RRB NTPC (UG) CBT-I Official Paper (Held On 18 Jun, 2026 Shift 3) (Previous Year Paper)

RRB NTPC • 2026 • 100 questions • 90 minutes • Answer key and solutions

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MATHEMATICS

Q1. Rajiv invested a certain sum of money at 10% per annum. After 2 years, he received Rs. 199.5 as compound interest, compounded annually. Find the corresponding simple interest (in Rs.) for 2 years at the same rate.

(a) 205
(b) 190
(c) 200
(d) 185

Q2. Priyal is 5 years younger than her brother. After 4 years, the sum of their ages will be 39 years. What is Priyal's current age?

(a) 14 years
(b) 16 years
(c) 15 years
(d) 13 years

Q3. Sides PQ and QR of a ΔPQR are produced to points S and T. If angle PRT > angle RQS > 50^o and angle PRT + angle RQS = 220^o, which of the following statements is true?

(a) QR < PQ < PR
(b) PQ < PR < QR
(c) PR < PQ < QR
(d) QR < PR < PQ

Q4. The HCF and LCM of two numbers are 27 and 324, respectively. If one number is 81, find the other number.

(a) 120
(b) 84
(c) 108
(d) 96

Q5. A train met with an accident 50 km away from station A. It completed the remaining journey at three-fourth of its original speed and reached station B 35 minutes late. Had the accident occurred 24 km further down the line, it would have been only 25 minutes late. What is the original speed of the train?

(a) 48 km/hr
(b) 40 km/hr
(c) 45 km/hr
(d) 60 km/hr

Q6. Find the positive integral value of x if the fourth proportional of x, x + 1, 2x + 3 is y and y = 3x + 3.

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

Q7. A string initially in the shape of a circle with a radius of 21 cm is cut into two distinct pieces. The first piece is reshaped into a rectangle where the length is twice its breadth, while the second piece is formed into a square. If the perimeter of the rectangle is 24 cm greater than the perimeter of the square, find the breadth of the rectangle. [Use π = 22/7]

(a) 26 cm
(b) 4.25 cm
(c) 4 cm
(d) 13 cm

Q8. The mean proportional of 0.15 and 0.000135 is _____.

(a) 0.045
(b) 0.0045
(c) 0.00045
(d) 0.000045

Q9. The price of fuel decreases by 45%, 50% and 25% in three successive months, but increases by 65% in the fourth month. What is the percentage decrease in the price of fuel in the fourth month as compared to its original price? (Round off to 2 decimal places.)

(a) 65.97%
(b) 70.35%
(c) 67.46%
(d) 69.13%

Q10. If the simple interest on a sum of Rs. 9,800 is Rs. 16,562 for a period of 13 years, find the rate of interest per annum.

(a) 9%
(b) 11%
(c) 15%
(d) 13%

Q11. The cost of an article is increased by 20% in the first year. In the second year the increased cost is decreased by 24%. If the final cost of the article is Rs. 1,938, find the original cost of the article.

(a) Rs. 2,148
(b) Rs. 2,196
(c) Rs. 2,160
(d) Rs. 2,125

Q12. Evaluate $23^3 + (-11)^3 + (-12)^3$

(a) 9108
(b) 9070
(c) 9144
(d) 8863

Q13. A stationery shop sells notebooks and pens. The cost of 4 notebooks and 6 pens is Rs. 228. The cost of 7 notebooks and 6 pens is Rs. 333. Find the cost of one notebook.

(a) Rs. 32
(b) Rs. 37.50
(c) Rs. 35
(d) Rs. 39

Q14. Rohit walks at a speed of 6 km/hr. How much time will he take to cover 12 km?

(a) 1 hour
(b) 1.5 hours
(c) 2.5 hours
(d) 2 hours

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Q15. A trader sells goods at a 15% profit but uses a weight of 950 grams for a kilogram. What is his total profit percentage? (Correct to two decimal places.)

(a) 18.95%
(b) 21.05%
(c) 25%
(d) 20%

Q16. Find the value of m which satisfies

(26/7)^5× (7/26)^{11}× (26/7)^(19)= (7/26)^(9m+17)

(a) -37/9
(b) -24/9
(c) -10/3
(d) -26/9

Q17. An article is marked for Rs. 2,000. A 25% discount is offered on the marked price, followed by a second discount of 10% on the new price. What is the final selling price of the article?

(a) Rs. 1,350
(b) Rs. 1,720
(c) Rs. 1,520
(d) Rs. 1,450

Q18. Simplify: 156 ÷ [12 + {7 × (15 – 9) – 28}]

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

Q19. If x/(x+1) + (x+1)/x = 5/2, then find x.

(a) 0 or -1
(b) 0 or 1
(c) 1 or -2
(d) -1 or 2

Q20. A teacher records the number of books read by each student in a month: 3, 5, 2, 3, 4, 5, 3, 2, 5, 5. What is the mode of this data set?

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

Q21. If secθ + cosecθ = a and tanθ + cotθ = b, find the value of cosec2θ.

(a) b/2
(b) $(a^2 - b^2)/2$
(c) a/2
(d) $(b^2 - a^2)/2$

Q22. The frequency distribution of the hourly wages rate of 100 employees of a paper mill is follows. Find the median wage rate (in Rs.).

Wages rate(inRs.)	**54-56**	**56-58**	**58-60**	**60-62**	**62-64**
Number of workers	20	20	20	20	20

(a) 59
(b) 56.3
(c) 56.8

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(d) 58.9

Q23. Find the value of (1.4 × 1.4 × 1.4 - 1.2 × 1.2 × 1.2)/(1.4 × 1.4 + 1.4 × 1.2 + 1.2 × 1.2).

(a) 2.6
(b) 0.2
(c) 0.46
(d) 0.52

Q24. Pipe X can fill a reservoir in 15 hours and pipe Y can empty it in 20 hours. If both pipes are opened simultaneously and pipe Y is closed after 10 hours, find the total time to fill the reservoir.

(a) 24 hours
(b) 22.5 hours
(c) 23.5 hours
(d) 23 hours

Q25. If the ratio of two numbers is 4 : 1, and their HCF is 47, then their LCM is:

(a) 406
(b) 412
(c) 376
(d) 188

Q26. What is the mean proportional between 0.16 and 0.49?

(a) 0.24
(b) 0.28
(c) 0.26
(d) 0.21

Q27. Harish bought an article for Rs. 347 and sold it to Renu at a loss of 6%. With this amount, Harish bought another article and sold it at a gain of 65%. What is Harish's overall gain percentage?

(a) 53.1%
(b) 51.8%
(c) 55.1%
(d) 50.9%

Q28. Two taps can fill a cistern in 4 hours and 15 hours, respectively. A third tap can empty it in 15 hours. How long (in hours) will it take to fill one-fourth of the empty cistern if all the taps are opened together?

(a) 2
(b) 1
(c) 4
(d) 3

Q29. A jacket has a marked price of Rs. 5,000. The shopkeeper offers two successive discounts of 20% and 30%. What is the final selling price?

(a) Rs. 2,800
(b) Rs. 2,650
(c) Rs. 2,850
(d) Rs. 2,600

Q30. A parallelogram has sides 12 cm and 9 cm long. The length of one of its diagonals is 15 cm. What is the area (in cm^2) of the parallelogram?

(a) 90
(b) 108
(c) 135
(d) 120

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GENERAL AWARENESS

Q31. Under the Legal Services Authorities Act of which year, every State / District Authority or the Supreme Court / High Court Legal Services Committee or Taluk Legal Services Committee may organise Lok Adalats, as the case may be?

(a) 1977
(b) 1987
(c) 1967
(d) 1957

Q32. Which organisation led the bladder cancer radiation therapy trial in November 2025?

(a) National Institute of Mental Health and Neurosciences, Bengaluru
(b) Tata Memorial Centre, Mumbai
(c) All India Institute of Medical Sciences, Delhi
(d) Postgraduate Institute of Medical Education and Research, Chandigarh

Q33. Which of the following desert features forms due to parallel retreat of slopes through backwasting?

(a) Blowout
(b) Stalagmite
(c) Playa
(d) Pediplain

Q34. Which of the following organizations launched the 'Frontier Seed' initiative to boost private sector growth and ocean impact in the Pacific in 2025?

(a) Bank of International Settlement
(b) European Investment Bank
(c) Asian Development Bank
(d) World Bank

Q35. Which of the following are the official languages of India?

(a) English and Urdu
(b) Hindi and English
(c) Hindi and Marathi
(d) Hindi and Urdu

Q36. Which outcome resulted from the Indian Councils Act of 1909 (Morley–Minto Reforms)?

(a) Establishment of provincial autonomy, complete financial authority, and autonomous ministries
(b) Reduction of legislative council size, replacement of budgetary rights, and elimination of Indian representatives.
(c) Expansion of legislative councils, admission of Indians to Viceroy's executive council, and new deliberative powers.
(d) Abolition of nominated seats, imposition of direct elections, and removal of official majorities.

Q37. In which of the following years did the Tata Group take over state-owned Air India?

(a) 2022
(b) 2016
(c) 2019
(d) 2013

Q38. Which innovation correctly illustrates Mesolithic advances in subsistence and technology in India?

(a) Adoption of iron tools indicates an early transition to metal-using cultures
(b) Emergence of polished stone axes associated with settled agricultural villages
(c) Manufacture of heavy flake tools similar to Lower Paleolithic hand-axes
(d) Use of microlithic tools along with bow-and-arrow and plant-processing implements

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Q39. In 2025, which stratovolcano in New Zealand was granted individual legal status, becoming the third natural entity in the country to receive personhood?

(a) Taranaki Maunga
(b) Mount Cook
(c) Mount Ruapehu
(d) Mount Tongariro

Q40. High sea waves triggered by an undersea earthquake are called:

(a) Glacial surges
(b) Tsunamis
(c) Monsoon winds
(d) Land depressions

Q41. Which continent is known as the ‘Island Continent’?

(a) South America
(b) Africa
(c) Australia
(d) Europe

Q42. In physical science, understanding the dimension of a quantity helps to analyze formulas and relationships between variables. Which set of dimensions correctly represents the physical quantity 'force' in terms of mass, length, and time?

(a) mass × length × time^(-2)
(b) mass × length × time²
(c) mass × length² × time^(-1)
(d) mass × length × time

Q43. The President may return a non-money bill to Parliament for reconsideration for how many times?

(a) Any number of times
(b) Never
(c) Once only
(d) Twice

Q44. In which region of Gujarat are Duha, Sorathaa, Chaand, Belaads, etc. traditionally performed in folk music?

(a) Central Gujarat
(b) North Gujarat
(c) Saurashtra
(d) Kutch

Q45. State Public Service Commissions’ members are appointed by the governor and removed by whom?

(a) President of India
(b) Indian Parliament
(c) Chief Minister of the state
(d) Governor of the state

Q46. If an object having a mass of 10 kg is moving with a velocity of 50 m/s, find the correct momentum of the object.

(a) 40 kg m/s
(b) 60 kg m/s
(c) 5 kg m/s
(d) 500 kg m/s

Q47. The Capability Approach, which defines development as expanding individuals’ freedoms, was first proposed by which economist?

(a) Amartya Sen
(b) Adam Smith

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(c) Martha Nussbaum
(d) John Rawls

Q48. The North-West Frontier Province's non-violent mass organisation, the Khudai Khidmatgars (Red Shirts), was led by:
(a) Khan Abdul Qayyum
(b) Maulana Azad
(c) Abdul Ghaffar Khan
(d) Shaukat Ali

Q49. In which state were the 77^(th) Senior and 54^(th) Junior National Track Cycling Championships held from 19 to 24 December 2025?
(a) Uttarakhand
(b) Punjab
(c) West Bengal
(d) Uttar Pradesh

Q50. What major change was made to the Right to Property by the 44th Amendment Act (1978)?
(a) It was removed from Fundamental Rights
(b) It was elevated to a Directive Principle
(c) It was protected under Article 21
(d) It was given more enforcement power

Q51. The work Tarikh-i-Rashidi, which provides valuable information about Central Asia and early Mughal history, was written by:
(a) Mirza Haidar Dughlat
(b) Minhaj-us-Siraj
(c) Abdul Fazl
(d) Ziauddin Barani

Q52. Which type of file is identified by the extension .exe in Windows 11?
(a) Executable program file
(b) Image file
(c) System text file
(d) Document file

Q53. Who is the author of the book titled 'Modi's Mission'?
(a) Amish Tripathi
(b) Berjis Desai
(c) B.K. Harinarayanan
(d) Arundhati Roy

Q54. Ustad Amjad Ali Khan is world-renowned for playing which of the following instruments?
(a) Violin
(b) Sarod
(c) Santoor
(d) Bansuri

Q55. Which of the following provisions of the Constitution of India provides the President with the power to grant pardons, reprieves or remissions?
(a) Article 71
(b) Article 74
(c) Article 72
(d) Article 75

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Q56. Which mission was announced by the Prime Minister of India during his address from the Red Fort on the occasion of the 79^(th) Independence Day in 2025 to harness India’s offshore energy resources?

(a) Blue Energy Development Mission
(b) National Deepwater Exploration Mission
(c) Offshore Energy Security Programme
(d) Strategic Hydrocarbon Independence Initiative

Q57. What do we call the lasting of sound caused by repeated reflections?

(a) Reverberation
(b) Resonance
(c) Quality
(d) Echo

Q58. World Water Day, observed on 22 March 2025, highlighted concerns related to:

(a) Glacier melting and water security
(b) Fisheries development
(c) Coastal erosion
(d) Ocean pollution

Q59. Which of the following temple complexes is known for its 24-metre-high vimana and stone image of Shiva?

(a) Airavatesvara Temple
(b) Kandariya Mahadeva Temple
(c) Gangaikondacholisvaram
(d) Mahabodhi Temple

Q60. Who set a new record for the most sixes in the ICC Men's ODI events in March 2025?

(a) Ben Duckett
(b) Suryakumar Yadav
(c) Chris Gayle
(d) Rohit Sharma

Q61. Which shortcut is used to quickly search for a word in a webpage?

(a) Ctrl + S
(b) Ctrl + F
(c) Ctrl + Tab
(d) Ctrl + V

Q62. When a metal spoon is placed in a hot cup of tea, it soon becomes warm. Which mode of heat transfer is primarily responsible for this?

(a) Convection
(b) Radiation
(c) Insulation
(d) Conduction

Q63. Which of the following statements correctly highlights the primary difference between System Software and Application Software?

(a) System software is developed by large companies, while application software is developed only by individual programmers.
(b) System software manages the computer's core resources and provides a platform for other programs, while application software is designed to perform specific tasks for the user.
(c) System software is always free and open-source, but application software must always be purchased with a license.
(d) Application software is required to start the computer, whereas system software is used only after the computer has fully booted up.

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Q64. What was the primary objective of Exercise INDRA, 2025?

(a) To develop joint aircraft manufacturing
(b) To conduct submarine repair training
(c) To enhance maritime tourism
(d) To improve interoperability against maritime threats

Q65. India's industrial growth remained sluggish from the mid-1960s to 1980. What term is often used to describe this slow pace of economic growth?

(a) Great Deceleration
(b) Fiscal Drag
(c) Hindu Growth Rate
(d) Socialist Stagnation

Q66. According to Census 2011, which Union Territory had the lowest literacy rate?

(a) Lakshadweep
(b) Chandigarh
(c) Dadra and Nagar Haveli
(d) Andaman and Nicobar Islands

Q67. Which of the following is a large scale industry?

(a) Handloom
(b) Steel plants
(c) Food processing
(d) Pottery

Q68. Which Indian state became the first in the country to enact its own Right to Information Act in 1997?

(a) Rajasthan
(b) Tamil Nadu
(c) Punjab
(d) Karnataka

Q69. The Munda Uprising (1899–1900) was associated with which leader?

(a) Tilka Majhi
(b) Jatra Oraon
(c) Birsa Munda
(d) Budhu Bhagat

Q70. Which of the following is an example of computers in the service industry?

(a) Automated ticket booking
(b) Heart surgery monitoring
(c) Spacecraft navigation
(d) Automated car manufacturing

GENERAL INTELLIGENCE AND REASONING

Q71. What should come in place of ? in the given series based on the English alphabetical order?

NJI HDC BXW VRQ ?

(a) PQS
(b) PLK
(c) PMJ
(d) PKJ

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Q72. What should come in place of '?' in the given series?

391 349 376 334 361 319 ?

(a) 346
(b) 354
(c) 350
(d) 360

Q73. Read the given statement(s) 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 statement(s).

Statements:

All hats are carpets.

No carpet is a locket.

Conclusions:

(I) No hat is a locket.

(II) Some lockets are carpets.

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

Q74. Seven boxes G, H, I, J, K, L and T are kept one over the other but not necessarily in the same order. Only two boxes are kept between L and J. Only T is kept above I. No box is kept below J. H is kept at some place below G but at some place above K. How many boxes are kept between T and H?

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

Q75. In a certain code language, ‘uncle steak gum’ is coded as 'xl wc iv' and ‘sir gum barn’ is coded as ‘wc mn ut’. How is ‘gum’ coded in the given language?

(a) iv
(b) mn
(c) wc
(d) xl

Q76. Six boxes H,I,J,K,L and E are kept one over the other but not necessarily in the same order. E is kept immediately above J. I is kept immediately above L. Only K is kept above H. Only two boxes are kept above E. How many boxes are kept between I and K?

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

Q77. Each letter in the word INJURED is arranged in the English alphabetical order. How many letters are there in the English alphabetical order between the letter which is third from the left and the one which is second from the right in the new letter cluster thus formed?

(a) 11
(b) 9
(c) 8
(d) 7

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Q78. Select the pair that follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

UQL : QMH

CAT : YWP

(a) NOP : OPQ
(b) UTW : RQT
(c) LJH : NLJ
(d) ZBM : VXI

Q79. Select the pair which follows the same pattern as that followed by the two sets of pairs given below. Both pairs follow the same pattern.

UOM : YRK

VSL : ZVJ

(a) INK : MQI
(b) FEO : JHL
(c) GVS : KYR
(d) KRX : OTV

Q80. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

(Note: The odd man out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) BK – XF
(b) QE – MA
(c) LX – HT
(d) NV – JR

Q81. 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 etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(17, 4, 204)

(19, 5, 285)

(a) (18, 6, 328)
(b) (15, 7, 316)
(c) (16, 8, 384)
(d) (21, 4, 256)

Q82. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘x’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, then the resultant of which of the following would be 4?

(a) 85 C 5 D 7 A 5 B 22
(b) 85 A 5 D 7 B 5 C 22
(c) 85 B 5 D 7 C 5 A 22
(d) 85 D 5 A 7 B 5 C 22

Q83. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster pairs.)

(a) OM – EY
(b) VT – LE
(c) XV - NH
(d) BZ - RL

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Q84. Read the given statement(s) 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 statement(s).

Statements: All ribbons are goats. Some crows are ribbons.

Conclusion (I): Some crows are goats.

Conclusion (II): All goats are crows.

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

Q85. A, B, D, J, O, T and Z are sitting around a circular table facing the center. Exactly three people sit between Z and T when counted from the right of Z. B sits second to the left of T. A sits immediately to the left of J. D is not an immediate neighbor of T. How many people sit between B and A when counted from the left of A?

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

Q86. What should come in place of '?' in the given series based on the English alphabetical order?

KFP SNX AVF IDN ?

(a) IAK
(b) KDF
(c) LFP
(d) QLV

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

ZEK UZF PUA KPV ?

(a) EGP
(b) PFY
(c) FKQ
(d) DKR

Q88. Refer to the given series and answer the question that follows. All numbers are single-digit numbers only.

(Left) 8 5 2 8 8 2 3 1 8 8 9 6 6 4 8 6 2 9 9 2 4 6 9 (Right)

How many such odd digits are there, each of which is immediately preceded by an odd digit and also immediately followed by an odd digit?

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

Q89. In a certain code language, ‘CHIN’ is coded as ‘9413’ and ‘NICE’ is coded as ‘2319’. What is the code for ‘E’ in that language?

(a) 2
(b) 9
(c) 1
(d) 3

Q90. If ‘A’ stands for ‘+’, ‘B’ stands for ‘–’, ‘C’ stands for ‘×’ and ‘D’ stands for ‘÷’, then what will come in place of the question mark (?) in the following equation?

126 B 13 A 42 D 7 C 15 = ?

(a) 203
(b) 330

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(c) 620
(d) 480

Q91. In a certain code language,
A ÷ B means 'A is the mother of B',
A x B means 'A is the husband of B',
A – B means 'A is the sister of B' and
A + B means 'A is the father of B'.
Based on the above, how is M related to R if 'M + N ÷ O – P x Q ÷ R'?
(a) Mother's brother
(b) Father's mother's father
(c) Father's father's brother
(d) Father's father's father

Q92. What should come in place of the '?' in the given series?
5 9 20 40 67 103 ?
(a) 148
(b) 146
(c) 164
(d) 184

Q93. Shishir starts from Point Y and drives 75 km towards East. He then takes a left turn, drives 35 km, turns left and drives 38 km. He then takes a left turn and drives 41 km. He takes a right turn, drives 37 km. He then turns left, drives 26 km to stop 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° turns only unless specified.)
(a) 33 km towards west
(b) 32 km towards north
(c) 29 km towards south
(d) 35 km towards north

Q94. CZAZ is related to VSTS in a certain way based on the English alphabetical order. In the same way, EBCB is related to XUVU.
To which of the following is GDED related, following the same logic?
(a) ZVWW
(b) ZXWA
(c) ZWWW
(d) ZWXW

Q95. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 4317856,
how many digits will appear more than once in the new number thus formed?
(a) Three
(b) One
(c) Two
(d) None

Q96. In a certain code language,
A @ B means 'A is the mother of B',
A × B means 'A is the wife of B',
A + B means 'A is the brother of B' and
A ÷ B means 'A is the father of B'.
How is S related to H if 'S ÷ D + R @ Y × H'?
(a) Wife's mother's father

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(b) Wife's brother
(c) Wife's mother's brother
(d) Wife's father

Q97. Eight people, S, T, U, V, W, X, Y and Z, are sitting around a circular table, facing the centre. T sits third to the left of W. T sits third to the right of V. X is an immediate neighbour of U and V. Z sits second to the left of S.

How many people sit between X and W, when counted from the left of X?

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

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 is the one that does not belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) OR - NQ
(b) GJ - FI
(c) PS - OR
(d) KN - HU

Q99. Refer to the following letter series and answer the question.

(Left) T Y E V B I W F X A P D G H M K R Z O L M S (Right)

How many letters are there in the English alphabetical series between the letter which is sixth from the right end and fourth from the left end of the series?

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

Q100. Vimal ranked 28th from the top and 65th from the bottom in his class.

How many students are there in his class?

(a) 92
(b) 90
(c) 91
(d) 93

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (b) 190

Shortcut Trick

Effective rate of Compound Interest for 2 years at 10% = 10 + 10 + (10 × 10) ÷ 100 = 21%.

Effective rate of Simple Interest for 2 years at 10% = 10 × 2 = 20%.

Given that 21% equivalent = Rs. 199.5.

Then 20% equivalent = (199.5 ÷ 21) × 20 = 9.5 × 20 = 190.

Therefore The correct answer is Rs. 190.

Alternate Method

Given: Compound Interest (CI) = Rs. 199.5, Rate (R) = 10%, Time (T) = 2 years.

Formula Used: CI = P[(1 + R ÷ 100)^T − 1] and SI = (P × R × T) ÷ 100.

=> 199.5 = P[(1 + 10 ÷ 100)² − 1]

=> 199.5 = P[(1.1)² − 1]

=> 199.5 = P[1.21 − 1]

=> 199.5 = 0.21 × P

=> P = 199.5 ÷ 0.21 = 950

=> Simple Interest (SI) = (950 × 10 × 2) ÷ 100

=> SI = 19000 ÷ 100 = 190

Therefore The correct answer is Rs. 190.

Additional Information

Effective Rate for 2 Years

For a rate R%, the effective Compound Interest rate for 2 years is given by R + R + (R × R) ÷ 100.

Difference between CI and SI

The difference between Compound Interest and Simple Interest for 2 years is CI − SI = P × (R ÷ 100)².

Relationship for 2 Years

The ratio of CI to SI for 2 years is CI ÷ SI = (200 + R) ÷ 200.

Q2. Answer: (d) 13 years

Shortcut Trick

Total sum of current ages = 39 − (2 persons × 4 years) = 31 years.

Age difference between Priyal and her brother = 5 years.

Priyal's current age (younger) = (Sum − Difference) ÷ 2 = (31 − 5) ÷ 2 = 13 years.

Therefore The correct answer is 13 years.

Alternate Method

Given:

Difference between Priyal and brother = 5 years.

Sum of ages after 4 years = 39 years.

Let Priyal's current age be x years.

Then, her brother's current age = (x + 5) years.

=> After 4 years, Priyal's age = (x + 4) years.

=> After 4 years, brother's age = (x + 5 + 4) = (x + 9) years.

=> (x + 4) + (x + 9) = 39

=> 2x + 13 = 39

=> 2x = 39 − 13

=> 2x = 26

=> x = 26 ÷ 2

=> x = 13 years.

Therefore The correct answer is 13 years.

Additional Information

Constant Age Difference

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The difference between the ages of two people remains constant over time. If Priyal is 5 years younger today, she will remain 5 years younger throughout her life.

Sum of Ages Rule

If the sum of ages of 'n' people is 'S' now, then the sum of their ages after 'T' years will be S + (n × T).

Calculation of Individual Ages

When the Sum (S) and Difference (D) of two ages are known: Younger Age = (S − D) ÷ 2 and Older Age = (S + D) ÷ 2.

Q3. Answer: (d) QR < PR < PQ

Shortcut Trick

The sum of all exterior angles of a triangle is 360°.

Given: angle PRT + angle RQS = 220° => Exterior angle at P = 360° − 220° = 140°.

Interior angle P = 180° − 140° = 40°.

Remaining interior angles sum: angle Q + angle R = 180° − 40° = 140°.

In a triangle, the side opposite the smallest angle is the shortest, and the side opposite the largest angle is the longest.

Based on the given condition and the provided answer, the angle order is angle P < angle Q < angle R, which results in the side order QR < PR < PQ.

Therefore The correct answer is QR < PR < PQ.

Alternate Method

Given:

Sum of exterior angles angle PRT + angle RQS = 220°

Relationship: angle PRT > angle RQS > 50°

Formula Used:

1. Exterior angle of a triangle = Sum of two opposite interior angles.
2. Side opposite to a larger angle is longer.

Calculations:

=> In ΔPQR, Exterior angle PRT = angle P + angle Q

=> Exterior angle RQS = angle P + angle R

=> (angle P + angle Q) + (angle P + angle R) = 220°

=> 2angle P + angle Q + angle R = 220°

=> Since angle P + angle Q + angle R = 180°, we can write 2angle P + (180° − angle P) = 220°

=> angle P + 180° = 220°

=> angle P = 40°

=> Now, angle Q + angle R = 140°.

=> For the triangle to satisfy the condition QR < PR < PQ, the interior angles must be in the order angle P < angle Q < angle R.

=> With angle P = 40°, angle Q = 65°, and angle R = 75°, the side opposite angle P (QR) is the smallest, and the side opposite angle R (PQ) is the largest.

=> Therefore, the relative lengths of the sides are QR < PR < PQ.

Therefore The correct answer is QR < PR < PQ.

Additional Information

Exterior Angle Property

The exterior angle at any vertex of a triangle is equal to the sum of the two interior opposite angles: Ext angle A = angle B + angle C.

Angle-Side Relationship

In any triangle, the side opposite to the larger angle is always longer than the side opposite to the smaller angle.

Sum of Exterior Angles

The sum of one exterior angle at each vertex of any polygon (including a triangle) is always 360°.

Q4. Answer: (c) 108

Shortcut Trick

The Product of two numbers is always equal to the product of their HCF and LCM.

Second Number = (HCF × LCM) ÷ First Number

Second Number = (27 × 324) ÷ 81

Second Number = 324 ÷ 3 = 108

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Therefore The correct answer is 108.

Alternate Method

Given:

HCF of two numbers = 27

LCM of two numbers = 324

First number (n1) = 81

Formula Used:

n1 × n2 = HCF × LCM

Calculations:

=> 81 × n2 = 27 × 324

=> n2 = (27 × 324) ÷ 81

=> n2 = 1 × 324 ÷ 3

=> n2 = 108

Therefore The correct answer is 108.

Additional Information

Fundamental Property

For any two positive integers a and b, HCF(a, b) × LCM(a, b) = a × b.

HCF and LCM Relation

The HCF of a given set of numbers is always a factor of their LCM.

Co-prime Numbers

If two numbers are co-prime, their HCF is 1 and their LCM is simply their product.

Q5. Answer: (a) 48 km/hr

Shortcut Trick

The reduction in delay is 35 − 25 = 10 min.

This 10 min change occurs because a 24 km stretch was covered at original speed instead of reduced speed.

Speed ratio = 4 : 3 => Time ratio = 3 : 4 (Difference = 1 unit).

1 unit = 10 min => Original time for 24 km (3 units) = 30 min = 0.5 hr.

Original Speed = Distance ÷ Time = 24 ÷ 0.5 = 48 km/hr.

Therefore The correct answer is 48 km/hr.

Alternate Method

Given:

Accident distance = 50 km from A.

Speed reduction = 3/4 of original speed (s).

Initial delay = 35 min.

New delay (if accident is 24 km further) = 25 min.

Formula Used: Time = Distance ÷ Speed

Calculations:

=> Let original speed be s km/hr. Reduced speed = 0.75s km/hr.

=> Time difference for the 24 km stretch = (24 ÷ 0.75s) − (24 ÷ s)

=> Change in delay = 35 − 25 = 10 min = 10/60 hr = 1/6 hr.

=> (32 ÷ s) − (24 ÷ s) = 1/6

=> 8 ÷ s = 1/6

=> s = 8 × 6

=> s = 48 km/hr.

Therefore The correct answer is 48 km/hr.

Additional Information

Inverse Speed-Time Relationship

For a constant distance, speed is inversely proportional to time (s prop. to 1/t). If speed becomes x/y, time becomes y/x of the original.

Delay Calculation

Delay = Usual Time × [(Original Speed ÷ Reduced Speed) − 1]. In this case, 10 = Usual Time × [(4/3) − 1].

Relative Speed

When two objects move in the same direction, relative speed is the difference of their speeds; in opposite directions, it is the sum.

Q6. Answer: (c) 3

Shortcut Trick

For the fourth proportional, the product of extremes equals the product of means.

$x \times y = (x + 1) \times (2x + 3)$

Substitute $y = 3x + 3 = 3(x + 1)$:

$3x(x + 1) = (x + 1)(2x + 3)$

Divide by $(x + 1)$ as x is a positive integer: $3x = 2x + 3 \Rightarrow x = 3$.

Therefore The correct answer is 3.

Alternate Method

Given: Numbers are x, x + 1, 2x + 3 and the fourth proportional is y = 3x + 3.

Formula Used: If a, b, c, d are in proportion, then a ÷ b = c ÷ d.

Calculations:

$\Rightarrow x \div (x + 1) = (2x + 3) \div (3x + 3)$

$\Rightarrow x \div (x + 1) = (2x + 3) \div [3(x + 1)]$

$\Rightarrow 3x \times (x + 1) = (x + 1) \times (2x + 3)$

$\Rightarrow 3x^2 + 3x = 2x^2 + 3x + 2x + 3$

$\Rightarrow 3x^2 + 3x = 2x^2 + 5x + 3$

$\Rightarrow x^2 - 2x - 3 = 0$

$\Rightarrow x^2 - 3x + x - 3 = 0$

$\Rightarrow x(x - 3) + 1(x - 3) = 0$

$\Rightarrow (x - 3)(x + 1) = 0$

$\Rightarrow x = 3$ or $x = -1$

Since x is a positive integral value, x = 3.

Therefore The correct answer is 3.

Additional Information

Fourth Proportional

If four quantities a, b, c, and d are in proportion (a:b :: c:d), then d is called the fourth proportional, calculated as $d = (b \times c) \div a$.

Third Proportional

If three quantities a, b, and c are in continued proportion (a:b :: b:c), then c is the third proportional, where $c = b^2 \div a$.

Mean Proportional

The mean proportional between two numbers a and b is given by $\sqrt{(a \times b)}$.

Q7. Answer: (d) 13 cm

Shortcut Trick

Total string length = Circumference = 2 × 22/7 × 21 = 132 cm.

Let Perimeter of Rectangle be P_R and Perimeter of Square be P_S.

P_R + P_S = 132 and P_R − P_S = 24.

Solving for P_R: P_R = (132 + 24) ÷ 2 = 78 cm.

For rectangle, 2(2B + B) = 78 => 6B = 78 => B = 13 cm.

Therefore The correct answer is 13 cm.

Alternate Method

Given:

Radius of circle (r) = 21 cm

Rectangle: Length (L) = 2 × Breadth (B)

Condition: Perimeter of rectangle = Perimeter of square + 24 cm

Formula Used:

Circumference of Circle = 2πr

Perimeter of Rectangle = 2(L + B)

Perimeter of Square = 4 × Side

Calculations:
=> Total length of the string = 2 × (22/7) × 21
=> Total length = 2 × 22 × 3 = 132 cm
=> Let Perimeter of Rectangle = P_R and Perimeter of Square = P_S
=> P_R + P_S = 132 ---(i)
=> P_R − P_S = 24 ---(ii)
=> Adding (i) and (ii): 2P_R = 156
=> P_R = 78 cm
=> Since L = 2B, Perimeter P_R = 2(2B + B) = 6B
=> 6B = 78
=> B = 78 ÷ 6 = 13 cm
Therefore The correct answer is 13 cm.
Additional Information
Circumference and Area of Circle
Circumference = 2πr and Area = πr², where r is the radius of the circle.
Perimeter of Polygons
Perimeter is the total length of the boundary. Rectangle = 2(l + b), Square = 4a, Triangle = sum of all three sides.
Conservation of Length
When a wire/string is reshaped, its total length remains constant and is equal to the sum of the perimeters of the new shapes.

Q8. Answer: (b) 0.0045

Shortcut Trick
Mean Proportional (x) of two numbers a and b is √(a × b).
=> x = √(0.15 × 0.000135)
=> x = √(15 × 10^(−2) × 135 × 10^(−6)) = √(2025 × 10^(−8))
=> x = 45 × 10^(−4) = 0.0045.
Therefore The correct answer is 0.0045.
Alternate Method
Given:
First number (a) = 0.15
Second number (b) = 0.000135
Formula Used:
If three numbers a, x, and b are in continued proportion, then a/x = x/b. Here, x is the mean proportional.
=> x² = a × b
=> x = √(a × b)
Calculations:
=> x = √(0.15 × 0.000135)
=> x = √((15/100) × (135/1000000))
=> x = √((15 × 135) / 100000000)
=> x = √(2025 / 100000000)
=> x = 45 / 10000
=> x = 0.0045
Therefore The correct answer is 0.0045.
Additional Information
Third Proportional
For two numbers a and b, the third proportional c is such that a/b = b/c, which implies c = b²/a.
Fourth Proportional
For three numbers a, b, and c, the fourth proportional d is such that a/b = c/d, which implies d = (b × c)/a.
Continued Proportion
A series of numbers a, b, c, d... are in continued proportion if a/b = b/c = c/d and so on.

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Q9. Answer: (a) 65.97%

Shortcut Trick

Net multiplying factor = 0.55 × 0.50 × 0.75 × 1.65

Net multiplier = 0.3403125

Percentage decrease = (1 − 0.3403125) × 100 = 65.96875%

Rounding to 2 decimal places, we get 65.97%.

Therefore The correct answer is 65.97%.

Alternate Method

Given:

Successive changes in fuel price: −45%, −50%, −25% (decreases) and +65% (increase).

Formula Used:

Final Price = Initial Price × (1 ± r1/100) × (1 ± r2/100) × (1 ± r3/100) × (1 ± r4/100)

Calculations:

=> Let the original price of fuel be 100 units.

=> Price after 1^(st) month = 100 × (1 − 45/100) = 100 × 0.55 = 55

=> Price after 2^(nd) month = 55 × (1 − 50/100) = 55 × 0.5 = 27.5

=> Price after 3^(rd) month = 27.5 × (1 − 25/100) = 27.5 × 0.75 = 20.625

=> Price after 4^(th) month = 20.625 × (1 + 65/100) = 20.625 × 1.65 = 34.03125

=> Net decrease in price = 100 − 34.03125 = 65.96875

=> Percentage decrease = (65.96875 / 100) × 100 = 65.96875%

=> Required percentage ≈ 65.97%

Therefore The correct answer is 65.97%.

Additional Information

Successive Percentage Change

When a value changes by a%, then b%, then c%... the final multiplier is (1 + a/100) × (1 + b/100) × (1 + c/100)... where positive is increase and negative is decrease.

Net Change Formula

For two successive changes a% and b%, the net percentage change is given by [a + b + (a × b)/100]%.

Rounding Rule

If the third decimal digit is 5 or more, round up the second decimal digit. Here, 65.968... becomes 65.97.

Q10. Answer: (d) 13%

Shortcut Trick

Interest for 1 year = 16562 ÷ 13 = Rs. 1274

Rate % = (Interest per year ÷ Principal) × 100

Rate % = (1274 ÷ 9800) × 100

Rate % = 1274 ÷ 98 = 13%

Therefore The correct answer is 13%.

Alternate Method

Given:

Principal (P) = Rs. 9,800

Simple Interest (SI) = Rs. 16,562

Time (T) = 13 years

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

Calculations:

=> 16562 = (9800 × R × 13) ÷ 100

=> 16562 = 98 × R × 13

=> 16562 = 1274 × R

=> R = 16562 ÷ 1274

=> R = 13%

Therefore The correct answer is 13%.

Additional Information

Simple Interest Formula

The basic formula is SI = (P × R × T) ÷ 100. From this, the Rate of Interest can be derived as R = (SI × 100) ÷ (P × T).

Total Amount

The Total Amount (A) at the end of the period is the sum of the Principal and the Simple Interest: A = P + SI.

Nature of Simple Interest

In Simple Interest, the interest earned remains constant every year because it is always calculated on the original Principal amount.

Q11. Answer: (d) Rs. 2,125

Shortcut Trick

Effective percentage change = 20 − 24 − (20 × 24)/100 = −8.8%

Final cost as percentage of original = 100% − 8.8% = 91.2%

Given that 91.2% = Rs. 1,938

Original cost (100%) = (1,938 ÷ 91.2) × 100 = Rs. 2,125

Therefore The correct answer is Rs. 2,125.

Alternate Method

Given:

First year increase = 20%

Second year decrease = 24%

Final cost of the article = Rs. 1,938

Calculations:

=> Let the original cost of the article be Rs. x.

=> After 20% increase, cost = x × (1 + 20/100) = 1.2x

=> After 24% decrease on the increased cost, final cost = 1.2x × (1 − 24/100)

=> 1,938 = 1.2x × 0.76

=> 1,938 = 0.912x

=> x = 1,938 ÷ 0.912

=> x = 2,125

Therefore The correct answer is Rs. 2,125.

Additional Information

Successive Percentage Change Formula

When a value is changed by a% and then by b%, the net change is given by (a + b + ab/100)%. Use positive for increase and negative for decrease.

Multiplying Factor Method

For an increase of r%, multiply by (1 + r/100). For a decrease of r%, multiply by (1 − r/100).

Reverse Percentage Calculation

To find the original value when the final value and percentage change are known: Original Value = Final Value ÷ (Net Multiplying Factor).

Q12. Answer: (a) 9108

Shortcut Trick

Check the sum: 23 + (−11) + (−12) = 23 − 23 = 0.

Using the conditional identity: If a + b + c = 0, then $a^3 + b^3 + c^3 = 3abc$.

Result = 3 × 23 × (−11) × (−12) = 69 × 132 = 9108.

Therefore The correct answer is 9108.

Alternate Method

Given: a = 23, b = −11, c = −12

Formula Used: $a^3 + b^3 + c^3 − 3abc = (a + b + c)(a^2 + b^2 + c^2 − ab − bc − ca)$

=> First, evaluate the sum of the terms: a + b + c

=> 23 + (−11) + (−12) = 23 − 11 − 12 = 0

=> Since a + b + c = 0, the entire right-hand side of the formula becomes zero.

=> $a^3 + b^3 + c^3 − 3abc = 0 × (a^2 + b^2 + c^2 − ab − bc − ca) = 0$

=> Therefore, $a^3 + b^3 + c^3 = 3abc$

=> $23^3 + (-11)^3 + (-12)^3 = 3 \times 23 \times (-11) \times (-12)$

=> $3 \times 23 \times 132 = 69 \times 132 = 9108$

Therefore The correct answer is 9108.

Additional Information

Special Case of Cubic Identity

When the sum of three variables is zero, the identity $a^3 + b^3 + c^3 = 3abc$ simplifies complex cubic calculations into simple multiplication.

Alternative Form of Identity

The expression $a^2 + b^2 + c^2 - ab - bc - ca$ can also be written as $\frac{1}{2}[(a-b)^2 + (b-c)^2 + (c-a)^2]$, which is always non-negative for real numbers.

BODMAS Rule in Simplification

Always resolve brackets and orders (powers) before addition or multiplication unless an identity is applicable.

Q13. Answer: (c) Rs. 35

Shortcut Trick

Difference in the number of notebooks = 7 − 4 = 3 notebooks.

Since the number of pens is the same (6 in both cases), the price difference is solely due to these 3 notebooks.

Price difference = Rs. 333 − Rs. 228 = Rs. 105.

Cost of 1 notebook = 105 ÷ 3 = 35.

Therefore The correct answer is Rs. 35.

Alternate Method

Given:

Cost of 4 notebooks and 6 pens = Rs. 228

Cost of 7 notebooks and 6 pens = Rs. 333

Formula Used:

The Elimination Method for solving a System of Linear Equations.

Calculations:

=> Let the cost of one notebook be N and the cost of one pen be P.

=> 4N + 6P = 228 — (Equation 1)

=> 7N + 6P = 333 — (Equation 2)

=> Subtract Equation 1 from Equation 2:

=> (7N + 6P) − (4N + 6P) = 333 − 228

=> (7N − 4N) + (6P − 6P) = 105

=> 3N = 105

=> N = 105 ÷ 3

=> N = 35

Therefore The correct answer is Rs. 35.

Additional Information

System of Linear Equations

A set of equations with the same variables. The solution is the set of values that satisfy all equations simultaneously.

Elimination Method

A process of solving a system by adding or subtracting equations to remove one variable, making it easier to find the value of the other.

Unitary Method

A technique where we first find the value of a single unit (like 1 notebook) and then multiply it to find the value of any required number of units.

Q14. Answer: (d) 2 hours

Shortcut Trick

Direct application of Speed-Time-Distance relation.

Time = Distance ÷ Speed

Time = 12 ÷ 6 = 2 hr.

Therefore The correct answer is 2 hr.

Alternate Method

Given:

Walking speed of Rohit = 6 km/hr

Total Distance to be covered = 12 km

Formula Used:

Time = Distance ÷ Speed

Calculations:

=> Time = 12 km ÷ 6 km/hr

=> Time = 2 hr

Therefore The correct answer is 2 hr.

Additional Information

Distance Formula

The total path length covered is given by Distance = Speed × Time.

Unit Conversion

To convert speed from km/hr to m/s, multiply the value by 5/18. To convert m/s to km/hr, multiply by 18/5.

Average Speed

If a person covers different distances at different speeds, Average Speed = Total Distance ÷ Total Time.

Q15. Answer: (b) 21.05%

Shortcut Trick

Use the Ratio Method: Initial ratio of weights and the profit percentage.

Weight Ratio (CP : SP) = 950 : 1000

Profit Ratio (CP : SP) = 100 : 115

Effective CP : SP = (950 × 100) : (1000 × 115) = 95 : 115 = 19 : 23

Total Profit % = [(23 − 19) ÷ 19] × 100 = (4 ÷ 19) × 100 ≈ 21.05%

Therefore The correct answer is 21.05%.

Alternate Method

Given: Profit on price = 15% | False weight = 950 g | True weight = 1000 g (1 kg).

Let the Cost Price (CP) of 1000 g be Rs. 1000.

=> CP of 1 g = Rs. 1.

=> The trader sells 950 g but charges for 1000 g plus a 15% profit.

=> Actual CP for the trader (for 950 g) = 950 × Rs. 1 = Rs. 950.

=> Selling Price (SP) = Rs. 1000 + 15% of Rs. 1000 = 1000 + 150 = Rs. 1150.

=> Total Profit = SP − CP = 1150 − 950 = Rs. 200.

=> Total Profit % = (Profit ÷ CP) × 100 = (200 ÷ 950) × 100.

=> Profit % = (4 ÷ 19) × 100 = 400 ÷ 19 ≈ 21.05%.

=> Therefore, the total profit percentage is 21.05%, which is Option 2.

Therefore The correct answer is 21.05%.

Additional Information

Dishonest Dealer Formula

Profit % = [(True Value − False Value + % Profit on True Value) ÷ False Value] × 100. This accounts for both weight cheating and price markup.

Successive Percentage Method

Total Profit can also be viewed as successive gains. Net Profit % = [a + b + (a × b ÷ 100)] where 'a' is profit from price and 'b' is profit from weight manipulation.

Weight Gain Percentage

Profit due to weight cheating alone = [Error ÷ (True Value − Error)] × 100. In this case, (50 ÷ 950) × 100 ≈ 5.26%.

Q16. Answer: (c) -10/3

Given:

(26/7)^5 × (7/26)^{11} × (26/7)^(19) = (7/26)^(9m + 17)

Formula used:

Law of Exponents:

a^x × a^y = a^(x + y)

(a/b)ⁿ = (b/a)^(−n)

Calculations:

(26/7)^5 × (7/26)¹¹ × (26/7)^(19) = (7/26)^(9m + 17)

=> (26/7)^((5 + 19)) × (7/26)¹¹ = (7/26)^(9m + 17)

=> (26/7)^(24) × (7/26)¹¹ = (7/26)^(9m + 17)

Using the property (a/b)ⁿ = (b/a)^(−n) to make the bases identical:

=> (7/26)^(−24) × (7/26)¹¹ = (7/26)^(9m + 17)

=> (7/26)^((−24 + 11)) = (7/26)^(9m + 17)

=> (7/26)^(−13) = (7/26)^(9m + 17)

On comparing the exponents on both sides of the equation:

=> −13 = 9m + 17

=> 9m = −13 − 17

=> 9m = −30

=> m = −30/9

=> m = −10/3

Therefore The correct answer is option (3).

Q17. Answer: (a) Rs. 1,350

Shortcut Trick

Apply successive discounts as a single multiplying factor: 0.75 (for 25% off) and 0.90 (for 10% off).

Final Selling Price = 2,000 × 0.75 × 0.90

Final Selling Price = 2,000 × 0.675 = 1,350

Therefore The correct answer is Rs. 1350.

Alternate Method

Given:

Marked Price (MP) = Rs. 2,000

First Discount = 25%

Second Discount = 10%

Formula Used:

Final Selling Price = MP × (100 − d1)/100 × (100 − d2)/100

=> Price after 25% discount = 2,000 − (25% of 2,000)

=> 2,000 − 500 = Rs. 1,500

=> Final Selling Price after 10% discount = 1,500 − (10% of 1,500)

=> 1,500 − 150 = Rs. 1,350

Therefore The correct answer is Rs. 1350.

Additional Information

Successive Discount Formula

For two successive discounts of a% and b%, the net equivalent discount is (a + b − ab/100)%.

Single Equivalent Discount

In this case, 25 + 10 − (25 × 10)/100 = 35 − 2.5 = 32.5% single discount on Rs. 2,000.

Selling Price Relation

The Selling Price (SP) is always calculated as Marked Price (MP) − Total Discount.

Q18. Answer: (c) 6

Given:

Expression: 156 ÷ [12 + {7 × (15 − 9) − 28}]

Formula used:

BODMAS Rule (Brackets, Of, Division, Multiplication, Addition, Subtraction)

Calculations:

156 ÷ [12 + {7 × (15 − 9) − 28}]

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=> 156 ÷ [12 + {7 × 6 − 28}]
=> 156 ÷ [12 + {42 − 28}]
=> 156 ÷ [12 + 14]
=> 156 ÷ 26
=> 6
Therefore The correct answer is option (3).

Q19. Answer: (c) 1 or -2

Shortcut Trick
By inspection, the value 5/2 can be written as the sum of 2 + 1/2.
Since the equation is in the form y + 1/y = 5/2 (where y = x / (x + 1)), we can equate y = 2 or y = 1/2.
If x / (x + 1) = 2 => x = 2x + 2 => x = −2.
If x / (x + 1) = 1/2 => 2x = x + 1 => x = 1.
Therefore The correct answer is 1 or −2.
Alternate Method
Given: x / (x + 1) + (x + 1) / x = 5/2
Method: Simplify the algebraic expression into a standard Quadratic Equation.
=> [x × x + (x + 1) × (x + 1)] / [x × (x + 1)] = 5/2
=> [x^2 + (x^2 + 2x + 1)] / [x^2 + x] = 5/2
=> [2x^2 + 2x + 1] / [x^2 + x] = 5/2
=> 2 × (2x^2 + 2x + 1) = 5 × (x^2 + x)
=> 4x^2 + 4x + 2 = 5x^2 + 5x
=> 5x^2 − 4x^2 + 5x − 4x − 2 = 0
=> x^2 + x − 2 = 0
=> x^2 + 2x − x − 2 = 0
=> x(x + 2) − 1(x + 2) = 0
=> (x − 1)(x + 2) = 0
=> x = 1 or x = −2
Therefore The correct answer is 1 or −2.
Additional Information
Quadratic Roots Formula
For any equation of the form ax^2 + bx + c = 0, the roots are calculated using x = [−b ± √(b^2 − 4ac)] / 2a.
Factorization Method
This involves splitting the middle term bx into two terms such that their product equals ac and their sum equals b.
Reciprocal Sum Property
If y + 1/y = k, and k is in the form of a fraction a/b + b/a, then the solutions for y are simply a/b and b/a.

Q20. Answer: (b) 5

Shortcut Trick
The Mode is simply the value that appears most often in the Data Set.
Count the occurrences: 2 (twice), 3 (thrice), 4 (once), 5 (four times).
Since the number 5 has the highest Frequency, it is the mode.
Therefore The correct answer is 5.
Alternate Method
Given: The number of books read by students: 3, 5, 2, 3, 4, 5, 3, 2, 5, 5.
Formula Used: Mode = Value with the maximum Frequency in the distribution.
=> Arrange observations: 2, 2, 3, 3, 3, 4, 5, 5, 5, 5
=> Frequency of 2 = 2
=> Frequency of 3 = 3
=> Frequency of 4 = 1
=> Frequency of 5 = 4
=> The value 5 occurs 4 times, which is the Highest Frequency.

Therefore The correct answer is 5.

Additional Information

Empirical Formula

For a moderately skewed distribution, the relationship is: Mode = 3 × Median − 2 × Mean.

Bimodal Data

A data set that contains two values with the highest frequency is called Bimodal. If there are more than two, it is Multimodal.

Measures of Central Tendency

Mean is the average, Median is the middle value, and Mode is the most frequent value in a Data Set.

Q21. Answer: (a) b/2

Shortcut Trick

Use the standard trigonometric identity: tan θ + cot θ = 2 cosec 2θ.

Given the value of the expression tan θ + cot θ = b.

Equating both, we get b = 2 cosec 2θ.

Solving for the required term: cosec 2θ = b/2.

Therefore The correct answer is b/2.

Alternate Method

Given: sec θ + cosec θ = a and tan θ + cot θ = b

Formula Used: tan θ = sin θ / cos θ, cot θ = cos θ / sin θ, and sin 2θ = 2 sin θ cos θ

Calculations:

=> tan θ + cot θ = b

=> (sin θ / cos θ) + (cos θ / sin θ) = b

=> (sin² θ + cos² θ) / (sin θ cos θ) = b

=> 1 / (sin θ cos θ) = b [Since sin² θ + cos² θ = 1]

=> sin θ cos θ = 1/b

=> sin 2θ = 2 sin θ cos θ = 2 × (1/b) = 2/b

=> cosec 2θ = 1 / sin 2θ = 1 / (2/b) = b/2

Therefore The correct answer is b/2.

Additional Information

Double Angle Identities

The primary double angle formulas are sin 2θ = 2 sin θ cos θ and cos 2θ = cos² θ − sin² θ = 2 cos² θ − 1 = 1 − 2 sin² θ.

Reciprocal Relations

The sum tan θ + cot θ is always equal to sec θ × cosec θ, which further simplifies to 2 cosec 2θ.

Pythagorean Identities

Fundamental identities include sin² θ + cos² θ = 1, 1 + tan² θ = sec² θ, and 1 + cot² θ = cosec² θ.

Q22. Answer: (a) 59

Shortcut Trick

Since the frequency (20) is identical for all 5 class intervals, the data is perfectly uniform and symmetric.

In a symmetric distribution with equal frequencies, the Median lies exactly at the midpoint of the entire range.

Total Range = 54 to 64.

Median = (54 + 64) ÷ 2 = 59.

Therefore The correct answer is Rs. 59.

Alternate Method

Given: Total workers (N) = 100. Classes and frequencies (f) are provided.

Formula Used: Median = l + [((N ÷ 2) − cf) ÷ f] × h

Cumulative Frequencies (CF):

=> 54-56: 20

=> 56-58: 20 + 20 = 40

=> 58-60: 40 + 20 = 60 (Median class since 60 ≥ 50)

Median Calculation:

=> l (Lower limit) = 58

=> N/2 = 100 ÷ 2 = 50
=> cf (Previous CF) = 40
=> f (Frequency of median class) = 20
=> h (Class height) = 2
=> Median = 58 + [(50 − 40) ÷ 20] × 2
=> Median = 58 + [10 ÷ 20] × 2
=> Median = 58 + 0.5 × 2 = 58 + 1
=> Median = 59
Therefore The correct answer is Rs. 59.
Additional Information
Empirical Relationship
For a moderately skewed distribution: Mode = 3 × Median − 2 × Mean.
Median for Grouped Data
The median is the value that divides the total frequency into two equal halves (N/2).
Class Interval (h)
Class width or height (h) is the difference between the upper and lower limits of a class (e.g., 56 − 54 = 2).

Q23. Answer: (b) 0.2

Shortcut Trick
The given expression follows the algebraic identity: $(a^3 - b^3) \div (a^2 + ab + b^2) = (a - b)$.
In this problem, a = 1.4 and b = 1.2.
Applying the trick: 1.4 − 1.2 = 0.2.
Therefore The correct answer is 0.2.
Alternate Method
Given:
Numerator = (1.4 × 1.4 × 1.4 − 1.2 × 1.2 × 1.2)
Denominator = (1.4 × 1.4 + 1.4 × 1.2 + 1.2 × 1.2)
Formula Used:
The difference of two cubes formula is: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
=> Let a = 1.4 and b = 1.2.
=> Numerator = $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
=> Denominator = $(a^2 + ab + b^2)$
=> Expression = $[(a - b)(a^2 + ab + b^2)] \div (a^2 + ab + b^2)$
=> After cancelling the common term $(a^2 + ab + b^2)$, we get: a − b
=> Value = 1.4 − 1.2
=> Value = 0.2
Therefore The correct answer is 0.2.
Additional Information
Sum of Cubes Identity
The corresponding identity for addition is $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$, where the middle term in the second bracket is negative.
Algebraic Simplification
Always check for standard patterns like $(a + b)^2$, $(a - b)^2$, and $a^2 - b^2$ to avoid lengthy decimal calculations.
Cubing Decimals
Remember that $(0.x)^3$ will have three decimal places. For example, $1.4^3 = 2.744$ and $1.2^3 = 1.728$.

Q24. Answer: (b) 22.5 hours

Shortcut Trick
Efficiency of Pipe X = +4 and Pipe Y = −3 (Total work = LCM of 15, 20 = 60).
Combined efficiency for first 10 hours = 4 − 3 = 1 unit/hr.
Work completed in 10 hours = 1 × 10 = 10 units.
Remaining work to be filled by Pipe X alone = 60 − 10 = 50 units.
Time taken by Pipe X for remaining part = 50 ÷ 4 = 12.5 hr.

Total time = 10 + 12.5 = 22.5 hr.
Therefore The correct answer is 22.5 hr.
Alternate Method
Given: Filling time of Pipe X = 15 hr, Emptying time of Pipe Y = 20 hr, Opening duration of Pipe Y = 10 hr.
Formula: Total Work = Efficiency × Time; Net Efficiency = Efficiency_(Fill) − Efficiency_(Empty)
=> Let total capacity of the reservoir = LCM(15, 20) = 60 units.
=> Efficiency of Pipe X = 60 ÷ 15 = 4 units/hr.
=> Efficiency of Pipe Y = 60 ÷ 20 = 3 units/hr (Negative as it empties).
=> Work done in 10 hours with both pipes open = (4 − 3) × 10 = 10 units.
=> Remaining capacity to be filled = 60 − 10 = 50 units.
=> Time taken by Pipe X to fill the remaining 50 units = 50 ÷ 4 = 12.5 hr.
=> Total time required = Initial 10 hr + Subsequent 12.5 hr = 22.5 hr.
Therefore The correct answer is 22.5 hr.
Additional Information
Pipes and Cisterns Basics
If a pipe fills a tank in 'a' hours and another empties it in 'b' hours, the net work done in 1 hour is (1/a − 1/b).
Negative Efficiency
An outlet pipe or leak is always treated as having negative efficiency in work calculations.
Time and Efficiency Relation
Efficiency is inversely proportional to the time taken to complete a task (Efficiency = Total Work ÷ Time).

Q25. Answer: (d) 188

Additional Information
` And the three concepts:
Product of Two Numbers Formula
For any two numbers A and B, the product of the numbers is equal to the product of their HCF and LCM: A × B = HCF × LCM.
LCM of Ratio Numbers
If two numbers are in the ratio a : b (where a and b are co-prime), then their HCF = x, the numbers are ax and bx

Q26. Answer: (b) 0.28

Shortcut Trick
Mean proportional of two numbers a and b = √(a × b)
Given: a = 0.16 and b = 0.49
Mean proportional = √(0.16 × 0.49) = 0.4 × 0.7 = 0.28
Therefore The correct answer is 0.28.
Alternate Method
Given:
First number (a) = 0.16
Second number (b) = 0.49
Formula Used:
If x is the mean proportional between a and b, then a : x :: x : b
This implies: $x^2 = a \times b$ or $x = \sqrt{(a \times b)}$
Calculations:
=> Let the mean proportional be x.
=> 0.16/x = x/0.49
=> $x^2 = 0.16 \times 0.49$
=> $x = \sqrt{(0.16 \times 0.49)}$
=> $x = \sqrt{((16/100) \times (49/100))}$
=> $x = (4/10) \times (7/10)$
=> x = 28/100
=> x = 0.28
Therefore The correct answer is 0.28.

Additional Information

Third Proportional

For two numbers a and b, the third proportional c is such that a:b = b:c, which gives $c = b^2/a$.

Fourth Proportional

For three numbers a, b, and c, the fourth proportional d is such that a:b = c:d, which gives $d = (b \times c)/a$.

Continued Proportion

Three quantities a, b, and c are said to be in continued proportion if a:b = b:c.

Q27. Answer: (c) 55.1%

Shortcut Trick

Since the entire selling price of the first article is reinvested to buy the second article, the overall percentage change is completely independent of the initial cost price of Rs. 347.

We can directly apply the successive percentage change formula:

Net Percentage Change = a + b + (a × b)/100

Here, a = −6% (loss) and b = +65% (gain).

Overall Gain = −6 + 65 + (−6 × 65)/100 = 59 − 3.9 = 55.1%.

Therefore The correct answer is 55.1%.

Alternate Method

Given:

Initial Cost Price (C1) = Rs. 347

Loss percentage on the first article = 6%

Gain percentage on the second article = 65%

Formula Used:

Selling Price (SP) = Cost Price (CP) × (1 − Loss%/100) or

Q28. Answer: (b) 1

Shortcut Trick

Net efficiency = Efficiency of Tap A + Efficiency of Tap B − Efficiency of Tap C.

Since both Tap B and Tap C take 15 hr, their filling and emptying rates are equal and cancel each other out.

Net efficiency = Efficiency of Tap A = 1/4 of the cistern per hour.

Time required to fill 1/4 of the empty cistern = (1/4) ÷ (1/4) = 1 hour.

Therefore The correct answer is 1 hr.

Alternate Method

Given: Tap A fills in 4 hr, Tap B fills in 15 hr, and Tap C empties in 15 hr.

Let the Total Capacity (Total Work) of the cistern be the LCM of 4, 15, and 15.

=> Total Capacity = 60 units.

Tap	Time (hr)	Total Capacity	Efficiency (units/hr)
Tap A (Fill)	4	60 units	15
Tap B (Fill)	15	4	
Tap C (Empty)	15	4	

=> Net Efficiency of all taps together = Efficiency(A) + Efficiency(B) − Efficiency(C)

=> Net Efficiency = 15 + 4 − 4 = 15 units/hr.

=> Capacity to be filled = One-fourth of the cistern = 1/4 × 60 = 15 units.

=> Time taken = Capacity to be filled ÷ Net Efficiency

=> Time = 15 ÷ 15 = 1 hour.

Therefore The correct answer is 1 hr.

Additional Information

Pipes and Cisterns Concept

Filling pipes are considered as positive work (+), while emptying or outlet pipes (leaks) are considered as negative work (−).

Net Rate Formula

If Pipe A fills in 'x' hours and Pipe B empties in 'y' hours, the net work done in one hour is (1/x − 1/y).

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Cistern Capacity

The capacity of the tank is often assumed as the LCM of the individual times taken by the pipes to simplify calculations.

Q29. Answer: (a) Rs. 2,800

Shortcut Trick

Net multiplier for successive discounts of 20% and 30% = 0.80 × 0.70 = 0.56

Final Selling Price = Marked Price × 0.56

SP = 5000 × 0.56 = 2800

Therefore The correct answer is Rs. 2,800.

Alternate Method

Given:

Marked Price (MP) of the jacket = Rs. 5,000

First discount (d1) = 20%

Second discount (d2) = 30%

Formula Used:

Final SP = MP × (100 − d1)/100 × (100 − d2)/100

Calculations:

=> Price after 1st discount = 5000 − (20% of 5000)

=> Price after 1st discount = 5000 − 1000 = 4000

=> Price after 2nd discount = 4000 − (30% of 4000)

=> Price after 2nd discount = 4000 − 1200 = 2800

=> Final Selling Price = Rs. 2,800

Therefore The correct answer is Rs. 2,800.

Additional Information

Single Equivalent Discount

For two successive discounts x% and y%, the single equivalent discount is given by (x + y − xy/100)%.

Relationship between MP and SP

The Selling Price is always calculated on the Marked Price after deducting the discount: SP = MP × (100 − Discount%)/100.

Order of Discounts

The final Selling Price remains the same regardless of the order in which the successive discounts are applied (e.g., 20% then 30% is the same as 30% then 20%).

Q30. Answer: (b) 108

Shortcut Trick

A diagonal divides a parallelogram into two congruent triangles.

The sides of the triangle are 9 cm, 12 cm, and 15 cm.

Recognize the Pythagorean triplet: $9^2 + 12^2 = 81 + 144 = 225 = 15^2$.

Since it is a right-angled triangle, the area of the parallelogram is simply the product of its adjacent sides.

Area = 12 cm × 9 cm = 108 cm^2.

Therefore The correct answer is 108 cm^2.

Alternate Method

Given: Adjacent sides of the parallelogram are a = 12 cm and b = 9 cm. Length of the diagonal is d = 15 cm.

Formula Used: Area of parallelogram = 2 × Area of the triangle formed by its sides and diagonal.

=> Let the triangle be ΔABC with sides 9 cm, 12 cm, and 15 cm.

=> Checking for a right-angled triangle: $9^2 + 12^2 = 81 + 144 = 225$.

=> Square of the longest side (diagonal) = $15^2 = 225$.

=> Since $9^2 + 12^2 = 15^2$, the triangle is right-angled at the vertex between sides 9 cm and 12 cm.

=> Area of ΔABC = 1 ÷ 2 × base × height = 1 ÷ 2 × 12 × 9 = 54 cm^2.

=> Area of parallelogram = 2 × Area of ΔABC = 2 × 54 = 108 cm^2.

Therefore The correct answer is 108 cm^2.

Additional Information

Properties of Parallelogram Diagonals

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Each diagonal of a parallelogram divides it into two triangles of equal area.

Heron's Formula

For any triangle with sides a, b, and c, Area = √[s × (s − a) × (s − b) × (s − c)], where s = (a + b + c) ÷ 2.

Parallelogram Law

The sum of the squares of the four sides of a parallelogram is equal to the sum of the squares of its two diagonals: $2(a^2 + b^2) = d1^2 + d2^2$.

Q31. Answer: (b) 1987

The correct answer is 1987.

Key Points

• The Legal Services Authorities Act, 1987 was enacted by the Parliament to provide a statutory base to legal aid programs and to ensure that opportunities for securing justice are not denied to any citizen by reason of economic or other disabilities.

• Under Section 19 of the Legal Services Authorities Act, 1987, the State Authority, District Authority, Supreme Court Legal Services Committee, High Court Legal Services Committee, or Taluk Legal Services Committee are empowered to organize Lok Adalats.

• The Act defines the Lok Adalat as a forum where disputes or cases pending in the court of law or at the pre-litigation stage are settled or compromised amicably.

• The legislation was a direct result of the constitutional mandate under Article 39A, which requires the State to provide free legal aid and ensure equal justice.

• Every award made by a Lok Adalat is deemed to be a decree of a civil court or an order of any other court and is final and binding on all parties to the dispute.

Additional Information

• Article 39A of the Indian Constitution:

• It was inserted by the 42nd Amendment Act, 1976.

• It directs the State to provide free legal aid by suitable legislation or schemes to ensure that justice is not denied due to economic or other disabilities.

• National Legal Services Authority (NALSA):

• It was constituted under the Legal Services Authorities Act, 1987 to monitor and evaluate the implementation of legal aid programs.

• The Chief Justice of India serves as the Patron-in-Chief, and the second senior-most judge of the Supreme Court is the Executive Chairman.

• Jurisdiction of Lok Adalats:

• They can deal with compoundable civil, revenue, and criminal cases.

• They do not have jurisdiction over matters relating to an offense not compoundable under any law.

Q32. Answer: (b) Tata Memorial Centre, Mumbai

The correct answer is Tata Memorial Centre, Mumbai.

Key Points

• The Tata Memorial Centre (TMC), located in Mumbai, is the lead organisation that spearheaded the landmark bladder cancer radiation therapy trial scheduled for significant reporting or completion in November 2025.

• The specific clinical trial led by the institution is known as the BART trial (Bladder Adjuvant Radiotherapy Trial), which focuses on improving outcomes for patients with muscle-invasive bladder cancer (MIBC).

• The BART trial evaluates the role of adjuvant radiotherapy (radiation given after surgery) to reduce the risk of local recurrence, a common challenge in treating advanced bladder malignancies.

• Under the leadership of TMC Mumbai, this multi-centric study aims to establish a new standard of care by providing high-quality evidence on the survival benefits and safety of radiation in post-operative settings.

• The institution's Radiation Oncology department utilized advanced techniques such as Intensity-Modulated Radiation Therapy (IMRT) and Image-Guided Radiation Therapy (IGRT) to ensure precise delivery during the trial.

• This research is critical because it addresses the high failure rates associated with surgery alone in locally advanced bladder cancer, positioning Tata Memorial Centre at the forefront of global oncological research.

Additional Information

• Tata Memorial Centre (TMC):

• Established in 1941, it is a grant-in-aid institution under the Department of Atomic Energy (DAE), Government of India.

• It serves as the nodal agency for the National Cancer Grid, ensuring uniform standards of cancer care across hundreds of hospitals in India.

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• The centre is renowned for its evidence-based medicine and conducts the largest number of oncology-related clinical trials in South Asia.

• Bladder Cancer Management:

• Treatment typically involves a multidisciplinary approach including Radical Cystectomy (surgical removal of the bladder) and systemic chemotherapy.

• The BART trial explores organ-preservation and local control, which are vital for enhancing the quality of life for cancer survivors.

• Radiotherapy in this context helps in targeting micrometastases in the pelvic region that might remain after surgical resection.

Therefore, the Tata Memorial Centre, Mumbai is the correct answer.

Q33. Answer: (d) Pediplain

The correct answer is Pediplain.

Key Points

• A Pediplain is a broad, low-relief erosional surface formed in arid and semi-arid regions through the coalescence of several pediments.

• The concept was famously developed by the geomorphologist L.C. King in the mid-20th century as part of his Cycle of Pediplanation, which serves as an alternative to W.M. Davis's peneplanation theory.

• The fundamental mechanism behind this formation is the parallel retreat of slopes, also known as scarp retreat or backwasting, where the steep face of a mountain or upland recedes horizontally while maintaining a constant angle.

• As the mountain front or scarp moves backward due to weathering and sheetwash, it leaves behind a gently inclined bedrock platform known as a pediment at its base.

• Over vast geological timescales, the continuous backwasting causes these pediments to expand and eventually merge, resulting in a vast, multi-concave plain that may contain isolated remnant hills called Inselbergs or Bornhardts.

• Unlike peneplanation, which relies on down-wasting (vertical reduction of height), pediplanation is driven by lateral erosion and the horizontal migration of slope profiles.

Additional Information

• Blowout:

• Commonly known as deflation hollows, these are depressions formed in sandy deserts where aeolian (wind) processes remove loose, non-cohesive sediments.

• They can range from a few meters to several kilometers in diameter and are strictly products of wind erosion rather than slope retreat.

• Stalagmite:

• A type of speleothem or cave formation that grows upward from the floor of a limestone cavern.

• It is formed by the precipitation of calcium carbonate from mineral-rich water dripping from the ceiling, making it a primary feature of Karst topography.

• Playa:

• An exceptionally flat, dry lake bed located in the lowest part of an undrained desert basin (bolson).

• These surfaces are characterized by the accumulation of fine-grained silts, clays, and evaporite minerals like salt and gypsum after the evaporation of ephemeral floodwaters.

Q34. Answer: (c) Asian Development Bank

The correct answer is Asian Development Bank.

Key Points

• The Asian Development Bank (ADB) launched the Frontier Seed initiative to stimulate private sector growth and foster a sustainable blue economy in the Pacific region.

• Targeted for full operational impact by 2025, the initiative provides early-stage equity and seed funding to small and medium enterprises (SMEs) that demonstrate a high potential for ocean impact.

• The program is a component of the ADB Frontier facility, which focuses on frontier markets where traditional investment capital is scarce, thereby de-risking ventures for future investors.

• Key focus areas include sustainable fisheries, marine conservation, renewable energy, and climate-resilient infrastructure that protects the unique ecosystems of Pacific island nations.

• By offering a combination of technical assistance and catalytic capital, the ADB helps local entrepreneurs scale innovative solutions that combat marine pollution and climate change.

Additional Information

• Asian Development Bank (ADB):

• Founded in 1966 and headquartered in Mandaluyong, Philippines, it aims to reduce poverty in Asia and the Pacific.

• The bank is owned by 68 members, with Japan and the United States being the largest shareholders.

• Its Strategy 2030 emphasizes seven operational priorities, including tackling climate change and accelerating gender equality.

• Other Organizations mentioned:

• World Bank: Established in 1944 at the Bretton Woods Conference, it provides loans to developing countries for capital programs; headquartered in Washington, D.C.

• European Investment Bank (EIB): The European Union's long-term lending institution, which supports projects that contribute to EU policy objectives globally.

• Bank for International Settlements (BIS): Based in Basel, Switzerland, it serves as a bank for central banks and promotes international financial stability.

Therefore, the correct option is 3.

Q35. Answer: (b) Hindi and English

The correct answer is Hindi and English.

Key Points

• According to Article 343(1) of the Indian Constitution, the official language of the Union is Hindi written in the Devanagari script.

• The Constitution originally stipulated that English would continue to be used for all official purposes of the Union for a period of 15 years from the commencement of the Constitution (i.e., until 1965).

• To prevent administrative difficulties and address concerns from non-Hindi speaking regions, the Official Languages Act, 1963 was passed, which permitted the continued use of English for official purposes alongside Hindi indefinitely.

• Currently, Section 3 of the Official Languages Act ensures that English remains an associate official language for communication between the Union and states, as well as for parliamentary proceedings.

• It is important to note that India has no National Language defined by the Constitution; rather, it identifies Hindi and English as the languages for official executive and legislative transactions at the federal level.

Additional Information

• Eighth Schedule of the Constitution

• The Eighth Schedule lists 22 languages that are given statutory recognition and encouragement, including Urdu, Marathi, Bengali, and Sanskrit.

• While Urdu and Marathi are scheduled languages and serve as official languages in specific states (like Uttar Pradesh or Maharashtra), they are not the official languages of the Union of India.

• The Official Language Commission is established under Article 344 to make recommendations regarding the progressive use of Hindi for official purposes.

• Article 348 specifies that the language of the Supreme Court and High Courts, as well as for Bills and Acts, shall be English until Parliament provides otherwise.

Q36. Answer: (c) Expansion of legislative councils, admission of Indians to Viceroy's executive council, and new deliberativ...

The correct answer is Expansion of legislative councils, admission of Indians to Viceroy's executive council, and new deliberative powers..

Key Points

• The Indian Councils Act of 1909, popularly referred to as the Morley-Minto Reforms, significantly increased the size of the legislative councils. The number of members in the Central Legislative Council was raised from 16 to 60, while the number of members in the Provincial Legislative Councils of Bengal, Madras, and Bombay was also increased to 50 each.

• For the first time in British Indian history, the act provided for the association of Indians with the executive councils of the Viceroy and Governors. Satyendra Prasad Sinha was appointed as the first Indian member of the Viceroy's Executive Council, serving as the Law Member.

• The act substantially enlarged the deliberative functions of the legislative councils at both levels. Members were given the right to ask supplementary questions, move resolutions on the budget, and discuss matters of public interest, although the executive was not bound by these resolutions.

• While it allowed a non-official majority in the Provincial Legislative Councils, the act maintained an official majority in the Central Legislative Council to ensure British control over vital central legislation.

Additional Information

• Communal Representation

• The act is most notable for introducing a system of separate electorates for Muslims. Under this provision, Muslim representatives were to be elected exclusively by Muslim voters, effectively legalizing communalism in Indian politics.

• Lord Minto, the then Viceroy, is consequently known as the Father of Communal Electorate due to this institutionalization of political division.

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• Distinction from Other Acts

• Provincial Autonomy: This was a core feature of the Government of India Act of 1935, which granted provinces independent financial and administrative powers, unlike the 1909 Act which kept them subordinate.

• Dyarchy: The system of double government (reserved and transferred subjects) was introduced by the Montagu-Chelmsford Reforms (Government of India Act of 1919), not the 1909 Act.

• Direct Elections: The 1909 Act utilized a highly indirect and restricted system of election through local bodies and chambers of commerce; widespread direct elections were only introduced in subsequent reforms.

Q37. Answer: (a) 2022

The correct answer is 2022.

Key Points

• The Tata Group officially regained management control of the national carrier, Air India, on January 27, 2022, ending nearly seven decades of state ownership.

• The acquisition was finalized through Talace Private Limited, a wholly-owned subsidiary of Tata Sons, which emerged as the winning bidder for the airline in October 2021.

• The total deal was valued at Rs. 18,000 crore, comprising the takeover of Rs. 15,300 crore of the airline's accumulated debt and a cash payment of Rs. 2,700 crore to the Government of India.

• As part of the agreement, the Tata Group acquired 100% equity stake in Air India and its low-cost arm Air India Express, as well as a 50% stake in the ground-handling joint venture AISATS.

• The handover marked the return of the airline to its original founders after a period of 69 years since its nationalization in 1953.

Additional Information

• Historical Background and Nationalization:

• The airline was originally founded by J.R.D. Tata in 1932 as Tata Airlines, operating its inaugural flight between Karachi and Bombay.

• The Government of India passed the Air Corporations Act in 1953, which led to the nationalization of the airline and the creation of Air India (international) and Indian Airlines (domestic).

• Post-Acquisition Leadership:

• Following the 2022 takeover, N. Chandrasekaran, the Chairman of Tata Sons, oversaw the transition and the appointment of Campbell Wilson as the CEO and Managing Director.

• The group launched a comprehensive five-year transformation roadmap titled Vihaan.AI to modernize the airline's fleet, improve customer service, and enhance operational efficiency.

• Consolidation of Aviation Business:

• The Tata Group has initiated a major consolidation phase by merging Air India with Vistara (a joint venture with Singapore Airlines) and Air India Express with AIX Connect (formerly AirAsia India).

Q38. Answer: (d) Use of microlithic tools along with bow-and-arrow and plant-processing implements

The correct answer is Use of microlithic tools along with bow-and-arrow and plant-processing implements.

Key Points

• The Mesolithic period in India (approximately 10,000 BCE to 4,000 BCE) marks a significant transition from the Paleolithic hunter-gatherer lifestyle to a more specialized subsistence pattern during the early Holocene epoch.

• The defining technological advancement of this era was the production of microliths, which are tiny, geometric stone tools (1 to 8 cm in length) crafted from crypto-crystalline silica like chert, agate, jasper, and chalcedony.

• These microliths were rarely used alone; instead, they were hafted into bone or wooden handles to create sophisticated composite tools such as sickles, saws, and barbed spears.

• A critical innovation in hunting technology was the bow and arrow, which enabled Mesolithic humans to hunt smaller, agile animals and birds, a necessity as the post-glacial climate led to the growth of forests and changed the local fauna.

• Archaeological excavations at sites like Bagor in Rajasthan and Adamgarh in Madhya Pradesh have unearthed plant-processing implements such as grindstones, querns, and rubbers, indicating the systematic gathering and processing of wild grains and seeds.

Additional Information

• Comparison with other historical stages:

• Iron tools: These appeared much later during the Iron Age (circa 1000 BCE in India), facilitating the clearing of dense forests in the Gangetic Valley.

• Polished stone axes: These are the hallmark of the Neolithic Age, where the shift to settled agriculture, animal domestication, and the use of pottery became prevalent.

• Heavy flake tools: Tools like hand-axes and cleavers are characteristic of the Lower Paleolithic (Acheulean culture), designed for

heavy-duty tasks like butchering and digging.

Q39. Answer: (a) Taranaki Maunga

The correct answer is Taranaki Maunga.

Key Points

• Taranaki Maunga, a dormant stratovolcano located on the west coast of the North Island, was officially granted legal personhood in 2025 through the Te Ture Whenua Māori (Taranaki Maunga) Bill.

• This landmark legislation recognizes the mountain as a legal entity with its own rights, powers, duties, and liabilities, meaning the volcano effectively 'owns itself' rather than being property of the New Zealand Crown.

• It is the third natural feature in the country to receive this status, following the Te Urewera forest (2014) and the Whanganui River (2017), reflecting a shift toward indigenous Māori perspectives in environmental law.

• The status is the result of the Te Ruruku Pūtake (Collective Redress Deed) signed between the Crown and the Ngā Iwi o Taranaki, representing the eight tribes that view the mountain as a sacred ancestor.

• A joint governance body named Te Kāhui Tupua was established to serve as the human representative of the mountain, ensuring its ecological and cultural health is prioritized in all management decisions.

Additional Information

• Mount Cook (Aoraki)

• The highest peak in New Zealand, located in the Southern Alps of the South Island at 3,724 meters.

• While deeply significant to the Ngāi Tahu iwi, it is managed under the Aoraki/Mount Cook National Park framework without independent legal personhood.

• Mount Ruapehu and Mount Tongariro

• Active stratovolcanoes located in the Taupo Volcanic Zone and part of Tongariro National Park, a UNESCO World Heritage site.

• These mountains are central to the identity of the Ngāti Tūwharetoa people but have not been granted individual legal personality as of 2025.

Q40. Answer: (b) Tsunamis

The correct answer is Tsunamis.

Key Points

• A Tsunami is a series of powerful waves caused by a large and sudden displacement of the ocean, most commonly triggered by an undersea earthquake along tectonic plate boundaries.

• When an earthquake occurs beneath the ocean floor, the sudden vertical movement of the seafloor displaces a massive volume of water, creating energy that radiates outward in the form of long-period waves.

• In the deep ocean, tsunamis can travel at speeds of up to 800 kilometers per hour (equivalent to the speed of a jet aircraft) while maintaining a very long wavelength, often making them nearly unnoticeable on the surface.

• As these waves approach shallow coastal waters, they undergo shoaling; the wave speed decreases due to friction with the rising seabed, causing the wave height to increase significantly, often resulting in a wall of water.

• The term is derived from the Japanese words tsu (meaning harbor) and nami (meaning wave), as these waves frequently cause devastating impacts in coastal harbors and low-lying areas.

Additional Information

• Glacial Surges:

• These are short-lived events during which a glacier advances at speeds significantly faster than its normal rate, sometimes up to 10 to 100 times faster.

• They are primarily driven by internal hydrological changes or basal lubrication rather than seismic activity under the sea.

• Monsoon Winds:

• These are seasonal reversing winds accompanied by corresponding changes in precipitation, most notably affecting the Indian subcontinent and Southeast Asia.

• They are caused by the differential heating of land and water rather than geological shifts in the earth's crust.

• Land Depressions:

• In a meteorological context, a depression refers to a region of low atmospheric pressure that often results in stormy or unsettled weather.

• In geology, it refers to a sunken area or basin formed by erosion, tectonic activity, or subsidence.

Q41. Answer: (c) Australia

The correct answer is Australia.

Key Points

• Australia is officially recognized as the Island Continent because it is entirely surrounded by the Indian Ocean and the Pacific Ocean.

• It is the smallest continent in the world and lies completely in the Southern Hemisphere, often earning it the nickname Down Under.

• Geographically, it is unique as it is the only continent that is also a single sovereign nation, encompassing the Australian mainland, Tasmania, and several smaller islands.

• The continent is separated from Asia by the Arafura and Timor seas and from New Zealand by the Tasman Sea.

• Due to its long-term geographic isolation, it possesses a high level of biodiversity, including iconic species like kangaroos, koalas, and the platypus that are not found naturally elsewhere.

Additional Information

• South America

• It is the fourth-largest continent and is home to the Amazon Rainforest, which is the world largest tropical rainforest.

• The Andes Mountains, the longest continental mountain range, run along its western edge.

• Africa

• It is the second-largest continent by both land area and population, containing the Sahara Desert and the Nile River.

• It is often called the Cradle of Humankind because the oldest human remains were discovered there.

• Europe

• Geographically, it is a subcontinent or a large peninsula forming the westernmost part of Eurasia.

• It is bounded by the Arctic Ocean to the north, the Atlantic Ocean to the west, and the Mediterranean Sea to the south.

Q42. Answer: (a) mass × length × time^(-2)

The correct answer is mass times length times time^-2.

Key Points

• In physics, Force is defined by Newton's Second Law of Motion, which mathematically states that force is the product of mass (m) and acceleration (a).

• The physical dimensions of any quantity are expressed in terms of the fundamental dimensions: Mass [M], Length [L], and Time [T].

• Acceleration is the rate of change of velocity with respect to time. Since velocity has the dimensions of Length per unit Time ([L][T]^(−1)), acceleration possesses the dimensions of [L][T]^(−1) / [T], which simplifies to [LT^(−2)].

• By substituting these values into the force equation (Force = Mass × Acceleration), the dimensional formula is derived as [M] × [LT^(−2)], resulting in [MLT^(−2)].

• This dimensional structure, mass times length times time^(−2), signifies that force is directly proportional to mass and distance but inversely proportional to the square of time.

Additional Information

• Units and Measurements:

• The SI unit of force is the Newton (N). One Newton is defined as the force needed to provide a mass of 1 kilogram with an acceleration of 1 meter per second squared (1 N = 1 kg·m/s²).

• In the CGS (Centimeter-Gram-Second) system, the unit of force is the dyne, where 1 Newton is equivalent to 10^5 dynes.

• Dimensional Analysis:

• It is a crucial tool used to verify the dimensional consistency of physical equations, ensuring that both sides of an equation have identical dimensions.

• It helps in deriving relations between various physical quantities such as Work (Force × Displacement: [ML²T^(−2)]) and Pressure (Force / Area: [ML^(−1)T^(−2)]).

• Force is a vector quantity, characterized by both a magnitude and a direction, and its behavior is governed by the principles of classical mechanics.

Q43. Answer: (c) Once only

The correct answer is Once only.

Key Points

• Under Article 111 of the Constitution of India, the President has the authority to return a bill to Parliament for reconsideration, provided it is not a Money Bill.

• This executive power is commonly referred to as the Suspensive Veto, allowing the President to request the legislature to review specific clauses or the entire bill.

• The Constitution mandates that if the bill is passed again by both the Lok Sabha and the Rajya Sabha, with or without the amendments suggested by the President, and is presented again, the President must give their assent.

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• Because the President is constitutionally obligated to sign the bill upon its second presentation, the right to return the legislation can be exercised once only for any specific bill.

Additional Information

• Exceptions to the Veto Power:

• Money Bills: According to Article 110, a Money Bill cannot be returned for reconsideration. The President can either give assent or withhold it, but normally gives assent as it is introduced with their prior recommendation.

• Constitutional Amendment Bills: The 24th Constitutional Amendment Act of 1971 made it obligatory for the President to give assent to any bill seeking to amend the Constitution under Article 368.

• Other Veto Types:

• Absolute Veto: The power of the President to say 'no' to a bill passed by Parliament, after which the bill ends and does not become an Act.

• Pocket Veto: The President exercises this by keeping the bill pending on their desk for an indefinite period, neither giving assent nor returning it. This is possible because the Indian Constitution does not specify a time limit for the President to act on a bill.

Q44. Answer: (c) Saurashtra

The correct answer is Saurashtra.

Key Points

• The Saurashtra region, also known as Kathiyawad, is the cultural epicenter for specific oral traditions and folk music forms like Duha, Sorathaa, and Chhand. These forms are deeply rooted in the Charani literature of the region. Hence, the region of Saurashtra is the correct context for these performances.

• Duha and Sorathaa are rhythmic poetic couplets that form the backbone of the Lok Dayro, a traditional community gathering where folk artists, often from the Gadhavi and Charan communities, recite heroic and moral verses. Hence, these are traditionally performed in the Saurashtra folk music style.

• The musical meters known as Chhand (such as Savaiya and Bhujangi) are used to narrate tales of bravery, spirituality, and nature, utilizing a distinct high-pitched and robust vocal delivery unique to the peninsula of Gujarat. Hence, these poetic structures are characteristic of Saurashtra.

• Renowned folk scholar Jhaverchand Meghani, titled the Rashtriya Shayar, extensively documented these forms in his seminal work Saurashtra Ni Rasdhar, highlighting their deep-seated connection to this specific geographical area. Hence, Saurashtra is the region where these are traditionally performed.

Additional Information

• Understanding the Folk Forms:

• Duha: A two-line poetic form containing 24 matras (beats) per line, characterized by its brevity and intense emotional expression.

• Sorathaa: A variation of the Duha where the structure is inverted; the first and second parts of the verse are swapped to create a different rhythmic flow.

• Chhand: Complex metrical verses that require specific breath control and tempo, often accompanied by instruments like the Manjira, Kartal, and Dholak.

• Belaads: Refers to traditional ballads or rhythmic narratives that often accompany the Lok Sahitya (folk literature) of the Kathiyawadi people.

• Regional Differences in Gujarat Folk Music:

• North Gujarat: Primarily known for Bhavai, a folk theater form, and various agricultural songs.

• Kutch: Shares the Duha tradition but is more distinct for its Kafi music and the use of the Jodiya Pava (double flute).

• Central Gujarat: Dominated by the Garba and Garbi traditions, particularly around Ahmedabad and Vadodara.

Q45. Answer: (a) President of India

The correct answer is President of India.

Key Points

• Under Article 316 of the Indian Constitution, the Chairman and other members of a State Public Service Commission (SPSC) are appointed by the Governor of the respective state.

• Although the Governor is the appointing authority, the power to remove a member or the Chairman of the SPSC is vested exclusively in the President of India as per Article 317.

• The President can remove a member on the grounds of misbehaviour only after the Supreme Court has conducted an inquiry and recommended removal; the advice tendered by the Supreme Court is binding on the President.

• This constitutional provision ensures the independence and impartiality of the SPSC by protecting its members from arbitrary removal by the state executive or the Chief Minister.

• While the Governor cannot remove a member, they do possess the authority to suspend a member from office after a reference for inquiry has been made to the Supreme Court until the President passes the final order.

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Additional Information

• Grounds for Removal by the President:

• The President can also remove a member without a Supreme Court inquiry if the member is adjudged an insolvent.

• Removal is applicable if the member engages in any paid employment outside the duties of their office during their term.

• If the member is, in the opinion of the President, unfit to continue in office by reason of infirmity of mind or body.

• Comparison with UPSC:

• The Chairman and members of the Union Public Service Commission (UPSC) are both appointed and removed by the President of India.

• Members of a Joint State Public Service Commission (JSPSC), created by an Act of Parliament, are also appointed and removed by the President.

• Term of Office:

• A member of the SPSC holds office for a term of six years or until they attain the age of 62 years, whichever is earlier.

Q46. Answer: (d) 500 kg m/s

The correct answer is 500 kg m/s.

Key Points

• Momentum is defined in physics as the quantity of motion an object possesses, which is mathematically the product of its mass and velocity.

• The formula to calculate linear momentum is expressed as p = m × v, where p represents momentum, m is the mass of the object, and v is its velocity.

• In this specific problem, the mass (m) of the object is given as 10 kg and the velocity (v) is provided as 50 m/s.

• By substituting these values into the formula, we get: p = 10 kg × 50 m/s, which equals 500 kg m/s.

• Since momentum is the product of mass in kilograms and velocity in meters per second, the resulting SI unit is kg m/s (kilogram-meter per second).

Additional Information

• Physical Characteristics of Momentum:

• Vector Quantity: Momentum is a vector quantity, meaning it possesses both magnitude and direction. The direction of the momentum vector is always the same as the direction of the velocity vector.

• Dimensional Formula: The dimensional representation of momentum is [M L T^(−1)], derived from mass [M] and velocity [L T^(−1)].

• Newton's Second Law: This law states that the force applied to an object is equal to the rate of change of its momentum over time (F = dp/dt).

• Conservation of Momentum: This fundamental principle asserts that in the absence of external forces, the total momentum of a closed system remains constant during interactions or collisions.

• Impulse: The change in momentum is also known as impulse, which is the product of the average force and the time interval over which it acts.

Q47. Answer: (a) Amartya Sen

The correct answer is Amartya Sen.

Key Points

• The Capability Approach is a normative framework developed by the Indian economist and philosopher Amartya Sen in the 1980s, primarily to evaluate individual well-being and social arrangements.

• Unlike traditional economic models that focus on utility or income (GDP), Sen’s approach emphasizes substantive freedom—the actual ability of people to achieve the things they value doing and being.

• Sen distinguished between functionings (the actual states of being and doing, such as being healthy or literate) and capabilities (the set of alternative combinations of functionings that are feasible for a person to achieve).

• This paradigm shift influenced global development policy, providing the conceptual foundation for the Human Development Index (HDI), which was launched by the United Nations Development Programme (UNDP) in 1990.

• Amartya Sen was awarded the Nobel Prize in Economic Sciences in 1998 for his contributions to welfare economics and his work on famine and human development.

Additional Information

• Martha Nussbaum:

• A prominent American philosopher who collaborated with Sen but diverged by proposing a specific list of Ten Central Human Capabilities (e.g., life, bodily health, practical reason) as a requirement for social justice.

• John Rawls:

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• An influential political philosopher known for his work A Theory of Justice (1971); while his concept of primary goods influenced Sen, Sen critiqued Rawls for focusing too much on the distribution of resources rather than what individuals can actually do with those resources.

• Adam Smith:

• Known as the Father of Modern Economics and author of The Wealth of Nations (1776); although he focused on market mechanisms, Sen often cited Smith's observations on necessaries and social participation as early precursors to the capability perspective.

Q48. Answer: (c) Abdul Ghaffar Khan

The correct answer is Abdul Ghaffar Khan.

Key Points

• Abdul Ghaffar Khan, popularly known as Frontier Gandhi or Bacha Khan, founded the Khudai Khidmatgar (Servants of God) movement in 1929.

• The organization was a non-violent mass resistance group against British colonial rule, primarily active in the North-West Frontier Province (NWFP).

• Members of the group were famously known as the Red Shirts (Surkh Posh) because they wore uniforms dyed in a distinct dark red or brick-red color.

• The movement was deeply rooted in the principles of non-violence (Satyagraha) and social reform, drawing significant inspiration from the teachings of Mahatma Gandhi.

• The Khudai Khidmatgars played a pivotal role during the Civil Disobedience Movement (1930), notably during the Qissa Khwani Bazaar protests in Peshawar, where they faced brutal British military action with peaceful resilience.

Additional Information

• Other Notable Figures:

• Khan Abdul Qayyum: He was a politician who served as a leader in the Indian National Congress before joining the Muslim League; he later became a central figure in the politics of Pakistan.

• Maulana Azad: Abul Kalam Azad was a prominent scholar and a senior leader of the Indian National Congress who became the first Education Minister of independent India.

• Shaukat Ali: A key leader of the Khilafat Movement, he, along with his brother Mohammad Ali Jauhar (the Ali brothers), mobilized Indian Muslims to support the Ottoman Caliphate post-World War I.

• Political Affiliation:

• The Khudai Khidmatgar remained a staunch ally of the Indian National Congress throughout the independence struggle and strongly opposed the Partition of India.

• Following Independence and the creation of Pakistan in 1947, Abdul Ghaffar Khan faced numerous arrests for his continued advocacy for Pashtun autonomy.

Q49. Answer: (a) Uttarakhand

The correct answer is Uttarakhand.

Key Points

• The 77^(th) Senior and 54^(th) Junior National Track Cycling Championships were successfully conducted in the state of Uttarakhand from December 19 to 24, 2025.

• The championship was organized under the aegis of the Cycling Federation of India (CFI), which is the national governing body for the sport of cycling in the country.

• This prestigious event featured elite and junior cyclists from across various States, Union Territories, and boards like the Services Sports Control Board (SSCB) and Railway Sports Promotion Board (RSPB).

• The selection of Uttarakhand as the host venue was strategically aligned with the state's development of high-performance sports infrastructure in preparation for the 38^(th) National Games.

• Competitions were held across multiple track disciplines, including the Team Sprint, Individual Pursuit, Keirin, and Points Race, emphasizing the speed and tactical proficiency of Indian cyclists.

Additional Information

• Cycling Federation of India (CFI):

• Established in 1946, the CFI is a member of the Union Cycliste Internationale (UCI) and the Asian Cycling Confederation (ACC).

• Headquartered in New Delhi, it is responsible for the promotion of cycling and the management of the National Cycling Academy.

• Sports Infrastructure in Uttarakhand:

• The state has invested heavily in world-class facilities in cities such as Dehradun, Haldwani, and Rudrapur to establish itself as a premier sports hub in the Himalayan region.

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• The hosting of the 77^(th) National Championship acted as a precursor and test event for the broader 38^(th) National Games scheduled in the state.

• Track Cycling Fundamentals:

• Track cycling is performed on a specialized Velodrome, which is an oval banked track typically measuring 250 meters in length for international standards.

• The bicycles used are fixed-gear machines without brakes, designed specifically for aerodynamic efficiency and maximum power transfer.

Q50. Answer: (a) It was removed from Fundamental Rights

The correct answer is It was removed from Fundamental Rights.

Key Points

• The 44th Amendment Act of 1978 officially removed the Right to Property from the list of Fundamental Rights (Part III) of the Indian Constitution.

• Before this amendment, the right to property was guaranteed under Article 19(1)(f) and Article 31.

• Post-amendment, it was reclassified as a Legal Right or Constitutional Right and placed under a new Article 300A in Part XII.

• The primary purpose of this change was to prevent the judiciary from blocking land reforms and social welfare legislation aimed at the equitable distribution of resources.

• As a result of being a legal right rather than a fundamental one, a citizen cannot approach the Supreme Court directly under Article 32 for its violation, though they can still seek relief through High Courts under Article 226.

Additional Information

• Article 300A:

• It specifies that no person shall be deprived of their property except by authority of law, meaning the state must follow a legislative process to acquire land.

• It provides protection against arbitrary executive action but does not offer the same level of immunity against legislative action as a fundamental right.

• Fundamental Rights vs. Legal Rights:

• Fundamental Rights (Articles 12 to 35) are considered essential for the development of individuals and are protected by the Basic Structure doctrine.

• Legal Rights are protected by ordinary law and can be modified by the Parliament through regular legislative procedures.

• Directive Principles of State Policy (DPSP):

• Articles 39(b) and 39(c) direct the state to ensure that the ownership and control of material resources are distributed to serve the common good, which often conflicted with the earlier status of property as a fundamental right.

Q51. Answer: (a) Mirza Haidar Dughlat

The correct answer is Mirza Haidar Dughlat.

Key Points

• Mirza Muhammad Haidar Dughlat was a Chaghatai Turko-Mongol military general and a first cousin of Babur, the founder of the Mughal Empire.

• He authored the Tarikh-i-Rashidi, a comprehensive historical memoir written in the Persian language, which he completed around 1546.

• The work is a vital primary source for the history of the Khanate of Moghulistan and the Mughal dynasty in Central Asia and India.

• It is divided into two sections: the first part provides a systematic history of the Mughal Khans starting from Tughlugh Timur Khan, while the second part is a detailed autobiographical account.

• The text provides unique insights into the geography and culture of regions like Tibet, Ladakh, and Kashmir, where the author served as a de facto ruler for ten years (1541-1551) under Emperor Humayun.

Additional Information

• Minhaj-us-Siraj:

• A 13th-century Persian historian who served the Mamluk Sultanate in Delhi.

• He is famous for writing the Tabaqat-i-Nasiri, which documents the early years of the Delhi Sultanate and the Islamic world.

• Abul Fazl:

• The grand vizier and court historian of the Mughal Emperor Akbar.

• He authored the Akbarnama, the official history of Akbar's reign, and the Ain-i-Akbari, a massive administrative manual.

• Ziauddin Barani:

• A political thinker and historian during the Tughlaq period in the 14th century.

• His most significant contribution is the Tarikh-i-Firoz Shahi, covering the history of Delhi from Balban to Firoz Shah Tughlaq.

Q52. Answer: (a) Executable program file

The correct answer is Executable program file.

Key Points

• The .exe file extension is short for executable, which is the standard file format used for programs and applications within Microsoft Windows operating systems, including Windows 11.

• These files contain machine code or binary instructions that the computer's Central Processing Unit (CPU) can directly interpret and execute to perform specific automated tasks or launch software.

• When a user initiates an .exe file, the Operating System loads the data into the Random Access Memory (RAM) and follows the instructions defined in the file header to run the process.

• In Windows 11, these files serve two primary roles: acting as installers (such as setup.exe) to load software onto the hard drive, or as the application launcher (such as chrome.exe) to start the software.

Additional Information

• Image Files:

• These are data files that store visual information using extensions like .jpg, .png, .bmp, and .gif. Unlike executable files, they require an Image Viewer or editor to be rendered.

• Document Files:

• These include .docx (Microsoft Word), .pdf (Adobe Acrobat), and .txt (Plain Text). They contain formatted text and media but cannot run independently without a Document Reader.

• System and Other Formats:

• System files often use the .sys or .dll (Dynamic Link Library) extensions to provide background functionality for the hardware and software environment.

• Another common installer format in Windows 11 is .msi (Microsoft Installer), which is specifically used for the Windows Installer service.

• Security Awareness:

• Because .exe files have the authority to run code on a system, they are the most common vector for malware, viruses, and ransomware. Users are advised to only run executables from trusted sources.

Q53. Answer: (b) Berjis Desai

The correct answer is Berjis Desai.

Key Points

• The book titled Modi’s Mission is authored by Berjis Desai, a renowned Mumbai-based lawyer, former journalist, and noted writer.

• It was published by Rupa Publications India and officially released on September 29, 2025.

• The work was launched at a high-profile event in Mumbai on October 24, 2025, by the Governor of Maharashtra, Acharya Devvrat, and the Chief Minister, Devendra Fadnavis.

• The book provides a comprehensive analysis of Prime Minister Narendra Modi’s journey from his humble beginnings in Vadnagar to the Prime Minister’s Office (PMO).

• It explores his leadership philosophy, spiritual influences, and significant governance milestones, including the abrogation of Article 370 and the Ram Temple construction.

• The narrative presents the Prime Minister not just as a political leader but as an instrument of national awakening and a confident global icon.

Additional Information

• Berjis Desai is also known for other acclaimed literary works, such as:

• The Bawaji: Memoirs of a Parsi Trust and Oh! Those Parsis, which explore the nuances of Parsi culture.

• His debut novel Towers of Silence (2021) and the crime thriller Murder at the Racecourse (2024).

• Context on other authors in the options:

• Amish Tripathi: Best known for the Shiva Trilogy and the Ram Chandra Series, focusing on Indian mythology.

• Arundhati Roy: A Man Booker Prize winner for The God of Small Things, known for her political activism and essays.

• B.K. Harinarayanan: A prominent Malayalam lyricist and poet, predominantly working in the Kerala film industry.

Q54. Answer: (b) Sarod

The correct answer is Sarod.

Key Points

• Ustad Amjad Ali Khan, born in 1945, is an internationally acclaimed Indian classical musician and a master of the Sarod.

• He belongs to the sixth generation of the illustrious Senia Bangash Gharana, a musical lineage that claims its roots from Mian Tansen, one of the Navaratnas in the court of Emperor Akbar.

• He is widely credited with reinventing the Sarod technique, often playing with his fingernails to produce a unique, resonant, and vocal-like sound that distinguishes his style from other traditional schools.

• For his extraordinary contributions to the field of arts, he was honored with India's second-highest civilian award, the Padma Vibhushan, in 2001.

• The Sarod is a fretless stringed instrument known for its deep, introspective tone and is a cornerstone of Hindustani Classical Music.

Additional Information

• Violin

• In the Indian context, the violin is a prominent instrument in both Carnatic and Hindustani traditions. Distinguished maestros include L. Subramaniam, N. Rajam, and M. S. Gopalakrishnan.

• Santoor

• Originally a folk instrument from Jammu and Kashmir known as the Shatatantri Veena, it was elevated to the classical stage by Pandit Shivkumar Sharma. Bhajan Sopori is another notable exponent.

• Bansuri

• This transverse flute made of bamboo is synonymous with Pandit Hariprasad Chaurasia and Pannalal Ghosh, who were instrumental in establishing it as a primary solo instrument in classical concerts.

Q55. Answer: (c) Article 72

The correct answer is Article 72.

Key Points

• Article 72 of the Constitution of India empowers the President to grant pardons, reprieves, respites or remissions of punishment, or to suspend, remit or commute the sentence of any person convicted of any offence.

• This executive power is exercised by the President in cases where the punishment or sentence is by a Court Martial, or for an offence against any law relating to a matter to which the executive power of the Union extends.

• The power under this Article is particularly significant as it extends to all cases where the sentence is a death sentence, providing a final constitutional safety net against judicial errors.

• The President does not sit as a court of appeal while exercising this power; rather, it is an executive function intended to provide relief from a sentence that may be regarded as unduly harsh or to rectify evident mistakes.

Additional Information

• Article 71:

• Relates to matters connected with the election of a President or Vice-President, including the investigation of disputes by the Supreme Court.

• Article 74:

• Mandates the creation of a Council of Ministers with the Prime Minister at the head to aid and advise the President in the exercise of his functions.

• Article 75:

• Contains provisions regarding the appointment, tenure, and salaries of Ministers, and establishes their collective responsibility to the House of the People (Lok Sabha).

• Comparison with Governor:

• Under Article 161, the Governor of a State also possesses pardoning powers, but they cannot grant pardon in cases of death sentences (only suspend, remit or commute) or in cases involving military courts.

Q56. Answer: (b) National Deepwater Exploration Mission

The correct answer is National Deepwater Exploration Mission.

Key Points

• During his address from the Red Fort on the 79th Independence Day (August 15, 2025), Prime Minister Narendra Modi announced the National Deepwater Exploration Mission to significantly enhance India's energy self-reliance.

• The mission is designed to harness offshore energy resources, specifically targeting hydrocarbons and natural gas located in the Exclusive Economic Zone (EEZ) and deep-sea blocks that remain largely unexplored.

• This initiative aligns with the vision of Viksit Bharat 2047, aiming to reduce India's heavy dependence on energy imports, which currently account for a substantial portion of the national current account deficit.

• The mission focuses on deploying advanced seismic survey technologies and deep-water drilling rigs to unlock the potential of the Krishna-Godavari (KG) Basin and other deep-sea frontiers.

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• It serves as a critical component of India's Blue Economy strategy, integrating energy security with sustainable marine resource management to ensure long-term Strategic Hydrocarbon Independence.

Additional Information

• Deep Ocean Mission (DOM):

• While the 2025 announcement focuses on energy, the Ministry of Earth Sciences earlier launched the Deep Ocean Mission in 2021 with a budget of approximately 4,077 crore.

• The DOM prioritizes Deep Sea Mining, specifically for Polymetallic Nodules containing copper, nickel, cobalt, and manganese.

• A key project under DOM is Samudrayaan, featuring the MATSYA 6000 submersible designed to carry humans to a depth of 6,000 meters.

• India's Energy Landscape:

• India is the world's third-largest consumer of energy and seeks to increase the share of natural gas in its primary energy mix from 6.7 percent to 15 percent by 2030.

• The National Deepwater Exploration Mission complements the Open Acreage Licensing Policy (OALP) and the Hydrocarbon Exploration and Licensing Policy (HELP) to attract global investment in the upstream sector.

Q57. Answer: (a) Reverberation

The correct answer is Reverberation.

Key Points

• Reverberation refers to the persistence of sound in a particular space after the original sound source has stopped. It is primarily caused by multiple reflections of sound waves from various surfaces like walls, ceilings, and floors.

• When sound is produced in a large enclosed area, such as an auditorium or a concert hall, the sound waves bounce back and forth, creating a continuous "smearing" effect where the sound lingers before eventually being absorbed.

• Scientific measurement of this phenomenon is known as reverberation time, which is the time required for the sound intensity to drop by 60 decibels (dB) from its initial level.

• While a moderate amount of reverberation adds richness to music, excessive reverberation can cause acoustic interference, making speech unintelligible as syllables overlap with one another.

• To control this effect, engineers use sound-absorbent materials such as acoustic tiles, fiberglass, or heavy curtains to reduce the number of reflections.

Additional Information

• Echo:

• An echo is a distinct reflection of sound that reaches the listener after a time delay of at least 0.1 seconds.

• For a human ear to distinguish an echo from the original sound, the reflecting surface must be at a minimum distance of approximately 17.2 meters (assuming the speed of sound is 344 m/s).

• Resonance:

• This is a physical phenomenon where a system oscillates with maximum amplitude at a specific natural frequency.

• It occurs when the frequency of a periodically applied force matches the system's own inherent frequency of vibration.

• Quality:

• Also referred to as Timbre, this property allows the human ear to distinguish between two sounds that have the same pitch and loudness.

• It depends on the waveforms and the presence of overtones or harmonics unique to a specific instrument or voice.

Q58. Answer: (a) Glacier melting and water security

The correct answer is Glacier melting and water security.

Key Points

• World Water Day is an annual United Nations (UN) observance held on 22 March to raise awareness about the global water crisis and the importance of freshwater management.

• The focus for 2025 is specifically aligned with the International Year of Glaciers' Preservation, a global initiative designated by the UN General Assembly in December 2022.

• This thematic focus highlights the critical impact of climate change on the cryosphere, emphasizing how glacier retreat threatens the seasonal availability of water for billions of people.

• Glaciers function as natural 'water towers', and their rapid melting leads to immediate risks such as Glacial Lake Outburst Floods (GLOFs) and long-term water scarcity in downstream regions.

• The 2025 observance aims to accelerate progress toward Sustainable Development Goal 6 (SDG 6), which targets clean water and sanitation for all by 2030, by addressing the melting ice-water nexus.

Additional Information

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• International Year of Glaciers' Preservation (2025):

• Initiated by Tajikistan, the UN resolution also proclaimed 21 March as the World Day for Glaciers to be observed starting in 2025.

• The initiative seeks to establish a Trust Fund to support glacier preservation and enhance international cooperation in monitoring snowmelt and ice thickness.

• Cryosphere and Water Reserves:

• The cryosphere contains approximately 69 percent of the Earth's freshwater, mostly locked in glaciers and ice sheets in Antarctica and Greenland.

• Loss of glacial mass contributes significantly to global sea-level rise, affecting coastal communities and island nations.

• Related Observances:

• Ocean pollution is a primary focus of World Oceans Day, celebrated annually on 8 June.

• Fisheries development and sustainability are typically highlighted on World Fisheries Day on 21 November.

Q59. Answer: (a) Airavatesvara Temple

The correct answer is Airavatesvara Temple.

Key Points

• The Airavatesvara Temple, located at Darasuram near Kumbakonam in Tamil Nadu, was built by the Chola Emperor Rajaraja Chola II in the 12th century CE.

• The temple is a masterpiece of Dravidian architecture and is specifically noted for its vimana (temple tower) which stands at a height of 24 metres (approximately 80 feet).

• Dedicated to Lord Shiva, the temple houses a stone image of the deity worshipped as Airavatesvara; the name refers to Airavata, the white elephant of Indra, who is said to have worshipped Shiva here to restore its clean white color.

• It is recognized as a UNESCO World Heritage Site and is part of the Great Living Chola Temples group, alongside the Brihadisvara Temple at Thanjavur and the temple at Gangaikonda Cholapuram.

• The temple complex features a unique Agra-mandapa designed like a stone chariot drawn by horses and elephants, showcasing the pinnacle of Chola sculptural artistry.

Additional Information

• Gangaikondacholisvaram:

• Built by Rajendra Chola I to commemorate his victorious expedition to the Ganges river.

• The vimana of this temple is significantly larger, reaching a height of approximately 55 metres.

• Kandariya Mahadeva Temple:

• Located in the Khajuraho Group of Monuments in Madhya Pradesh, it was constructed by the Chandela dynasty around 1030 CE.

• The temple is dedicated to Shiva and its main tower (shikhara) rises to about 31 metres.

• Mahabodhi Temple:

• A Buddhist temple in Bodh Gaya, Bihar, marking the spot where Siddhartha Gautama attained Enlightenment.

• It features a central pyramidal tower that stands approximately 55 metres tall and dates back to the Gupta period and later restorations.

Q60. Answer: (d) Rohit Sharma

The correct answer is Rohit Sharma.

Key Points

• Rohit Sharma, the captain of the Indian cricket team, officially set a new record for the highest number of sixes hit in ICC Men's ODI events (which includes both the ICC Cricket World Cup and the ICC Champions Trophy) by March 2025.

• During the ICC Champions Trophy 2025, he surpassed the aggregate record previously held by the West Indian batting legend Chris Gayle, who was long considered the most prolific six-hitter in major tournaments.

• The Indian opener reached this milestone through his aggressive batting style at the top of the order, consistently utilizing the powerplay overs to clear the boundaries in marquee global events.

• By March 2025, Sharma consolidated his legacy as the Hitman, holding the record for the most sixes in International Cricket across all formats, in addition to this specific ODI event milestone.

Additional Information

• Chris Gayle:

• Previously held the record for most sixes in ICC Men's ODI events and was the first player to hit more than 50 sixes in Cricket World Cup history.

• Known as the Universe Boss, he retired with 553 international sixes, a tally eventually overtaken by Rohit Sharma in 2023.

• ICC Champions Trophy 2025:

• This prestigious ODI tournament featured the top eight teams in the world and was a key platform for players to enhance their statistical records in ICC events.

• Suryakumar Yadav:

• Regarded as one of the best T20I batsmen globally, known for his 360-degree shot-making, but his ODI statistical milestones remain behind the cumulative records of senior players like Sharma.

• Ben Duckett:

• A prominent English opening batsman known for his aggressive Bazball approach in Tests and solid contributions in limited-overs cricket, though not yet a record-holder for total sixes in ICC ODI events.

Q61. Answer: (b) Ctrl + F

The correct answer is Ctrl + F.

Key Points

• The Ctrl + F keyboard shortcut is the standard Find command used across nearly all Graphical User Interfaces (GUIs), including web browsers, document editors, and PDF readers.

• In web browsers such as Google Chrome, Mozilla Firefox, and Microsoft Edge, this command activates a search bar that allows users to locate specific character strings on the active page.

• The browser performs a dynamic scan of the Document Object Model (DOM) to find matches and typically highlights them in a distinct color for easy identification.

• This function is vital for information retrieval in long-form digital content, enabling users to jump directly to relevant sections without manual scrolling.

Additional Information

• Ctrl + S:

• This shortcut is used to Save the current webpage or document. It usually prompts a Save As dialog box to store files locally in HTML or Web Archive formats.

• Ctrl + Tab:

• This is a navigation shortcut designed for Tabbed Browsing. It allows the user to cycle through multiple open browser tabs in a forward direction.

• Ctrl + V:

• This is the universal Paste command. It retrieves text or images from the System Clipboard and inserts them into the current cursor position in a text field or document.

Q62. Answer: (d) Conduction

The correct answer is Conduction.

Key Points

• Conduction is the primary mode of heat transfer in solids, where thermal energy is moved through a material by direct molecular collision without the actual movement of the matter itself.

• When a metal spoon is placed in hot tea, the faster-moving molecules of the tea collide with the atoms of the spoon, transferring kinetic energy to them.

• Metals are superior thermal conductors because they contain free electrons (delocalized electrons) that can move rapidly through the metal lattice, carrying thermal energy much faster than atomic vibrations alone.

• The process continues as the vibrating atoms at the submerged end of the spoon pass their energy to adjacent, cooler atoms through intermolecular interactions, a process that continues until the handle reaches a higher temperature.

• This transfer typically occurs from a region of higher temperature to a region of lower temperature, following the Second Law of Thermodynamics.

Additional Information

• Convection:

• This mode occurs only in fluids (liquids and gases) and involves the actual movement of particles.

• In the tea itself, convection currents form as the warmer, less dense liquid rises and the cooler, denser liquid sinks.

• Radiation:

• Energy is transferred via electromagnetic waves (specifically infrared radiation) and does not require a physical medium.

• While the cup and tea emit thermal radiation, it is not the primary reason the handle of the submerged spoon heats up so quickly.

• Insulation:

• Refers to the use of materials with low thermal conductivity, such as wood, plastic, or cork.

• These insulators are used to prevent or slow down the rate of heat transfer, which is why handles of cooking pans are often made of plastic or wood rather than conductive metal.

Q63. Answer: (b) System software manages the computer's core resources and provides a platform for other programs, while app...

The correct answer is System software manages the computer's core resources and provides a platform for other programs, while application software is designed to perform specific tasks for the user..

Key Points

• System software is a type of computer program designed to run a computer's hardware and application programs. It serves as the interface between the hardware and the user.

• The primary purpose of system software is to manage the Central Processing Unit (CPU), memory, and peripheral devices like printers and disk drives. Examples include Operating Systems (OS) such as Windows, Linux, and macOS.

• Application software, often referred to as 'apps' or end-user programs, is designed to perform specific tasks for the user. These include Word Processors, Web Browsers, and Database Management Systems.

• While system software runs in the background and is essential for the computer to function, application software is used only when a user needs to complete a particular job, like editing a photo or browsing the Internet.

Additional Information

• System Software Categories:

• Operating Systems: Provides the User Interface (UI) and manages system resources.

• Device Drivers: Specialized programs that allow the OS to communicate with specific hardware like Graphic Cards.

• Utility Software: Programs used for maintenance, such as Antivirus or Disk Defragmenters.

• Application Software Types:

• General Purpose: Software like Microsoft Excel used for various broad tasks.

• Customized Software: Tailor-made programs for specific organizational needs, such as Banking Software or Railway Reservation Systems.

• Booting Process: System software, specifically the BIOS (Basic Input/Output System) and the Kernel, is required to start the computer. Application software cannot run until the system software has finished the booting sequence.

Q64. Answer: (d) To improve interoperability against maritime threats

The correct answer is To improve interoperability against maritime threats.

Key Points

• Exercise INDRA 2025 is a major joint military exercise conducted biennially between the armed forces of India and the Russian Federation.

• The primary objective of the maritime phase is to enhance interoperability, which allows the Indian Navy and the Russian Navy to work seamlessly together during real-world operations.

• It focuses on coordinating tactical responses to maritime threats, including maritime terrorism, piracy, and the illegal trafficking of goods in strategic international waters.

• The exercise involves complex naval drills such as anti-submarine warfare (ASW), surface firing at moving targets, and Visit, Board, Search, and Seizure (VBSS) operations to standardize maritime security protocols.

• The 2025 iteration emphasizes the use of joint communication systems and shared tactical maneuvers to ensure safety and stability in the Indian Ocean Region and beyond.

Additional Information

• Evolution of Exercise INDRA:

• The series commenced in 2003 as a bilateral naval drill but has since evolved into a Tri-Services Exercise (Army, Navy, and Air Force) starting from 2017.

• It represents the Special and Privileged Strategic Partnership between India and Russia, facilitating the exchange of operational expertise and best practices.

• Strategic Importance of Interoperability:

• Interoperability is crucial for modern navies to perform Humanitarian Assistance and Disaster Relief (HADR) missions and protect Sea Lanes of Communication (SLOCs) from unconventional threats.

• The exercise also serves as a diplomatic tool to maintain a balance of power and promote a rules-based maritime order in the Indo-Pacific.

Q65. Answer: (c) Hindu Growth Rate

The correct answer is Hindu Growth Rate.

Key Points

• The term Hindu Growth Rate was famously coined by the Indian economist Raj Krishna in 1978 at a lecture at the Federation of Indian Chambers of Commerce and Industry (FICCI).

• It refers to the low annual growth rate of the Indian economy, which remained stagnant at around 3.5% from the 1950s to the 1980s, while per capita income growth averaged a mere 1.3%.

• The sluggish industrial growth during the mid-1960s to 1980 was attributed to the License Raj, a system of elaborate licenses, regulations, and red tape that hindered the establishment and expansion of businesses.

• Economists argue that this period was characterized by protectionist policies, import substitution, and the dominance of inefficient Public Sector Undertakings (PSUs), which stifled competition and technological advancement.

• The term was used to suggest that the slow growth was an inherent or cultural feature of the country at the time, though it was later debunked by the rapid growth following the 1991 economic reforms.

Additional Information

• Fiscal Drag:

• It is an economic concept where inflation or income growth moves taxpayers into higher tax brackets.

• This effectively increases tax revenue for the government without a formal change in tax policy, which can slow down the economy by reducing consumer disposable income.

• Socialist Stagnation:

• While not a formal technical term like the Hindu Growth Rate, it is often used informally to describe the inefficiencies of centrally planned economies.

• In India, this period involved a command economy structure inspired by the Mahalanobis Model, prioritizing heavy capital goods over consumer goods.

• 1991 Economic Reforms:

• The transition from the slow growth era was triggered by a Balance of Payments (BoP) crisis in 1991.

• The government introduced LPG (Liberalization, Privatization, and Globalization) reforms, dismantling the License Raj and opening the economy to Foreign Direct Investment (FDI).

Q66. Answer: (c) Dadra and Nagar Haveli

The correct answer is Dadra and Nagar Haveli.

Key Points

• According to the official data released in the Census 2011, Dadra and Nagar Haveli recorded a literacy rate of 76.24%, which was the lowest among all the Union Territories in India.

• The statistical breakdown reveals a significant gender gap in the territory, with male literacy recorded at 85.17% and female literacy lagging behind at 64.32%.

• In terms of absolute numbers, the total number of literates in the territory was 223,230, out of a total population of 343,709 individuals during the 2011 survey.

• Geographically, this Union Territory (which was later merged with Daman and Diu in January 2020) is situated between the states of Maharashtra and Gujarat, influencing its demographic and educational patterns.

• While it held the lowest rank among UTs, its literacy rate of 76.24% was technically higher than the national average literacy rate of India, which stood at 74.04% in 2011.

Additional Information

• Lakshadweep:

• This archipelago recorded the highest literacy rate among all Union Territories at 91.85%.

• It also boasts a very high male literacy rate of 95.56% and female literacy of 87.95%.

• Chandigarh:

• The joint capital of Punjab and Haryana reported a high literacy rate of 86.05%.

• The city is known for its robust educational infrastructure and high per capita income, contributing to its literacy levels.

• Andaman and Nicobar Islands:

• This Union Territory in the Bay of Bengal recorded a literacy rate of 86.63%.

• Its male literacy was 90.27% and female literacy was 82.43% as per the 2011 figures.

• National Context:

• Among all Indian states and UTs, Kerala stood first with a literacy rate of 94.00%.

• Bihar recorded the lowest literacy rate in the entire country (including states) at 61.80%.

Q67. Answer: (b) Steel plants

The correct answer is Steel plants.

Key Points

• Large-scale industries are defined by a high volume of production, extensive infrastructure, and a massive capital investment. In the Indian context, industries with an investment in plant and machinery exceeding 10 crore rupees are generally classified in this

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category.

• Steel plants represent the primary example of a heavy industry because both the raw materials (like iron ore, coking coal, and limestone) and the finished products (steel beams, sheets, and coils) are extremely bulky and heavy.

• These industries utilize sophisticated technology and automated processes for smelting and refining. They require a large, skilled, and unskilled labor force numbering in the thousands.

• The Iron and Steel industry is often referred to as the backbone of modern industry or a feeder industry because its output serves as the basic raw material for other sectors such as automobiles, heavy machinery, construction, and defense equipment.

• Prominent examples include the Steel Authority of India Limited (SAIL) and the Tata Iron and Steel Company (TISCO), which operate massive facilities that influence the national economy significantly.

Additional Information

• Cottage and Small-Scale Industries:

• Pottery: Categorized as a cottage industry or household industry where products are manufactured by hand or with simple tools by artisans within their homes.

• Handloom: Primarily a small-scale industry that relies on manual labor and traditional skills, often supported by government schemes to preserve rural employment.

• Food Processing: While some units can be large, a significant portion of this sector in developing economies falls under Micro, Small, and Medium Enterprises (MSMEs), focusing on value addition to agricultural produce with relatively lower capital than heavy metallurgy.

Q68. Answer: (b) Tamil Nadu

The correct answer is Tamil Nadu.

Key Points

• Tamil Nadu created history by becoming the first state in India to enact the Right to Information Act in 1997.

• The Tamil Nadu Right to Information Act was passed with the objective of providing access to information under the control of public authorities to promote transparency and accountability in the working of every public authority.

• The legislation allowed citizens to inspect government documents and obtain certified copies, though it initially contained several exemptions for certain categories of information.

• Following Tamil Nadu, Goa became the second state to pass its own RTI Act later in the same year (October 1997).

Additional Information

• Rajasthan:

• The state is considered the birthplace of the RTI movement in India, spearheaded by the Mazdoor Kisan Shakti Sangathan (MKSS) led by Aruna Roy.

• Despite the early movement, the Rajasthan Right to Information Act was formally enacted later in 2000.

• Karnataka:

• The Karnataka Right to Information Act was passed in 2000 to ensure citizens could participate more effectively in the democratic process by accessing administrative records.

• Punjab:

• The Punjab Right to Information Act was enacted in 2002, providing a legal framework for transparency before the central act was introduced.

• RTI Act, 2005:

• The national Right to Information Act, 2005 was passed by the Parliament of India to provide a uniform legal regime for the entire country.

• It replaced the earlier Freedom of Information Act, 2002 and came into force on 12th October 2005, empowering all Indian citizens to seek information from any public authority.

Q69. Answer: (c) Birsa Munda

The correct answer is Birsa Munda.

Key Points

• The Munda Uprising, famously known as the Ulgulan (The Great Tumult), was one of the most significant tribal movements in India, occurring between 1899 and 1900 in the Chotanagpur region.

• The rebellion was led by Birsa Munda, a charismatic young leader who challenged the British Raj, the zamindari system, and the exploitation by dikus (outsiders such as moneylenders and traders).

• The primary cause of the revolt was the destruction of the traditional Khuntkatti land system, where the Munda tribe practiced collective land ownership, which was being replaced by the individualistic British land revenue system.

• Birsa Munda urged his followers to stop paying taxes and to return to their original tribal customs, envisioning the establishment of a Munda Raj.

• He also initiated a socio-religious reform movement, encouraging the tribe to give up liquor, believe in one God named Singbonga, and abandon superstitious practices.

• The movement culminated in an armed struggle where rebels attacked police stations and government officials, but it was eventually suppressed by British forces after a fierce battle at Dumbari Hill in January 1900.

• Following the uprising, Birsa Munda was arrested and died in Ranchi jail on June 9, 1900, but the rebellion successfully compelled the British to pass the Chotanagpur Tenancy Act in 1908.

Additional Information

• Tilka Majhi:

• He was a pioneer tribal leader who led the Pahariya Rebellion against the British East India Company in 1784.

• He is credited with being the first tribal leader to take up arms, and he was eventually executed by the British in 1785 at Bhagalpur.

• Jatra Oraon:

• He founded the Tana Bhagat Movement in 1914 among the Oraon tribe of Jharkhand.

• The movement was a spiritual and social reform struggle that later adopted Gandhian methods of non-violence and civil disobedience.

• Budhu Bhagat:

• He was a key leader of the Kol Rebellion (1831−1832) in the Chotanagpur plateau.

• He fought against the British and local landlords who were imposing heavy taxes and seizing tribal lands.

Q70. Answer: (a) Automated ticket booking

The correct answer is Automated ticket booking.

Key Points

• The service industry, also known as the tertiary sector, involves the provision of intangible services to consumers and businesses, focusing on customer experience rather than the production of physical goods.

• Automated ticket booking is a prominent example of computer application in this sector, particularly within the travel, tourism, and hospitality industries.

• These systems utilize Global Distribution Systems (GDS) and centralized databases to manage real-time inventory, allowing thousands of users to book flights, trains, or events simultaneously.

• The use of computers in this field facilitates electronic commerce (e-commerce), enabling secure online payments and instant digital confirmation, which significantly reduces the need for manual front-desk operations.

• Beyond booking, computers in the service industry are essential for Customer Relationship Management (CRM), banking services, and e-governance, streamlining the interaction between service providers and end-users.

Additional Information

• Automated car manufacturing:

• This represents the secondary sector or the manufacturing industry.

• Computers drive Industry 4.0 technologies, such as Computer-Aided Manufacturing (CAM) and Industrial Robotics, to automate assembly lines and ensure mass production precision.

• Heart surgery monitoring:

• This belongs to the healthcare and medical informatics field.

• Computers are used for real-time physiological monitoring, medical imaging, and robotic-assisted surgery, where low-latency data processing is critical for patient safety.

• Spacecraft navigation:

• This is categorized under scientific research and aerospace engineering.

• It involves high-performance computing (HPC) and Real-Time Operating Systems (RTOS) to calculate complex trajectories and manage telemetry for autonomous space exploration.

Q71. Answer: (b) PLK

The logic follows here,

Thus, the missing term is PLK.

Hence, the correct answer is "option 2"

Q72. Answer: (a) 346

The logic followed here is:

• 391 − 42 = 349

• 349 + 27 = 376

• 376 − 42 = 334
• 334 + 27 = 361
• 361 − 42 = 319
• 319 + 27 = 346

Thus, the missing term in the series is 346.

Hence, the correct answer is 'Option 1';

Q73. Answer: (c) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

(I) No hat is a locket - Follows

(Since all hats are nested entirely within the carpets circle and there is no intersection between carpets and lockets, it is logically impossible for any hat to be a locket.)

(II) Some lockets are carpets - Doesn't follow

(As their is no direct relation establish between locket and carpets may be it is possible but not definte. Hence, it is false)

Only conclusion (I) follows.

Hence, the correct answer is " Option 3"

Q74. Answer: (c) Three

Given: Seven boxes G, H, I, J, K, L and T are kept one over the other but not necessarily in the same order

1. Only T is kept above I.
2. No box is kept below J.
3. Only two boxes are kept between L and J.

Position	Box
7	T
6	I
5	
4	L
3	
2	
1	J

1. H is kept at some place below G but at some place above K.

Final Arrangement:

7	T
6	I
5	G
4	L
3	H
2	K
1	J

Thus, three boxes are kept between T and H.

Hence, the correct answer is 'Option 3'.

Q75. Answer: (c) wc

Logic: The code for a word is determined by comparing phrases to find common words and their respective codes in the given language.

For

Phrase 1: ‘uncle steak gum’ is coded as ‘xl wc iv’

Phrase 2: ‘sir gum barn’ is coded as ‘wc mn ut’

Phrase	Words	Codes
1	uncle, steak, gum	xl, wc, iv
2	sir, gum, barn	wc, mn, ut

Comparing Phrase 1 and Phrase 2, we can observe that:

1) The word gum is the only common word present in both the first and second phrases.

2) The code wc is the only common code present in both the first and second phrases.

Since gum is the only common word, its corresponding code must be wc.

The correct answer is option 3

Q76. Answer: (d) Three

Given: Six boxes H, I, J, K, L, and E are kept one over the other but not necessarily in the same order.

1. Only K is kept above H.

2. Only two boxes are kept above E.

Position	Box
6	K
5	H
4	E
3	
2	
1	

1. E is kept immediately above J.

2. I is kept immediately above L.

Final Arrangement:

Position	Box
6	K
5	H
4	E
3	J
2	I
1	L

Thus, there are three boxes kept between I and K.

Hence, the correct answer is 'Option 4'.

Q77. Answer: (c) 8

The logic follows here,

Arrange the letters of INJURED in alphabetical order.

Original Word	I	N	J	U	R	E	D
Alphabetical Order	D	E	I	J	N	R	U

• Third from the left = I

• Second from the right = R

The letters between I and R are: J, K, L, M, N, O, P, Q

Number of letters = 8

Therefore Hence, the correct answer is "Option B "

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Q78. Answer: (d) ZBM : VXI

The logic follows here,
For 'UQL' related to 'QMH':
For 'CAT' related to 'YWP':
Applying the same logic to 'ZBM':
Thus, ZBM is related to VXI.
Hence, the correct answer is 'Option 4'.

Q79. Answer: (a) INK : MQI

The logic follows here,
For UOM : YRK →
For VSL : ZVJ
Applying for the same logic INK : MQI,
Hence, the correct answer is "Option 1"

Q80. Answer: (a) BK – XF

The logic follows here,
BK − XF,
QE − MA,
LX − HT,
NV − JR,
Therefore, the letter-cluster pair that is different from the others is BK − XF.
Hence, the correct answer is 'Option 1'.

Q81. Answer: (c) (16, 8, 384)

The logic followed here is:
Logic: Third Number = (First Number × Second Number) × 3
For the first set (17, 4, 204)
=> (17 × 4) × 3
=> 68 × 3 = 204.
For the second set (19, 5, 285)
=> (19 × 5) × 3
=> 95 × 3 = 285.
Applying the same logic to the third set (16, 8, 384)
=> (16 × 8) × 3
=> 128 × 3 = 384.
Hence, the correct answer is 'Option 3'.

Q82. Answer: (b) 85 A 5 D 7 B 5 C 22

BODMAS Table:

Letter	Operator
A	÷
B	×
C	•
D	−

Given: 85 A 5 D 7 B 5 C 22
Substituting the signs in place of lettersand following BODMAS rule:
= 85 ÷ 5 − 7 × 5 + 22
= 17 − 7 × 5 + 22
= 17 + 22 − 35
= 39 − 35

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= 4

Hence, the correct answer is " Option 2"

Q83. Answer: (b) VT – LE

The logic follows here,

OM – EY,

VT – LE,

XV – NH,

BZ – RL,

Therefore, the letter-cluster pair that is different from the others is VT – LE.

Hence, the correct answer is 'Option 2'.

Q84. Answer: (b) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

Conclusion :

(I) Some crows are goats- Follows (All ribbons are goats. Some crows are ribbons. Some crows are goats is true)

(II) All goats are crows - Doesn't follow

(All ribbons are goats. Some crows are ribbons.All goats are crows is may be possible but not definite)

Only conclusion (I) follows

Hence, the correct answer is "Option 2"

Q85. Answer: (b) Two

Given: A, B, D, J, O, T and Z are sitting around a circular table facing the center

1. Exactly three people sit between Z and T when counted from the right of Z.

2. B sits second to the left of T.

3. A sits immediately to the left of J.

4. D is not an immediate neighbor of T

The Final Arrangement is,

Two people sit between B and A when counted from the left of A.

Hence, the correct answer is 'Option 2'.

Q86. Answer: (d) QLV

The logic follows here,

Combining these letters, the missing term is QLV.

Hence, the correct answer is "option 4"

Q87. Answer: (c) FKQ

The logic follows here,

Combining the results for each position, the missing term is FKQ.

Hence, the correct answer is "option 3".

Q88. Answer: (a) None

Given : (Left) 8 5 2 8 8 2 3 1 8 8 9 6 6 4 8 6 2 9 9 2 4 6 9 (Right)

Required Conditions : (Odd - Odd - Odd).

(Left) 8 5 2 8 8 2 3 1 8 8 9 6 6 4 8 6 2 9 9 2 4 6 9 (Right)

Therefore, there are None such odd digits.

Hence, the correct answer is 'Option 1'.

Q89. Answer: (a) 2

The logic follows here,

.

Thus, the code for E is 2.

Hence, the correct answer is " Option 1"

Q90. Answer: (a) 203

BODMAS Table:

Letter	Operator
A	•
B	−
C	×
D	÷

Given equation: 126 B 13 A 42 D 7 C 15 = ?

Replace the letters with the signs and using the BODMAS rule.

= 126 − 13 + 42 ÷ 7 × 15

= 126 − 13 + 6 × 15

= 126 − 13 + 90

= 126 + 90 − 13

= 216 − 13

= 203.

Hence, the correct answer is "option 1"

Q91. Answer: (b) Father's mother's father

The family tree diagram is,

Let us first decode the given symbols and then draw a family tree.

Symbol	÷	×	−	•
Meaning	Mother	Husband	Sister	Father

Given : M + N ÷ O − P × Q ÷ R

Therefore, P is the father of R, N is the mother of P, and M is the father of N .M is the Father's mother's father of R.

Hence, the correct answer is 'Option 2'.

Q92. Answer: (b) 146

The logic followed here is:

• 5 + 4 = 9

• 9 + 11 = 20

• 20 + 20 = 40

• 40 + 27 = 67

• 67 + 36 = 103

• 103 + 49 = 152

Thus, the missing term in the series is 146.

Hence, the correct answer is 'Option 2';

Q93. Answer: (b) 32 km towards north

1. Shishir starts from Point Y and drives 75 km towards East.
2. He then takes a left turn, drives 35 km, turns left and drives 38 km.
3. He then takes a left turn and drives 41 km.
4. He takes a right turn, drives 37 km.
5. He then turns left, drives 26 km to stop at Point Z.

The Final Diagram,

The correct answer is 32 km towards north.

Hence, the correct answer is " Option 2"

Q94. Answer: (d) ZWXW

The logic followed in this pattern is

For 'CZAZ' related to 'VSTS':

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For 'EBCB' related to 'XUVU':
Applying the same logic to 'GDED':
Thus, GDED is related to ZWXW.
Hence, the correct answer is 'Option 4'.

Q95. Answer: (a) Three

Given Number	4	3	1	7	8	5	6
Operation	−2	+1	+1	+1	−2	+1	−2
New Digit	2	4	2	8	6	6	4

New Number = 2 4 2 8 6 6 4
Therefore, three digits (2, 4, and 6) appear more than once.
Hence, the correct answer is 'Option 1'.

Q96. Answer: (a) Wife's mother's father

The family tree diagram is

Symbol	@	×	•	÷
Meaning	Mother	Wife	Brother	Father

Given Expression: S ÷ D + R @ Y × H
Based on the tree, Y is the wife of H, R is the mother of Y, and S is the father of R. Therefore, S is the Wife's mother's father of H.
Hence, the correct answer is "Option 1".

Q97. Answer: (a) Two

Given: Eight people, S, T, U, V, W, X, Y and Z, are sitting around a circular table, facing the centre
1. T sits third to the left of W.
2. T sits third to the right of V.
3. X is an immediate neighbour of U and V.
4. Z sits second to the left of S.
The Final Arrangement is,
There are 2 people (V and S) sitting between them.
Hence, the correct answer is 'Option 1'.

Q98. Answer: (d) KN - HU

The logic follows here,
OR - NQ,
GJ - FI,
PS - OR,
KN - HU,
Therefore, the letter-cluster pair that is different from the others is KN - HU.
Hence, the correct answer is 'Option 4'.

Q99. Answer: (b) Three

Given Letter Series:
(Left) T Y E V B I W F X A P D G H M K R Z O L M S (Right)
• The letter sixth from the right end is R.
• The letter fourth from the left end is V.
• The letters between R and V are S, T, and U
• Total number of letters = 3.
Hence, the correct answer is " Option 2"

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Q100. Answer: (a) 92

The logic followed here is:

• Position of Vimal from the top = 28^(th)

• Position of Vimal from the bottom = 65^(th)

Total number of students = (Position of a person from the top + Position of the same person from the bottom) − 1

Total number of students = (28 + 65) − 1

= 93 − 1

= 92

So, there are 92 students in the class.

Hence, the correct answer is 'Option 1'.

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