforcing maritime laws with jurisdiction over the territorial waters of India.

Additional Information

• Indian Coast Guard (ICG):

• Established in 1978, the Indian Coast Guard operates under the Ministry of Defence.

• Its primary responsibilities include ensuring the safety and security of India’s maritime zones.

• It conducts operations like search and rescue missions, anti-smuggling activities, and environmental protection.

• The ICG works closely with the Indian Navy, Customs Department, and state governments to maintain maritime security.

• Maritime Security:

• Maritime security involves protecting a nation's territorial waters, exclusive economic zones, and key maritime assets.

• It includes combating threats such as piracy, smuggling, illegal fishing, and terrorism.

• The Indian Coast Guard plays a pivotal role in ensuring the integrity of India's maritime boundaries.

• Search and Rescue (SAR) Operations:

• The ICG conducts Search and Rescue operations to assist vessels in distress in Indian waters.

• It is part of the Global Maritime Distress and Safety System (GMDSS).

• SAR operations are supported by aircraft, ships, and coastal radar stations.

• Coastal Surveillance Network (CSN):

• The Coastal Surveillance Network is a chain of radar stations along India’s coastline.

• It helps monitor vessel movement and enhance maritime domain awareness.

• This system is crucial for detecting and preventing illegal activities in Indian waters.

Q24. Answer: (b) 39.76%

Shortcut Trick

Let initial Cost Price (CP) be 100. Profit is 66%, so initial Selling Price (SP) = 166.

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When figures are interchanged, New CP = 166 and New SP = 100.

Loss = 166 − 100 = 66.

Loss % = (Loss ÷ New CP) × 100 = (66 ÷ 166) × 100.

Loss % ≈ 39.759% ≈ 39.76%.

Therefore The correct answer is 39.76%.

Alternate Method

Given: Profit = 66% | Interchange of CP and SP.

Formulas: SP = CP × (100 + Profit%) ÷ 100 | Loss % = (Loss ÷ CP) × 100

=> Let original CP = 100 units.

=> Original SP = 100 + 66 = 166 units.

=> New case: New CP = 166 and New SP = 100.

=> Loss = New CP − New SP = 166 − 100 = 66.

=> Loss % = (66 ÷ 166) × 100 = 39.75903...

=> Rounded off to two decimal places = 39.76%.

Therefore The correct answer is 39.76%.

Additional Information

Profit and Loss Calculation Base

Always calculate Profit % or Loss % on the Cost Price (CP) unless stated otherwise in the problem.

Effect of Interchanging CP and SP

If a transaction results in a profit of x% and then the prices are interchanged, the new loss % will always be numerically different from the original profit % because the base (CP) changes.

Q25. Answer: (b) 94

The logic followed here is:

Thus, the missing term in the series is 94.

Hence, the correct answer is "Option 2";

Q26. Answer: (c) Marginal standing facility

The correct answer is Marginal Standing Facility.

Key Points

• The Marginal Standing Facility (MSF) is a liquidity adjustment facility provided by the Reserve Bank of India (RBI) to banks, enabling them to borrow overnight funds.

• It was introduced in May 2011 by the RBI as a part of its monetary policy framework to manage short-term liquidity mismatches.

• The MSF rate is set at 100 basis points (1%) higher than the repo rate, making it a costlier option for banks compared to the repo rate.

• Banks can access MSF by pledging their Statutory Liquidity Ratio (SLR) securities beyond the mandatory requirement up to a certain limit.

• MSF is primarily used by banks during periods of acute liquidity stress, acting as a safety valve for the banking system.

Additional Information

• Repo Rate

• It is the rate at which the RBI lends money to commercial banks for short-term needs, typically to control inflation and liquidity.

• The repo rate is a critical tool in the RBI's monetary policy to influence borrowing and lending in the economy.

• Statutory Liquidity Ratio (SLR)

• It is the minimum percentage of a bank's net demand and time liabilities that must be maintained in the form of liquid assets like cash, gold, or approved securities.

• SLR is a tool used by the RBI to regulate bank credit expansion and ensure financial stability.

• Liquidity Adjustment Facility (LAF)

• LAF is a mechanism through which the RBI manages liquidity and provides short-term funds to banks via repo and reverse repo operations.

• It helps in maintaining monetary stability and ensuring that liquidity conditions align with the monetary policy stance.

• Standing Deposit Facility (SDF)

• It is a tool introduced by the RBI in April 2022 to absorb excess liquidity from the banking system without the need for collateral.

• The SDF rate is set below the repo rate, functioning as the floor of the liquidity adjustment corridor.

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Q27. Answer: (d) Rs. 19,425

Shortcut Trick

Ratio of investment of A : B = 8 : 5. Profit is shared in the same ratio.

A's share is 8 units = Rs. 7,770 => 1 unit = 7,770 ÷ 8 = Rs. 971.25.

Total distributed profit (A + B) = 8 + 5 = 13 units = 13 × 971.25 = Rs. 12,626.25.

This distributed profit is 100% − 35% = 65% of total profit.

Total Profit = (12,626.25 ÷ 65) × 100 = Rs. 19,425.

Therefore The correct answer is Rs. 19,425.

Alternate Method

Given → Investment ratio 8 : 5, Charity = 35%, A's share = Rs. 7,770.

Formulas: Profit Share prop. to Investment | Remaining Profit = Total Profit × (100 − Charity%) ÷ 100.

=> Let the Total Profit be P.

=> Remaining profit after charity = P × (100 − 35) ÷ 100 = 0.65P.

=> A's share = (Ratio of A ÷ Total Ratio) × Remaining Profit.

=> 7,770 = (8 ÷ 13) × 0.65P.

=> 7,770 = (8 ÷ 13) × (65 ÷ 100) × P.

=> 7,770 = (8 × 5 ÷ 100) × P => 7,770 = 0.4P.

=> P = 7,770 ÷ 0.4 = 19,425.

Therefore The correct answer is Rs. 19,425.

Additional Information

Partnership Rules

Profit is distributed based on the product of Capital × Time. If time is constant, profit ratio equals the investment ratio.

Charity and Net Profit

When a percentage of profit is donated, the partners only divide the remaining amount among themselves.

Q28. Answer: (d) Telugu

The correct answer is Telugu.

Key Points

• Srirangam Srinivasa Rao (Sri Sri) was a prominent Telugu poet, lyricist, and writer known for his revolutionary and progressive works.

• He received the Sahitya Akademi Award in 1972 for his poetry collection titled "Khadga Srushti."

• Sri Sri is celebrated as the first modern Telugu poet who introduced free verse and broke traditional poetic norms.

• His works reflect themes of social justice, equality, and resistance against oppression, making him a key figure in progressive literature.

• Some of his notable works include "Maha Prasthanam" (The Great Journey), which is considered a masterpiece in Telugu literature.

Additional Information

• Telugu Literature:

• Telugu is one of the classical languages of India, with a rich literary tradition spanning over a millennium.

• Notable periods include the Bhakti movement, during which poets like Annamacharya and Tyagaraja composed devotional songs.

• Modern Telugu literature saw the emergence of revolutionary writers like Sri Sri and Chalam, who addressed societal issues and reforms.

• Sahitya Akademi Award:

• It is a prestigious literary honor presented annually by the Sahitya Akademi, India's National Academy of Letters.

• The award recognizes outstanding literary works in 24 Indian languages, including Telugu.

• Recipients receive a plaque and a cash prize, signifying their contribution to Indian literature.

• Free Verse Poetry:

• Free verse poetry does not follow traditional patterns of rhyme or meter, allowing poets greater creative freedom.

• Sri Sri popularized free verse in Telugu, making it a powerful medium to express revolutionary and progressive ideas.

• This style was instrumental in challenging the status quo and addressing themes of social change.

• Revolutionary Literature:

• Revolutionary literature often focuses on societal issues, advocating for equality, justice, and reform.

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• It serves as a voice for marginalized groups and challenges oppressive systems.

• Sri Sri's works are iconic examples of revolutionary literature in Telugu, inspiring generations of writers and activists.

Q29. Answer: (d) Only conclusion (I) follows.

Given Statements:

All cats are bills.

No snake are bills.

All snakes are dolls.

The least possible Venn diagram for the given statements is:

Conclusions:

I. Some dolls are not cats. - True (Because 'All snakes are dolls' and 'No snake are bills.' Since all cats are bills, no snakes can be cats. Therefore, the part of dolls that is snakes cannot be cats, which means 'Some dolls are not cats' is a definite conclusion.)

II. No bills are dolls. - False (Because there is no definite relation given between bills and dolls.)

So, Only conclusion I follows.

Hence, the correct answer is "Option 4".

Q30. Answer: (c) Kannauj

The correct answer is Kannauj.

Key Points

• Kannauj was the capital of Harshavardhana's empire during his reign in the 7th century CE.

• Harshavardhana shifted his capital from Thanesar (in modern Haryana) to Kannauj (in modern Uttar Pradesh) to establish better control over the Ganga-Yamuna Doab region.

• Kannauj became a prominent political, cultural, and economic hub under Harsha's rule.

• The Chinese traveler Xuanzang (Hiuen Tsang) visited Kannauj during Harsha's reign and provided detailed accounts of its prosperity and grandeur.

• Kannauj's strategic location on the Ganges River made it a key center for trade and administration during Harsha's empire.

Additional Information

• Harshavardhana

• Harshavardhana (590–647 CE) was a powerful emperor of the Vardhana dynasty who ruled northern India.

• He was known for his administrative capabilities, patronage of the arts, and promotion of Buddhism.

• His empire extended over much of northern India, though it didn't include regions like the Deccan or the far south.

• Xuanzang's Account

• The Chinese Buddhist monk Xuanzang visited Harsha's court and described him as a just and benevolent ruler.

• Xuanzang stayed in Harsha's empire for several years and documented its political, social, and religious aspects.

• Kannauj was described as a flourishing city with rich cultural and economic life.

• Religious Contributions

• Harsha was initially a follower of Hinduism but later became a patron of Buddhism.

• He organized a grand religious assembly at Kannauj, which was attended by scholars and leaders from various parts of the world.

• Harsha also built several stupas and monasteries to promote Buddhism.

• Decline of Kannauj

• Following Harsha's death, Kannauj became a contested site among various regional powers, including the Gurjara-Pratiharas, Palas, and Rashtrakutas.

• Its prominence declined over time due to these conflicts and the lack of a strong central authority.

Q31. Answer: (b) 3

Given series:

(Left) 3 © 3 # 1 & & 5 £ 9 3 4 * & 2 2 % 2 2 7 © @ (Right)

Condition to be checked:

Number → Symbol → Symbol

3 © 3 # 1 & & 5 £ 9 3 4 * & 2 2 % 2 2 7 © @

There is three such symbol in the above arrangement.

Hence, the correct answer is "Option 2".

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Q32. Answer: (b) GST

The correct answer is GST.

Key Points

• Goods and Services Tax (GST) was implemented on 1 July 2017 to replace multiple indirect taxes in India.

• It is a comprehensive, multi-stage, and destination-based tax that is levied on every value addition, making the tax system more transparent and efficient.

• GST unified India's indirect tax structure by subsuming taxes such as VAT, excise duty, service tax, and central sales tax.

• GST is divided into CGST (Central GST), SGST (State GST), and IGST (Integrated GST), ensuring fair revenue distribution between the central and state governments.

• The GST Council, chaired by the Union Finance Minister, is responsible for making recommendations related to GST rates, exemptions, and other tax-related matters.

Additional Information

• Value Added Tax (VAT):

• VAT was a state-level tax levied on the sale of goods within a state, implemented in India in 2005.

• It was replaced by GST as it led to a cascading tax effect, where tax was levied on tax at different stages of production and distribution.

• Service Tax:

• Introduced in 1994, service tax was levied on taxable services provided in India.

• Under GST, service tax was subsumed along with other indirect taxes to simplify the taxation system.

• Excise Duty:

• Excise duty was a tax imposed on the manufacture of goods in India.

• It was replaced by GST to streamline taxation and remove multiple layers of indirect taxation.

• GST Benefits:

• Eliminated the cascading effect of taxes, reducing the overall tax burden.

• Boosted ease of doing business by simplifying compliance and promoting a unified market.

• Enhanced transparency in the taxation system through technology-driven compliance mechanisms like GSTN (Goods and Services Tax Network).

• GST Challenges:

• Initial compliance issues due to the transition from the previous tax regime.

• Criticism regarding the classification of goods/services under different tax slabs (0%, 5%, 12%, 18%, and 28%).

• The government has moved to two main GST slabs: 5% and 18%. A special 40% rate will apply to selected luxury and “sin” goods (e.g., high-end cars, tobacco) beyond the two main slabs.

• Concerns over revenue sharing between the center and states in the initial years of GST implementation.

Q33. Answer: (a) 1,65,600

Shortcut Trick

Net percentage increase = a + b + (a × b) ÷ 100

Net increase = 15 + 20 + (15 × 20) ÷ 100 = 35 + 3 = 38%

Population after 2 years = 1,20,000 × 138% = 1,65,600

Therefore The correct answer is 1,65,600.

Alternate Method

Initial Population = 1,20,000

Growth Rate 1 (R1) = 15%

Growth Rate 2 (R2) = 20%

=> Population after 1 year = 1,20,000 × (1 + 15/100)

=> Population after 1 year = 1,20,000 × 1.15 = 1,38,000

=> Population after 2 years = 1,38,000 × (1 + 20/100)

=> Population after 2 years = 1,38,000 × 1.20

=> Final Population = 1,65,600

Therefore The correct answer is 1,65,600.

Additional Information

Successive Percentage Change

When a value changes by a% and then by b%, the effective change is (a + b + ab/100)%. This is applicable to population growth

and compound interest.

Population Decrease (Depreciation)

If the population decreases, use a negative sign for the rate: Final = Initial × $(1 - R/100)^n$.

Multiplying Factor Method

For a 15% increase, the multiplying factor is 1.15. For a 20% increase, it is 1.20. Total factor = 1.15 × 1.20 = 1.38.

Q34. Answer: (d) Eastern India

The correct answer is Eastern India.

Key Points

• Norwesters, locally known as Kalbaisakhi, are violent thunderstorms that occur in the pre-monsoon season (March-May) in Eastern India.

• These storms are most prevalent in states such as West Bengal, Odisha, Bihar, Jharkhand, and Assam.

• They are characterized by strong winds, heavy rainfall, and sometimes hail, which can lead to significant agricultural damage.

• Norwesters are triggered by the interaction of hot, dry air from the northwest with moist air from the Bay of Bengal.

• These storms are crucial for pre-monsoon rainfall, benefiting crops like jute, paddy, and tea in Eastern India.

Additional Information

• Kalbaisakhi:

• Kalbaisakhi is a Bengali term that translates to "Black Storms of Baisakh," referring to their occurrence in the first month of the Bengali calendar.

• These storms often bring respite from the intense heat of summer in Eastern India.

• Formation of Norwesters:

• Norwesters develop due to thermal convection caused by intense heating of the land during the day.

• The rapid ascent of warm air leads to the formation of cumulonimbus clouds, which result in thunderstorms.

• Impact on Agriculture:

• While Norwesters can cause local destruction, they play a positive role in enhancing soil moisture and supporting the growth of crops like rice, tea, and mango.

• They are especially important for tea plantations in Assam and jute cultivation in West Bengal.

• Other Regional Weather Phenomena:

• Southern India experiences pre-monsoon showers called Mango Showers.

• Western India often faces dust storms during this period.

Q35. Answer: (a) Kerala

The correct answer is Kerala.

Key Points

• The Moplah Uprising (also called the Mappila Rebellion) took place in 1921, predominantly in the Malabar region of present-day Kerala.

• The rebellion primarily involved the Muslim Moplah (Mappila) community protesting against British colonial rule and oppressive Hindu landlords.

• The uprising was part of the larger Khilafat Movement, which aimed to protect the Ottoman Caliphate and was supported by Indian Muslims.

• The Moplahs were enraged by the exploitation and land revenue systems imposed by the British and landlords, leading to violent clashes.

• It resulted in significant casualties and highlighted the socio-religious tensions in colonial India.

Additional Information

• Moplahs (Mappilas):

• The Mappilas are a Muslim community native to Kerala, with roots in Arab traders who settled in the region centuries ago.

• They were primarily agricultural laborers under Hindu landlords during the colonial period.

• Khilafat Movement:

• A pan-Islamic movement initiated in India to protest the disintegration of the Ottoman Empire and the abolition of the Caliphate after World War I.

• It was led by prominent leaders like Mohammed Ali and Shaukat Ali.

• Impact of Moplah Uprising:

• The rebellion led to widespread violence, loss of life, and destruction of property, resulting in harsh retaliation by the British.

• It exposed deep-rooted agrarian issues and communal tensions in the Malabar region.

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• British Response:

• The British authorities deployed military forces to suppress the rebellion.

• Thousands of Moplahs were killed, and many were arrested or exiled to penal settlements.

Q36. Answer: (c) Intensive Agriculture District Programme

The correct answer is Intensive Agriculture District Programme.

Key Points

• The Intensive Agriculture District Programme (IADP) was launched in 1960 as a pilot initiative to enhance agricultural productivity in India.

• It was part of the efforts to address food shortages and improve self-sufficiency in grain production during the early stages of India's Green Revolution.

• The programme focused on specific districts with favorable conditions for agricultural growth, utilizing high-yielding seeds, fertilizers, and irrigation techniques.

• IADP was considered the precursor to the Green Revolution and laid the foundation for widespread adoption of modern farming practices.

• The success of the programme demonstrated the potential of scientific and technological interventions in agriculture, influencing future government policies.

Additional Information

• Green Revolution in India

• The Green Revolution began in the mid-1960s and aimed at increasing agricultural output, particularly in wheat and rice production.

• It relied heavily on the use of high-yielding variety (HYV) seeds, chemical fertilizers, pesticides, and irrigation systems.

• Punjab, Haryana, and western Uttar Pradesh were the primary regions benefiting from the Green Revolution.

• It helped India achieve self-sufficiency in food grain production but also led to environmental challenges like soil degradation and overuse of water resources.

• High-Yielding Variety (HYV) Seeds

• HYV seeds are genetically modified seeds designed to increase crop yield.

• They played a pivotal role during the Green Revolution, contributing to higher production levels.

• These seeds require intensive irrigation and fertilizers for optimal growth.

• Fertilizers and Pesticides

• Fertilizers provide essential nutrients to crops, such as nitrogen, phosphorus, and potassium, boosting agricultural productivity.

• Pesticides are chemicals used to prevent or eliminate pests, ensuring healthy crop growth.

• Excessive use of fertilizers and pesticides during the Green Revolution led to environmental concerns like water pollution and soil contamination.

• Irrigation Infrastructure

• The Green Revolution emphasized the development of irrigation facilities to ensure year-round water availability.

• Canals, tube wells, and other irrigation systems were widely constructed during this period.

Q37. Answer: (b) JWWB

The solution for the given number/symbol coding problem is as follows.

Number/Symbol	**8**	**6**	**•**	**%**	**9**	**&**	**3**	**•**	**@**	**5**	**$**	**7**	**4**
Code	W	C	E	J	F	A	D	Q	G	P	R	B	U

Given: %987

Rule No. (i): This condition does not apply because the first element (%) is a symbol and not a number.

Rule No. (ii): This condition does not apply because the first element (%) is a symbol and not an even number.

Rule No. (iii): This condition applies because the third element (8) is a perfect cube ($2^3=8$). The second element (9) will be coded with the code for the third element (8).

Based on the applicable rule (iii), the codes are as follows:

The code for % is J.

The code for 9 becomes the code for 8, which is W.

The code for 8 is W.

The code for 7 is B.

Thus, '%987' is coded as → JWWB.

Hence, the correct answer is "Option 2".

Q38. Answer: (a) SINK-IKNS-KNIS

The logic followed here is,

For, SAME - AEMS-EMAS

GOAL - OLAG-LAOG

Similarly,

Option 1) SINK-IKNS-KNIS

Hence, the correct answer is "Option 1".

Q39. Answer: (b) Rudrasimha III

The correct answer is Rudrasimha III.

Key Points

• Rudrasimha III was the last ruler of the Western Kshatrapas, a dynasty that ruled parts of western and central India.

• Chandragupta II, also known as Vikramaditya, defeated Rudrasimha III around 395 CE to annex the territories of the Western Kshatrapas into the Gupta Empire.

• This victory significantly expanded the Gupta Empire and secured control over important trade routes in western India.

• The defeat of Rudrasimha III marked the end of the Saka era's rule in the region, which had lasted for several centuries.

• This conquest is commemorated in inscriptions and coins that celebrate Chandragupta II's military achievements.

Additional Information

• Western Kshatrapas

• The Western Kshatrapas were an Indo-Scythian dynasty that ruled the western and central parts of India after the decline of the Mauryan Empire.

• They are known for their silver coins, which provide valuable historical insights into their reign and society.

• Chandragupta II

• Chandragupta II, also known as Vikramaditya, was one of the most powerful Gupta emperors, ruling from approximately 375 to 415 CE.

• His reign is considered a golden age in Indian history due to advancements in art, science, and literature.

• Saka Era

• The Saka Era was established by the Indo-Scythians and is widely used in Indian calendars.

• The defeat of Rudrasimha III marked the decline of the Saka rulers in India.

• Gupta Empire's Expansion

• The annexation of the Western Kshatrapas by Chandragupta II helped the Gupta Empire secure key trade routes and ports, boosting its economy.

• This expansion contributed to the empire's reputation as a major power in ancient India.

Q40. Answer: (c) 14

Shortcut Trick

Given $x = 2 + \sqrt{3}$. Notice that $2^2 - (\sqrt{3})^2 = 4 - 3 = 1$.

If the difference of squares of the terms is 1, then $1/x = 2 - \sqrt{3}$.

Adding both: $x + 1/x = (2 + \sqrt{3}) + (2 - \sqrt{3}) = 4$.

Using the shortcut $x^2 + 1/x^2 = (x + 1/x)^2 - 2$:

Result $= 4^2 - 2 = 16 - 2 = 14$.

Therefore The correct answer is 14.

Alternate Method

Given: $x = 2 + \sqrt{3}$

Step 1: Find 1/x

=> $1/x = 1 / (2 + \sqrt{3})$

=> Rationalizing the denominator: $[1 / (2 + \sqrt{3})] \times [(2 - \sqrt{3}) / (2 - \sqrt{3})]$

=> $1/x = (2 - \sqrt{3}) / (2^2 - (\sqrt{3})^2)$

=> $1/x = (2 - \sqrt{3}) / (4 - 3) = 2 - \sqrt{3}$

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Step 2: Find (x + 1/x)

=> x + 1/x = (2 + √3) + (2 − √3)

=> x + 1/x = 4

Step 3: Calculate $x^2 + 1/x^2$

Formula used: $(a + b)^2 = a^2 + b^2 + 2ab$

=> $(x + 1/x)^2 = x^2 + 1/x^2 + 2(x)(1/x)$

=> $4^2 = x^2 + 1/x^2 + 2$

=> $16 = x^2 + 1/x^2 + 2$

=> $x^2 + 1/x^2 = 16 − 2 = 14$

Therefore The correct answer is 14.

Additional Information

Rationalization Rule

If $x = a + \sqrt{b}$, and $a^2 − b = 1$, then its reciprocal 1/x is always $a − \sqrt{b}$.

Algebraic Powers

If $x + 1/x = k$, then $x^2 + 1/x^2 = k^2 − 2$ and $x^3 + 1/x^3 = k^3 − 3k$.

Square of a Binomial

Standard identity: $(a + b)^2 = a^2 + 2ab + b^2$ and $(a − b)^2 = a^2 − 2ab + b^2$.

Q41. Answer: (a) HDFC Bank

The correct answer is HDFC Bank.

Key Points

• HDFC Bank was the first private bank to be established in India after the liberalization reforms of 1991.

• It was formally inaugurated in April 1994 by then Union Finance Minister Dr. Manmohan Singh, marking the entry of private banks into the Indian financial sector.

• The bank was set up under the guidelines of the Reserve Bank of India (RBI) to promote competition and efficiency in the banking system.

• IndusInd Bank was initiated with a focus on retail banking and corporate banking services, paving the way for further privatization in the sector.

• It was named after the Indus Valley Civilization, symbolizing prosperity and innovation in the financial domain.

Additional Information

• Liberalization of 1991:

• The 1991 economic reforms, also known as the LPG reforms (Liberalization, Privatization, Globalization), were introduced by Dr. Manmohan Singh under the Narasimha Rao government.

• These reforms aimed to dismantle the License Raj, reduce state control, and encourage private and foreign investment.

• Role of the RBI:

• The Reserve Bank of India (RBI) played a pivotal role in laying down guidelines for the establishment of new private sector banks post-1991.

• It ensured that these banks adhered to stringent regulatory measures to maintain financial stability.

• Other Early Private Banks:

• After IndusInd Bank, other private banks like HDFC Bank (1994), ICICI Bank (1994), and Axis Bank (1993, as UTI Bank) followed suit.

• These banks revolutionized the financial landscape by offering modern banking services and leveraging technology.

• Impact of Privatization on Banking:

• Privatization introduced competition, improved efficiency, and enhanced customer service in the Indian banking sector.

• It also facilitated the adoption of innovative technologies such as ATMs, online banking, and mobile banking.

Q42. Answer: (a) United States

The correct answer is United States.

Key Points

• The United States will host the 2025 FIFA Club World Cup, marking a significant milestone in international club football.

• This edition will be the first to feature an expanded format with 32 teams, replacing the current seven-team competition structure.

• The tournament will provide a platform for the world's top football clubs to compete, with teams qualifying based on their performances in continental club competitions.

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• The decision was announced by FIFA in 2023, as part of its effort to enhance the global appeal and reach of club-level football.

• The event is expected to serve as a precursor to the 2026 FIFA World Cup, which will also be co-hosted by the United States, along with Canada and Mexico.

Additional Information

• FIFA Club World Cup:

• It is an annual football competition organized by FIFA, featuring champion clubs from each of the six continental confederations.

• The tournament aims to determine the best club team in the world.

• The competition was first held in 2000, with Corinthians (Brazil) being the inaugural champions.

• Expanded Format (2025):

• The 2025 edition will introduce a 32-team format, similar to the FIFA World Cup.

• This change is designed to increase the tournament's competitiveness and global appeal.

• The format will include champions from various confederations, as well as additional high-performing teams.

• Significance for the United States:

• Hosting the 2025 FIFA Club World Cup demonstrates the growing prominence of football (soccer) in the United States.

• The event aligns with the country’s preparations for the 2026 FIFA World Cup, boosting infrastructure and fan engagement.

• Key Participating Teams:

• Clubs like Real Madrid, Manchester City, Flamengo, and Al Ahly are expected to participate, based on their continental successes.

• These teams represent some of the strongest footballing traditions globally, ensuring high-quality competition.

Q43. Answer: (d) Prasanna Kumar D

The correct answer is Prasanna Kumar D.

Key Points

• Prasanna Kumar D was elected as the Vice President of the Institute of Chartered Accountants of India (ICAI) for the term 2025-26 in February 2025.

• The ICAI is a statutory body established under the Chartered Accountants Act, 1949, responsible for regulating the profession of Chartered Accountancy in India.

• The Vice President is elected annually by the Central Council members of ICAI, who represent the governing body of the institute.

• Prasanna Kumar D is known for his contributions to the field of finance and accounting and for spearheading various initiatives within ICAI during his tenure.

• ICAI plays a crucial role in setting accounting standards, auditing practices, and promoting ethical conduct among professionals in India.

Additional Information

• Institute of Chartered Accountants of India (ICAI):

• ICAI was established on July 1, 1949, by an Act of Parliament and is the second-largest accounting body in the world.

• It oversees the education, training, and certification of Chartered Accountants in India.

• ICAI is responsible for developing and enforcing accounting standards and auditing guidelines in India.

• Role of Vice President in ICAI:

• The Vice President assists the President in executing key organizational functions and initiatives.

• He/she plays a pivotal role in strategic decision-making and representing the institute at national and international forums.

• The Vice President is elected annually, ensuring dynamic leadership within the organization.

• Chartered Accountants Act, 1949:

• This Act governs the establishment, functioning, and regulation of ICAI.

• It empowers ICAI to conduct examinations, certify Chartered Accountants, and enforce professional ethics.

• It also provides ICAI the authority to take disciplinary action against members for misconduct.

• ICAI's Contribution to Global Accounting:

• ICAI collaborates with international accounting bodies to promote global standards and practices.

• It is a member of the International Federation of Accountants (IFAC), contributing to the harmonization of accounting and auditing globally.

• ICAI organizes international conferences to discuss advancements in accounting, auditing, and financial reporting.

Q44. Answer: (d) 5 - 10 - 15 - 30

The logic followed here is:

Logic:

First number = Second number × 2.

Second number = Third number + 5.

Third number = Fourth number × 2.

For, 10 - 20 - 25 - 50

=> 10 × 2 = 20

=> 20 + 5 = 25

=> 25 × 2 = 50

Here, the logic followed.

For, 3 - 6 - 11 - 22

=> 3 × 2 = 6

=> 6 + 5 = 11

=> 11 × 2 = 22

Here, the logic followed.

Now, let's check the options based on this logic:

Option 1) 15 - 15 - 30 - 35

=> 15 × 2 = 30. (Given Second number is 15, 15 ≠ 30)

Here, logic not followed.

Option 2) 12 - 14 - 18

=> This set only contains three numbers and does not follow the required pattern length.

Here, logic not followed.

Option 3) 18 - 21 - 22 - 44

=> 18 × 2 = 36. (Given Second number is 21, 21 ≠ 36)

Here, logic not followed.

Option 4) 5 - 10 - 15 - 30

=> 5 × 2 = 10 (Matches)

=> 10 + 5 = 15 (Matches)

=> 15 × 2 = 30 (Matches)

Here, logic followed.

Hence, the correct answer is "Option 4".

Q45. Answer: (d) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

• The Bagh Caves are a group of nine rock-cut caves located in the Dhar district of Madhya Pradesh, India.

• They are renowned for their Buddhist mural paintings, which are considered masterpieces of ancient Indian art.

• The caves date back to the 5th–6th century CE during the Gupta period, which is often referred to as the "Golden Age" of India.

• The murals in these caves were created using the temperate fresco technique and depict scenes from Buddhist Jataka tales and other religious themes.

• The caves are named after the nearby village of Bagh and are located on the banks of the Baghini River.

Additional Information

• Rock-Cut Architecture in India

• India has a rich tradition of rock-cut architecture, with structures carved directly into natural rock formations.

• Examples include the Ajanta Caves, Ellora Caves, and the Elephanta Caves.

• These caves often served as monasteries, temples, or places of worship.

• Buddhist Art and Iconography

• Buddhist art flourished in India during the Maurya, Gupta, and post-Gupta periods.

• It includes murals, sculptures, and carvings that depict the life and teachings of Buddha and the Jataka tales.

• The Bagh Caves are an important example of the synthesis of art and spirituality in Buddhist culture.

• Gupta Period

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• The Gupta Empire (circa 320–550 CE) is often regarded as the "Golden Age" of India due to advancements in art, science, and culture.

• The Bagh Caves' paintings reflect the artistic excellence of this era, with intricate designs and vibrant colors.

• Preservation Efforts

• The Bagh Caves have undergone conservation efforts to preserve their murals, which were damaged due to environmental factors.

• These efforts aim to safeguard the historical and cultural legacy of the site for future generations.

Q46. Answer: (b) Rs. 4,200

Shortcut Trick

Total Simple Interest percentage for 2 years = Rate × Time = 5% × 2 = 10%.

Given that 10% of the Sum (Principal) = Rs. 420.

Therefore, 100% (Principal) = Rs. 420 × 10 = Rs. 4,200.

Therefore The correct answer is Rs. 4,200.

Alternate Method

Given:

Simple Interest (SI) = Rs. 420

Time (T) = 2 years

Rate of Interest (R) = 5% per annum

Formula Used:

SI = (P × R × T) ÷ 100

Calculations:

=> 420 = (P × 5 × 2) ÷ 100

=> 420 = (P × 10) ÷ 100

=> 420 = P ÷ 10

=> P = 420 × 10

=> P = Rs. 4,200

Therefore The correct answer is Rs. 4,200.

Additional Information

Simple Interest (SI)

It is the interest calculated only on the initial Principal amount for every period. Formula: SI = (P × R × T) / 100.

Total Amount (A)

The total money returned after the given time period, which includes both the Principal and the Interest. Formula: A = P + SI.

Rate and Time Relation

For Simple Interest, the interest earned is directly proportional to both the Rate of interest and the Time duration.

Q47. Answer: (c) 14

The given three-digit numbers are: 617, 335, 930, 489, 671.

Now,

The highest number is 930. Its first digit is 9.

The lowest number is 335. Its third digit is 5.

Perform the addition.

Add the first digit of the highest number 9 to the third digit of the lowest number 5.

9 + 5 = 14.

Hence, the correct answer is "Option 3".

Q48. Answer: (c) None

Given:

The number is 4319286.

Arranging the digits of the number 4319286 in descending order from left to right:

Original Digit	**4**	**3**	**1**	**9**	**2**	**8**	**6**
Sorted Digit	9	8	6	4	3	2	1

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Comparing the positions:

The position(s) of none of the digits will remain unchanged.

Hence, the correct answer is "Option 3".

Q49. Answer: (a) ROM

The correct answer is ROM.

Key Points

• ROM (Read-Only Memory) is a type of non-volatile memory used to store essential system instructions that remain intact even when the computer is powered off.

• It contains firmware, which is permanently written by the manufacturer and cannot be modified by the user under normal conditions.

• ROM is crucial for the booting process as it stores the BIOS (Basic Input/Output System) or UEFI firmware instructions.

• Unlike RAM, the data in ROM is persistent and not lost when the system is shut down, making it ideal for storing critical instructions.

• Examples of ROM include EPROM (Erasable Programmable ROM) and EEPROM (Electrically Erasable Programmable ROM), which are more flexible variations.

Additional Information

• RAM (Random Access Memory):

• RAM is a volatile memory type used for temporary data storage while a program is running.

• It provides faster read and write speeds compared to ROM but loses all data when the computer is turned off.

• Registers:

• Registers are high-speed storage locations within the CPU used to store temporary data and instructions.

• They are much smaller in size but faster compared to both RAM and ROM.

• Cache Memory:

• Cache memory is a small-sized type of volatile memory located close to the CPU to store frequently accessed data and instructions.

• It significantly enhances the processing speed by reducing the time required to access data from the main memory.

• Types of ROM:

• Masked ROM: Pre-programmed at the time of manufacturing.

• PROM: Programmable Read-Only Memory that can be written once.

• EPROM: Can be erased using ultraviolet light and reprogrammed.

• EEPROM: Can be erased and reprogrammed electrically.

Q50. Answer: (d) 112

Shortcut Trick

Average marks of 7 subjects = 76

Average marks of 6 subjects (excluding English) = 70

Deviation per subject = 76 − 70 = 6

Total deviation for 6 subjects = 6 × 6 = 36

English marks = New Average + Total Deviation = 76 + 36 = 112

Therefore The correct answer is 112.

Alternate Method

Given:

Average of 7 subjects = 76

Average of 6 subjects = 70

Formula Used:

Total sum = Average × Number of observations

Value of excluded item = (Total sum of all items) − (Total sum of remaining items)

6 Subjects (Avg: 70)

English

Combined Avg: 76

Total Marks = (76 × 7) = 532

Calculations:

=> Total marks in 7 subjects = 76 × 7 = 532

=> Total marks in 6 subjects (excluding English) = 70 × 6 = 420

=> Marks in English = Total marks in 7 subjects − Total marks in 6 subjects

=> Marks in English = 532 − 420

=> Marks in English = 112

Therefore The correct answer is 112.

Additional Information

Average Definition

The arithmetic mean is calculated as: Average = (Sum of all observations) ÷ (Number of observations).

Inclusion/Exclusion Effect

When a new value is added, if the average increases, the new value is greater than the old average; if the average decreases, the new value is less than the old average.

General Formula for New Entry

New value = (New Average × New count) − (Old Average × Old count).

Q51. Answer: (a) KQN

The logic followed here is:

Option (1): KQN

Option (2): NTP

Option (3): QWS

Option (4): TZV

The letter-cluster that DOES NOT belong to the group is: KQN.

Hence, the correct answer is "Option (1)"

Q52. Answer: (d) Imaginary roots

Shortcut Trick

Identify the coefficients: a = 2, b = 1, c = 3.

Calculate the Discriminant (D) = b2 − 4ac.

D = 12 − 4 × 2 × 3 = 1 − 24 = −23.

Since D < 0, the roots are always imaginary.

Therefore The correct answer is Imaginary roots.

Alternate Method

Given Quadratic Equation: 2x2 + x + 3 = 0

The nature of roots is determined by the Discriminant (D) formula: D = b2 − 4ac.

=> Comparing with ax2 + bx + c = 0, we get:

=> a = 2, b = 1, c = 3

=> D = (1)2 − 4 × 2 × 3

=> D = 1 − 24

=> D = −23

=> Since the Discriminant is less than zero (D < 0), the roots of the given equation are Imaginary roots.

Therefore The correct answer is Imaginary roots.

Additional Information

Nature of Roots Table

For a Quadratic Equation, if D > 0, roots are Real and Distinct; if D = 0, roots are Real and Equal; if D < 0, roots are Imaginary.

Rational vs Irrational Roots

If D is a perfect square and a, b, c are rational, roots are rational. If D is not a perfect square, roots are irrational conjugates.

Sum and Product of Roots

For ax2 + bx + c = 0, the Sum of roots (α + β) = −b/a and the Product of roots (αβ) = c/a.

Q53. Answer: (a) 2sec A

Shortcut Trick

Put A = 0° in the given expression.

=> (√1 / √1) + (√1 / √1) = 1 + 1 = 2.

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Check options for A = 0°: (1) 2 sec 0° = 2(1) = 2. (2) 2 sin 0° = 0. (3) 2 cos 0° = 2. (4) 2 cosec 0° = undefined.

Since both (1) and (3) give 2, check A = 30°: (√1.5/√0.5) + (√0.5/√1.5) = √3 + 1/√3 = 4/√3. Option (1) 2 sec 30° = 4/√3.

Therefore The correct answer is 2sec A.

Alternate Method

Given: Expression = (√(1 + sin A) / √(1 − sin A)) + (√(1 − sin A) / √(1 + sin A))

Formula Used: (a + b)(a − b) = a² − b²; cos²A = 1 − sin²A; sec A = 1/cos A

=> Take the LCM of the denominators: √((1 − sin A)(1 + sin A))

=> Numerator = (√(1 + sin A))² + (√(1 − sin A))²

=> Expression = (1 + sin A + 1 − sin A) / √(1 − sin² A)

=> Expression = 2 / √(cos² A)

=> Expression = 2 / cos A

=> Expression = 2 sec A

Therefore The correct answer is 2sec A.

Additional Information

Trigonometric Identities

Fundamental identity: sin²θ + cos²θ = 1. Reciprocal identity: sec θ = 1/cos θ.

Rationalization of Surds

To simplify √((1+sin A)/(1-sin A)), multiply numerator and denominator by √(1+sin A) to get (1+sin A)/cos A = sec A + tan A.

Q54. Answer: (d) Brother's son

Decoding symbols for Family Tree:

Let's decode the relationships step-by-step:

T is the wife of S.

L is the daughter of T.

K is the sister of S.

W is the mother of L's father (S).

P is the son of S.

According to the given information Family Tree Representation:

Thus, P is the Brother's son of K.

Hence, the correct answer is "Option 4"

Q55. Answer: (c) Elected Treasurer of the Panchayat

The correct answer is Elected Treasurer of the Panchayat.

Key Points

• Every Gram Panchayat in India is mandated to have a Panchayat Secretary, who is responsible for administrative tasks and record-keeping.

• Each Gram Panchayat is headed by an Elected President, also known as the Sarpanch, who represents the Panchayat.

• The position of Elected Treasurer is not a statutory requirement in Gram Panchayats and may not exist in many Panchayats.

• Many Gram Panchayats also have a Vice President (Upsarpanch), who assists the Sarpanch and acts as the deputy.

• The structure of Gram Panchayats is defined by the 73rd Constitutional Amendment Act, which provides guidelines for their composition and functioning.

Additional Information

• Gram Panchayat:

• It is the basic unit of the Panchayati Raj system in India, established under the 73rd Constitutional Amendment Act, 1992.

• Each Gram Panchayat governs a village or group of villages.

• The Panchayat is responsible for local governance and development activities.

• 73rd Constitutional Amendment:

• Introduced in 1992, it institutionalized the Panchayati Raj system in India.

• It provided a three-tier system of governance: Gram Panchayat, Panchayat Samiti, and Zilla Parishad.

• It mandated the creation of Panchayats at the village, intermediate, and district levels.

• Panchayat Secretary:

• A government-appointed official responsible for maintaining records, accounts, and correspondence in the Panchayat.

• Acts as a liaison between the government and the Panchayat.

• Sarpanch:

• The elected head of the Gram Panchayat.

• Responsible for presiding over meetings and implementing decisions.

• Acts as the representative of the Panchayat in external affairs.

Q56. Answer: (d) 86

Shortcut Trick

Let the assumed average be 85.

Calculate deviations from 85: (82−85), (86−85), (92−85), (75−85), (95−85) → −3, +1, +7, −10, +10.

Sum of deviations = −3 + 1 + 7 − 10 + 10 = +5.

Average deviation = Total deviation ÷ Number of items = 5 ÷ 5 = +1.

Actual Average = Assumed Average + Average deviation = 85 + 1 = 86.

Therefore The correct answer is 86.

Alternate Method

Given: Marks in five assignments are 82, 86, 92, 75, and 95.

Formula Used: Average Score = Sum of all marks ÷ Total number of assignments

=> Sum of marks = 82 + 86 + 92 + 75 + 95

=> Sum of marks = 430

=> Total number of assignments = 5

=> Average Score = 430 ÷ 5

=> Average Score = 86

Therefore The correct answer is 86.

Additional Information

Arithmetic Mean Property

The sum of the deviations of a set of observations from their arithmetic mean is always zero. $\sum(x_i - x) = 0$.

Effect of Constant Change

If a constant value 'k' is added to or subtracted from every observation in a data set, the new average will also increase or decrease by 'k'.

Weighted Average

When different values have different levels of importance, the weighted average is used: $(\sum w_i x_i) \div \sum w_i$.

Q57. Answer: (b) Green Productivity 2.0 Ecosystem

The correct answer is Green Productivity 2.0 Ecosystem.

Key Points

• The 67th Governing Body Meeting (GBM) of the Asian Productivity Organization (APO) discussed the launch of the Green Productivity 2.0 Ecosystem as a future-focused initiative.

• Green Productivity 2.0 aims to integrate sustainability and productivity strategies to drive economic growth while addressing environmental challenges.

• This initiative focuses on enhancing the adoption of green technologies, supporting circular economies, and promoting resource efficiency across the Asia-Pacific region.

• The APO highlighted the importance of a collaborative ecosystem involving governments, industries, and communities to achieve its Green Productivity goals.

• The Green Productivity 2.0 Ecosystem aligns with the United Nations Sustainable Development Goals (SDGs), particularly those related to climate action, responsible consumption, and sustainable industrialization.

Additional Information

• Asian Productivity Organization (APO)

• The APO is an intergovernmental organization established in 1961 to promote productivity growth in the Asia-Pacific region.

• It has 21 member countries, including India, Japan, South Korea, and others.

• The organization focuses on capacity building, research, and the development of productivity-enhancing practices.

• Green Productivity

• Green Productivity is a strategy for enhancing productivity and environmental performance simultaneously.

• It combines the principles of sustainable development with productivity improvement methods.

• The concept was first introduced by the APO in the early 1990s.

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• Circular Economy

• A circular economy focuses on eliminating waste and promoting the continual use of resources through recycling, reusing, and refurbishing.

• It contrasts with the traditional linear economy, which follows a "take, make, dispose" model.

• United Nations Sustainable Development Goals (SDGs)

• The SDGs are a global framework of 17 goals adopted by the UN in 2015 to address challenges like poverty, inequality, and climate change.

• Green Productivity initiatives align particularly with SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action).

Q58. Answer: (b) Swami Vivekananda

The correct answer is Swami Vivekananda.

Key Points

• The Ramakrishna Mission was founded by Swami Vivekananda in 1897 in the city of Kolkata, India.

• It was established to propagate the teachings of Ramakrishna Paramahamsa, Swami Vivekananda's spiritual guru.

• The mission focuses on spiritual enlightenment, social service, and interfaith harmony.

• Swami Vivekananda envisioned the Ramakrishna Mission as a unique combination of monastic order and social service organization.

• Today, the Ramakrishna Mission runs schools, colleges, hospitals, and charitable institutions worldwide, emphasizing education and healthcare.

Additional Information

• Swami Vivekananda (1863–1902):

• He was a prominent Indian monk and philosopher who introduced Indian philosophies of Vedanta and Yoga to the Western world.

• He is best remembered for his iconic speech at the World's Parliament of Religions in Chicago in 1893, where he addressed the audience as "Sisters and Brothers of America."

• His teachings emphasized the importance of self-realization, interfaith dialogue, and service to humanity.

• Ramakrishna Paramahamsa:

• He was a 19th-century Indian mystic and saint, revered as the spiritual master of Swami Vivekananda.

• Ramakrishna's teachings emphasized the universality of all religions and the pursuit of spiritual truth.

• The Motto of Ramakrishna Mission:

• The motto of the organization is "For one's own salvation and for the welfare of the world," reflecting its dual focus on spirituality and social service.

• Educational and Healthcare Initiatives:

• The Ramakrishna Mission operates numerous schools, universities, hospitals, and rural development centers across India and abroad.

• Its institutions are recognized for their commitment to quality education, irrespective of caste, creed, or religion.

Q59. Answer: (a) 717/31

Shortcut Trick

Combined efficiency = (1/26 + 1/36) cistern per hour.

Time to fill full cistern = (26 × 36) / (26 + 36) = 936 / 62 = 468 / 31 hours.

Time to fill half cistern = (1/2) × (468 / 31) = 234 / 31 hours.

234 / 31 = 7(17/31) hours.

Therefore The correct answer is 7(17)/(31) hours.

Alternate Method

Person	Days	Total Work	Efficiency
Pipe A	26	468 units	18
Pipe B	36	13	

=> Total Work (LCM of 26 and 36) = 468 units

=> Efficiency of A = 468 ÷ 26 = 18 units/hour

=> Efficiency of B = 468 ÷ 36 = 13 units/hour

=> Combined Efficiency (A + B) = 18 + 13 = 31 units/hour

=> Half of Total Work = 468 ÷ 2 = 234 units

=> Time taken = 234 ÷ 31 = 7(17/31) hours

Therefore The correct answer is 7(17)/(31) hours.

Additional Information

Pipes and Cisterns Concept

If pipe A fills in 'x' hours and pipe B in 'y' hours, together they fill in (xy)/(x+y) hours.

Inlet vs Outlet Pipes

Inlet pipes have positive efficiency while outlet (leakage) pipes have negative efficiency.

Partial Work Rule

Time taken to complete 'n' fraction of work = n × Total time required for full work.

Q60. Answer: (a) 5

Shortcut Trick

Let Cost Price (CP) be 100.

Marked Price (MP) = 100 + 40% of 100 = 140.

Selling Price (SP) = 100 + 33% of 100 = 133.

Discount = MP − SP = 140 − 133 = 7.

Discount% (X) = (Discount ÷ MP) × 100 = (7 ÷ 140) × 100 = 5%.

Therefore The correct answer is 5.

Alternate Method

Given: Markup% = 40%, Profit% = 33%, Discount% = X.

Formulas: SP = CP × (100 + Profit%) ÷ 100 | MP = CP × (100 + Markup%) ÷ 100 | SP = MP × (100 − Discount%) ÷ 100.

=> Assume CP = 100.

=> Marked Price (MP) = 100 × (1 + 40/100) = 140.

=> Selling Price (SP) = 100 × (1 + 33/100) = 133.

=> We know SP = MP × (100 − X) ÷ 100.

=> 133 = 140 × (100 − X) ÷ 100.

=> 133 = 1.4 × (100 − X) => 133 ÷ 1.4 = 100 − X.

=> 95 = 100 − X => X = 5.

Therefore The correct answer is 5.

Additional Information

Relationship between CP, MP, Profit, and Discount

The ratio of Marked Price to Cost Price can be expressed as: MP ÷ CP = (100 + Profit%) ÷ (100 − Discount%).

Successive Percentage Change

Profit% can be viewed as the net result of a markup followed by a discount: Net% = m − d − (m × d) ÷ 100, where m is markup and d is discount.

Q61. Answer: (b) 57

Given:

Rakesh's rank from the top = 24th.

Rakesh's rank from the bottom = 34th.

Total persons = (Rank from Top) + (Rank from Bottom) - 1

Total students = 24 + 34 - 1

= 58 - 1 = 57

Thus, there are 57 students in the class.

Hence, the correct answer is "Option 2".

Q62. Answer: (d) CPU

The correct answer is CPU.

Key Points

• The Central Processing Unit (CPU) is often referred to as the brain of the computer, responsible for processing instructions and performing calculations.

• It executes programs by carrying out basic arithmetic, logic, control, and input/output (I/O) operations specified by the

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instructions.

• Modern CPUs consist of multiple cores, which enable parallel processing for enhanced performance.

• The CPU interacts with other components like RAM and storage devices to fetch, decode, and execute instructions efficiently.

• It operates using a clock speed measured in GHz, which determines how many instructions it can process per second.

Additional Information

• RAM (Random Access Memory):

• RAM is a volatile memory used by the CPU to temporarily store data and instructions that are actively being used or processed.

• It enables faster access to data compared to storage devices like HDD or SSD.

• However, data in RAM is lost when the computer is powered off.

• HDD (Hard Disk Drive):

• An HDD is a non-volatile storage device used for storing large amounts of data permanently.

• It operates using magnetic storage and has slower read/write speeds compared to RAM.

• It is primarily used for storing the operating system, applications, and user data.

• FDD (Floppy Disk Drive):

• A floppy disk drive is an older storage device used to read and write data to floppy disks.

• It has largely been replaced by modern storage devices due to its limited capacity and slow speed.

• CPU Components:

• The CPU is composed of the Arithmetic Logic Unit (ALU), which performs calculations and logical operations.

• The Control Unit (CU) directs operations by interpreting instructions and coordinating with other hardware components.

• Registers within the CPU temporarily store data and instructions for quick access.

Q63. Answer: (c) -10 °C to 110 °C

The correct answer is -10 °C to 110 °C.

Key Points

• The usual temperature range of a laboratory thermometer is -10 °C to 110 °C, suitable for various experimental purposes.

• Laboratory thermometers are primarily used to measure temperature in scientific research and experiments.

• These thermometers are non-clinical and are not meant for measuring body temperature.

• The thermometer typically uses mercury or alcohol as the thermometric liquid due to their high sensitivity to temperature changes.

Additional Information

• Thermometer Types:

• Clinical Thermometers: Used to measure human body temperature, typically ranging from 35 °C to 42 °C.

• Laboratory Thermometers: Designed for experiments, with a broader range of -10 °C to 110 °C.

• Digital Thermometers: Use electronic sensors for temperature measurement, offering higher accuracy.

• Thermometric Liquids:

• Mercury: High thermal expansion and accuracy; used in traditional thermometers.

• Alcohol: Colored alcohol is used for better visibility and low freezing points.

• Working Principle: Laboratory thermometers operate on the principle of thermal expansion, where the liquid expands or contracts with temperature changes.

• Precautions:

• Ensure the thermometer is upright while taking measurements.

• Avoid measuring temperatures beyond the thermometer's range to prevent damage.

• Handle mercury thermometers carefully due to mercury's toxicity.

Q64. Answer: (d) 323

The correct answer is 323.

Key Points

• As of February 2023, a total of 323 sports infrastructure projects have been approved under the Khelo India programme.

• The Khelo India programme is a flagship initiative launched by the Ministry of Youth Affairs and Sports to promote grassroots sports and develop infrastructure across India.

• These projects include the establishment of state-of-the-art facilities such as sports academies, training centers, and stadiums to nurture talent and improve access.

• The programme focuses on building a robust sports ecosystem, including talent identification and nurturing, sports education,

and broadening community participation.

• Khelo India aims to engage youth in sports activities and provide them with an opportunity to excel at national and international levels.

Additional Information

• About Khelo India Programme:

• Launched in 2018, the programme aims to revive India's sports culture at the grassroots level.

• It focuses on promoting "sports for all" and "sports for excellence."

• Under the initiative, athletes are provided scholarships and training facilities.

• Sports Infrastructure Development:

• State governments and sports authorities collaborate to develop infrastructure in rural and urban areas.

• Projects include stadium construction, synthetic tracks, swimming pools, and multi-purpose halls.

• Talent Identification:

• The programme identifies young talent through competitions like Khelo India Youth Games.

• Selected athletes are trained at specialized academies with advanced coaching facilities.

• Impact of Khelo India:

• India has seen increased participation in sports, especially among youth, due to the programme.

• The initiative is contributing to India's improved performance at international events.

Q65. Answer: (a) 21

Shortcut Trick

Divide the given number 25553 by the divisor 38 to find the remainder.

25553 ÷ 38 leaves a remainder of 17.

Required number to be added = Divisor − Remainder = 38 − 17 = 21.

Therefore The correct answer is 21.

Alternate Method

Given:

Given dividend = 25553

Given divisor = 38

Formula Used:

When a number is not perfectly divisible, the smallest number to be added to make it divisible is given by:

Required Number = Divisor − Remainder

Calculations:

=> 25553 ÷ 38

=> 25553 = 38 × 672 + 17

=> Remainder = 17

=> Smallest number to be added = 38 − 17

=> Smallest number to be added = 21

Therefore The correct answer is 21.

Additional Information

Divisibility and Remainder Rules

To find the smallest number to be subtracted from a dividend to make it perfectly divisible, the required value is simply the Remainder itself.

Divisibility by 38

A number is divisible by 38 if it is an even number (divisible by 2) and also divisible by the prime number 19.

Q66. Answer: (b) K

Given: Seven boxes D, E, F, G, I, J and K are kept one over the other. The lowermost box is numbered 1 and the topmost is numbered 7.

1) No box is kept above F.

2) Only three boxes are kept between F and K.

7	**F**
6	

5	
4	
3	K
2	
1	

3) E is kept immediately above K

7	**F**
6	
5	
4	E
3	K
2	
1	

4) Only one box is kept between D and E.

5) Only four boxes are kept between D and G. J is kept at some place above I.

7	**F**
6	D
5	J
4	E
3	K
2	I
1	G

Thus, K is kept second below J.

Hence, the correct answer is "Option 2".

Q67. Answer: (d) = UBE, % = PWZ

Given:

: YFI :: LSV : %

Option 1) # = VBE, % = PWZ

For # (VBE) to YFI

For LSV to % (PWZ)

Option 2) # = ZBE, % = BWZ

For # (ZBE) to YFI

For LSV to % (BWZ)

Option 3) # = UBE, % = PWQ

For # (UBE) to YFI

For LSV to % (PWQ)

Option 4) # = UBE, % = PWZ

For # (UBE) to YFI

For LSV to % (PWZ)

Since the patterns for both pairs match, Option 4 is the correct answer.

Hence, the correct answer is "Option 4".

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Q68. Answer: (c) 14/5

Shortcut Trick

Total Work (LCM of 6, 10) = 30 units.

Efficiency of Hemant = 5, Efficiency of Vian = 3.

Combined work in 2 days = (5 + 3) × 2 = 16 units.

Remaining work = 30 − 16 = 14 units.

Days for Hemant to finish = 14 ÷ 5 = 14/5 days.

Therefore The correct answer is 14/5 days.

Alternate Method

Given: Time taken by Hemant = 6 days, Time taken by Vian = 10 days.

Formula Used: Efficiency = Total Work ÷ Time taken.

Person	Days	Total Work	Efficiency
Hemant	6	30	5
Vian	10	3	

=> Work done by Hemant and Vian together in 1 day = 5 + 3 = 8 units.

=> Work done in 2 days = 8 × 2 = 16 units.

=> Remaining work = Total Work − Completed Work = 30 − 16 = 14 units.

=> Time taken by Hemant to complete remaining work = Remaining Work ÷ Efficiency of Hemant

=> Time = 14/5 days.

Therefore The correct answer is 14/5 days.

Additional Information

Pipes and Cisterns

This logic is identical to filling a tank where efficiency is the rate of flow. Inlet pipes have positive efficiency while outlet pipes have negative efficiency.

Work and Wages

Wages are always distributed in the ratio of the actual work done by each person (or the ratio of efficiencies if they work for the same duration).

Alternate Day Work

If persons work on alternate days, calculate the work done in one full cycle (e.g., 2 days) and then find the number of cycles required to complete the total work.

Q69. Answer: (c) 1/3

Given:

(15/18)/(15/3) ÷ (3/6 × 12/9 + 2/6) + 3/8 ÷ 18/15 of 15/8

Calculation:

(15/18)/(15/3) ÷ (3/6 × 12/9 + 2/6) + 3/8 ÷ 18/15 of 15/8

=> 3/18 ÷ (1/2 × 4/3 + 1/3) + 3/8 ÷ 18/15 × 15/8

=> 1/6 ÷ (2/3 + 1/3) + 3/8 ÷ 18/8

=> 1/6 ÷ (2/3 + 1/3) + 3/8 ÷ 9/4

=> 1/6 ÷ 1 + 3/8 × 4/9

=> 1/6 ÷ 1 + 1/6

=> 1/6 + 1/6

=> 2/6

=> 1/3

Therefore Option 3 is the correct answer.

Q70. Answer: (d) 193

The logic followed here is:

Thus, the missing term in the series is 193.

Hence, the correct answer is "Option 4";

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Q71. Answer: (d) Compoundable offences

The correct answer is Compoundable offences.

Key Points

• Lok Adalat is an alternative dispute resolution mechanism established under the Legal Services Authorities Act, 1987.

• Cases that can be settled in Lok Adalat include compoundable offences, civil cases, and disputes related to bank recovery, matrimonial issues, and labor matters.

• Compoundable offences refer to crimes where the complainant and accused can mutually agree to settle the matter outside court.

• The award passed by Lok Adalat is final and binding, and it holds the same status as a decree of a civil court.

• Lok Adalat provides a cost-effective and speedy resolution of disputes, avoiding lengthy litigation processes.

Additional Information

• Lok Adalat:

• Also known as "People's Court," it is organized by the State/District Legal Services Authority, High Court, or Supreme Court committees.

• It promotes amicable settlement of disputes through conciliation and compromise.

• It does not involve court fees, and parties are free to directly interact with the presiding judge.

• Compoundable Offences:

• These are less severe crimes, such as theft, assault, or defamation, which can be settled with the victim's consent.

• The Indian Penal Code (IPC) specifies which offences are compoundable.

• Examples include Section 323 (voluntarily causing hurt) and Section 506 (criminal intimidation).

• Legal Services Authorities Act, 1987:

• It provides statutory backing for the establishment of Lok Adalat.

• The Act ensures free legal aid and promotes alternative dispute resolution mechanisms.

• Under the Act, Lok Adalat can resolve both pre-litigation and ongoing cases.

• Benefits of Lok Adalat:

• Ensures faster resolution of cases compared to conventional courts.

• Reduces the workload of courts by addressing pending cases.

• Offers legal aid and settlement without imposing court fees.

Q72. Answer: (c) Slide Sorter View

The correct answer is Slide Sorter View.

Key Points

• Slide Sorter View in Microsoft PowerPoint provides a visual overview of the entire presentation, displaying all slides in thumbnail format.

• This view is specifically designed to make it easy to reorganize, rearrange, and manage slides within the presentation.

• Users can drag and drop slides to change their order, facilitating quick adjustments to the presentation structure.

• It is an ideal choice for reviewing the overall flow and sequence of content before finalizing the slideshow.

• Slide Sorter View is accessible via the View tab in the PowerPoint ribbon.

Additional Information

• Slide Show View

• This view is used for presenting slides in full-screen mode, allowing the presenter to deliver the content to an audience.

• It enables users to navigate slides sequentially or jump to specific slides during the presentation.

• Animations, transitions, and multimedia elements can be previewed in this view.

• Normal View

• Normal View is the default editing mode in PowerPoint, where users can work on individual slides and see a slide thumbnail pane.

• It allows for text editing, formatting, and insertion of multimedia elements on specific slides.

• Reading View

• Reading View displays the presentation in a windowed mode, providing a more immersive experience without switching to full-screen mode.

• This view is often used for reviewing a presentation without editing or presenting it.

• Slide Sorter Importance

• It is especially useful for presentations with a large number of slides, enabling streamlined organization.

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• Incorporates features for adding sections and grouping slides to enhance the presentation's structure.

Q73. Answer: (a) 40/9

Shortcut Trick

Average Speed for a two-way journey with same distance = (2 × S1 × S2) ÷ (S1 + S2)

Morning speed (S1) = 5 ÷ 1 = 5 km/hr

Evening speed (S2) = 5 ÷ (1 + 15/60) = 5 ÷ 1.25 = 4 km/hr

Average Speed = (2 × 5 × 4) ÷ (5 + 4) = 40/9 km/hr

Therefore The correct answer is 40/9 km/hr.

Alternate Method

Given:

Distance (one way) = 5 km

Time taken in morning (T1) = 1 hour

Time taken in evening (T2) = 1 hour + 15 minutes = 1 + 15/60 = 1 + 1/4 = 5/4 hours

Formula Used:

Average Speed = Total Distance ÷ Total Time

Calculations:

=> Total distance = 5 km (going) + 5 km (returning) = 10 km

=> Total time = 1 + 5/4 = (4 + 5) ÷ 4 = 9/4 hours

=> Average Speed = 10 ÷ (9/4)

=> Average Speed = (10 × 4) ÷ 9

=> Average Speed = 40/9 km/hr

Therefore The correct answer is 40/9 km/hr.

Additional Information

Average Speed Concept

When a person travels equal distances at speeds x and y, the average speed is 2xy/(x+y). If distances are different, use Total Distance / Total Time.

Relative Speed

For two objects moving in the same direction, relative speed = S1 − S2. In opposite directions, relative speed = S1 + S2.

Unit Conversion

To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.

Q74. Answer: (c) Only 1 and 3

The correct answer is Option 3: Only 1 and 3.

Key Points

• The Namo Drone Didi scheme is aimed at empowering women-led self-help groups (SHGs) by enabling them to offer drone-based agricultural services.

• It is a central sector scheme launched in 2024 to improve the livelihoods of women SHGs by integrating advanced technology such as drones into agricultural practices.

• The scheme focuses on enhancing the income of women SHGs by providing drones for agricultural purposes like pesticide spraying and crop monitoring.

• The primary objective is to bridge the gap in technology adoption in rural areas while simultaneously promoting gender empowerment through skill development.

• The scheme aligns with the government's broader vision of digital transformation in agriculture and fostering women entrepreneurship.

Additional Information

• Drones in Agriculture:

• Drones are increasingly being used for precision agriculture, including crop monitoring, soil analysis, irrigation planning, and pesticide application.

• They help reduce the cost of manual labor and improve the efficiency and accuracy of farming practices.

• Central Sector Scheme:

• Central sector schemes are fully funded by the central government and implemented by its agencies.

• These schemes often target specific areas like agriculture, education, or skill development.

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• Self-Help Groups (SHGs):

• SHGs are community-based organizations primarily consisting of women, aiming to provide financial and social support to their members.

• They play a significant role in rural development and poverty alleviation through micro-financing and skill-building initiatives.

• Digital Agriculture Initiatives in India:

• The government has been promoting the use of technology in agriculture through programs like the Digital Agriculture Mission 2021-2025.

• These initiatives focus on integrating AI, IoT, and drone technology to enhance agricultural productivity.

• Women Empowerment through Technology:

• Technology-based schemes like Namo Drone Didi aim to provide skill development, financial independence, and entrepreneurial opportunities for women.

• Such initiatives contribute to achieving gender equality and sustainable development goals (SDGs).

Q75. Answer: (c) 20

Shortcut Trick

If an amount becomes n times in t years, it will become n^k times in k × t years.

Here, the amount becomes 2 times in 10 years (n = 2, t = 10).

We want the amount to become 4 times, which is 2^2 times (k = 2).

Required Time = k × t = 2 × 10 = 20 years.

Therefore The correct answer is 20 years.

Alternate Method

Given: Initial amount = P, Time t1 = 10 years, Amount A1 = 2P.

Formula Used: $A = P(1 + r/100)^n$

=> Case 1: 2P = P(1 + r/100)^(10)

=> 2 = (1 + r/100)^(10) --- (Equation 1)

=> Case 2: Let the required time be T for the amount to become 4P.

=> 4P = P(1 + r/100)^T

=> 4 = (1 + r/100)^T

=> 2^2 = (1 + r/100)^T

=> From Equation 1, substitute the value of 2:

=> $[(1 + r/100)^{(10)}]^2$ = (1 + r/100)^T

=> (1 + r/100)^(20) = (1 + r/100)^T

=> T = 20 years

Therefore The correct answer is 20 years.

Additional Information

Compound Interest Amount Formula

The total amount A after n years is given by $A = P(1 + r/100)^n$, where P is the principal and r is the annual interest rate.

Rule of 72

A quick way to estimate how long it takes for an investment to double is dividing 72 by the annual interest rate (r). Time ≈ 72 ÷ r.

Difference between CI and SI

For 2 years, the difference between Compound Interest and Simple Interest is given by $P(r/100)^2$.

Q76. Answer: (a) 26 March 2025

The correct answer is 26 March 2025.

Key Points

• The government of India decided to discontinue the Medium-term and Long-term Government Deposit (MLTGD) components of the Gold Monetisation Scheme (GMS) from 26 March 2025.

• The Gold Monetisation Scheme (GMS) was introduced in 2015 to mobilize idle gold and put it into productive use in the economy.

• MLTGD components under GMS allowed individuals and institutions to deposit gold for medium-term (5-7 years) and long-term (12-15 years) tenure.

• Discontinuing MLTGD components aligns with the government's strategy to streamline the gold monetisation process and focus on other viable components like short-term deposits.

• Depositors under the GMS were offered interest rates on their gold deposits, encouraging participation in the scheme.

Additional Information

• Gold Monetisation Scheme (GMS):

• Launched by the Government of India in November 2015 to reduce the dependency on gold imports and utilize idle gold reserves.

• Allows individuals and institutions to deposit gold in exchange for interest and withdrawal options.

• Gold deposits under GMS are accepted by banks and refineries for further utilization.

• Medium-term and Long-term Government Deposits (MLTGD):

• MLTGD components involve depositing gold for periods of 5-7 years (medium-term) and 12-15 years (long-term).

• These deposits were aimed at institutional investors and individuals seeking higher returns over extended durations.

• Short-term Gold Deposit:

• Short-term deposits under GMS are typically for a tenure of 1-3 years.

• These deposits are primarily used by banks for internal purposes like reserve management.

• Objectives of GMS:

• To mobilize idle gold lying with households and institutions in India.

• To reduce reliance on gold imports, which contribute significantly to India's trade deficit.

• To provide benefits to depositors in the form of interest on their gold holdings.

Q77. Answer: (c) 9

Given:

The number is 1538672.

Arranging the digits of the number 1538672 in ascending order from left to right:

Original Position	1st	2nd	3rd	4th	5th	6th	7th
Original Digit	1	5	3	8	6	7	2
Sorted Digit	1	2	3	5	6	7	8

The new number formed is 1235678.

The second digit from the left is 2.

The second digit from the right is 7.

The sum of these two digits is 2 + 7 = 9.

Hence, the correct answer is "Option 3".

Q78. Answer: (a) 84

BODMAS Rule:

According to the question, the letters are interchanged as follows:

Original Letter	A	B	C	D
New Symbol	÷	×	•	−

Now, given the equation: 63 D 19 C 6 B 9 D (56 A 4) = ?

After interchanging the specified letters, the new equation is:

63 − 19 + 6 × 9 - (56 ÷ 4)

=> 63 − 19 + 6 × 9 - 14

=> 63 − 19 + 54 - 14 = 84

Hence, the correct answer is "Option 1".

Q79. Answer: (b) 12 km towards west

Given:

Steve starts from Point A and drives 10 km towards north.

He then takes a right turn, drives 7 km, turns right, and drives 3 km.

He then takes a left turn and drives 5 km.

He takes a final right turn, drives 7 km, and stops at Point P.

Thus, he should drive12 km towards west in order to reach Point A again.

Hence, the correct answer is "Option 2".

Q80. Answer: (a) ASZC

The solution for the given number/symbol coding problem is as follows.

Number/Symbol	2	9	6	7	4	#	3	@	1
Code	Y	A	L	B	S	D	E	Z	C

Given: 9 4 @ 1

Rule No. (i): This condition does not apply because the first element (9) is a number, not a symbol.

Rule No. (ii): This condition does not apply because the last element (1) is an odd number, not an even number.

Rule No. (iii): This condition does not apply because the third element (@) is a symbol, not a perfect square.

Based on the conditions, none of the rules apply. Therefore, we follow the direct codes given in the table.

The code for 9 is A.

The code for 4 is S.

The code for @ is Z.

The code for 1 is C.

Thus, '9 4 @ 1' is coded as → ASZC.

Hence, the correct answer is "Option 1".

Q81. Answer: (b) Alluvial soil

The correct answer is Alluvial Soil.

Key Points

• Alluvial soil, formed by river deposits, is one of the most fertile soil types in India.
• It has high water retention capacity, making it ideal for wet farming practices.
• Alluvial soils are rich in potash, phosphoric acid, and lime, which are essential for crop growth.
• This soil is predominantly found in the Indo-Gangetic Plain and deltas of major rivers like Ganges, Brahmaputra, and Mahanadi.
• Crops like rice, wheat, sugarcane, and jute thrive in alluvial soil due to its fertility and moisture-retaining properties.

Additional Information

• Wet farming:
• Wet farming involves the cultivation of crops in areas with sufficient water supply, either through rainfall or irrigation.
• It is commonly practised in regions with high annual rainfall or access to perennial rivers.
• Examples of wet farming crops include rice, sugarcane, and jute.
• Types of soils in India:
• Alluvial soil: Fertile, found in river basins and plains, supports diverse crops.
• Black soil: Rich in clay, ideal for cotton cultivation, found in Deccan Plateau.
• Red soil: Formed by weathering of igneous rocks, less fertile, requires fertilizers.
• Laterite soil: Found in high rainfall areas, used for crops like tea, coffee, and cashew.
• Regions with alluvial soil:
• Indo-Gangetic Plain: Uttar Pradesh, Bihar, Punjab, Haryana, and West Bengal.
• Delta regions: Mahanadi, Godavari, Krishna, and Kaveri deltas.
• Soil conservation:
• Practices like crop rotation, contour farming, and afforestation help maintain soil fertility.
• Proper irrigation and drainage systems prevent waterlogging and salinization.

Q82. Answer: (b) Naga

The correct answer is Naga.

Key Points

• The Hornbill Festival is celebrated annually in Nagaland, India, and is associated with the Naga tribes.
• The festival, named after the bird Hornbill, symbolizes the rich cultural heritage and traditions of the Naga tribal groups.
• It is held from 1st to 10th December each year in Kisama village near Kohima, Nagaland's capital.
• The festival showcases folk music, dance, traditional sports, and crafts of the Naga communities.
• The event is organized by the Government of Nagaland to promote unity among the tribes and attract tourists to the region.

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Additional Information

• Naga Tribes

• There are 16 officially recognized Naga tribes in Nagaland, including Ao, Angami, Sema, Lotha, and Chakhesang.

• Each tribe has its distinct language, customs, and attire.

• The tribes predominantly follow Christianity, though traditional animistic practices are also observed.

• Each tribe contributes its unique cultural elements to the Hornbill Festival.

• Hornbill Bird

• The Hornbill is a large tropical bird found in Southeast Asia and is considered sacred by many Naga tribes.

• Its feathers are often used in traditional Naga headgear and symbolize bravery and prosperity.

• Tourism and Economic Impact

• The Hornbill Festival attracts thousands of domestic and international tourists each year.

• It serves as a major boost to Nagaland's economy by promoting local crafts, cuisines, and cultural performances.

• Unity and Cultural Exchange

• The festival fosters unity among the diverse Naga tribes and provides a platform for cultural exchange.

• It also encourages people from other parts of India and the world to experience the vibrant traditions of Nagaland.

Q83. Answer: (d) 34

Shortcut Trick

Present sum of A, B, and C = (66 × 3) + (2 × 3) = 198 + 6 = 204 years.

Present sum of A and C = (89 × 2) − (2 × 2) = 178 − 4 = 174 years.

Present age of B = 204 − 174 = 30 years.

Age of B after 4 years = 30 + 4 = 34 years.

Therefore The correct answer is 34 years.

Alternate Method

Given: Average age of A, B, C 2 years ago = 66 years. Average age of A, C 2 years hence = 89 years.

Formula: Total Age = Average Age × Number of persons.

=> Sum of ages of A, B, C 2 years ago = 66 × 3 = 198 years.

=> Present sum of ages (A + B + C) = 198 + (2 × 3) = 204 years.

=> Sum of ages of A, C 2 years from now = 89 × 2 = 178 years.

=> Present sum of ages (A + C) = 178 − (2 × 2) = 174 years.

=> Present age of B = (A + B + C) − (A + C) = 204 − 174 = 30 years.

=> Age of B after 4 years = 30 + 4 = 34 years.

Therefore The correct answer is 34 years.

Additional Information

Average Age Property

If the average age of n people is x years, then after t years, the average age will be (x + t) years.

Total Sum of Ages

When calculating the total sum after t years for n people, always add (n × t) to the current sum.

Weighted Average

Combined average = (n1x1 + n2x2) ÷ (n1 + n2) where n is the number of items and x is the average.

Q84. Answer: (d) 8

Given:

The number is 3178456.

Arranging the digits of the number 3178456 in ascending order from left to right:

Original Digit	**3**	**1**	**7**	**8**	**4**	**5**	**6**
Sorted Digit	1	3	4	5	6	7	8

The new number formed is 1345678.

The first digit is 1.

The second digit from the right is 7.

The sum of these two digits is 1 + 7 = 8.

Hence, the correct answer is "Option 4".

Q85. Answer: (d) 939

Shortcut Trick

Use the direct relation between Marked Price (MP) and Cost Price (CP): MP ÷ CP = (100 + Profit%) ÷ (100 − Discount%).

MP ÷ 626 = (100 + 35) ÷ (100 − 10) = 135 ÷ 90.

MP ÷ 626 = 3 ÷ 2.

MP = 626 × 1.5 = 939.

Therefore The correct answer is Rs. 939.

Alternate Method

Given: Cost Price (CP) = Rs. 626, Profit = 35%, Discount = 10%.

Formulas: SP = CP × (100 + P%) ÷ 100 | MP = (SP × 100) ÷ (100 − D%)

=> Step 1: Calculate Selling Price (SP) = 626 × (135 ÷ 100) = 626 × 1.35 = 845.1.

=> Step 2: Calculate Marked Price (MP) using SP and Discount = 845.1 ÷ (90 ÷ 100).

=> Step 3: MP = 845.1 ÷ 0.9 = 939.

Therefore The correct answer is Rs. 939.

Additional Information

Marked Price & Discount

Marked price is the price mentioned on the label. Discount is always calculated on the Marked Price. SP = MP − Discount.

Profit and CP Relationship

Profit or Loss is always calculated on the Cost Price unless specified otherwise. SP = CP + Profit.

Q86. Answer: (d) sh

The given code language is:

Thus, 'vow' is coded as 'sh'.

Hence, the correct answer is "Option 4".

Q87. Answer: (d) Amrita and Babita

Given: Amita, Babita, Geeta, Kavita, Meeta, Sarita, Vinita are sitting in a straight line, facing north.

Sarita sits third to the left of Amita, who is third to the left of Meeta.

Neither Sarita nor Babita sit immediately next to Kavita.

Geeta sits third to the right of Kavita.

The first three pairs (Sarita & Kavita, Babita & Meeta, and Vinita & Amita) all have exactly one person sitting between them.

The fourth pair, Amita and Babita, is different because they are seated together with no one between them.

Therefore, the pair that does NOT belong to the group is Amita and Babita.

Hence, the correct answer is "Option 4".

Q88. Answer: (d) 5 km/hr

Shortcut Trick

Speed of Stream = (Downstream Speed − Upstream Speed) ÷ 2

Speed of Stream = (46 − 36) ÷ 2

Speed of Stream = 10 ÷ 2 = 5 km/hr

Therefore The correct answer is 5 km/hr.

Alternate Method

Given:

Downstream Speed (D) = 46 km/hr

Upstream Speed (U) = 36 km/hr

Formula Used:

Let speed of boat in still water be 'u' and speed of current be 'v'.

D = u + v

U = u − v

Speed of current (v) = (D − U) ÷ 2

Calculations:

=> v = (46 − 36) ÷ 2

=> v = 10 ÷ 2

=> v = 5 km/hr

Therefore The correct answer is 5 km/hr.

Additional Information

Speed of Boat in Still Water

It is the average of downstream and upstream speeds: u = (Downstream + Upstream) ÷ 2.

Downstream vs Upstream

Downstream speed is always greater than upstream speed because the current assists the boat.

Relative Speed in Water

Downstream Speed = Speed of boat + Speed of stream; Upstream Speed = Speed of boat − Speed of stream.

Q89. Answer: (c) ZEKP

The logic followed here is,

VAGL → PUAF

XCIN → RWCH

Applying the same logic to FKQV:

The resulting word is ZEKP.

Hence, the correct answer is "Option 3".

Q90. Answer: (d) Gujarat

The correct answer is Gujarat.

Key Points

• India’s first commercial semiconductor fabrication plant is set to be established in Gujarat under the India Semiconductor Mission.

• The project is part of the government’s initiative to promote domestic semiconductor manufacturing and reduce reliance on imports.

• Gujarat was selected due to its robust infrastructure, conducive industrial policy, and availability of skilled manpower.

• Semiconductor fabrication is a critical industry for advancements in electronics, communication, and computing technologies.

• The plant is expected to boost India's position in the global semiconductor supply chain, fostering innovation and economic growth.

Additional Information

• India Semiconductor Mission (ISM):

• Launched by the Government of India in December 2021 to strengthen India's semiconductor and display manufacturing ecosystem.

• The mission aims to make India a global hub for semiconductor design, manufacturing, and technology development.

• It provides financial support and incentives for companies investing in semiconductor facilities.

• Semiconductor Fabrication (Fab) Plant:

• A facility where integrated circuits (chips) are manufactured using photolithography and other advanced processes.

• Fabs are essential for producing components used in electronics, automobiles, medical devices, and communication systems.

• Global Semiconductor Industry:

• The semiconductor industry is crucial for powering digital technologies and is valued at over $600 billion globally.

• Countries like Taiwan, South Korea, and the USA are leading players in semiconductor manufacturing.

• Challenges in Semiconductor Manufacturing:

• Requires significant capital investment, highly specialized equipment, and skilled manpower.

• Global supply chain disruptions have highlighted the need for domestic production capabilities.

Q91. Answer: (d) 54

Shortcut Trick

Find Total Frequency (N) = 166. Calculate N/2 = 83.

Identify the Median Class where Cumulative Frequency (cf) is just ≥ 83.

Cumulative frequencies: 37, 48, 74, 84... → Median Class is 45-55.

Apply interpolation: Median = 45 + [(83 − 74) / 10] × 10 = 45 + 9 = 54.

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Therefore The correct answer is 54 years.

Alternate Method

Given: Frequency distribution of age of patients.

Formula Used: Median = L + [(N/2 − cf_p) / f] × h

Where: L = Lower limit of median class, N = Total frequency, cf_p = Cumulative frequency of preceding class, f = Frequency of median class, h = Class width.

Age (Years)	Frequency (f)	Cumulative Frequency (cf)
15-25	37	37
25-35	11	48
35-45	26	74
45-55	10	84
55-65	39	123
65-75	25	148
75-85	18	166

Calculations:

=> Total Frequency (N) = 37 + 11 + 26 + 10 + 39 + 25 + 18 = 166

=> N/2 = 166 / 2 = 83

&

Q92. Answer: (d) Japanese

The correct answer is Japanese.

Key Points

• Yoko Ogawa is a renowned Japanese author known for her literary works that explore memory, relationships, and human psychology.

• The novel "Mina's Matchbox" was originally written in Japanese, showcasing Ogawa's rich storytelling style and cultural depth.

• Yoko Ogawa has received numerous accolades for her works, including the prestigious Akutagawa Prize, which is one of Japan's top literary awards.

• The English translation of "Mina's Matchbox" was scheduled for release on 2 August 2024, enabling her stories to reach a global audience.

• Ogawa's works have been translated into multiple languages, making her a celebrated author internationally.

Additional Information

• Japanese Literature:

• Japanese literature has a long and rich history, spanning classical, modern, and contemporary works.

• Notable authors include Haruki Murakami, Yasunari Kawabata, and Kenzaburō Ōe, with Kawabata and Ōe being Nobel Prize winners.

• Genres range from haiku poetry and historical narratives to modern novels exploring existential themes.

• Japanese literature emphasizes minimalism, nature, and deep emotional introspection.

• Translation in Literature:

• Translating literary works involves not just converting language but also preserving cultural nuances and emotional depth.

• Renowned translators like Stephen Snyder have worked on Ogawa's novels, ensuring their integrity in English.

• Translations play a crucial role in bridging cultural gaps and introducing regional authors to global audiences.

• Yoko Ogawa's Notable Works:

• The Housekeeper and the Professor: A heartwarming story about relationships and memory.

• The Memory Police: A dystopian novel exploring themes of erasure and loss.

• Ogawa's works often delve into human emotions and the subtle complexities of everyday life.

• Global Reception of Japanese Literature:

• Japanese authors have gained widespread recognition for their unique storytelling and cultural perspectives.

• Many novels have become international bestsellers, reflecting universal themes and resonating with diverse audiences.

• The popularity of Japanese literature has been bolstered by English translations and adaptations.

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Q93. Answer: (d) Two

Given: Seven people, A, B, C, D, S, T, and U are sitting in a row, facing north.

Only two people sit between T and C.

Only D sits to the right of U.

Only one person sits between C and U.

B sits at some place to the right of S but at some place to the left of A.

Thus, two people sit between A and S.

Hence, the correct answer is "Option 4".

Q94. Answer: (a) 1937

The correct answer is 1937.

Key Points

• The Reserve Bank of India (RBI) was established on 1 April 1935, in Kolkata under the provisions of the Reserve Bank of India Act, 1934.

• The central office of the Reserve Bank of India was shifted from Kolkata to Mumbai in 1937.

• Mumbai became the permanent headquarters of the RBI, primarily due to its strategic location as the financial capital of India.

• As the central office, the Mumbai branch houses the Governor’s office and is responsible for policy formulation.

• The RBI was initially a privately-owned institution but was nationalized in 1949 after India's independence.

Additional Information

• Reserve Bank of India (RBI):

• It is India's central bank and the regulator of the financial system.

• The RBI controls the issue and supply of the Indian Rupee and manages foreign exchange under the Foreign Exchange Management Act, 1999.

• It plays a crucial role in monetary policy formulation to ensure price stability and economic growth.

• Governance Structure:

• The RBI is governed by a central board of directors, which includes the Governor, Deputy Governors, and other appointed members.

• The Governor is the chief executive officer of the RBI and is appointed by the Government of India.

• Functions of the RBI:

• Formulates and implements monetary policy to maintain inflation and economic stability.

• Supervises and regulates banks and financial institutions to ensure financial stability.

• Acts as a banker to the government and manages public debt.

• Manages foreign exchange and controls the currency supply in the economy.

• Historical Context:

• The RBI was modeled on the lines of the Bank of England and initially functioned as a privately-owned bank.

• After nationalization in 1949, it became a fully government-owned institution.

• The RBI has played a pivotal role in shaping India's economic policies, especially post-independence.

Q95. Answer: (a) It allows users to interact with visual data and sends touch signals to the computer.

The correct answer is It allows users to interact with visual data and sends touch signals to the computer.

Key Points

• A touchscreen is a device that integrates both input and output functionalities in one interface.

• It displays visual data on the screen (output) and detects touch gestures/signals from users, such as taps or swipes (input).

• Touchscreens are commonly used in smartphones, tablets, ATMs, and other devices requiring direct user interaction.

• The ability to interpret touch and send signals to the computer makes it a key input device, while its display capability makes it an output device.

• Modern touchscreens often use capacitive or resistive technology to detect touch, enabling precise interaction.

Additional Information

• Capacitive Touchscreen Technology

• Uses the electrical properties of the human body to detect touch.

• Highly responsive and supports multi-touch gestures like pinch-to-zoom.

• Commonly used in smartphones, tablets, and modern laptops.

• Resistive Touchscreen Technology

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• Consists of two layers separated by a small gap; touch causes the layers to connect.
• Works with any object, including a stylus, unlike capacitive screens which require conductive touch.
• Frequently used in industrial and medical devices due to durability.
• Input vs. Output Devices
• Input devices allow users to send data to the computer (e.g., keyboard, mouse).
• Output devices display or present data from the computer (e.g., monitor, printer).
• Touchscreens combine both functionalities, making them unique hybrid devices.
• Applications of Touchscreens
• Widely used in consumer electronics, including smartphones, tablets, and smartwatches.
• Integrated into public systems such as kiosks, ATMs, and ticket machines.
• Enhanced usability in automotive dashboards and industrial machinery interfaces.

Q96. Answer: (a) Uttar Pradesh

The correct answer is Uttar Pradesh.

Key Points

• According to the NITI Aayog's discussion paper released in January 2024, Uttar Pradesh recorded the highest number of people escaping multidimensional poverty between 2013-14 and 2022-23.
• Multidimensional poverty refers to deprivation across multiple indicators such as health, education, and living standards, rather than income alone.
• Uttar Pradesh's achievement is attributed to focused efforts on improving access to basic amenities, health facilities, and education.
• Government initiatives like the Pradhan Mantri Awas Yojana, Swachh Bharat Abhiyan, and rural electrification have played a significant role in poverty reduction.
• NITI Aayog uses the Multidimensional Poverty Index (MPI), aligned with global standards, to assess poverty reduction in states.

Additional Information

• NITI Aayog's Multidimensional Poverty Index (MPI):
• The MPI measures poverty using three dimensions: health, education, and standard of living.
• It incorporates 12 indicators, including nutrition, child mortality, years of schooling, cooking fuel, sanitation, drinking water, electricity, housing, and assets.
• The index is aligned with the United Nations Development Programme's (UNDP) global MPI framework.
• Key Government Initiatives for Poverty Reduction:
• Pradhan Mantri Awas Yojana (PMAY): Aims to provide affordable housing to the urban and rural poor by 2022.
• Swachh Bharat Abhiyan: Focused on improving sanitation infrastructure and eliminating open defecation.
• Saubhagya Yojana: Ensures last-mile connectivity of electricity to all households in the country.
• Ayushman Bharat: Provides free health coverage of up to Rs. 5 lakh per family per year for secondary and tertiary care hospitalization.
• State-Specific Achievements:
• Uttar Pradesh has made significant strides in improving maternal and child health indicators.
• The state has focused on skill development programs to enhance employability and reduce income poverty.
• Global Context of Multidimensional Poverty:
• The concept was introduced by the UNDP and Oxford Poverty and Human Development Initiative (OPHI).
• It emphasizes that poverty is not only about income but also encompasses deprivation in essential capabilities and access to basic services.

Q97. Answer: (b) Buoyant force

The correct answer is Buoyant Force.

Key Points

• Buoyant force is the upward force exerted by a fluid that opposes the weight of an object immersed in it.
• This force arises because the fluid displaced by the object creates a pressure difference between the top and bottom of the object.
• Buoyant force is governed by Archimedes' principle, which states that the upward force is equal to the weight of the fluid displaced.
• It plays a crucial role in enabling objects like ships to float on water and balloons to rise in the air.
• Buoyant force depends on the density of the fluid and the volume of the object submerged.

Additional Information
• Archimedes' Principle:
• Discovered by the Greek mathematician Archimedes, this principle explains buoyancy.
• It states that a body submerged in a fluid experiences an upward force equal to the weight of the fluid displaced.
• Density and Buoyancy:
• An object floats if its density is less than the density of the fluid it is immersed in.
• Objects denser than the fluid sink due to insufficient buoyant force to counter their weight.
• Applications of Buoyant Force:
• Used in designing ships, submarines, and floating devices.
• Helps in understanding the functioning of hot air balloons and hydrometers.
• Factors Affecting Buoyant Force:
• The volume of the object submerged: Larger volume displaces more fluid, increasing buoyant force.
• The density of the fluid: Higher density fluids exert greater buoyant force.

Q98. Answer: (b) IGL

The logic followed here is:
Option (1): SXU
Option (2): IGL
Option (3): UZW
Option (4): NSP
The letter-cluster that DOES NOT belong to the group is: IGL.
Hence, the correct answer is "Option 2"

Q99. Answer: (a) 49

Shortcut Trick
Identify the frequency of each observation in the given data set.
Frequency of 49 = 4 times.
Frequency of 54 = 3 times.
Other values appear 2 times or less.
Since 49 has the highest frequency, it is the mode.
Therefore The correct answer is 49.
Alternate Method
Given Data: 49, 54, 54, 43, 52, 49, 51, 46, 53, 43, 53, 44, 49, 45, 44, 40, 52, 54, 49
Formula Used: Mode is the value that occurs most frequently in a data set.
43 2 44 2 49 4 52 2 53 2 54 3

Q100. Answer: (d) 10

Shortcut Trick
Ratio of Exterior angle to Interior angle = 1 : 4
Sum of ratio parts = 1 + 4 = 5 units
5 units = 180° => 1 unit (Exterior angle) = 36°
Number of sides = 360° ÷ 36° = 10
Therefore The correct answer is 10.
Alternate Method
Given:
Ratio of exterior angle to interior angle = 1 : 4
Formula Used:
1. Exterior angle + Interior angle = 180°
2. Number of sides (n) = 360° ÷ Exterior angle
Calculations:
=> Let the exterior angle be x and the interior angle be 4x.
=> x + 4x = 180°
=> 5x = 180°

=> x = 36°

=> Number of sides (n) = 360° ÷ 36°

=> n = 10

Therefore The correct answer is 10.

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