RRB NTPC (UG) CBT-I Official Paper (Held On: 09 Sept, 2025 Shift 2) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. The Tropic of Cancer passes through which two northeastern states of India?

(a) Nagaland and Mizoram
(b) Tripura and Nagaland
(c) Tripura and Manipur
(d) Tripura and Mizoram

Q2. Providing immediate assistance during a disaster is classified under which stage of disaster management?

(a) Relief response
(b) Prevention
(c) Reconstruction
(d) Preparation

Q3. The Advocates (Amendment) Bill, 2025, proposed which significant change to the legal profession?

(a) Retirement age fixed at 60 for advocates
(b) Dissolution of Bar Council of India structure
(c) Recognising in-house counsel and corporate lawyers as "legal practitioners"
(d) Ban on entry of foreign law firms in India

Q4. Which of the following is located in the northern part of the Eastern Ghats?

(a) Mahendragiri hills
(b) Nilgiri hills
(c) Doddabetta hills
(d) Anaimalai hills

Q5. Which of the following countries was elected as the President of the African-Asian Rural Development Organizaon for the Triennium 2025–2027 during its 21st General Session in February 2025?

(a) India
(b) Bangladesh
(c) Egypt
(d) Indonesia

Q6. Which state / union territory had the highest urbanisation in 2011, as per the Census of India data?

(a) Delhi
(b) Meghalaya
(c) Assam
(d) Chandigarh

Q7. Which Indian state is set to host the country's first AI-centric Special Economic Zone (SEZ)?

(a) Maharashtra
(b) Tamil Nadu
(c) Karnataka
(d) Chhattisgarh

Q8. Which of the following applications can help you NOT to create a file?

(a) Paint
(b) Notepad
(c) MS-Word
(d) Windows Explorer

Q9. The internal energy of gas is the _____.

(a) only potential energies of its molecules when the box is at res
(b) sum of rotational, vibrational and potential energies of its molecules when the box is at rest
(c) sum of kinetic and potential energies of its molecules when the box is at rest
(d) sum of translational, rotational and vibrational energies of its molecules when the box is at rest

Q10. On which theme did the Reserve Bank of India (RBI) organise a conference for largesized Non-Banking Financial Companies (NBFCs) in Chennai on 28 March 2025?

(a) Shared Vision, Shared Responsibility: Strengthening the NBFCs
(b) Advancing the Digital Disruptions in NBFCs
(c) NBFCs: The Rise of the Indian Economy
(d) The Future of NBFC Unfolds

Q11. Which Indian author won the Debut category at the KLF Book Awards in 2025 for 'The Many Lives of Syeda X'?

(a) Anant Vijay
(b) Rohit Manchanda
(c) Neha Dixit
(d) Gautam Choubey

Q12. What three-part economic strategy defined India’s policy changes in the 1990s?

(a) Liberalisation, Privatisation and Globalisation
(b) Urbanisation, Industrialisation and Digitalisation
(c) Nationalisation, Regulation and Protectionism
(d) Devolution, Decentralisation and Deregulation

Q13. As of April 2025, under which pension scheme do the players who won silver or bronze medal in Asian or Commonwealth Games get a pension of Rs. 12,000 per month?

(a) Panchayat Yuva Krida aur Khel Abhiyan
(b) Retired Sportsperson Empowerment Training Programme
(c) Sports Fund for Pension to Meritorious Sportspersons
(d) Pension to Meritorious Sportspersons

Q14. Which legal authority gives statutory status to Lok Adalats in India?

(a) The Arbitration and Conciliation Act
(b) The Civil Procedure Code
(c) The Indian Penal Code
(d) The Legal Services Authorities Act

Q15. Which of the following styles of temple architecture is predominantly found in North India?

(a) Nagara
(b) Dravidian
(c) Baroque
(d) Vesara

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Q16. Why is infrastructure referred to as the 'wheels' of economic growth?

(a) It is part of international trade.
(b) It supports currency circulation.
(c) It enables delivery of goods, services and access.
(d) It helps in stabilising inflation.

Q17. Which of the following Directive Principles reflects Gandhian ideology?

(a) Equal pay for equal work
(b) Organisation of village panchayats
(c) Uniform civil code
(d) Separation of judiciary from the executive

Q18. Rajendra Chola I is known for his naval expeditions on the revived Sri Vijaya empire of:

(a) Indonesia
(b) Myanmar
(c) Sri Lanka
(d) Cambodia

Q19. At which session did the Indian National Congress split into Moderates and Extremists?

(a) Surat Session
(b) Arrival of Simon Commission
(c) Partition of Bengal
(d) Formation of Muslim League

Q20. Which single-window telecom regulator's April 2025 consultation on satellite-based spectrum assignment complements India's 6G backhaul ambitions?

(a) TRAI
(b) NIXI
(c) WPC
(d) NIC

Q21. Which foreign ruler invaded India in 1739, leading to the massacre of Delhi and further weakening the Mughal Empire?

(a) Sher Shah
(b) Ahmad Shah Abdali
(c) Nadir Shah
(d) Babur

Q22. Which constitutional body is empowered to adjudicate legal disputes between the Centre and one or more states in India?

(a) Supreme Court of India
(b) Inter-State Council
(c) Election Commission
(d) Finance Commission

Q23. Human development emphasises enlarging people's choices by improving health, education, and income. Which global organisation publishes the Human Development Index (HDI)?

(a) United Nations Development Programme
(b) International Monetary Fund
(c) World Bank
(d) World Economic Forum

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Q24. In May 2025, the central government extended the tenure of Central Bureau of Investigation (CBI) director Praveen Sood for a period of _____.

(a) 6 months
(b) 3 months
(c) 2 years
(d) 1 year

Q25. Who among the following has been re-elected as the President of Ecuador in May 2025?

(a) Rafael Correa
(b) Lenín Moreno
(c) Daniel Noboa
(d) Guillermo Lasso

Q26. Which Amendment is considered a near rewrite of the Constitution and made changes to the Preamble, Schedule VII and 53 Articles?

(a) 42^(nd)Amendment
(b) 38^(th)Amendment
(c) 44^(th) Amendment
(d) 86^(th) Amendment

Q27. Public health programmes enhance access to life-saving interventions and services. Which scheme aims to provide free health coverage to 50 crore beneficiaries in India?

(a) Ayushman Bharat - PMJAY
(b) PM-KISAN
(c) National Rural Health Mission
(d) Ujjwala Yojana

Q28. Sand dunes that form long ridges parallel to the coastline are most common _____.

(a) along low sedimentary coasts
(b) in estuarine regions only
(c) along high rocky coasts
(d) along tectonic plate boundaries

Q29. Which of the following institutes launched Bharat Cancer Genome Atlas in February 2025?

(a) Indian Institute of Technology, Bombay
(b) Indian Institute of Technology, Gandhinagar
(c) Indian Institute of Technology, Madras
(d) Indian Institute of Technology, Delhi

Q30. What is the direction of frictional force?

(a) Along the normal to the contact surface
(b) Opposite to the direction of relative motion
(c) Perpendicular to the motion
(d) Same as the direction of applied force

Q31. Which of the following major events followed the death of Potti Sreeramulu?

(a) Creation of linguistic minorities commission
(b) Appointment of the States Reorganisation Commission
(c) Formation of the Planning Commission
(d) Formation of the Election Commission

Q32. This freedom fighter did not share Gandhi's ideal of 'ahimsa' and 'satyagraha'. In 1941, he left his Calcutta home to Singapore via Germany and raised the Indian National Army. The leader in question is:

(a) Subhash Chandra Bose
(b) Mohan Singh

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(c) Jawaharlal Nehru
(d) Captain Laxmi

Q33. Which Article of the Constitution of India deals with the post of the Governor?
(a) Article 74
(b) Article 63
(c) Article 112
(d) Article 153

Q34. Which Indian state hosted the International Millet Conference, 2025, to promote millet farming and trade?
(a) Rajasthan
(b) Telangana
(c) Karnataka
(d) Odisha

Q35. Which of the following is used to access programs, files and settings in Windows 7?
(a) Taskbar
(b) Start Button
(c) Control Panel
(d) Notification Area

Q36. Wet farming is least likely to be found among which the following Indian states?
(a) Haryana
(b) Assam
(c) Manipur
(d) Tripura

Q37. What is the name of the ancient Indian text on dramaturgy and theatre?
(a) Arthashastra
(b) Manusmriti
(c) Rigveda
(d) Natya Shastra

Q38. According to the Inter-Services Organisations (Command, Control and Discipline) Act, 2023—effective from May 2025—unified command authority has been granted over personnel from which branches of the Indian Armed Forces?
(a) Navy and Air Force
(b) Army and Navy
(c) Army and Coast Guard
(d) Army, Navy, and Air Force

Q39. The critical angle for diamond is approximately _____.
(a) 45°
(b) 24.4°
(c) 60°
(d) 31.8°

Q40. In which of the following states did the Defence Research and Development Organisation (DRDO) conduct the maiden flight-trials of the Stratospheric Airship Platform in May 2025?
(a) Odisha
(b) Karnataka
(c) Punjab
(d) Madhya Pradesh

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MATHEMATICS

Q41. In covering a distance of 162 km, Anmol takes 3 hours more than Nikhil. If Anmol doubles his speed, then he would take 6 hours less than Nikhil. Anmol's speed is:

(a) 9 km/hr
(b) 3 km/hr
(c) 5 km/hr
(d) 4 km/hr

Q42. Given that 17^(0.24) = x, 17^(0.51)= y and x^z = y^4, then the value of z is close to:

(a) 8.5
(b) 8.9
(c) 10.44
(d) 8.58

Q43. What is the median of the following data?

24, 30, 40, 80, 15, 57, 78, 82, 39, 97, 82

(a) 57
(b) 58
(c) 56.5
(d) 57.5

Q44. If the longest diagonal of a cube measures 15 cm, then what is the total surface area (in sq. cm) of the cube?

(a) 540 sq.cm
(b) 180 √3 sq.cm
(c) 450 sq.cm
(d) 337.50 sq.cm

Q45. In a store, the price of a bicycle is Rs. 4,300, with a trade discount of 12%. What is the amount of the discount?

(a) Rs. 548
(b) Rs. 524
(c) Rs. 486
(d) Rs. 516

Q46. The current population of a town is 16,362. It increases by 25% and 60% in two successive years but decreases by 50% in the third year. What is the population of the town at the end of the third year?

(a) 16,363
(b) 16,362
(c) 16,358
(d) 16,360

Q47. Arun bought some pencils at the rate of Rs. 180 a dozen. He sold them for Rs. 18 each. His profit percentage is _____%.

(a) 20
(b) 18
(c) 22
(d) 24

Q48. An amount of Rs. 552 is divided among three persons in the ratio of 19 : 11 : 18. The difference between the largest and the smallest shares (in Rs.) in the distribution is:

(a) 5
(b) 105
(c) 92
(d) 12

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Q49. If $X = (\sin^2\theta)/(1+\cos\theta) - \sin\theta/(\cot\theta - \text{cosec}\theta)$, then the value of (X-1) is:

(a) $\cos^2\theta - \cot^2\theta$
(b) $\text{cosec}^2\theta + \cot^2\theta$
(c) $\sec^2\theta - \tan^2\theta$
(d) $\sin^2\theta + \tan^2\theta$

Q50. The value of (3^0 + 3^(−2) + 3^(−1)) × 27 is _____.

(a) 39
(b) 3
(c) 23
(d) 32

Q51. If the radius of the base of a right circular cylinder is decreased by 19% and its height is increased by 102%, then what is the percentage increase (closest integer) in its volume?

(a) 12%
(b) 33%
(c) 26%
(d) 145

Q52. A TV is listed at Rs. 80,000. A customer can either avail of a single discount of 28% or two successive discounts of 20% and 10%. Which discount option is better, and what is the monetary difference?

(a) Both the discount are the same ; Rs. 0
(b) Single discount of 28% ; Rs. 1,500
(c) Two successive discounts of 20% and 10% ; Rs. 1,600
(d) Single discount of 28% ; Rs. 1,005

Q53. Which of the following ratios is the greatest?

(a) 38 : 83
(b) 35 : 77
(c) 47 : 67
(d) 50 : 62

Q54. A can do a work in 12 days and B can do the same work in 21 days. If they work on it together for 3 days, then what fraction of the work is left?

(a) 25/28
(b) 15/28
(c) 17/28
(d) 27/28

Q55. The average of first 166 even numbers is

(a) 168
(b) 167
(c) 166.5
(d) 167.5

Q56. The value of $2^2 + \sqrt{(8^2)} - 3\sqrt{100} - 19$ is

(a) -44
(b) -37
(c) -45
(d) -28

Q57. The sum of two numbers is 84 and their L.C.M. is 245. What are the two numbers?

(a) 49, 35
(b) 42, 42
(c) 54, 30

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(d) 47, 37

Q58. Simplify: $4((5/4)x^2 - 25x + 19) - 5(x^2 + 5x - 14)$.

(a) $-125x - 146$
(b) $-125x + 146$
(c) $125x + 146$
(d) $125x - 146$

Q59. Rs. 87,400 were divided among A, B and C, such that 4 times the share of A = 9 times the share of B = 3 times the share of C. Find the share of A

(a) Rs. 31,464
(b) Rs. 31,278
(c) Rs. 31,552
(d) Rs. 31,576

Q60. A man goes to Nagpur from Visakhapatnam at a speed of 24 km/hr and returns to Visakhapatnam at speed of 40 km/hr, through the same route. What is his average speed (in km/hr) of the entire journey?

(a) 25
(b) 28
(c) 29
(d) 30

Q61. Three pieces of timber that are 187 m, 102 m and 255 m long have to be divided into planks of the same length. What is the greatest possible length (in metres) of each plank?

(a) 17
(b) 19
(c) 11
(d) 13

Q62. Four times the present age of P exceeds the present age of Q by 46 years. After 7 years, three times Q's age will be 41 years less than seven times P's age at that time. What is the present age (in years) of Q?

(a) 53
(b) 56
(c) 54
(d) 64

Q63. What sum of money (in Rs.) will amount to Rs. 2,160 at 5% per annum simple interest in 5 years?

(a) Rs. 1,728
(b) Rs. 8,640
(c) Rs. 1,678
(d) Rs. 1,778

Q64. The value of $\sqrt{196} + \sqrt{0.0256} - \sqrt{7.29}$ is _____.

(a) 9.2
(b) 11.46
(c) 12.2
(d) 8.11

Q65. The product of two positive numbers is 11045. If the first number is five times the second number, then the sum of the two numbers is:

(a) 289
(b) 282
(c) 291
(d) 295

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Q66. A number, when increased by 60%, gives 3630. The number is:

(a) 1134.375
(b) 6806.25
(c) 2268.75
(d) 4537.5

Q67. A sum of money triples itself at a certain rate of compound interest in 12 years. In how many years will it amount to 27 times of itself?

(a) 33 years
(b) 36 years
(c) 46 years
(d) 41 years

Q68. By selling an article at 4/13 of its actual selling price, Hitesh incurs a loss of 22%. If he sells it at 60% of its actual selling price, then the profit percentage is:

(a) 52.1%
(b) 54.5%
(c) 53.9%
(d) 54.2%

Q69. Let A and B be two regular polygons. The sum of the interior angles of A is 1260°. Each interior angle of B exceeds its exterior angle by 90°. Find the sum of the number of sides of A and B.

(a) 15
(b) 17
(c) 18
(d) 19

Q70. Pipe P can fill 2/9 part of a tank in 20 hours, and pipe Q can fill 2/5 part of the same tank in 18 hours. Both P and Q were kept open for 3 hours, then both were closed. Pipe R alone was then opened and it emptied the water in the tank in 4 hours. Pipes P, Q and R together can fill the empty tank in:

(a) 100 hours
(b) 120 hours
(c) 101 hours
(d) 134 hours

GENERAL INTELLIGENCE AND REASONING

Q71. AQWE is related to FVBJ in a certain way based on the English alphabetical order. In the same way, UKQY is related to ZPVD. To which of the following is JZFN related, following the same logic?

(a) OEKS
(b) OKIU
(c) KIOP
(d) OKIT

Q72. OWLS is related to TRPO in a certain way based on the English alphabetical order. In the same way, YMTK is related to DHXG. To which of the following is ICBC related, following the same logic?

(a) OWGX
(b) NXFY
(c) NWEX
(d) MYEZ

Q73. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair 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) WA - SF

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(b) DY - ZD
(c) ZG - VL
(d) ME - HJ

Q74. If 1 is added for each odd digit and 1 is subtracted from each even digit of the number 86435621, how many digits are repeated more than once in the new number formed?

(a) None
(b) One
(c) More than two
(d) Two

Q75. Each of the digits in the number 6243514 is arranged in ascending order from left to right. What will be the sum of the digits which are second from the left and third from the right in the new number thus formed?

(a) 7
(b) 5
(c) 8
(d) 6

Q76. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the set in which the numbers are related in the same way as are the numbers of the following sets. (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.)

45, 165

21, 141

(a) 25, 155
(b) 38, 158
(c) 12, 122
(d) 32, 162

Q77. If 2 is added to each even digit and 3 is subtracted from each odd digit in the number 6325497, what will be the sum of the greatest and smallest digit in the number thus formed?

(a) 6
(b) 10
(c) 8
(d) 12

Q78. Aditya ranked 19^(th) from the top and 29^(th) from the bottom in his class. How many students are there in his class?

(a) 46
(b) 48
(c) 47
(d) 49

Q79. A is the mother of G. G is the father of D. D is the son of T. Y is the father of T. How is A related to Y?

(a) Daughter's husband's sister
(b) Husband's mother
(c) Husband's sister
(d) Daughter's husband's mother

Q80. What should come in place of the question mark (?) in the given series?

9 25 50 82 123 ?

(a) 117
(b) 127
(c) 171

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(d) 172

Q81. In a certain code language, ‘BEST’ is coded as ‘5237’ and ‘SINK’ is coded as ‘6142’. What is the code for ‘S’ in the given code language?

(a) 6
(b) 2
(c) 3
(d) 4

Q82. Seven people, I, J, K, L, M, N and O, are sitting in a row, facing north. No one sits to the left of O. Only four people sit between O and I. Only three people sit to the right of K. J sits to the immediate left of N. L is not an immediate neighbour of K. Who sits at the rightmost end of the line?

(a) L
(b) I
(c) K
(d) N

Q83. XSLE is related to AWOI in a certain way based on the English alphabetical order. In the same way, JIXU is related to MMAY. To which of the following options is SUGG related, following the same logic?

(a) VYJK
(b) VIKU
(c) VJKU
(d) VYKI

Q84. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) 9 & # 3 % £ 4 7 & 2 $ * 5 Ω 6 1 @ 8 (Right)

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

(a) None
(b) More than two
(c) Two
(d) One

Q85. In a certain code language, ‘WANT’ is coded as ‘3517’ and ‘TIDE’ is coded as ‘2146’. What is the code for ‘T’ in the given code language?

(a) 1
(b) 5
(c) 2
(d) 6

Q86. What should come in place of the question mark (?) in the given series?

97, 101, 110, 126, 151, ?

(a) 178
(b) 186
(c) 185
(d) 187

Q87. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

GRA QCM ANY ?

(a) KUK
(b) YKK
(c) KYK
(d) KKY

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Q88. Manoj starts from Point A and drives 11 km towards the south. He then takes a right turn and drives 7 km, then turns right and drives 13 km. He then takes a right turn and drives 12 km. He takes a final right turn, drives 2 km and stops at Point P. How far (shortest distance) and in which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 4 km to the west
(b) 5 km to the east
(c) 5 km to the west
(d) 4 km to the east

Q89. 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) TWZ
(b) LQR
(c) YBE
(d) PSV

Q90. 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 conclusions logically follow(s) from the statements.

Statements:

All chairs are papers.

No chair is a desk.

Conclusions:

(I): No paper is a desk.

(II): All papers are chairs.

(a) Only Conclusion II follows
(b) Neither Conclusion I nor II follows
(c) Both Conclusions I and II follow
(d) Only Conclusion I follows

Q91. If 2 is added to each odd digit and 1 is subtracted from each even digit in the number 6531874, what will be the sum of the digits which are second from the left and second from the right in the new number thus formed?

(a) 15
(b) 16
(c) 14
(d) 12

Q92. 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) @ 8 < 8 @ < 3 ^ # + 6 2^1 ^> (Right)

If all the numbers are dropped from the series, which of the following will be seventh from the left?

(a) #
(b) >
(c) @
(d) +

Q93. What should come in place of ? in the given series based on the English alphabetical order?

RTM PRK NPI LNG ?

(a) JKF
(b) JLF
(c) JLE
(d) JKE

Q94. Jwalith starts from Point Y and drives 25 km towards south. He then takes a left turn, drives 10 km. He then turns left and drives 25 km. He takes a final left turn, drives 7 km and stops at Point Z. How far (shortest distance) and towards which direction should he drive in order to reach Point Y again? (All turns are 90-degree turns only unless specified)

(a) 3 km towards west
(b) 6 km towards east
(c) 25 km towards south
(d) 7 km towards north

Q95. Six people, A, B, C, D, E and F are sitting in a row, facing the north. Only two people are sitting to the right of C. A is sitting second to the left of D. B is sitting to the immediate right of A. F is sitting second to the right of D. Who is sitting second to the left of E?

(a) A
(b) D
(c) F
(d) C

Q96. All 93 students in a class are standing in a row facing north. Veer is 48th from the right end while Kabir is 33rd from the left end. How many people stand between Veer and Kabir?

(a) 11
(b) 12
(c) 14
(d) 13

Q97. Seven boxes R, S, T, U, V, W and Z are kept one over the other, but not necessarily in the same order. Z is kept immediately above S. V is kept immediately above T. Only U is kept above W. Only two boxes are kept above Z. V is not kept at the third position from the bottom. How many boxes are kept between R and U?

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

Q98. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair 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) HF−DB
(b) DB−ZX
(c) VT−RP
(d) OM−JK

Q99. 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 conclusions logically follow(s) from the statements.

Statements: All pins are bugs. All pins are rulers.

Conclusions (I): Some bugs are rulers.

Conclusions (II): All rulers are pins.

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

Q100. What should come in place of the question mark (?) in the given series?

1091 1092 1096 1105 1121 ?

(a) 1146
(b) 1136
(c) 1131

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(d) 1141

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) Tripura and Mizoram

The correct answer is Tripura and Mizoram.

Key Points

• The Tropic of Cancer is an important latitude located at approximately 23.5° North of the equator.

• In India, the Tropic of Cancer passes through 8 states: Gujarat, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Tripura, and Mizoram.

• Among the northeastern states, the Tropic of Cancer crosses Tripura and Mizoram.

• In Tripura, the Tropic of Cancer passes near Udaipur city, while in Mizoram, it passes near Champhai district.

• This latitude marks the northernmost point where the Sun can appear directly overhead at noon, which occurs during the summer solstice (around June 21).

Additional Information

• Option 1: Nagaland and Mizoram

• The Tropic of Cancer does not pass through Nagaland.

• However, Mizoram is crossed by the Tropic of Cancer, specifically near Champhai.

• Option 2: Tripura and Nagaland

• While the Tropic of Cancer does pass through Tripura, it does not pass through Nagaland.

• Nagaland lies further north of the Tropic of Cancer.

• Option 3: Tripura and Manipur

• The Tropic of Cancer crosses Tripura but does not pass through Manipur.

• Manipur is located further north of the Tropic of Cancer.

• Tropic of Cancer in India

• India is one of the 16 countries through which the Tropic of Cancer passes.

• In India, this latitude crosses the central and eastern regions of the country, influencing climatic conditions.

• It is associated with a tropical climate and marks the boundary between the tropical and subtropical zones.

Q2. Answer: (a) Relief response

The correct answer is Relief response.

Key Points

• Relief response refers to the immediate assistance provided to reduce the suffering of affected populations during disasters.

• The primary objectives of relief response include saving lives, minimizing injury, and reducing harm to communities.

• Relief efforts typically involve activities such as search and rescue operations, providing emergency medical care, food distribution, temporary shelters, and water supply.

• In disaster management, the relief response phase focuses on quick action and coordination among government agencies,

NGOs, and international organizations.

• It is the first stage in disaster recovery efforts, followed by other stages such as reconstruction and prevention.

Additional Information

• Prevention:

• Prevention focuses on reducing the risks and impacts of disasters before they occur.

• Activities under prevention include risk assessment, hazard mapping, and building infrastructure resistant to disasters.

• Examples include constructing earthquake-resistant buildings and implementing flood control measures.

• Reconstruction:

• Reconstruction refers to efforts aimed at restoring communities to their pre-disaster state or improving conditions to ensure long-term resilience.

• It typically involves rebuilding homes, infrastructure, and public facilities.

• This phase also includes psychological recovery and economic revitalization of the affected region.

• Preparation:

• Preparation involves activities designed to ensure effective response and readiness for disasters.

• Key activities include training emergency personnel, conducting drills, and ensuring adequate emergency supplies.

• It helps minimize the impact of disasters and improves the efficiency of relief operations.

Q3. Answer: (c) Recognising in-house counsel and corporate lawyers as "legal practitioners"

The correct answer is Recognising in-house counsel and corporate lawyers as "legal practitioners".

Key Points

• The Advocates (Amendment) Bill, 2025, proposed the inclusion of in-house counsel and corporate lawyers as recognized "legal practitioners" under the Advocates Act, 1961.

• This recognition aims to expand the definition of legal practitioners beyond traditional litigation lawyers to include professionals working in corporate legal departments.

• The move seeks to align India's legal framework with international standards where corporate lawyers and legal advisors are often treated as practicing professionals.

• Recognizing in-house counsel facilitates their ability to provide legal advice and represent their organizations in legal matters without limitations.

• This amendment is intended to strengthen the corporate legal ecosystem and improve access to specialized legal expertise.

Additional Information

• Advocates Act, 1961

• The Advocates Act, 1961 governs the legal profession in India and provides for the establishment of the Bar Council of India and State Bar Councils.

• It outlines the qualifications, enrollment process, and ethical conduct expected of advocates.

• Amendments to the Act aim to modernize the legal profession and address contemporary challenges faced by legal practitioners.

Q4. Answer: (a) Mahendragiri hills

The correct answer is Mahendragiri hills.

Key Points

• The Mahendragiri hills are part of the Eastern Ghats and are located in the northern region of these hills in the state of Odisha, India.

• These hills are situated in the Gajapati district of Odisha and have an elevation of approximately 1,501 meters (4,925 feet) above sea level.

• The Mahendragiri hills are associated with Hindu mythology, particularly the Mahabharata, where it is said that Lord Parashurama meditated here.

• This region is rich in biodiversity and is home to various species of flora and fauna, making it an important ecological zone.

• The Mahendragiri hills are known for their scenic beauty and are a popular destination for trekking and pilgrimage in Odisha.

Additional Information

• Nilgiri Hills:

• The Nilgiri Hills are located in the southern part of India, primarily in Tamil Nadu, with parts extending into Kerala and Karnataka.

• They form part of the Western Ghats and are known for their tea plantations, scenic beauty, and biodiversity.

• Ooty (Udhagamandalam), a popular hill station, is located in the Nilgiri Hills.

• Doddabetta Hills:

• Doddabetta is the highest peak in the Nilgiri Hills, located near Ooty in Tamil Nadu.

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• It has an elevation of 2,637 meters (8,652 feet) above sea level and offers panoramic views of the surrounding areas.
• The peak is a popular tourist attraction and is part of the Nilgiri Biosphere Reserve.
• Anaimalai Hills:
• The Anaimalai Hills, also known as the Elephant Hills, are located in the southern part of India, spanning Tamil Nadu and Kerala.
• They are part of the Western Ghats and are known for their rich biodiversity and dense forests.
• Important wildlife sanctuaries like the Anaimalai Tiger Reserve and Parambikulam Wildlife Sanctuary are located in this region.

Q5. Answer: (a) India

The correct answer is India.

Key Points

• India was elected as the President of the African-Asian Rural Development Organization (AARDO) for the triennium 2025–2027 during its 21st General Session in February 2025.
• AARDO is an inter-governmental organization aimed at promoting rural development in Africa and Asia through cooperation and collaboration among its member countries.
• India has been one of the founding members of AARDO and has played a significant role in its initiatives, particularly in capacity-building programs, technical assistance, and rural development projects.
• The election reflects India's growing influence and leadership in fostering South-South cooperation for sustainable rural development.
• India's presidency is expected to focus on enhancing agricultural productivity, rural poverty alleviation, and knowledge-sharing among the member countries of AARDO.

Additional Information

• African-Asian Rural Development Organization (AARDO)
• AARDO was established in 1962 with the objective of promoting rural development in Africa and Asia through technical cooperation and resource sharing.
• The organization comprises 33 member countries from Africa and Asia and works on various rural development projects, including agriculture, education, health, and infrastructure.
• AARDO organizes training programs, workshops, and seminars to enhance the capacities of stakeholders in rural development.
• The organization fosters South-South cooperation and knowledge exchange among its member countries.

Q6. Answer: (a) Delhi

The correct answer is Delhi.

Key Points

• Delhi had the highest urbanisation rate in India as per the 2011 Census data, with 97.5% of its population living in urban areas.
• The Census of India defines urbanisation as the percentage of the population living in areas officially classified as urban.
• The high urbanisation rate in Delhi is attributed to its status as the capital city of India, serving as a hub for governance, trade, industry, education, and migration.
• Delhi is characterized by densely populated metropolitan areas, including New Delhi, and is home to diverse employment opportunities and better infrastructure.
• Urbanisation in Delhi has been driven by rural-to-urban migration, especially from nearby states such as Uttar Pradesh, Bihar, Haryana, and Punjab, seeking better livelihoods and opportunities.

Additional Information

• Urbanisation in India
• Urbanisation refers to the increase in the percentage of a population living in urban areas, typically driven by economic development and migration.
• India's urbanisation rate in 2011 was approximately 31.16%, with significant variation between states and Union Territories.
• Factors influencing urbanisation include industrialization, better infrastructure, employment opportunities, and improved living standards.

Q7. Answer: (d) Chhattisgarh

The correct answer is Chhattisgarh.

Key Points

• Chhattisgarh is set to host the country's first Artificial Intelligence (AI)-centric Special Economic Zone (SEZ) to promote advanced technology industries.
• This initiative is part of the state government's effort to transform Chhattisgarh into a hub for technological innovation and attract investments in AI-focused industries.

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• The proposed SEZ will serve as a platform for fostering innovation, research, and development in AI and related technologies.

• It aims to create employment opportunities and contribute to the growth of a skilled workforce in emerging technologies.

• The state government is collaborating with various stakeholders, including private companies and academic institutions, to ensure the successful implementation of the AI SEZ.

Additional Information

• Special Economic Zones (SEZs):

• SEZs are specially delineated areas aimed at promoting economic growth and attracting foreign investment by providing tax incentives and infrastructural support.

• They are designed to boost exports, generate employment, and enhance industrial development in various sectors.

• An AI-centric SEZ focuses on fostering innovation in artificial intelligence, creating opportunities for research, development, and deployment of advanced technologies.

Q8. Answer: (d) Windows Explorer

The correct answer is Windows Explorer.

Key Points

• Windows Explorer is a file management system used in Microsoft Windows operating systems to browse and manage files and folders.

• It allows users to view, copy, move, rename, and delete files or folders but does not provide tools for creating new files directly within the interface.

• Unlike other applications such as MS-Word or Notepad, Windows Explorer is not designed to generate or edit content within files.

• Its primary function is to serve as a user-friendly interface for organizing and accessing files stored on a computer or connected storage devices.

• Windows Explorer is now known as File Explorer in modern versions of Windows, starting from Windows 8.

Additional Information

• Paint:

• Paint is a basic graphics editing application included in Microsoft Windows operating systems.

• It enables users to create and edit images, including the ability to save them as files in different formats such as BMP, JPEG, PNG, and GIF.

• Users can draw, color, and manipulate pictures with tools such as brushes, shapes, and text.

• Notepad:

• Notepad is a simple text editor available in Windows operating systems.

• It allows users to create, edit, and save plain text files with the extension ".txt".

• Notepad is often used for creating or editing lightweight text documents, scripts, or code snippets.

• MS-Word:

• MS-Word, or Microsoft Word, is a word processing software developed by Microsoft.

• It allows users to create, edit, and format text-based documents such as letters, resumes, and reports.

• Documents can be saved in various formats, including DOCX and PDF, and include advanced tools for styling, layout, and collaboration.

Q9. Answer: (c) sum of kinetic and potential energies of its molecules when the box is at rest

The correct answer is sum of kinetic and potential energies of its molecules when the box is at rest.

Key Points

• The internal energy of a gas is defined as the total energy contained within the system due to the motion and interaction of its molecules.

• It primarily consists of the sum of kinetic energy (related to molecular motion such as translation, rotation, and vibration) and potential energy (due to intermolecular forces).

• Kinetic energy arises from the thermal motion of molecules (translational, rotational, and vibrational motions) and is directly proportional to the temperature of the gas.

• Potential energy is due to intermolecular forces, which are typically negligible for ideal gases but significant in real gases under certain conditions (e.g., high pressure, low temperature).

• The internal energy is a state function and depends only on the state variables such as temperature, pressure, and volume, and not on the path taken to reach that state.

Additional Information

• Internal Energy

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• Internal energy is an intrinsic property of matter that arises due to the motion and interactions of particles within the system.

• For an ideal gas, internal energy is solely a function of temperature and consists of kinetic energy.

• For real gases, internal energy also includes potential energy due to intermolecular forces.

• Changes in internal energy are central to thermodynamic processes such as heating, cooling, and phase transitions.

Q10. Answer: (a) Shared Vision, Shared Responsibility: Strengthening the NBFCs

The correct answer is Shared Vision, Shared Responsibility: Strengthening the NBFCs.

Key Points

• The Reserve Bank of India (RBI) organized a conference for large-sized Non-Banking Financial Companies (NBFCs) in Chennai on 28 March 2025.

• The theme of the conference was "Shared Vision, Shared Responsibility: Strengthening the NBFCs", which aimed to encourage cooperation and responsibility among stakeholders in the NBFC sector.

• This theme reflects the RBI's focus on enhancing the operational resilience and financial stability of NBFCs, a critical component of India's financial ecosystem.

• The conference highlighted the importance of NBFCs in supporting economic growth by providing credit access to underserved segments and contributing to financial inclusion.

• The discussions included measures for improving corporate governance, risk management practices, and adapting to evolving regulatory requirements in the NBFC sector.

Additional Information

• Non-Banking Financial Companies (NBFCs):

• NBFCs are financial institutions that provide banking services without meeting the legal definition of a bank.

• They play a crucial role in credit delivery, especially to underserved and unbanked sectors of the economy.

• Their activities include loans and advances, asset financing, leasing, hire purchase, and investment in securities.

• NBFCs are regulated by the Reserve Bank of India under the Reserve Bank of India Act, 1934.

Q11. Answer: (c) Neha Dixit

The correct answer is Neha Dixit.

Key Points

• Neha Dixit is a renowned Indian journalist and author who has been recognized for her impactful and thought-provoking works.

• She won the Debut category at the KLF (Kalinga Literary Festival) Book Awards in 2025 for her acclaimed book 'The Many Lives of Syeda X'.

• The book offers a compelling narrative that explores the complex and layered experiences of its protagonist, Syeda X, focusing on themes of resilience and identity.

• Neha Dixit’s work often delves into social and political issues, showcasing her sharp investigative skills and commitment to storytelling.

• The KLF Book Awards honor outstanding contributions in literature, and Neha Dixit’s win highlights her growing prominence in the literary landscape.

Additional Information

• Anant Vijay

• Anant Vijay is a prominent Indian author and journalist known for his works in Hindi literature.

• He has written extensively on cinema, politics, and culture, with notable books like 'Marxvad Ka Cinema'.

• Although celebrated for his contributions, he has not won the KLF Book Awards for 'The Many Lives of Syeda X'.

• Rohit Manchanda

• Rohit Manchanda is a lesser-known figure in the Indian literary space, primarily focusing on niche topics.

• He has contributed to technical and academic publications but has not been associated with the book 'The Many Lives of Syeda X'.

• Gautam Choubey

• Gautam Choubey is an emerging name in Indian literature with works that explore contemporary themes.

• While he is recognized for his contributions, he is not the author of 'The Many Lives of Syeda X' or a recipient of the 2025 KLF Book Awards.

Q12. Answer: (a) Liberalisation, Privatisation and Globalisation

The correct answer is Liberalisation, Privatisation and Globalisation.

Key Points

• The three-part economic strategy of Liberalisation, Privatisation, and Globalisation (LPG) was introduced in India in 1991 under

the leadership of then-Prime Minister P.V. Narasimha Rao and Finance Minister Dr. Manmohan Singh.

• Liberalisation: It refers to the reduction of government restrictions in the economy, encouraging private enterprises and investments. It involved measures such as removing industrial licensing, reducing tariffs, easing import-export restrictions, and encouraging foreign investments.

• Privatisation: It involved transferring ownership of state-owned enterprises to private entities to improve efficiency, productivity, and competitiveness in the economy.

• Globalisation: It refers to integrating the Indian economy with the world economy, leading to increased trade, foreign investments, and exposure to global markets.

• This reform package was introduced in response to the 1991 balance of payments crisis and marked a shift from a centrally planned economy to a market-oriented economy.

Additional Information

• Urbanisation, Industrialisation, and Digitalisation:

• Urbanisation: Refers to the growth of cities and urban areas due to migration and industrial development.

• Industrialisation: Involves the expansion of industries, manufacturing, and infrastructure to boost economic growth.

• Digitalisation: Refers to the adoption of digital technologies across sectors, which became prominent in later decades, particularly post-2000.

• Nationalisation, Regulation, and Protectionism:

• Nationalisation: Refers to the government taking control of private enterprises, such as banks, coal mines, etc.

• Regulation: Heavy government control over industries and businesses through licensing and quotas.

• Protectionism: Policies aimed at shielding domestic industries from foreign competition through high tariffs and import restrictions.

• These strategies were largely abandoned after the 1991 reforms.

• Devolution, Decentralisation, and Deregulation:

• Devolution: Refers to the transfer of powers from central to regional governments.

• Decentralisation: Involves empowering local governance bodies to improve decision-making at grassroots levels.

• Deregulation: Refers to reducing government control over industries, similar to liberalisation but in a broader context.

• While deregulation was part of the 1991 reforms, devolution and decentralisation pertain more to political and administrative changes.

Q13. Answer: (c) Sports Fund for Pension to Meritorious Sportspersons

The correct answer is Sports Fund for Pension to Meritorious Sportspersons.

Key Points

• The Sports Fund for Pension to Meritorious Sportspersons is a scheme introduced by the Government of India to provide financial assistance to retired sportspersons for their achievements and contributions.

• Sportspersons who have won medals in events like the Olympics, Asian Games, and Commonwealth Games are eligible for pensions under this scheme.

• As of April 2025, players who won silver or bronze medals in the Asian or Commonwealth Games receive a monthly pension of Rs. 12,000.

• The scheme is designed to ensure financial stability for retired athletes who brought glory to the nation but may lack other sources of income post-retirement.

• The pension amount is determined based on the level of achievement, with higher pensions provided to those who have won gold medals or participated in prestigious international tournaments.

Additional Information

• Panchayat Yuva Krida aur Khel Abhiyan (PYKKA)

• Launched in 2008, this scheme aimed to promote rural sports by creating basic sports infrastructure in all villages and blocks of the country.

• PYKKA was later replaced by the Khelo India Programme in 2016 to broaden the scope of sports promotion in India.

• The objective was to encourage youth participation in sports and identify talent at the grassroots level.

Q14. Answer: (d) The Legal Services Authorities Act

The correct answer is The Legal Services Authorities Act.

Key Points

• The Legal Services Authorities Act, 1987, provides statutory backing to Lok Adalats in India.

• Under Section 19 of the Act, Lok Adalats are established to facilitate the settlement of disputes through conciliation and compromise.

• The Act aims to promote access to justice for all, especially marginalized and weaker sections of society.

• Decisions made by Lok Adalats are binding on the parties involved, and no appeal lies against such decisions, ensuring quick resolution of disputes.

• Lok Adalats are organized at various levels, including state, district, and taluk levels, by the Legal Services Authorities.

Additional Information

• The Arbitration and Conciliation Act:

• This Act governs arbitration proceedings and provides a legal framework for resolving disputes outside the courts.

• It focuses on alternative dispute resolution methods but is distinct from Lok Adalats, which fall under the Legal Services Authorities Act.

• The Civil Procedure Code (CPC):

• The CPC governs the procedure to be followed in civil courts in India.

• While it provides provisions for alternative dispute resolution mechanisms, including mediation, it does not establish Lok Adalats.

• The Indian Penal Code (IPC):

• The IPC is the primary criminal code in India that defines offenses and prescribes punishments.

• It does not relate to the establishment or functioning of Lok Adalats, as they primarily deal with civil, family, and petty criminal disputes.

Q15. Answer: (a) Nagara

The correct answer is Nagara.

Key Points

• The Nagara style is one of the three main styles of temple architecture in India, predominantly found in North India.

• This architectural style is characterized by its curvilinear shikhara (tower) that rises vertically above the sanctum sanctorum (garbhagriha).

• The Nagara temples usually do not have elaborate boundary walls or gateways, unlike Dravidian temples.

• They are constructed on a raised platform called the jagati, and the sanctum is often surrounded by smaller subsidiary shrines.

• Famous examples of the Nagara style include the Kandariya Mahadev Temple in Khajuraho, the Sun Temple at Konark, and the Vishwanatha Temple in Varanasi.

Additional Information

• Dravidian Style

• The Dravidian style is primarily associated with South India and is characterized by pyramidal gopurams (gateway towers).

• These temples often have enclosed courtyards with high walls and a water tank for ritualistic purposes.

• They are adorned with intricate carvings and sculptures of deities, animals, and mythological themes.

• Famous examples include the Brihadeeswarar Temple in Thanjavur and the Meenakshi Temple in Madurai.

• Baroque Style

• The Baroque style of architecture originated in Europe during the late 16th century and is not related to Indian temple architecture.

• It is characterized by dramatic use of light, grandeur, and highly decorative elements in churches and palaces.

• Examples of Baroque architecture include St. Peter’s Basilica in Vatican City and the Palace of Versailles in France.

• Vesara Style

• The Vesara style is a fusion of Nagara and Dravidian styles and is found in the Deccan region.

• These temples often have a mix of curvilinear Nagara towers and pyramid-like Dravidian towers.

• Famous examples of the Vesara style include the Hoysaleswara Temple at Halebidu and the Chennakesava Temple at Belur.

Q16. Answer: (c) It enables delivery of goods, services and access.

The correct answer is It enables delivery of goods, services, and access.

Key Points

• Infrastructure is essential for transportation: Roads, railways, airways, and seaways form the backbone for transporting goods and services efficiently across regions, ensuring timely delivery and economic growth.

• Facilitates access to markets and services: Infrastructure development enables businesses to reach consumers and markets, while also providing people with access to health, education, and employment opportunities.

• Promotes industrial and agricultural growth: Well-developed infrastructure supports industries and agriculture by ensuring raw materials and finished products are transported smoothly, reducing production costs and boosting economic output.

• Improves connectivity and reduces regional disparities: Enhanced infrastructure ensures that even remote areas are connected to mainstream economic activities, fostering inclusive growth and reducing regional inequalities.

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• Foundation for foreign investments: A strong infrastructure system attracts foreign direct investment (FDI) as investors are drawn to economies with efficient transportation, energy, and communication networks.

Additional Information

• Infrastructure and Economic Growth

• Infrastructure refers to the physical systems and facilities like transportation, energy, communication, and water supply that are crucial for a country's economy.

• It creates a conducive environment for businesses, enhances productivity, and improves the standard of living by providing better access to essential services.

• Infrastructure is considered the 'wheels' of economic growth as it drives economic activities, facilitates mobility, and ensures efficient resource utilization.

Q17. Answer: (b) Organisation of village panchayats

The correct answer is Organisation of village panchayats.

Key Points

• The Directive Principle of Organisation of village panchayats is mentioned under Article 40 of the Indian Constitution.

• It reflects Gandhian ideology, emphasizing decentralized governance and empowerment of rural areas.

• Mahatma Gandhi believed in the concept of Gram Swaraj, advocating for self-reliant villages as the foundation of India's democracy.

• The idea promotes local self-governance, enabling villages to manage their affairs independently and democratically.

• The establishment of village panchayats aims to ensure participatory democracy, grassroots development, and social justice.

Additional Information

• Equal pay for equal work:

• This principle is enshrined under Article 39(d) of the Constitution of India.

• It falls under the category of economic principles rather than Gandhian ideology.

• It aims to promote equality in wages irrespective of gender, ensuring social and economic justice in employment.

• Uniform civil code:

• The concept of a Uniform Civil Code is laid out under Article 44 of the Indian Constitution.

• It calls for a common set of laws governing personal matters such as marriage, divorce, inheritance, and adoption across all religions.

• This principle reflects liberal and modern ideas rather than Gandhian ideology.

• Separation of judiciary from the executive:

• This principle is mentioned under Article 50 of the Indian Constitution.

• It advocates for the independence of the judiciary from the executive branch to uphold the rule of law and justice.

• This reflects administrative and legal principles rather than Gandhian thought.

Q18. Answer: (a) Indonesia

The correct answer is Indonesia.

Key Points

• Rajendra Chola I, a prominent Chola king, is renowned for his naval expeditions and military successes in Southeast Asia.

• He led successful naval campaigns against the Sri Vijaya Empire, which was based in modern-day Indonesia, particularly in Sumatra and the Malacca Strait.

• The Chola navy was considered one of the strongest during its time and played a pivotal role in expanding the Chola Empire’s influence overseas.

• Rajendra Chola I’s expeditions aimed to establish trade supremacy and a cultural foothold in Southeast Asia.

• Through these campaigns, the Cholas managed to ensure control over important maritime trade routes that connected India with Southeast Asia and China.

Additional Information

• The Chola Empire and its Naval Strength:

• The Chola Empire (9th–13th century) was one of the most powerful South Indian dynasties, known for its administrative efficiency, temple architecture, and extensive trade networks.

• The Chola navy was instrumental in establishing and maintaining the empire’s dominance over the Bay of Bengal and the Indian Ocean trade routes.

• The expeditions to Sri Vijaya marked a high point in the Cholas’ maritime history, showcasing their ability to project power far beyond the Indian subcontinent.

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Q19. Answer: (a) Surat Session

The correct answer is Surat Session.

Key Points

• The Surat Session of the Indian National Congress took place in 1907, marking a significant event in India's freedom struggle.

• This session led to a split between Moderates and Extremists in the Congress.

• The division occurred due to ideological differences—Moderates believed in constitutional reforms, while Extremists advocated for more aggressive measures like boycotts and Swadeshi movements.

• Prominent leaders like Dadabhai Naoroji and Gopal Krishna Gokhale represented the Moderates, whereas Bipin Chandra Pal, Bal Gangadhar Tilak, and Lala Lajpat Rai led the Extremists.

• The split weakened the Congress for some years but also reflected the growing intensity of the nationalist movement in India.

Additional Information

• Arrival of Simon Commission (1928):

• The Simon Commission was a group of British parliamentarians sent to India to recommend constitutional reforms.

• It was boycotted by Indians as it did not include any Indian members. The slogan "Simon Go Back" became popular during protests.

• The commission's arrival significantly fueled the demand for Purna Swaraj (complete independence).

• Partition of Bengal (1905):

• Initiated by Lord Curzon, the partition aimed to divide Bengal into East Bengal (majority Muslims) and West Bengal (majority Hindus).

• This move was perceived as an attempt to create communal divisions and weaken the growing nationalist movement.

• The partition led to massive protests, the Swadeshi Movement, and the eventual annulment of the partition in 1911.

• Formation of the Muslim League (1906):

• The Muslim League was founded in Dhaka to promote the political interests of Muslims in India.

• It later played a crucial role in the demand for Pakistan and the eventual partition of India in 1947.

• Initially, the League supported British rule and sought to protect Muslim rights within the Indian framework.

Q20. Answer: (a) TRAI

The correct answer is TRAI.

Key Points

• The Telecom Regulatory Authority of India (TRAI) is the primary telecom regulator in India responsible for overseeing and managing policies related to telecommunications, broadcasting, and spectrum allocation.

• In April 2025, TRAI's consultation on satellite-based spectrum assignment is expected to align with India's 6G backhaul ambitions, enabling high-speed and efficient data transmission for next-generation networks.

• Satellite-based spectrum assignment is crucial for expanding network connectivity to remote and rural areas, supporting the deployment of 6G technologies that require ultra-reliable and low-latency communications.

• TRAI plays a pivotal role in ensuring a balanced and transparent allocation of spectrum resources while fostering innovation and competition in the telecom sector.

• The consultation process by TRAI aims to address the technical, economic, and regulatory challenges of spectrum allocation for satellite-based systems, facilitating India's long-term goals in advanced telecommunications.

Additional Information

• National Internet Exchange of India (NIXI)

• NIXI is a non-profit organization established to facilitate Internet exchange points in India, enabling efficient routing of domestic internet traffic.

• It primarily focuses on promoting the adoption of the .IN domain and ensuring a secure and robust internet infrastructure in India.

• While NIXI plays a vital role in internet governance, it does not regulate spectrum allocation or satellite-based systems.

• Wireless Planning & Coordination (WPC)

• The WPC Wing, under the Department of Telecommunications, is responsible for managing spectrum allocation and licensing for wireless communication services in India.

• WPC focuses on spectrum management for terrestrial and satellite-based communication, but its role is limited to execution and licensing rather than policy consultation.

• National Informatics Centre (NIC)

• NIC is a premier government organization under the Ministry of Electronics and Information Technology (MeitY), providing IT support and services to government bodies across India.

• While NIC is instrumental in developing e-governance applications and IT infrastructure, it is not involved in spectrum allocation

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or telecom regulation.

Q21. Answer: (c) Nadir Shah

The correct answer is Nadir Shah.

Key Points

• Nadir Shah, the ruler of Persia (modern-day Iran), invaded India in 1739 during the reign of Mughal Emperor Muhammad Shah.

• He is infamous for the massacre of Delhi, which resulted in significant loss of life and wealth.

• Nadir Shah took away immense treasures, including the famous Koh-i-Noor diamond and the Peacock Throne, which symbolized the Mughal Empire's grandeur.

• The invasion severely weakened the already declining Mughal Empire, accelerating its disintegration and destabilizing the region.

• The invasion was driven by his ambition to expand his empire and the lure of India's wealth, as well as the Mughal Empire's weakened state and internal conflicts.

Additional Information

• Sher Shah Suri (Option 1):

• Sher Shah Suri was the founder of the Sur Empire in North India and ruled between 1540 and 1545.

• He is known for his administrative reforms, including the introduction of the Rupiya (currency) and the construction of the Grand Trunk Road.

• He did not invade India; rather, he was an Indian ruler who defeated the Mughal Emperor Humayun to establish his reign.

• Ahmad Shah Abdali (Option 2):

• Ahmad Shah Abdali, also known as Ahmad Shah Durrani, was the founder of the Durrani Empire in Afghanistan.

• He invaded India multiple times between 1748 and 1767, with the most notable invasion being the Third Battle of Panipat in 1761, where he defeated the Marathas.

• Though he caused significant damage to India, his invasions occurred after Nadir Shah's invasion.

• Babur (Option 4):

• Babur was the founder of the Mughal Empire in India, ruling from 1526 to 1530.

• He invaded India in 1526 and defeated Ibrahim Lodi in the First Battle of Panipat, marking the beginning of the Mughal rule in India.

• Unlike Nadir Shah, Babur's invasion was aimed at establishing a new empire rather than looting wealth.

Q22. Answer: (a) Supreme Court of India

The correct answer is Supreme Court of India.

Key Points

• The Supreme Court of India, as per Article 131 of the Indian Constitution, has the original jurisdiction to resolve disputes between:

• The Government of India and one or more states.

• The Government of India and any state(s) on one side and other states on the other.

• Two or more states.

• Such disputes must involve a question of law or fact on which the existence or extent of a legal right depends.

• Being the apex court, its decision is final and binding in such intergovernmental disputes.

• The jurisdiction of the Supreme Court in such matters is exclusive and cannot be exercised by any other court in India.

• The Supreme Court also ensures the maintenance of the federal structure of India by acting as the ultimate arbiter in disputes between the Centre and the states.

Additional Information

• Inter-State Council:

• It is a non-constitutional body established under Article 263 of the Indian Constitution to promote coordination and cooperation between the Centre and states.

• The council is primarily advisory in nature, with the authority to investigate and discuss subjects of common interest between the Centre and the states or among states.

• It plays a consultative role but does not have the power to adjudicate disputes.

• Election Commission:

• The Election Commission of India (ECI) is an independent constitutional authority responsible for administering elections to the Parliament, state legislatures, and offices of the President and Vice-President.

• It ensures free and fair elections but does not have the authority to adjudicate disputes between the Centre and states.

• Finance Commission:

• Established under Article 280 of the Indian Constitution, the Finance Commission is a constitutional body tasked with recommending the distribution of financial resources between the Centre and the states.

Q23. Answer: (a) United Nations Development Programme

The correct answer is United Nations Development Programme.

Key Points

• The Human Development Index (HDI) is a composite index that measures a country's average achievements in three fundamental aspects of human development: health (life expectancy), education (mean years and expected years of schooling), and income (gross national income per capita).

• The United Nations Development Programme (UNDP) is the organization responsible for publishing the HDI annually as part of its Human Development Report.

• The HDI was first introduced in 1990 by the UNDP to shift the focus of development economics from solely economic growth to people-centered policies.

• The HDI provides a single statistic that ranks countries into four tiers: very high, high, medium, and low human development, offering insights into inequalities in development across the globe.

• The HDI is widely used by policymakers, researchers, and governments to assess development priorities and frame policy measures for improving people's quality of life.

Additional Information

• International Monetary Fund (IMF):

• The IMF is an international organization that promotes global monetary cooperation, secures financial stability, facilitates international trade, promotes high employment and sustainable economic growth, and reduces poverty.

• It provides financial assistance and economic advice to member countries facing balance-of-payment crises.

• The IMF publishes key reports such as the World Economic Outlook and the Global Financial Stability Report but does not deal with human development indices.

• World Bank:

• The World Bank is an international financial institution that provides loans and grants to the governments of low- and middle-income countries for the purpose of pursuing capital projects.

• It focuses on reducing poverty and building shared prosperity by supporting development projects globally.

• While the World Bank publishes reports like the World Development Indicators and the Ease of Doing Business Report, it is not responsible for the HDI.

• World Economic Forum (WEF):

• The WEF is a Swiss-based international organization that engages political, business, academic, and other leaders to shape global, regional, and industry agendas.

• It is best known for its annual meeting in Davos, Switzerland, where global leaders discuss pressing issues such as economic policies, climate change, and technology.

• The WEF publishes reports such as the Global Competitiveness Report and the Global Risk Report but does not publish the HDI.

Q24. Answer: (d) 1 year

The correct answer is 1 year.

Key Points

• The central government extended the tenure of Central Bureau of Investigation (CBI) director Praveen Sood for a period of 1 year in May 2025.

• The extension of tenure is allowed under the provisions of the DSPE Act, 1946, which governs the functioning of the CBI.

• Such extensions are granted on the grounds of ensuring continuity and efficiency in the leadership of the organization.

• Praveen Sood, an IPS officer of the Karnataka cadre, was appointed as the CBI Director in May 2023 for an initial two-year tenure.

• This decision underscores the government’s focus on ensuring stability in the functioning of India’s premier investigative agency, particularly in high-profile cases.

Additional Information

• Central Bureau of Investigation (CBI):

• The CBI is India’s premier investigative agency, functioning under the Ministry of Personnel, Public Grievances, and Pensions.

• It investigates cases of corruption, economic offenses, and serious crimes, including cross-state and international cases.

• The CBI derives its power from the Delhi Special Police Establishment (DSPE) Act, 1946.

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• Importance of Leadership Continuity:

• Leadership continuity in organizations like the CBI ensures efficient handling of ongoing investigations and sensitive cases.

• It also helps maintain institutional integrity and public trust in the agency's operations.

Q25. Answer: (c) Daniel Noboa

The correct answer is Daniel Noboa.

Key Points

• Daniel Noboa was elected as the President of Ecuador in May 2025, representing a new era of leadership in the country.

• He is one of the youngest leaders in Ecuador's political history, and his presidency is seen as a step forward for political and economic reforms.

• Daniel Noboa is a businessman and politician, and he focused his campaign on economic recovery, employment generation, and addressing social inequalities in Ecuador.

• He succeeded Guillermo Lasso, who faced political challenges and controversies during his tenure.

• Noboa's leadership is expected to focus on fostering international relations, improving Ecuador's economy, and tackling issues such as organized crime and corruption.

Additional Information

• Rafael Correa

• Rafael Correa served as the President of Ecuador from 2007 to 2017 and was known for his socialist policies and focus on poverty reduction.

• During his tenure, he implemented numerous reforms, including increasing public investment in healthcare, education, and infrastructure.

• Correa's leadership faced criticism for alleged authoritarian tendencies and corruption scandals.

• He has been living in exile in Belgium due to legal battles in Ecuador concerning charges of corruption.

• Lenín Moreno

• Lenín Moreno served as the President of Ecuador from 2017 to 2021, succeeding Rafael Correa.

• His presidency marked a shift away from Correa's policies, with an emphasis on reducing public debt and fostering free-market reforms.

• He faced significant public protests and criticism for economic austerity measures and agreements with the International Monetary Fund (IMF).

• Moreno's leadership was also notable for exposing corruption cases from the previous administration.

• Guillermo Lasso

• Guillermo Lasso served as the President of Ecuador from 2021 to 2025.

• He was the first center-right leader to hold office in Ecuador in nearly two decades.

• Lasso's presidency faced challenges including economic crises, protests over fuel subsidies, and rising crime rates.

• Despite these challenges, he worked toward economic liberalization and improving relations with international organizations.

Q26. Answer: (a) 42^(nd)Amendment

The correct answer is 42nd Amendment.

Key Points

• The 42nd Amendment, enacted in 1976, is known as the "Mini-Constitution" of India because it brought the most extensive changes to the Indian Constitution.

• It introduced significant changes to the Preamble, incorporating the terms "Socialist," "Secular," and "Integrity."

• This amendment revised 53 Articles, affecting various parts of the Constitution, including fundamental rights, directive principles of state policy, and the relationship between the executive, legislature, and judiciary.

• Changes were made to Schedule VII, which defines the Union, State, and Concurrent lists, altering the distribution of powers between the central and state governments.

• The 42nd Amendment also expanded the scope of the Directive Principles of State Policy and limited judicial review by curtailing the power of the judiciary.

• It was enacted during the Emergency period under Prime Minister Indira Gandhi, leading to significant centralization of power.

Additional Information

• 38th Amendment:

• Enacted in 1975, it strengthened the powers of the President during an Emergency.

• It made the President's declaration of Emergency final and non-justiciable, curtailing judicial review.

• This amendment also empowered the President to make Ordinances without judicial interference.

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• 44th Amendment:

• Passed in 1978, it was enacted to undo the excesses of the 42nd Amendment.

• It restored the judiciary's power of judicial review and safeguarded fundamental rights such as the right to property (converted into a legal right).

• It made the President's declaration of Emergency subject to approval by both Houses of Parliament within a specified time.

• The amendment also ensured the protection of civil liberties during Emergency periods.

• 86th Amendment:

• Enacted in 2002, it introduced Article 21A, making education a fundamental right for children aged 6-14 years.

• It mandated the state to provide free and compulsory education to children in this age group.

• The amendment also modified Article 45 to focus on early childhood care and education for children below six years.

Q27. Answer: (a) Ayushman Bharat - PMJAY

The correct answer is Ayushman Bharat - PMJAY.

Key Points

• Ayushman Bharat - Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) is the world's largest government-funded health assurance scheme launched by the Government of India in 2018.

• The scheme aims to provide free health insurance coverage of up to Rs. 5 lakh per family per year, targeting economically vulnerable populations based on the Socio-Economic Caste Census (SECC) database.

• It covers secondary and tertiary care hospitalization across public and private empanelled hospitals, ensuring access to life-saving interventions and services.

• AB-PMJAY benefits approximately 50 crore beneficiaries, addressing healthcare inequalities in India.

• The scheme is fully financed by the Government of India and contributes to achieving universal health coverage by reducing out-of-pocket healthcare expenses.

Additional Information

• PM-KISAN (Pradhan Mantri Kisan Samman Nidhi)

• Launched in February 2019, this scheme provides income support to farmers to ensure their financial security and well-being.

• Under PM-KISAN, eligible farmers receive Rs. 6,000 annually in three equal installments directly into their bank accounts.

• The scheme targets farmers with landholdings up to 2 hectares and aims to reduce the financial burden on small and marginal farmers.

• National Rural Health Mission (NRHM)

• NRHM was launched in 2005 under the National Health Mission (NHM) to improve healthcare delivery in rural areas.

• It focuses on strengthening public health systems, enhancing healthcare infrastructure, and reducing maternal and child mortality rates.

• Key initiatives under NRHM include Janani Suraksha Yojana, Accredited Social Health Activists (ASHAs), and village health sanitation committees.

• Ujjwala Yojana

• Launched in 2016, Pradhan Mantri Ujjwala Yojana (PMUY) aims to provide free LPG connections to women belonging to Below Poverty Line (BPL) households.

• The scheme addresses health hazards caused by traditional cooking methods using firewood and aims to promote cleaner cooking fuel in rural India.

• As of 2023, over 9 crore LPG connections have been distributed under PMUY.

Q28. Answer: (a) along low sedimentary coasts

The correct answer is along low sedimentary coasts.

Key Points

• Sand dunes that form long ridges parallel to the coastline are called coastal dunes, and they are especially common along low sedimentary coasts.

• These dunes are created due to the deposition of sand transported by wind from beaches and tidal flats, typically in regions where the coastline is flat and sandy.

• Coastal dunes serve as natural barriers, protecting inland areas from coastal erosion and storm surges. They are most stable when vegetated.

• Low sedimentary coasts are characterized by high sand availability and low wave energy, which allows dunes to form and persist over time.

• Examples of such dunes can be observed along the coasts of the Gulf of Mexico in the United States and parts of India, such as Odisha's beaches.

Additional Information

• Where sand dunes are common:

• Low-lying, Sandy Coasts: These environments provide the vast amounts of loose sand needed for dune formation.

• Regions with Onshore Winds: Consistent wind blowing from the sea pushes sand inland, building dunes parallel to the shore.

• Humid Coastal Areas: Vegetation often helps stabilize the arms of these dunes (parabolic dunes), allowing them to grow long.

• Why sand dunes form there:

• Abundant Sand: Wide beaches supply the raw material.

• Wind Direction: A dominant, consistent wind direction sculpts the sand into long, parallel ridges.

• Coastal Protection: These dune systems are vital for protecting the mainland from storms and sea-level rise.

Q29. Answer: (c) Indian Institute of Technology, Madras

The correct answer is Indian Institute of Technology, Madras.

Key Points

• Indian Institute of Technology, Madras launched the Bharat Cancer Genome Atlas (BCGA) initiative to collect comprehensive cancer genome data specific to the Indian population.

• The initiative was developed in collaboration with several research organizations and hospitals across India to improve cancer diagnosis and treatment.

• BCGA aims to create a database of genetic mutations in cancer patients, helping researchers develop personalized cancer therapies.

• The project focuses on studying the unique genetic, lifestyle, and environmental factors contributing to cancer prevalence in India.

• Through BCGA, IIT Madras is leveraging advanced technologies like next-generation sequencing and bioinformatics to analyze cancer genomes efficiently.

Additional Information

• Bharat Cancer Genome Atlas:

• The Bharat Cancer Genome Atlas (BCGA) is an ambitious initiative aimed at creating a comprehensive database of genetic mutations in cancer patients across India.

• The project is inspired by the global Cancer Genome Atlas, which has significantly advanced cancer research worldwide.

• By focusing on India's diverse population, BCGA aims to uncover unique genetic and environmental risk factors for cancer, paving the way for personalized medicine.

Q30. Answer: (b) Opposite to the direction of relative motion

The correct answer is Opposite to the direction of relative motion.

Key Points

• Frictional force always acts opposite to the direction of relative motion or attempted motion between two surfaces in contact.

• It is a resistive force generated due to the interaction of surface irregularities at the molecular level.

• The magnitude of the frictional force depends on the normal force and the coefficient of friction between the surfaces.

• Frictional force can be classified into static friction (when there is no relative motion) and kinetic friction (when motion occurs).

• In real-life applications, friction plays a critical role in enabling activities such as walking, driving, and holding objects securely.

Additional Information

• Frictional Force

• Friction is a fundamental force in physics that arises due to the interaction between two surfaces.

• The coefficient of friction is a key parameter that quantifies the resistance offered by surfaces in contact.

• Friction can be advantageous (e.g., providing grip) or disadvantageous (e.g., causing wear and energy loss).

Q31. Answer: (b) Appointment of the States Reorganisation Commission

The correct answer is Appointment of the States Reorganisation Commission.

Key Points

• Potti Sreeramulu, a freedom fighter, fasted to death in 1952 to demand the creation of a separate state for Telugu-speaking people, which resulted in the formation of Andhra Pradesh.

• His death caused widespread protests and unrest, leading the government to consider the linguistic reorganization of states in India.

• In December 1953, the Indian government appointed the States Reorganisation Commission to examine the issues of reorganization of states based on linguistic and cultural factors.

• The commission, chaired by Justice Fazal Ali, submitted its report in 1955, which recommended the reorganization of states along linguistic lines.

• The recommendations of the commission led to the passage of the States Reorganisation Act, 1956, which established new states and reorganized the boundaries of existing ones.

Additional Information

• Creation of Linguistic Minorities Commission:

• The creation of the Linguistic Minorities Commission was not directly linked to Potti Sreeramulu's death.

• It was established in 1957 under Article 350B of the Indian Constitution to safeguard the interests of linguistic minorities.

• The commission works to ensure the rights and privileges of linguistic minorities in India and to promote their integration into the country's socio-economic framework.

• Formation of the Planning Commission:

• The Planning Commission was established earlier, in 1950, by Prime Minister Jawaharlal Nehru to oversee the economic development of India through five-year plans.

• It was not related to the events following the death of Potti Sreeramulu.

• Its primary objective was to promote sustainable economic growth and improve the standard of living in India.

• Formation of the Election Commission:

• The Election Commission of India was established in 1950 under Article 324 of the Indian Constitution.

• It is responsible for conducting free and fair elections in the country, including Lok Sabha, Rajya Sabha, and state legislative assemblies.

• Its creation was unrelated to Potti Sreeramulu's death.

Q32. Answer: (a) Subhash Chandra Bose

The correct answer is Subhash Chandra Bose.

Key Points

• Subhash Chandra Bose was a prominent Indian nationalist leader who advocated for complete independence from British rule.

• Unlike Mahatma Gandhi, Bose did not agree with the principle of non-violence (ahimsa) and passive resistance (satyagraha).

• In 1941, he escaped from house arrest in Calcutta (Kolkata) and traveled to Germany and later to Singapore to seek international support for India’s freedom.

• Bose was instrumental in forming and leading the Indian National Army (INA), also known as the Azad Hind Fauj, which aimed to liberate India through armed struggle.

• He adopted the slogan "Give me blood, and I shall give you freedom" to inspire Indians to join the fight for independence.

Additional Information

• Mohan Singh

• Mohan Singh was an Indian military officer who played a key role in the early formation of the Indian National Army (INA).

• He was a captain in the British Indian Army who later joined the Japanese forces during World War II to fight against British rule in India.

• He, however, resigned from the INA leadership due to differences with the Japanese command.

• Jawaharlal Nehru

• Jawaharlal Nehru was the first Prime Minister of India and a close associate of Mahatma Gandhi.

• He supported Gandhi’s principles of non-violence and peaceful resistance against British rule.

• Although Nehru admired Bose, he did not agree with his militaristic approach to achieving independence.

• Captain Laxmi

• Captain Laxmi, also known as Laxmi Sehgal, was a revolutionary who served as the leader of the women’s regiment of the Indian National Army (INA) called the Rani of Jhansi Regiment.

• She joined the INA under the leadership of Subhash Chandra Bose and fought for India’s independence.

• She later became a prominent political leader and social activist in independent India.

Q33. Answer: (d) Article 153

The correct answer is Article 153.

Key Points

• Article 153 of the Constitution of India states that there shall be a Governor for each state in India.

• The Governor acts as the constitutional head of the state, functioning under the framework of the Indian Constitution.

• The Governor is appointed by the President of India and holds office during the pleasure of the President.

• Article 153 allows for the possibility of the same individual being appointed as the Governor of two or more states.

• The Governor’s primary role is to act as a bridge between the Union Government and the state governments, ensuring federal coordination.

Additional Information

• Article 74

• Article 74 of the Constitution of India deals with the Council of Ministers to aid and advise the President.

• It mandates that the President of India shall act in accordance with the advice of the Council of Ministers headed by the Prime Minister.

• The advice given by the Council of Ministers is binding on the President.

• The provision ensures a parliamentary form of government where the executive is responsible to the legislature.

• Article 63

• Article 63 of the Constitution of India states that there shall be a Vice President of India.

• The Vice President is the ex-officio Chairman of the Rajya Sabha (Upper House of Parliament).

• The Vice President is elected by an electoral college consisting of the members of both Houses of Parliament.

• He/she acts as the President in the event of the absence, resignation, or removal of the President.

• Article 112

• Article 112 of the Constitution of India pertains to the Annual Financial Statement, commonly known as the Union Budget.

• The Union Budget is a statement of the estimated receipts and expenditures of the Government of India for a particular financial year.

• The budget is presented before both Houses of Parliament and is divided into two parts: the revenue budget and the capital budget.

• It plays a crucial role in the economic planning and financial management of the country.

Q34. Answer: (c) Karnataka

The correct answer is Karnataka.

Key Points

• Karnataka hosted the International Millet Conference in 2025 to promote millet farming and trade, aiming to boost awareness regarding the nutritional and ecological benefits of millets.

• The state is one of the largest producers of millets in India, with crops like ragi (finger millet), jowar (sorghum), and bajra (pearl millet) widely cultivated.

• Karnataka has been at the forefront of millet promotion, with initiatives like the “Raitha Siri” scheme that provides financial incentives for millet farmers.

• The conference brought together national and international stakeholders, including policymakers, researchers, and farmers, to discuss innovations and strategies for enhancing millet production and global trade.

• The event aligned with India’s efforts to celebrate 2023 as the International Year of Millets, as declared by the United Nations, emphasizing sustainable agricultural practices and food security.

Additional Information

• Millets

• Millets are highly nutritious, drought-resistant crops that require less water and chemical inputs, making them ideal for sustainable agriculture.

• Commonly referred to as “nutri-cereals,” they are rich in protein, fiber, vitamins, and minerals, contributing to food and nutritional security.

• Promoting millet cultivation aligns with global goals like combating climate change and ensuring food security for marginalized communities.

Q35. Answer: (b) Start Button

The correct answer is Start Button.

Key Points

• The Start Button in Windows 7 is the primary way to access programs, files, and settings on the computer.

• It is located on the lower-left corner of the screen within the taskbar, making it easily accessible for users.

• By clicking the Start Button, users can open the Start Menu, which provides access to frequently used applications, a search bar for quick navigation, and links to system settings and files.

• The Start Menu is divided into two main panels: the left panel shows pinned and recently used applications, while the right panel provides access to libraries, control panel, devices, and network connections.

• The Start Button also allows users to log off, shut down, restart, or put the computer to sleep.

Additional Information

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• Taskbar:

• The taskbar is a horizontal bar at the bottom of the Windows desktop that allows users to switch between open applications and access pinned programs quickly.

• It contains the Start Button, system tray, notification area, and shortcuts to frequently used programs.

• Although the taskbar provides access to applications, it does not offer features like searching for files or system settings directly.

• Control Panel:

• The Control Panel is a component of Microsoft Windows that provides centralized access to configure system settings and manage hardware or software.

• It includes options for managing user accounts, adjusting display settings, installing/uninstalling programs, and configuring network settings.

• While it is a powerful tool for system management, it is not used for accessing general applications or files.

• Notification Area:

• The notification area, also known as the system tray, is located on the right side of the taskbar in Windows.

• It displays system notifications, clock, and status icons for certain applications like antivirus software, volume control, and network connectivity.

• The notification area is not designed for accessing files, programs, or system settings directly.

Q36. Answer: (a) Haryana

The correct answer is Haryana.

Key Points

• Haryana is least likely to practice wet farming because of its semi-arid to sub-humid climatic conditions, characterized by low annual rainfall (400-700 mm on average).

• The state primarily focuses on irrigated farming using canal and groundwater systems, especially for crops like wheat, rice, and sugarcane, rather than relying on natural rainfall for wet farming.

• Wet farming, which depends on abundant and consistent rainfall, is not suitable for Haryana due to its lack of regular monsoonal rains.

• Haryana's agricultural practices are more aligned with dry and irrigated farming techniques, as seen in the widespread cultivation of wheat and mustard.

• The state has invested heavily in irrigation infrastructure to compensate for its natural water scarcity, further reducing the feasibility of wet farming.

Additional Information

• Wet Farming

• Wet farming refers to agricultural practices that rely on abundant and consistent rainfall or other water sources to cultivate crops.

• It is typically practiced in regions with high rainfall or access to perennial water resources.

• Crops such as rice, jute, and sugarcane are commonly associated with wet farming due to their water-intensive nature.

Q37. Answer: (d) Natya Shastra

The correct answer is Natya Shastra.

Key Points

• Natya Shastra is an ancient Indian treatise on dramaturgy, theatre, dance, and music written by Bharata Muni.

• The text consists of 36 chapters and covers topics like stage design, music, dance, makeup, and various forms of dramatic expression.

• It is often referred to as the fifth Veda and serves as the foundational text for various classical dance and theatre forms in India, including Bharatanatyam, Kathakali, and others.

• The Natya Shastra provides guidance on Rasa theory, which forms the core of Indian aesthetics, explaining how emotional states (rasas) are evoked in the audience.

• The work dates back to approximately 200 BCE to 200 CE and remains a significant source of knowledge for performing arts in India.

Additional Information

• Arthashastra

• Authored by Kautilya (Chanakya), it is an ancient Indian treatise on politics, economics, and military strategy.

• The text provides guidance on statecraft, governance, administration, taxation, and warfare, making it a significant historical document on ancient Indian polity.

• It is considered a foundational text for understanding ancient Indian economics and political philosophy.

• Manusmriti

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• Also known as the Laws of Manu, it is an ancient legal text and one of the oldest dharmashastras in Hinduism.

• The text outlines social laws, duties, and ethical conduct for different classes (varnas) and stages of life (ashramas).

• It has been a significant source for understanding ancient Indian social and legal systems but is often criticized for its rigid caste-based laws.

• Rigveda

• The Rigveda is the oldest of the four Vedas and is a collection of ancient Sanskrit hymns dedicated to various deities.

• It is a sacred text of Hinduism, composed around 1500 BCE and is considered one of the world's oldest religious texts.

• The Rigveda consists of 10 Mandalas (books) and includes hymns on cosmology, rituals, and praises of nature.

Q38. Answer: (d) Army, Navy, and Air Force

The correct answer is Army, Navy, and Air Force.

Key Points

• The Inter-Services Organisations (Command, Control and Discipline) Act, 2023 enables the central government to provide unified command authority over personnel from the Army, Navy, and Air Force.

• Effective from May 2025, this act aims to enhance coordination, integration, and operational effectiveness across the three branches of the Indian Armed Forces.

• The act empowers the heads of inter-services organisations to exercise disciplinary and administrative control over personnel from different branches under their command.

• This legislation is a significant step towards achieving jointness and synergy in military operations, a crucial aspect of modern warfare.

• It facilitates the establishment of joint structures and commands, such as the Chief of Defence Staff (CDS) and integrated theatre commands, to streamline decision-making and execution.

Additional Information

• Navy and Air Force (Option 1):

• The Navy and Air Force are two branches of the Indian Armed Forces, but the Inter-Services Organisations Act, 2023 focuses on all three branches, including the Army, to ensure unified command.

• While coordination between the Navy and Air Force is critical for maritime and aerial operations, unified authority is necessary to integrate all branches for comprehensive defense strategy.

• Army and Navy (Option 2):

• The Army and Navy operate in distinct domains—land and sea—and their integration is essential for coastal defense and amphibious operations.

• However, the Act includes the Air Force as well, making it inclusive of all major branches of the armed forces for effective joint operations.

• Army and Coast Guard (Option 3):

• The Coast Guard is not considered a part of the Indian Armed Forces but is a separate entity under the Ministry of Defence focused on maritime security and law enforcement.

• While coordination between the Army and Coast Guard is important in specific scenarios, the Act specifically addresses the Army, Navy, and Air Force for unified command structures.

• Main Theme of the Question:

• The Inter-Services Organisations (Command, Control and Discipline) Act, 2023 is a landmark legislation aimed at fostering jointness and integration among the Indian Armed Forces.

• It addresses long-standing issues of inter-service coordination and aims to enhance the nation's defense preparedness through streamlined command structures.

• The Act is expected to play a pivotal role in modernizing the military and adapting to evolving security challenges.

Q39. Answer: (b) 24.4°

The correct answer is 24.4º.

Key Points

• The critical angle is the angle of incidence beyond which light is totally internally reflected within a medium.

• The critical angle for diamond is approximately 24.4º, which is much smaller than most other materials.

• This small critical angle is due to diamond's high refractive index, approximately 2.42, which causes light to bend significantly as it enters the diamond.

• The phenomenon of total internal reflection in diamonds is responsible for their characteristic sparkle and brilliance.

• To calculate the critical angle, the formula used is sin(c) = 1/n, where n is the refractive index of the medium (diamond in this case).

Additional Information

• Concept of Critical Angle:

• The critical angle is a property determined by the refractive index of a material and the medium it is in contact with.

• It plays a key role in optics, particularly in phenomena like total internal reflection, which is widely used in fiber optics and gemstones like diamonds.

• Total internal reflection occurs only when light travels from a denser medium (higher refractive index) to a less dense medium (lower refractive index).

Q40. Answer: (d) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

• The Defence Research and Development Organisation (DRDO) conducted the maiden flight trials of the Stratospheric Airship Platform in Madhya Pradesh in May 2025.

• The flight trials were part of DRDO's initiative to explore and develop high-altitude platforms for strategic defense and surveillance.

• This airship is designed to operate at stratospheric altitudes (above 20 km) and can be utilized for communication, surveillance, and reconnaissance missions.

• The location in Madhya Pradesh was chosen due to its vast open areas and favorable conditions for conducting high-altitude experimental trials safely.

• The platform serves as a significant step in advancing India's self-reliance in cutting-edge aerospace and defense technologies.

Additional Information

• Stratospheric Airship Platform

• The Stratospheric Airship Platform is a lighter-than-air craft designed to operate at very high altitudes.

• It provides advantages like persistent surveillance, low operational costs, and reduced dependency on satellite systems.

• Such platforms are expected to revolutionize communication and defense systems by enabling long-duration operations.

Q41. Answer: (a) 9 km/hr

Shortcut Trick

When distance is constant, speed and time are inversely proportional.

As Anmol doubles his speed, his time gets halved. Reduction in time = T − T/2 = T/2.

Total time saved = 3 hours (initially more than Nikhil) + 6 hours (later less than Nikhil) = 9 hours.

=> T/2 = 9 hours => Original Time (T) = 18 hours.

Anmol's speed = Distance ÷ Time = 162 ÷ 18 = 9 km/hr.

Therefore The correct answer is 9 km/hr.

Alternate Method

Given:

Total distance = 162 km

Anmol takes 3 hours more than Nikhil initially.

If Anmol doubles his speed, he takes 6 hours less than Nikhil.

Formula Used:

Speed = Distance ÷ Time

Distance = 162 kmNormal Time: TNew Time: T/2Time Saved (T − T/2) = 3 + 6 = 9 hoursTherefore Original Time (T) = 18 hours

Calculations:

Let the time taken by Anmol originally be T_A hours and by Nikhil be T_N hours.

=> T_A − T_N = 3 --- (Equation 1)

When Anmol doubles his speed, his new time becomes T_A/2.

=> T_N − T_A/2 = 6 --- (Equation 2)

Adding Equation 1 and Equation 2:

=> (T_A − T_N) + (T_N − T_A/2) = 3 + 6

=> T_A − T_A/2 = 9

=> T_A/2 = 9

=> T_A = 18 hours

Now, Anmol's original speed = Distance ÷ T_A

=> Anmol's speed = 162 ÷ 18

=> Anmol's speed = 9 km/hr

Therefore The correct answer is 9 km/hr.

Additional Information

Proportionality in Speed and Time

When distance is constant, speed and time are inversely proportional (S1 × T1 = S2 × T2). If speed is multiplied by a certain factor, the time required is divided by that exact same factor.

Relative Speed

For objects moving in the same direction, relative speed is the difference of their individual speeds (S1 − S2). For objects moving in opposite directions towards each other, it is their sum (S1 + S2).

Average Speed

Average Speed is defined as Total Distance ÷ Total Time. When equal distances are covered at speeds S1 and S2 sequentially, the average speed becomes (2 × S1 × S2) ÷ (S1 + S2).

Q42. Answer: (a) 8.5

Shortcut Trick

Given x = 170.24 and y = 170.51.

Substitute these directly into xz = y4:

170.24z = 170.51 × 4

=> 0.24z = 2.04

=> z = 2.04 ÷ 0.24 = 8.5

Therefore The correct answer is 8.5.

Alternate Method

Given:

x = 170.24

y = 170.51

xz = y4

Formula Used:

Power of a power rule: (am)n = am × n

Equating rule: If am = an, then m = n (for a > 0, a ≠ 1)

Calculations:

=> Substitute the values of x and y in the given exponential equation:

=> (170.24)z = (170.51)4

=> Apply the power of a power rule to both sides:

=> 170.24 × z = 170.51 × 4

=> 170.24z = 172.04

=> Since the bases (17) are exactly the same, we can equate the exponents directly:

=> 0.24z = 2.04

=> z = 2.04 ÷ 0.24

=> Multiply numerator and denominator by 100 to remove decimals:

=> z = 204 ÷ 24

=> z = 51 ÷ 6

=> z = 17 ÷ 2

=> z = 8.5

Therefore The correct answer is 8.5.

Additional Information

Power of a Power Rule

To raise an existing power to another power, you multiply the given exponents: (am)n = am × n

Product Rule of Exponents

When multiplying two or more terms that have the same base, simply add their exponents together: am × an = am + n

Quotient Rule of Exponents

When dividing two terms with the identical base, subtract the denominator's exponent from the numerator's exponent: am ÷ an =

am − n

Zero Exponent Rule

Any non-zero base number raised to the power of exactly zero is always equal to one: a0 = 1

Q43. Answer: (a) 57

Shortcut Trick

To find the median quickly, simply sort the given data in ascending order and pick the exact middle term.

Sorted order: 15, 24, 30, 39, 40, 57, 78, 80, 82, 82, 97

Since there are 11 terms, the middle term is the 6^(th) value, which is 57.

Therefore The correct answer is 57.

Alternate Method

Given:

Data set: 24, 30, 40, 80, 15, 57, 78, 82, 39, 97, 82

Formula Used:

If the number of observations (n) is odd, Median = Value of the ((n + 1) ÷ 2)^(th) observation.

Data Arranged in Ascending Order

15

24

30

39

40

57

78

80

82

82

97

Median = 57

Middle value (6th term)

Calculations:

=> Total number of terms (n) = 11

=> Arranging the data in ascending order: 15, 24, 30, 39, 40, 57, 78, 80, 82, 82, 97

=> Median = ((11 + 1) ÷ 2)^(th) term

=> Median = (12 ÷ 2)^(th) term = 6^(th) term

=> The 6^(th) term in the arranged sequence is 57.

Therefore The correct answer is 57.

Additional Information

Mean

Mean is the average of all data points. Mean = (Sum of all observations) ÷ (Total number of observations).

Median (Even number of observations)

If the number of observations (n) is even, the Median is the average of the (n ÷ 2)^(th) and ((n ÷ 2) + 1)^(th) observations.

Mode

Mode is the value that appears most frequently in a data set. In the given set, the number 82 appears twice, making it the mode.

Q44. Answer: (c) 450 sq.cm

Shortcut Trick

There is a direct relation between the Total Surface Area (TSA) of a cube and its longest diagonal (D).

The direct formula is: TSA = 2 × D^2

=> TSA = 2 × $(15)^2$

=> TSA = 2 × 225 = 450 sq.cm.

Therefore The correct answer is 450 sq.cm.

Alternate Method

Given:
The longest diagonal of the cube = 15 cm.
Formula Used:
Longest Diagonal of a cube = $a\sqrt{3}$
Total Surface Area of a cube = $6a^2$
Where, 'a' is the side length of the cube.
Diagonal = 15 cm
Side = a
a
a
Longest Diagonal = $a\sqrt{3}$
Calculations:
=> $a\sqrt{3} = 15$
=> $a = 15 \div \sqrt{3}$
=> $a = 5\sqrt{3}$ cm
Now, substitute the value of 'a' into the total surface area formula:
=> Total Surface Area = $6 \times (5\sqrt{3})^2$
=> Total Surface Area = $6 \times (25 \times 3)$
=> Total Surface Area = $6 \times 75 = 450$ sq.cm.
Therefore The correct answer is 450 sq.cm.
Additional Information
Volume of a Cube
The volume represents the total 3D space enclosed inside the cube, calculated as $V = a^3$.
Lateral Surface Area of a Cube
The area of the four vertical side walls excluding the top and bottom faces is $LSA = 4a^2$.
Face Diagonal of a Cube
The diagonal lying on any flat square face of the cube is given by the formula $d = a\sqrt{2}$.
Cuboid Formulas
For a cuboid with length 'l', breadth 'b', and height 'h': Longest Diagonal = $\sqrt{(l^2 + b^2 + h^2)}$ and Total Surface Area = $2(lb + bh + hl)$.

Q45. Answer: (d) Rs. 516

Shortcut Trick
Discount = 12% of Marked Price
=> Discount = $(12 \div 100) \times 4300$
=> Discount = $12 \times 43 = 516$
Therefore The correct answer is Rs. 516.
Alternate Method
Given:
Marked Price of the bicycle = Rs. 4,300
Trade discount percentage = 12%
Marked Price = Rs. 4,300 (100%)
Selling Price (88%)
12%
Discount = ?
Rs. 3,784
Formula Used:
Discount Amount = (Discount % ÷ 100) × Marked Price
Calculations:
=> Discount = $(12 \div 100) \times 4300$
=> Discount = 12×43
=> Discount = Rs. 516
Therefore The correct answer is Rs. 516.

Additional Information

Selling Price Formula

Selling Price = Marked Price − Discount

Successive Discounts

The equivalent single discount for two successive discounts of a% and b% is given by: (a + b − a × b ÷ 100)%

Markup Percentage

Markup % = [(Marked Price − Cost Price) ÷ Cost Price] × 100

Q46. Answer: (b) 16,362

Shortcut Trick

Convert the successive percentage changes directly into multiplying factors: +25% = 5/4, +60% = 8/5, and −50% = 1/2.

Net multiplying factor = 5/4 × 8/5 × 1/2 = 40/40 = 1.

Since the net multiplier is exactly 1, the overall change in population is 0%.

Therefore, the population at the end of the third year remains identical to the initial population.

Therefore The correct answer is 16,362.

Alternate Method

Given:

Initial population = 16,362

Successive changes = +25%, +60%, −50%

Formula Used:

Final Value = Initial Value × (1 ± R1/100) × (1 ± R2/100) × (1 ± R3/100)

Start

Year 1

Year 2

Year 3

100x

125x

200x

100x

+25%

+60%

−50%

×5/4

×8/5

×1/2

Net Multiplier = 5/4 × 8/5 × 1/2 = 1

Therefore Final Population = Initial Population (0% Change)

Calculations:

=> Multiplier for Year 1 (+25%) = 1 + 25/100 = 125/100 = 5/4

=> Multiplier for Year 2 (+60%) = 1 + 60/100 = 160/100 = 8/5

=> Multiplier for Year 3 (−50%) = 1 − 50/100 = 50/100 = 1/2

=> Final Population = Initial Population × (Multiplier 1) × (Multiplier 2) × (Multiplier 3)

=> Final Population = 16,362 × 5/4 × 8/5 × 1/2

=> Final Population = 16,362 × (5 × 8 × 1) / (4 × 5 × 2)

=> Final Population = 16,362 × (40 / 40)

=> Final Population = 16,362 × 1 = 16,362

Therefore The correct answer is 16,362.

Additional Information

Successive Percentage Change

When a value undergoes multiple percentage changes successively, the net effect is calculated by continuously multiplying the respective variation factors: Final = Initial × (1 ± R1/100) × (1 ± R2/100).

Net Percentage Change Formula

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For two successive changes of A% and B%, the effective net percentage change can also be found rapidly using the direct formula: Net % = A + B + (A × B)/100.

Base Independence

The overall percentage multiplier is completely independent of the initial value. A net multiplier of exactly 1 implies that the quantity has returned entirely to its original starting baseline with a 0% overall change.

Q47. Answer: (a) 20

Shortcut Trick

CP of 1 pencil = 180 ÷ 12 = Rs. 15

Ratio of CP : SP = 15 : 18 = 5 : 6

Profit in ratio = 6 − 5 = 1 unit on a base of 5

Profit % = (1 ÷ 5) × 100 = 20%

Therefore The correct answer is 20%.

Alternate Method

Given:

Cost Price of 1 dozen (12) pencils = Rs. 180

Selling Price of 1 pencil = Rs. 18

Formula Used:

Profit = SP − CP

Profit % = (Profit ÷ CP) × 100

CP = Rs. 15

SP = Rs. 18

+Rs. 3 (Profit)

Profit % = (3 ÷ 15) × 100 = 20%

Calculations:

=> Cost Price (CP) of 1 pencil = 180 ÷ 12 = Rs. 15

=> Selling Price (SP) of 1 pencil = Rs. 18

=> Profit = 18 − 15 = Rs. 3

=> Profit % = (3 ÷ 15) × 100

=> Profit % = (1 ÷ 5) × 100 = 20%

Therefore The correct answer is 20%.

Additional Information

Profit and Loss Basics

Profit occurs when the Selling Price (SP) is greater than the Cost Price (CP), calculated as Profit = SP − CP. Conversely, a loss occurs when CP > SP.

Base of Calculation

Unless otherwise explicitly mentioned in the problem, both Profit % and Loss % are always evaluated based on the initial Cost Price (CP).

Successive Discounts

When two successive discounts of a% and b% are offered, the single equivalent discount percentage is given by (a + b − ab ÷ 100)%.

Q48. Answer: (c) 92

Shortcut Trick

Total parts of the given ratio = 19 + 11 + 18 = 48 parts.

Difference between the largest and smallest parts = 19 − 11 = 8 parts.

Value of 48 parts = 552

Value of 8 parts = (552 ÷ 48) × 8 = 11.5 × 8 = 92.

Therefore The correct answer is Rs. 92.

Alternate Method

19x

Largest Share

11x

Smallest Share

18x

Third Share

Total = 19x + 11x + 18x = 48x = Rs. 552

Difference = 19x − 11x = 8x

Given:

→ Total Amount = Rs. 552

→ Ratio of distribution = 19 : 11 : 18

Calculations:

=> Let the shares of the three persons be 19x, 11x, and 18x respectively.

=> Total sum = 19x + 11x + 18x = 48x

=> Since the total amount given is Rs. 552:

=> 48x = 552

=> x = 552 ÷ 48

=> x = 11.5

=> The largest share corresponds to the ratio part 19, which is 19x.

=> The smallest share corresponds to the ratio part 11, which is 11x.

=> Difference between largest and smallest share = 19x − 11x = 8x

=> Difference = 8 × 11.5 = 92

Therefore The correct answer is Rs. 92.

Additional Information

Distribution in a Ratio

If an amount T is to be divided in the ratio a : b : c, the individual shares are [a ÷ (a + b + c)] × T, [b ÷ (a + b + c)] × T, and [c ÷ (a + b + c)] × T.

Compound Ratio

When two or more ratios are multiplied together term by term, it is called a compound ratio. For a : b and c : d, the compound ratio is (a × c) : (b × d).

Proportion

An equation stating that two ratios are equal is called a proportion. If a : b = c : d, then a × d = b × c (Product of extremes = Product of means).

Q49. Answer: (c) $\sec^2\theta - \tan^2\theta$

Shortcut Trick

Substitute θ = 45° into the given expression.

X = (1/2) ÷ (1 + 1/√2) − (1/√2) ÷ (1 − √2)

X = 1 / (2 + √2) + 1 / (2 − √2) = [(2 − √2) + (2 + √2)] ÷ (4 − 2) = 4 ÷ 2 = 2

Required value = X − 1 = 2 − 1 = 1.

From the options, $\sec^2(45°) - \tan^2(45°) = (\sqrt{2})^2 - (1)^2 = 2 - 1 = 1$.

Therefore The correct answer is $\sec^2\theta - \tan^2\theta$.

Alternate Method

Given:

$X = \sin^2\theta / (1 + \cos\theta) - \sin\theta / (\cot\theta - \operatorname{cosec}\theta)$

Formula Used:

$\sin^2\theta = 1 - \cos^2\theta = (1 - \cos\theta)(1 + \cos\theta)$

$\cot\theta = \cos\theta / \sin\theta$ | $\operatorname{cosec}\theta = 1 / \sin\theta$

Calculations:

=> Term 1 = $\sin^2\theta / (1 + \cos\theta) = (1 - \cos^2\theta) / (1 + \cos\theta)$

=> Term 1 = $(1 - \cos\theta)(1 + \cos\theta) / (1 + \cos\theta) = 1 - \cos\theta$

=> Term 2 = $\sin\theta / (\cot\theta - \operatorname{cosec}\theta) = \sin\theta / [(\cos\theta - 1) / \sin\theta]$

=> Term 2 = $\sin^2\theta / (\cos\theta - 1) = (1 - \cos^2\theta) / (\cos\theta - 1)$

=> Term 2 = $-(\cos^2\theta - 1) / (\cos\theta - 1)$

=> Term 2 = $-(\cos\theta - 1)(\cos\theta + 1) / (\cos\theta - 1) = -(1 + \cos\theta)$

=> X = Term 1 − Term 2 = (1 − cosθ) − [−(1 + cosθ)]

=> X = 1 − cosθ + 1 + cosθ = 2

=> The required value is (X − 1) = 2 − 1 = 1

=> Checking the options, the standard identity $\sec^2\theta - \tan^2\theta$ equals 1.

Therefore The correct answer is $\sec^2\theta - \tan^2\theta$.

Additional Information

Pythagorean Identities

Fundamental trigonometric identities: $\sin^2\theta + \cos^2\theta = 1$, $\sec^2\theta - \tan^2\theta = 1$, and $\text{cosec}^2\theta - \cot^2\theta = 1$.

Value Substitution Method

When simplifying complex expressions, substituting standard angles (30°, 45°, 60°) quickly identifies the correct option. Always avoid angles that make any denominator zero.

Reciprocal Trigonometric Ratios

Key relationships to remember: cosecθ = 1 / sinθ, secθ = 1 / cosθ, and cotθ = 1 / tanθ = cosθ / sinθ.

Q50. Answer: (a) 39

Shortcut Trick

Expand the bracket and multiply 27 directly to each term to avoid fraction addition:

=> (1 + 1/9 + 1/3) × 27

=> (1 × 27) + (1/9 × 27) + (1/3 × 27)

=> 27 + 3 + 9 = 39

Therefore The correct answer is 39.

Alternate Method

Given:

Expression: (3^0 + 3^(−2) + 3^(−1)) × 27

Formula Used:

a^0 = 1

a^(−n) = 1 / a^n

Calculations:

=> Substitute the values of powers using exponent rules:

=> 3^0 = 1

=> 3^(−2) = 1 / 3^2 = 1/9

=> 3^(−1) = 1 / 3^1 = 1/3

=> Add the values inside the bracket by taking the LCM of the denominators (9, 3, and 1), which is 9:

=> (1 + 1/9 + 1/3) = (9 + 1 + 3) / 9 = 13/9

=> Now multiply the sum by 27:

=> (13 / 9) × 27

=> 13 × (27 ÷ 9)

=> 13 × 3 = 39

Therefore The correct answer is 39.

Additional Information

Zero Exponent Rule

Any non-zero real number raised to the power of zero is always equal to 1: a^0 = 1.

Negative Exponent Rule

A negative exponent implies the reciprocal of the base raised to the corresponding positive power: a^(−n) = 1 / a^n.

BODMAS Rule

Expressions must be evaluated following the order of Brackets, Orders (powers and roots), Division, Multiplication, Addition, and Subtraction.

Product Rule of Exponents

When multiplying terms with the same base, add the exponents: a^m × a^n = a^(m+n).

Q51. Answer: (b) 33%

Shortcut Trick

The volume of a cylinder is directly proportional to $r^2 \times h$.

Multiplying factor for radius = 1 − 0.19 = 0.81

Multiplying factor for height = 1 + 1.02 = 2.02

New Volume = $(0.81)^2 \times 2.02 \times$ Old Volume = $0.6561 \times 2.02 \times$ Old Volume = $1.325322 \times$ Old Volume

Percentage increase = $(1.325322 - 1) \times 100 = 32.53\% \approx 33\%$

Therefore The correct answer is 33%.

Alternate Method

Given:

Decrease in radius = 19%

Increase in height = 102%

Formula Used:

Volume of a cylinder (V) = $\pi r^2 h$

Initial Volume = 100%

New Volume ≈ 133%

• 33%

Calculations:

=> Let original radius = r and original height = h

=> Original Volume (V1) = $\pi r^2 h$

=> New radius (r2) = r − 0.19r = 0.81r

=> New height (h2) = h + 1.02h = 2.02h

=> New Volume (V2) = $\pi \times (0.81r)^2 \times (2.02h)$

=> V2 = $\pi \times 0.6561r^2 \times 2.02h$

=> V2 = $1.325322\ \pi r^2 h$

=> Increase in Volume = V2 − V1

=> Increase in Volume = $1.325322\ \pi r^2 h - \pi r^2 h = 0.325322\ \pi r^2 h$

=> Percentage Increase = $(0.325322\ \pi r^2 h \div \pi r^2 h) \times 100$

=> Percentage Increase = 32.5322% ≈ 33%

Therefore The correct answer is 33%.

Additional Information

Percentage Change

The fundamental formula to calculate the percentage change is: [(New Value − Old Value) ÷ Old Value] × 100.

Successive Percentage Change

When multiple successive percentage changes occur, applying a net multiplying factor corresponding to the direct proportionality (like r^2h for volume) offers the fastest calculation method instead of calculating step-by-step.

Volume of Cylinder & Cone

Volume of a Right Circular Cylinder = $\pi r^2 h$. Volume of a Right Circular Cone = $(1/3)\pi r^2 h$. In both formulas, the volume varies directly with the square of the radius and linearly with the height.

Q52. Answer: (a) Both the discount are the same ; Rs. 0

Shortcut Trick

Successive discount formula: d = x + y − (x × y) ÷ 100

Effective discount for 20% and 10% = 20 + 10 − (20 × 10) ÷ 100 = 28%

The single discount option is also 28%.

Since both discount percentages are equal, the discount amounts are exactly the same.

Difference in discount amount = Rs. 0

Therefore The correct answer is Both the discount are the same ; Rs. 0.

Alternate Method

Given:

List Price (MP) = Rs. 80,000

Discount Option A = Single discount of 28%

Discount Option B = Two successive discounts of 20% and 10%

Formula Used:

Discount Amount = MP × (Discount % ÷ 100)

MP
Rs. 80,000
• 28%
• 20%
64,000
• 10%
SP
Rs. 57,600
Difference = Rs. 0
Calculations:
For Discount Option A:
=> Discount = 28% of 80,000
=> Discount = (28 ÷ 100) × 80,000 = Rs. 22,400
For Discount Option B:
=> First Discount = 20% of 80,000 = (20 ÷ 100) × 80,000 = Rs. 16,000
=> Price after 1^(st) discount = 80,000 − 16,000 = Rs. 64,000
=> Second Discount = 10% of 64,000 = (10 ÷ 100) × 64,000 = Rs. 6,400
=> Total Discount = 16,000 + 6,400 = Rs. 22,400
Comparing both options:
=> Difference = 22,400 − 22,400 = Rs. 0
=> Both the discount options yield the exact same amount.
Therefore The correct answer is Both the discount are the same ; Rs. 0.
Additional Information
Successive Discount
When two discounts x% and y% are given one after the other, the effective single discount is calculated as (x + y − xy ÷ 100)%.
Marked Price (MP) and Selling Price (SP)
MP is the price labeled on the product. Discount is always calculated on the MP. SP = MP − Discount.
Three Successive Discounts
For three discounts x, y, and z, first find the effective discount for x and y, then use that resultant percentage with z using the same formula.

Q53. Answer: (d) 50 : 62

Shortcut Trick
Compare each ratio to 0.5 (or 50%) to quickly find the largest.
38 ÷ 83 is less than 0.5, and 35 ÷ 77 is less than 0.5.
47 ÷ 67 is roughly 0.70 (since 67 × 0.7 = 46.9).
50 ÷ 62 is exactly 25 ÷ 31, which is more than 0.80 (since 31 × 0.8 = 24.8).
Since 0.80 is the highest, 50 : 62 is the greatest ratio.
Therefore The correct answer is 50 : 62.
Alternate Method
Given:
Four ratios to compare: 38 : 83, 35 : 77, 47 : 67, and 50 : 62.
Method Used:
Convert each ratio to its decimal equivalent to compare their exact values directly.
38:83
≈ 0.457
35:77
≈ 0.454
47:67
≈ 0.701
50:62
≈ 0.806 (Max)

Calculations:

=> Ratio 1 = 38 ÷ 83 = 0.4578...

=> Ratio 2 = 35 ÷ 77 = 0.4545...

=> Ratio 3 = 47 ÷ 67 = 0.7014...

=> Ratio 4 = 50 ÷ 62 = 0.8064...

=> Arranging the values in descending order: 0.8064 > 0.7014 > 0.4578 > 0.4545

=> Since 0.8064 is the largest value, the corresponding ratio is the greatest.

Therefore The correct answer is 50 : 62.

Additional Information

Cross-Multiplication Method

To compare two ratios a:b and c:d quickly without division, calculate a×d and b×c. If a×d > b×c, then the ratio a:b > c:d.

Compound Ratio

The compound ratio of two individual ratios a:b and c:d is the product of their antecedents and consequents, given by (a×c) : (b×d).

Duplicate Ratio

The duplicate ratio of a:b is given by a2 : b2, which represents the direct ratio of their squared values.

Q54. Answer: (c) 17/28

Shortcut Trick

Total Work = LCM of 12 and 21 = 84 units

Efficiency of A = 84 ÷ 12 = 7 units/day, Efficiency of B = 84 ÷ 21 = 4 units/day

Work done by both in 3 days = (7 + 4) × 3 = 11 × 3 = 33 units

Remaining work = 84 − 33 = 51 units

Fraction of work left = 51 / 84 = 17/28

Therefore The correct answer is 17/28.

Alternate Method

Given:

Time taken by A to complete the work = 12 days

Time taken by B to complete the work = 21 days

Number of days they worked together = 3 days

Formula Used:

Total Work = LCM of given days

Efficiency = Total Work ÷ Days

Person	Days	Total Work	Efficiency
A	12	84	7
B	21	4	

Calculations:

=> Total combined efficiency of A and B = 7 + 4 = 11 units/day

=> Work completed by A and B in 3 days = 11 × 3 = 33 units

=> Remaining work = Total work − Work completed

=> Remaining work = 84 − 33 = 51 units

=> Fraction of work left = Remaining work ÷ Total work

=> Fraction of work left = 51 / 84

=> Fraction of work left = 17 / 28

Therefore The correct answer is 17/28.

Additional Information

LCM Method for Total Work

Taking the Lowest Common Multiple (LCM) of the given days as the assumed total work helps in keeping efficiency values as integers rather than fractions, making all additions and subtractions significantly faster.

Work Efficiency

Efficiency is inversely proportional to the time taken. The sum of individual efficiencies equals the combined efficiency of the team

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working simultaneously.

Fraction of Work Left vs Completed

The sum of the fraction of work completed and the fraction of work left is always equal to 1. E.g., if 3/4 of work is done, the left work is 1 − 3/4 = 1/4.

Q55. Answer: (b) 167

Shortcut Trick

The average of the first n even numbers is directly given by the formula (n + 1).

Here, the total number of even numbers (n) = 166

=> Average = 166 + 1 = 167

Therefore The correct answer is 167.

Alternate Method

Given:

We need to find the average of the first 166 even numbers.

The sequence of the first 166 even numbers is: 2, 4, 6, 8, ..., (166 × 2)

=> The sequence is 2, 4, 6, 8, ..., 332

Formula Used:

For an Arithmetic Progression (A.P.), Average = (First term + Last term) ÷ 2

2

4

6

.....

328

330

332

2

332

Average of A.P. Series

(2 + 332) ÷ 2 = 167

Calculations:

=> First term (a) = 2

=> Last term (l) = 332

=> Average = (2 + 332) ÷ 2

=> Average = 334 ÷ 2

=> Average = 167

Therefore The correct answer is 167.

Additional Information

Average of first n natural numbers

The average of the first n natural numbers is given by (n + 1) ÷ 2.

Average of first n odd numbers

The average of the first n odd numbers is always equal to n.

Sum of first n even numbers

The total sum of the first n even numbers is calculated using n × (n + 1).

Average of an Arithmetic Progression

For any sequence in arithmetic progression, the average is the exact middle value, given by (First term + Last term) ÷ 2.

Q56. Answer: (b) -37

Shortcut Trick

Evaluate each term directly using powers and roots:

=> $2^2 = 4$

=> $\sqrt{8^2} = 8$

=> $3\sqrt{100} = 3 \times 10 = 30$

Expression = 4 + 8 − 30 − 19 = 12 − 49 = −37

Therefore The correct answer is -37.

Alternate Method

Given:

$2^2 + \sqrt{8^2} - 3\sqrt{100} - 19$

Concept Used:

According to the BODMAS rule, the order of mathematical operations is:

Brackets → Order (Powers/Roots) → Division → Multiplication → Addition → Subtraction.

Calculations:

=> $2^2 + \sqrt{8^2} - 3\sqrt{100} - 19$

Evaluate the square terms and the square root values:

=> $4 + \sqrt{(8 \times 8)} - 3\sqrt{(10 \times 10)} - 19$

=> $4 + 8 - (3 \times 10) - 19$

Perform the multiplication:

=> 4 + 8 − 30 − 19

Now perform the addition first:

=> 12 − 30 − 19

Combine the negative terms and perform subtraction:

=> 12 − 49

=> −37

Therefore The correct answer is -37.

Additional Information

BODMAS Rule

It specifies the sequence of operations for evaluating mathematical expressions: Bracket, Order (exponents and roots), Division, Multiplication, Addition, and Subtraction.

Properties of Square Roots

The square root of a perfect square returns its positive base value. For example, $\sqrt{(a^2)} = a$ for any positive value of a.

Combining Negative Numbers

When combining multiple subtracted numbers, it is easier to add their magnitudes and subtract the sum from the positive numbers. Example: x − y − z = x − (y + z).

Q57. Answer: (a) 49, 35

Shortcut Trick

We can solve this directly by verifying the given options against the two conditions: Sum = 84 and LCM = 245.

Check Option 1: 49 + 35 = 84 (Sum matches) and LCM(49, 35) = 245 (LCM matches).

Check Option 2: 42 + 42 = 84, but LCM(42, 42) = 42 (LCM does not match).

Since Option 1 perfectly satisfies both conditions, it is the correct pair.

Therefore The correct answer is 49, 35.

Alternate Method

Given:

Sum of two numbers = 84

LCM of the numbers = 245

Number 1

Number 2

LCM = 245

Sum = 84

HCF must evenly divide both Sum and LCM

Concept Used:

Let the HCF of the two numbers be h. The numbers can be represented as hx and hy, where x and y are coprime.

Sum = h(x + y)

LCM = hxy

Calculation:

=> A key mathematical property is that the HCF (h) of any two numbers is exactly equal to the HCF of their Sum and their LCM.

=> Sum = 84 = $2^2 \times 3 \times 7$

=> LCM = 245 = 5×7^2

=> The highest common factor between 84 and 245 is 7, so HCF (h) = 7.

=> Substituting the value of h:

=> Sum = 7(x + y) = 84 => x + y = 12

=> LCM = 7xy = 245 => xy = 35

=> We need to find two coprime numbers whose sum is 12 and product is 35.

=> The values for x and y are 5 and 7 (since 5 + 7 = 12 and 5 × 7 = 35).

=> First number = hx = 7 × 7 = 49

=> Second number = hy = 7 × 5 = 35

Therefore The correct answer is 49, 35.

Additional Information

Product of Two Numbers

For any two given numbers, the product of the numbers is always equal to the product of their HCF and LCM (Number 1 × Number 2 = HCF × LCM).

Coprime Numbers Property

Two numbers are said to be coprime if their highest common factor (HCF) is exactly 1. The LCM of two coprime numbers is always equal to their direct product.

Fractions LCM and HCF

LCM of fractions = (LCM of numerators) ÷ (HCF of denominators) | HCF of fractions = (HCF of numerators) ÷ (LCM of denominators).

Q58. Answer: (b) −125x + 146

Shortcut Trick

Directly expand the given expression and logically group the terms together to save time.

For the x^2 terms: 4 × (5/4) − 5 = 5 − 5 = 0.

For the x terms: 4 × (−25) − 5 × 5 = −100 − 25 = −125.

For the constant terms: 4 × 19 − 5 × (−14) = 76 + 70 = 146.

Therefore The correct answer is −125x + 146.

Alternate Method

Given:

Expression: $4((5/4)x^2 - 25x + 19) - 5(x^2 + 5x - 14)$

Calculations:

=> $4 \times (5/4)x^2 - 4 \times 25x + 4 \times 19 - 5 \times x^2 - 5 \times 5x - 5 \times (-14)$

=> $5x^2 - 100x + 76 - 5x^2 - 25x + 70$

Grouping the similar terms together:

=> $(5x^2 - 5x^2) + (-100x - 25x) + (76 + 70)$

=> 0 − 125x + 146

=> −125x + 146

Therefore The correct answer is −125x + 146.

Additional Information

BODMAS Rule

It defines the correct sequence of operations in any mathematical expression: Brackets, Orders, Division × Multiplication, Addition − Subtraction.

Distributive Property

Multiplication can be directly distributed over addition and subtraction inside a bracket: a(b − c + d) = ab − ac + ad.

Combining Like Terms

Variables raised to identical exponents are considered like terms. These are simplified directly by performing basic arithmetic on their coefficients.

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Q59. Answer: (a) Rs. 31,464

Shortcut Trick

Using the cover-up (hide-and-multiply) method for 4A = 9B = 3C:

A = 9 × 3 = 27, B = 4 × 3 = 12, C = 4 × 9 = 36

Ratio A : B : C = 27 : 12 : 36 = 9 : 4 : 12

Total parts = 9 + 4 + 12 = 25 parts

A's share = (9 ÷ 25) × 87400 = 9 × 3496 = Rs. 31,464

Therefore The correct answer is Rs. 31,464.

Alternate Method

Given:

Total amount to be divided = Rs. 87,400

4 × A's share = 9 × B's share = 3 × C's share

Total Amount = Rs. 87,400 (25 parts)

A (9 parts)

B (4)

C (12 parts)

Share = ?

Ratio A : B : C = 9 : 4 : 12

Calculations:

=> Let 4A = 9B = 3C = LCM(4, 9, 3) = 36

=> A = 36 ÷ 4 = 9

=> B = 36 ÷ 9 = 4

=> C = 36 ÷ 3 = 12

=> Ratio of shares A : B : C = 9 : 4 : 12

=> Sum of ratio parts = 9 + 4 + 12 = 25 parts

=> 25 parts = Rs. 87,400

=> 1 part = 87400 ÷ 25 = Rs. 3,496

=> Share of A = 9 parts = 9 × 3496

=> Share of A = Rs. 31,464

Therefore The correct answer is Rs. 31,464.

Additional Information

Combined Ratio

If A:B = m:n and B:C = p:q, then the combined ratio A:B:C = mp : np : nq. This logic helps to seamlessly merge multiple distinct ratio relationships together.

Duplicate & Triplicate Ratios

The duplicate ratio of a:b is represented as $a^2:b^2$, whereas the triplicate ratio is represented as $a^3:b^3$.

Invertendo Property

If two ratios are equal such that a/b = c/d, then according to the invertendo property, their inverses are also equal, implying b/a = d/c.

Q60. Answer: (d) 30

Shortcut Trick

When the same distance is traveled in both directions, Average Speed = (2 × S1 × S2) ÷ (S1 + S2)

=> Average Speed = (2 × 24 × 40) ÷ (24 + 40)

=> Average Speed = 1920 ÷ 64

=> Average Speed = 30 km/hr

Therefore The correct answer is 30 km/hr.

Alternate Method

Given:

Speed from Visakhapatnam to Nagpur (S1) = 24 km/hr

Speed from Nagpur to Visakhapatnam (S2) = 40 km/hr

Formula Used:

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Time = Distance ÷ Speed

Average Speed = Total Distance ÷ Total Time

Visakhapatnam

Nagpur

24 km/hr

40 km/hr

Distance = D

Calculation:

Let the assumed distance between the two cities be the LCM of given speeds (24 and 40).

=> Assumed Distance D = LCM(24, 40) = 120 km

=> Time taken for onward journey = 120 ÷ 24 = 5 hrs

=> Time taken for return journey = 120 ÷ 40 = 3 hrs

=> Total distance covered = 120 + 120 = 240 km

=> Total time taken = 5 + 3 = 8 hrs

=> Average Speed = Total Distance ÷ Total Time

=> Average Speed = 240 ÷ 8 = 30 km/hr

Therefore The correct answer is 30 km/hr.

Additional Information

Average Speed for Different Distances

When different distances d1, d2, d3... are covered at speeds s1, s2, s3..., Average Speed = (Total Distance) ÷ (Total Time) = (d1 + d2 + d3...) ÷ (d1/s1 + d2/s2 + d3/s3...)

Average Speed for Three Equal Distances

If three equal distances are covered at speeds x, y and z, Average Speed = 3xyz ÷ (xy + yz + zx)

Relative Speed

When two objects move in opposite directions, Relative Speed = s1 + s2. When moving in the same direction, Relative Speed = |s1 − s2|.

Q61. Answer: (a) 17

Shortcut Trick

To find the greatest possible length, we simply need the Highest Common Factor (HCF) of the given lengths.

The HCF of any set of numbers must perfectly divide the difference between any two of those numbers.

Difference between 187 and 102 = 85.

Difference between 255 and 187 = 68.

The HCF of 85 and 68 is clearly 17, and since 17 perfectly divides 102, 187, and 255, it is the overall HCF.

Therefore The correct answer is 17 m.

Alternate Method

Given:

Lengths of timber pieces = 187 m, 102 m, and 255 m.

Formula Used:

Greatest possible length of each plank = HCF of the given lengths.

Timber 1 (187 m)

11 planks

Timber 2 (102 m)

6 planks

Timber 3 (255 m)

15 planks

17 m

Calculations:

=> The given lengths must be divided into equal pieces of the maximum possible size.

=> Let's find the prime factors of each length to determine the HCF.

=> 102 = 2 × 3 × 17

=> 187 = 11 × 17

=> 255 = 3 × 5 × 17

=> The highest common prime factor among all three numbers is 17.

=> Hence, HCF (102, 187, 255) = 17.

=> The greatest possible length of each individual plank must be 17 m.

Therefore The correct answer is 17 m.

Additional Information

LCM (Least Common Multiple)

Used to find the smallest common multiple, often applied in problems like multiple bells tolling together or determining when runners meet at the starting point of a track.

HCF and LCM Relation

For any two given numbers 'a' and 'b', the product of the numbers is always equal to the product of their HCF and LCM. Formula: a × b = HCF(a, b) × LCM(a, b).

HCF of Fractions

To find the HCF of multiple fractional values, use the relation: HCF = (HCF of Numerators) ÷ (LCM of Denominators).

Greatest Size Problems

Whenever a word problem asks you to divide different measurable quantities into exactly equal largest possible segments or groups, it requires calculating the Highest Common Factor (HCF) of the quantities.

Q62. Answer: (c) 54

Shortcut Trick

Let present ages be P and Q. Given: 4P − Q = 46 and 7(P + 7) − 3(Q + 7) = 41.

Simplify the second equation: 7P − 3Q = 13.

Multiply the first equation by 3: 12P − 3Q = 138.

Subtract the two equations: (12P − 7P) = 138 − 13 => 5P = 125 => P = 25.

Substitute P to find Q: Q = 4(25) − 46 = 54.

Therefore The correct answer is 54 years.

Alternate Method

Present

P's Age = P

Q's Age = Q

• 7 Years

Future

Age = P + 7

Age = Q + 7

4P − Q = 46 | 7(P+7) − 3(Q+7) = 41

Given:

=> Let the present age of P be P and the present age of Q be Q.

=> Four times the present age of P exceeds the present age of Q by 46 years:

=> 4P − Q = 46

=> Q = 4P − 46 --- (Equation 1)

=> After 7 years, age of P = P + 7 and age of Q = Q + 7.

=> Three times Q's future age is 41 years less than seven times P's future age:

=> 3(Q + 7) = 7(P + 7) − 41

=> 3Q + 21 = 7P + 49 − 41

=> 3Q + 21 = 7P + 8

=> 7P − 3Q = 13 --- (Equation 2)

Calculation:

=> Substitute Equation 1 into Equation 2:

=> 7P − 3(4P − 46) = 13

=> 7P − 12P + 138 = 13

=> −5P = 13 − 138

=> −5P = −125

=> P = 25

=> Now, substitute the value of P in Equation 1:

=> Q = 4(25) − 46

=> Q = 100 − 46 = 54

Therefore The correct answer is 54 years.

Additional Information

Linear Equations in Age Problems

Age problems usually involve establishing a relationship between the ages of individuals at present, past, or future. Ensure consistent translation of keywords like exceeds (+) and less than (−).

Time Shifting

If the present age is x, age n years ago is (x − n) and age n years from now is (x + n). Always apply the shift to both sides of an age relation or equation.

Solving Simultaneous Equations

Use either the substitution method or elimination method. In age problems, substitution is often faster when one variable can be easily expressed in terms of the other.

Q63. Answer: (a) Rs. 1,728

Shortcut Trick

Total Simple Interest percentage = Rate × Time = 5% × 5 = 25%.

Total Amount percentage = Principal (100%) + Interest (25%) = 125%.

Given that 125% of Principal = Rs. 2,160.

100% of Principal = (2160 ÷ 125) × 100 = 2160 × (4 ÷ 5).

Principal = 432 × 4 = Rs. 1,728.

Therefore The correct answer is Rs. 1,728.

Alternate Method

Given:

Amount (A) = Rs. 2,160

Rate (R) = 5% per annum

Time (T) = 5 years

Formula Used:

Amount = Principal × [1 + (R × T) ÷ 100]

Principal (100%)

SI (25%)

Total Amount = 125% → Rs. 2,160

Rate = 5% p.a. | Time = 5 years

Calculations:

=> 2160 = Principal × [1 + (5 × 5) ÷ 100]

=> 2160 = Principal × [1 + 25 ÷ 100]

=> 2160 = Principal × [1 + 1 ÷ 4]

=> 2160 = Principal × (5 ÷ 4)

=> Principal = 2160 × (4 ÷ 5)

=> Principal = 432 × 4

=> Principal = 1728

Therefore The correct answer is Rs. 1,728.

Additional Information

Simple Interest (SI)

Simple interest is calculated only on the principal amount. Formula: SI = (P × R × T) ÷ 100.

Effective Interest Rate

For simple interest, the total percentage of interest accumulated over 'T' years is simply R × T % of the principal.

Amount Formula

Total Amount is the sum of Principal and Simple Interest. A = P + SI = P[1 + (R × T) ÷ 100].

Q64. Answer: (b) 11.46

Shortcut Trick

Identify the perfect squares directly: 196 = 14^2, 256 = 16^2, 729 = 27^2.

Adjust the decimal places: 4 places in 0.0256 → 2 places in root → 0.16.

Adjust the decimal places: 2 places in 7.29 → 1 place in root → 2.7.

Substitute directly: 14 + 0.16 − 2.7 = 14.16 − 2.7 = 11.46.

Therefore The correct answer is 11.46.

Alternate Method

Given:

Expression = √196 + √0.0256 − √7.29

Calculations:

=> First, resolve the square roots by converting the decimals into fractions.

=> √196 = 14

=> √0.0256 = √(256 ÷ 10000) = 16 ÷ 100 = 0.16

=> √7.29 = √(729 ÷ 100) = 27 ÷ 10 = 2.7

=> Now, substitute these evaluated values back into the expression.

=> Expression = 14 + 0.16 − 2.7

=> Expression = 14.16 − 2.7

=> Expression = 11.46

Therefore The correct answer is 11.46.

Additional Information

BODMAS Rule

It dictates the standard sequence of calculations: Brackets, Orders (such as roots and powers), Division × Multiplication, and Addition − Subtraction.

Square Roots of Decimals

If a perfect square decimal has 2n decimal places, its square root will consistently have exactly n decimal places. Example: √0.0004 = 0.02.

Important Perfect Squares

Memorizing squares up to 30 speeds up simplification significantly. For instance, 24^2 = 576, 25^2 = 625, 26^2 = 676, and 27^2 = 729.

Q65. Answer: (b) 282

Shortcut Trick

Let the two numbers be in the ratio 5:1 (since the first is 5 times the second).

Product = 5 parts × 1 part = 5 × $(1 \text{ part})^2$ = 11045

=> $(1 \text{ part})^2$ = 2209 => 1 part = 47

Required sum = 5 parts + 1 part = 6 parts

=> Sum = 6 × 47 = 282

Therefore The correct answer is 282.

Alternate Method

Given:

The product of two positive numbers is 11045.

The first number is five times the second number.

First Number

5x

Second Number

x

Sum Total

6x

To Find: 6 × 47 = 282

Calculations:

Let the second number be x.

=> The first number = 5x

According to the given condition:

=> $5x \times x = 11045$

=> $5x^2 = 11045$

=> $x^2 = 11045 \div 5$

=> $x^2 = 2209$

=> $x = \sqrt{2209} = 47$

The numbers are positive, so x = 47.

=> The second number = 47

=> The first number = $5 \times 47 = 235$

=> Sum of the numbers = 235 + 47 = 282.

Therefore The correct answer is 282.

Additional Information

Square Root Estimation

To find √2209 easily, note that $40^2 = 1600$ and $50^2 = 2500$. Since 2209 ends in 9, its square root must end in 3 or 7. Thus, checking 43 or 47 yields $47^2 = 2209$.

Algebraic Identities

Formulas like $(a + b)^2 = a^2 + b^2 + 2ab$ and $(a - b)^2 = a^2 + b^2 - 2ab$ help to quickly find the sum or difference if the product and one other relation are known.

Signs in Multiplication

The product of two positive numbers or two negative numbers is always positive. The question specifically mentions positive numbers to effectively discard the negative root x = −47.

Q66. Answer: (c) 2268.75

Shortcut Trick

Convert percentage to fraction: 60% = 60 ÷ 100 = 3/5.

A 60% increase means the new value becomes 1 + 3/5 = 8/5 of the original number.

Given, 8/5 × Original Number = 3630

=> Original Number = 3630 × 5 ÷ 8

=> Original Number = 18150 ÷ 8 = 2268.75

Therefore The correct answer is 2268.75.

Alternate Method

Given:

A number when increased by 60% gives 3630.

Formula Used:

Final Value = Original Number × (1 + Percentage Increase ÷ 100)

Original (100%)

• 60%

Base = ?

160% = 3630

Calculations:

=> Let the original number be x.

=> Percentage increase = 60%

=> Final value = x + (60 ÷ 100) × x

=> 3630 = x + 0.6x

=> 3630 = 1.6x

=> x = 3630 ÷ 1.6

=> x = 36300 ÷ 16

=> x = 2268.75

Therefore The correct answer is 2268.75.

Additional Information

Percentage Increase Formula

Final Value = Base Value × (1 + R ÷ 100), where R is the percentage increase.

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Percentage Decrease Formula

Final Value = Base Value × (1 − R ÷ 100), where R is the percentage decrease.

Percentage to Fraction Conversion

Converting percentage to fraction simplifies calculation. Example: 60% = 60 ÷ 100 = 3/5. Thus, an increase of 60% means the final value is 1 + 3/5 = 8/5 of the original.

Q67. Answer: (b) 36 years

Shortcut Trick

If a sum becomes n times in T years at compound interest, it becomes n^m times in m × T years.

Here, the sum becomes 3 times in 12 years.

We need it to become 27 times, which is 3^3 times (meaning m = 3).

Therefore, required time = 3 × 12 = 36 years.

Therefore The correct answer is 36 years.

Alternate Method

Given:

A sum P becomes 3P in 12 years at compound interest.

Formula Used:

Amount A = P(1 + R ÷ 100)^T

0 years

12 years

24 years

36 years

P

3P

9P

27P

×3

×3

×3

Calculations:

=> 3P = $P(1 + R \div 100)^{12}$

=> 3 = $(1 + R \div 100)^{12}$ ... (Equation 1)

Let the required time taken for the sum to become 27 times be T years.

=> 27P = P(1 + R ÷ 100)^T

=> 27 = (1 + R ÷ 100)^T

=> 3^3 = (1 + R ÷ 100)^T

Substitute the value of 3 from Equation 1 into the above equation:

=> $[(1 + R \div 100)^{12}]^3$ = (1 + R ÷ 100)^T

=> (1 + R ÷ 100)^(36) = (1 + R ÷ 100)^T

Equating the exponents on both sides:

=> T = 36

Therefore The correct answer is 36 years.

Additional Information

Simple Interest vs Compound Interest

In Simple Interest, the principal remains constant over the years. In Compound Interest, the interest of the previous period is added to the principal to compute the interest for the next period, generating interest on interest.

Rule of 72

A quick mathematical formula to estimate the number of years required to double an invested sum at a given annual compound interest rate (R): Years ≈ 72 ÷ R.

Half-Yearly Compounding

When compound interest is calculated half-yearly, the annual rate of interest is halved (R ÷ 2) and the time period is doubled (2T) in the fundamental calculation formula.

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Q68. Answer: (a) 52.1%

Shortcut Trick

Let Actual SP = 13 units.

=> SP1 = 4 units = 78% of CP (since 22% loss) => 1 unit = 19.5% of CP

=> SP2 = 60% of Actual SP = 0.60 × 13 units = 7.8 units

=> SP2 in terms of CP = 7.8 × 19.5% = 152.1% of CP

=> Profit % = 152.1% − 100% = 52.1%

Therefore The correct answer is 52.1%.

Alternate Method

Given:

Selling at 4/13 of actual SP results in a 22% loss.

New selling condition: 60% of actual SP.

Formula Used:

SP = CP × (100 − Loss%) ÷ 100

Profit % = [(SP − CP) ÷ CP] × 100

× 4/13

× 60%

Actual SP = 253.5% of CP

SP1 = 78% of CP

(22% Loss)

SP2 = 152.1% of CP

(52.1% Profit)

New Profit = 152.1% − 100% = 52.1%

Calculations:

=> Let Cost Price (CP) = 100x

=> New SP1 = 100x × (100 − 22) ÷ 100 = 78x

=> According to the question: 4/13 of Actual SP = 78x

=> Actual SP = 78x × 13 ÷ 4 = 253.5x

=> Now, the article is sold at 60% of Actual SP.

=> New SP2 = 60% of 253.5x = (60 ÷ 100) × 253.5x = 152.1x

=> Profit = New SP2 − CP = 152.1x − 100x = 52.1x

=> Profit % = (52.1x ÷ 100x) × 100 = 52.1%

Therefore The correct answer is 52.1%.

Additional Information

Marked Price & Discount

Discount is always calculated on the Marked Price (MP). Selling Price = MP × (100 − Discount%) ÷ 100.

Successive Discounts

When two successive discounts of a% and b% are given, the effective discount percentage is (a + b − ab ÷ 100)%.

Dishonest Dealer Concept

If a dealer claims to sell at cost price but uses a false weight, Profit % = (True Weight − False Weight) ÷ False Weight × 100.

Q69. Answer: (b) 17

Shortcut Trick

Polygon A sides = (1260° ÷ 180°) + 2 = 7 + 2 = 9

For Polygon B, Exterior Angle = (180° − 90°) ÷ 2 = 45°

Polygon B sides = 360° ÷ 45° = 8

Total number of sides = 9 + 8 = 17

Therefore The correct answer is 17.

Alternate Method

Given:

Sum of interior angles of Polygon A = 1260°

For Polygon B, Interior Angle − Exterior Angle = 90°

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Formula Used:

Sum of interior angles of an n-sided polygon = (n − 2) × 180°

Interior Angle + Exterior Angle = 180°

Number of sides = 360° ÷ Exterior Angle

Polygon A

Sum of Int. Angles = 1260°

(n − 2) × 180° = 1260°

n − 2 = 7

n = 9

• Polygon B

I − E = 90°, I + E = 180°

E = 45°

I

E

n = 8

Total Sides = 9 + 8 = 17

Calculations:

For Polygon A:

=> (n_A − 2) × 180° = 1260°

=> n_A − 2 = 7

=> n_A = 9

For Polygon B:

Let the interior angle be I and the exterior angle be E.

=> I − E = 90°

=> I + E = 180° (Linear pair)

Subtracting the first equation from the second equation:

=> 2E = 90°

=> E = 45°

=> n_B = 360° ÷ 45°

=> n_B = 8

Total number of sides = n_A + n_B

=> Total sides = 9 + 8 = 17

Therefore The correct answer is 17.

Additional Information

Interior and Exterior Angles

For any regular polygon, the sum of an interior angle and its corresponding exterior angle always forms a straight line, which equals 180°.

Sum of Exterior Angles

The sum of all exterior angles of any convex polygon is always exactly 360°, regardless of the number of sides it has.

Diagonals of a Polygon

The total number of diagonals that can be drawn in an n-sided polygon is given by the formula n × (n − 3) ÷ 2.

Q70. Answer: (b) 120 hours

Shortcut Trick

Time for P to fill tank = 20 × (9/2) = 90 hours; Time for Q = 18 × (5/2) = 45 hours.

Let Total Work = 360 units. Efficiency: P = 4 units/hr, Q = 8 units/hr.

Work done by P and Q in 3 hours = (4 + 8) × 3 = 36 units.

R empties 36 units in 4 hours => R's efficiency = −36 ÷ 4 = −9 units/hr.

Time taken by P, Q, and R together = 360 ÷ (4 + 8 − 9) = 360 ÷ 3 = 120 hours.

Therefore The correct answer is 120 hours.

Alternate Method

Given:

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=> Pipe P fills 2/9 of the tank in 20 hours.
=> Time taken by P to fill the full tank = 20 × (9/2) = 90 hours.
=> Pipe Q fills 2/5 of the tank in 18 hours.
=> Time taken by Q to fill the full tank = 18 × (5/2) = 45 hours.
Calculations:

Pipe	Hours	Total Work	Efficiency
P	90	360	4
Q	45	8	

=> Combined efficiency of P and Q = 4 + 8 = 12 units/hour.
=> Tank filled by P and Q in 3 hours = 12 × 3 = 36 units.
=> Pipe R alone empties these 36 units in 4 hours.
=> Efficiency of Pipe R = −36 ÷ 4 = −9 units/hour.
=> Combined efficiency of Pipes P, Q, and R = 4 + 8 − 9 = 3 units/hour.
=> Time taken by P, Q, and R together = Total Work ÷ Combined Efficiency = 360 ÷ 3 = 120 hours.
Therefore The correct answer is 120 hours.
Additional Information
Pipes and Cisterns (LCM Method)
Total capacity is assumed as the LCM of time taken by individual pipes. Efficiency = Total Capacity ÷ Time.
Negative Work
A pipe that empties a tank performs negative work. Its efficiency is subtracted from the efficiency of the filling pipes.
Combined Work Rule
If multiple pipes operate simultaneously, their combined efficiency is the algebraic sum of their individual efficiencies.

Q71. Answer: (a) OEKS

The logic followed here is:
For, AQWE is related to FVBJ
For, UKQY is related to ZPVD
Similarly, for JZFN
So, JZFN will be related to OEKS
Hence, the correct answer is "Option 1".

Q72. Answer: (b) NXFY

The logic followed here is:
For, OWLS is related to TRPO
For, YMTK is related to DHXG
Similarly, for ICBC
So, ICBC will be related to NXFY.
Hence, the correct answer is "Option 2".

Q73. Answer: (d) ME - HJ

The logic followed here is:
Option 1) WA - SF
Option 2) DY - ZD
Option 3) ZG - VL
Option 4) ME - HJ
Here, 'ME - HJ' is odd among the given options.
Hence, the correct answer is "Option 4".

Q74. Answer: (b) One

Given numbers: 86435621
If 1 is added for each odd digit and 1 is subtracted from each even digit of the number, we get
New number: 7, 5, 3, 4, 6, 5, 1, 2

So, Only digit 5 is repeated more than once.
Hence, the correct answer is 'Option 2'.

Q75. Answer: (d) 6

• Original Number:
• 6243514
• Rearrange in Ascending Order (Left to Right):
• 1, 2, 3, 4, 4, 5, 6
• Identify the Target Digits:
• Second from the left: 2 (1, 2, 3, 4, 4, 5, 6)
• Third from the right: 4 (1, 2, 3, 4, 4, 5, 6)
• Calculate the Sum:
• 2 + 4 = 6
• Hence, the correct answer is "Option 4".

Q76. Answer: (b) 38, 158

The logic followed here is:
Logic: Second number = First number + 120
45, 165
=> 165 − 45 = 120
21, 141
=> 141 − 21 = 120
Now, checking the options:
Option 1) 25, 155
=> 25 + 120 = 145 (not 155)
Option 2) 38, 158
=> 38 + 120 = 158
Option 3) 12, 122
=> 12 + 120 = 132 (not 122)
Option 4) 12, 122
=> 32 + 120 = 152 (not 162)
Hence, the correct option is "Option 2"

Q77. Answer: (c) 8

The logic followed here is:
Given Number: 6325497
New digits: 8, 0, 4, 2, 6, 6, 4.
Greatest = 8
Smallest = 0.
So, Sum = 8 + 0 = 8.
Hence, the correct answer is 'Option 3'.

Q78. Answer: (c) 47

The logic followed here is:
Aditya's rank from the top = 19th
Aditya's rank from the bottom = 29th
Total students = (Rank from top) + (Rank from bottom) − 1
So, Total = 19 + 29 − 1 = 47
Hence, the correct answer is 'Option 3'.

Q79. Answer: (d) Daughter's husband's mother

Family Chart:
Given:
A is the mother of G.

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G is the father of D.
D is the son of T.
Y is the father of T.
So, A is the Daughter's husband's mother of Y.
Hence, the correct answer is "Option 3".

Q80. Answer: (c) 171

The logic followed here is:
thus, "171" will replace the question mark in the given series.
Hence, the correct option is "Option 3".

Q81. Answer: (b) 2

The logic followed here is:
'BEST' is coded as '5237'

B	E	S	T
5	2	3	7

'SINK' is coded as '6142'

S	I	N	K
6	1	4	2

S is common in both words and 2 is common in both codes.
So, 2 is the code for 'S' in the given code language.
Hence, the correct answer is 'Option 2'.

Q82. Answer: (a) L

Given: Seven people, I, J, K, L, M, N and O, are sitting in a row, facing north.
1) No one sits to the left of O.
2) Only four people sit between O and I.
3) J sits to the immediate left of N.
4) L is not an immediate neighbour of K.
So, L sits at the rightmost end of the line.
Hence, the correct answer is "Option 1".

Q83. Answer: (a) VYJK

The logic followed here is:
For, XSLE is related to AWOI
For, JIXU is related to MMAY
Similarly, for SUGG
So, SUGG will be related to VYJK
Hence, the correct answer is "Option 1".

Q84. Answer: (b) More than two

Given: (Left) 9 & # 3 % £ 4 7 & 2 $ * 5 Ω 6 1 @ 8 (Right)
Now,
Symbols which is immediately preceded by a number and also immediately followed by another number.
So, Needed pattern is: Number - Symbol - Number.
There are More than two Symbols which is immediately preceded by a number and also immediately followed by another number.
Hence, the correct answer is 'Option 2'.

Q85. Answer: (a) 1

The logic followed here is:
'WANT' is coded as '3517'

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W	A	N	T
3	5	1	7

'TIDE' is coded as '2146'

T	I	D	E
2	1	4	6

T is common in both words and 1 is common in both codes.

So, 1 is the code for 'T' in the given code language.

Hence, the correct answer is 'Option 1'.

Q86. Answer: (d) 187

The logic followed here is:

thus, "187" will replace the question mark in the given series.

Hence, the correct option is "Option 4".

Q87. Answer: (c) KYK

The logic followed here is:

So, 'KYK' will replace the question mark in the given series.

Hence, the correct answer is "Option 3".

Q88. Answer: (c) 5 km to the west

Given:

Manoj starts from Point A and drives 11 km towards the south.

He then takes a right turn and drives 7 km, then turns right and drives 13 km.

He then takes a right turn and drives 12 km.

He takes a final right turn, drives 2 km and stops at Point P.

So, He should drive 5 km to the west in order to reach Point A again.

Hence, the correct answer is "Option 3".

Q89. Answer: (b) LQR

The logic followed here is:

Option 1) TWZ

Option 2) LQR

Option 3) YBE

Option 4) PSV

Here, 'LQR' is odd among the given options.

Hence, the correct answer is "Option 2".

Q90. Answer: (b) Neither Conclusion I nor II follows

Given Statements:

All chairs are papers.

No chair is a desk.

The least possible Venn diagram for the given statement is:

Conclusions:

(I) No paper is a desk:

We know that Chairs do not overlap with Desks (Statement 2).

We also know that Papers contain Chairs (Statement 1).

However, Papers can exist outside the Chair set. It is possible that some of the items classified as Papers (that are not Chairs) do overlap with the set of Desks.

Conclusion (I) does not logically follow.

(II) All papers are chairs:

Relationship: This is the converse of Statement 1 (All Chairs are Papers).

Reasoning: A universal affirmative statement (All A are B) does not guarantee the truth of its converse (All B are A).

Since All Chairs are Papers, there can be Papers that are not Chairs.
Conclusion (II) does not logically follow.
So, Neither Conclusion I nor II follows
Hence, the correct answer is "Option 2".

Q91. Answer: (b) 16

The logic followed here is:
Given Number: 6531874
If 2 is added to each odd digit and 1 is subtracted from each even digit in the number, we get
New number: 5753793
Second from the left = 7
Second from the right = 9
So, Sum = 7 + 9 = 16
Hence, the correct answer is 'Option 2'.

Q92. Answer: (d) +

Given: (Left) @ 8 < 8 @ < 3 ^ # + 6 2¹ ^> (Right)
Now,
Symbols, which are immediately preceded by a number and also immediately followed by a number.
So, Needed pattern is: Number - Symbol - Number.
There are 5 Symbols which are preceded by a number and also immediately followed by a number.
Hence, the correct answer is 'Option 4'.

Q93. Answer: (c) JLE

The logic followed here is:
So, 'JLE' will replace the question mark in the given series.
Hence, the correct answer is "Option 3".

Q94. Answer: (a) 3 km towards west

Given:
Jwalith starts from Point Y and drives 25 km towards south.
He then takes a left turn, drives 10 km.
He then turns left and drives 25 km.
He takes a final left turn, drives 7 km and stops at Point Z.
So, He should drive 3 km towards west in order to reach Point Y again.
Hence, the correct answer is "Option 1".

Q95. Answer: (d) C

Given: Six people, A, B, C, D, E and F are sitting in a row, facing the north.
1) Only two people are sitting to the right of C.
2) A is sitting second to the left of D.
3) B is sitting to the immediate right of A.
4) F is sitting second to the right of D.
So, C is sitting second to the left of E.
Hence, the correct answer is "Option 4".

Q96. Answer: (b) 12

The logic followed here is:
Given:
All 93 students in a class are standing in a row facing north.
Veer is 48th from the right end while Kabir is 33rd from the left end.
Veer is 48th from the right.
So his position from the left = 93 − 48 + 1 = 46.
Kabir is 33rd from the left.

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Difference in their positions = 46 − 33 = 13.

People standing between them = 13 − 1 = 12.

Hence, the correct answer is 'Option 2'.

Q97. Answer: (d) Three

Given: Seven boxes R, S, T, U, V, W and Z are kept one over the other, but not necessarily in the same order.

1) Z is kept immediately above S.

2) V is kept immediately above T.

3) Only U is kept above W.

4) Only two boxes are kept above Z.

5) V is not kept at the third position from the bottom.

U
W
Z
S
R
V
T

So, there are 'Three' boxes are kept between R and U.

Hence, the correct answer is "Option 4".

Q98. Answer: (d) OM−JK

The logic followed here is:

Option 1) HF−DB

Option 2) DB−ZX

Option 3) VT−RP

Option 4) OM−JK

Here, 'OM−JK' is odd among the given options.

Hence, the correct answer is "Option 4".

Q99. Answer: (c) Only conclusion (I) follows.

Given Statements:

All pins are bugs.

All pins are rulers

The least possible Venn diagram for the given statement is:

Conclusions:

I. Some bugs are rulers:

Reasoning: Since all Pins are both Bugs and Rulers, the items that are Pins are the shared elements between the Bugs and Rulers sets. Therefore, the overlap between Bugs and Rulers is non-empty.

Conclusion (I) logically follows.

II. All rulers are pins:

Reasoning: This is the converse of Statement 2 (All Pins are Rulers). In logic, the converse of a universal affirmative statement (All A are B) is not necessarily true. It is possible that some Rulers exist that are not Pins.

Conclusion (II) does not logically follow.

So, Only conclusion (I) follows.

Hence, the correct answer is "Option 3".

Q100. Answer: (a) 1146

The logic followed here is:

thus, "1146" will replace the question mark in the given series.

Hence, the correct option is "Option 1".

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