RRB NTPC (UG) CBT-I Official Paper (Held On: 11 Aug, 2025 Shift 3) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. Why is legal enforceability of rules important in a society?

(a) It provides assurance that others will follow the rules.
(b) To punish minorities
(c) It gives power to the police only.
(d) So people can break them without fear

Q2. Which body acts as the apex at the district level in Panchayati Raj?

(a) Zilla Parishad
(b) Panchayat Samiti
(c) Municipal Corporation
(d) Gram Panchayat

Q3. Where was the 55th World Economic Forum Annual Meeting, 2025, held?

(a) Belgium
(b) Brazil
(c) Switzerland
(d) Peru

Q4. Which river in Jammu and Kashmir has the world's highest railway bridge built over it?

(a) Jhelum
(b) Chenab
(c) Ravi
(d) Beas

Q5. Which of the following Directive Principles of State Policy was added by the Forty-fourth Amendment Act, 1978?

(a) Protection and improvement of the environment and wildlife
(b) Provision for free legal aid to the poor
(c) Participation of workers in industrial management
(d) Reduction of inequalities in income and status among individuals and groups

Q6. Identify the language which is primarily spoken in the state of Mizoram in India from the options below.

(a) Lushai
(b) Nissi
(c) Ao
(d) Mizo

Q7. How does the use of renewable energy contribute to sustainable development?

(a) It rapidly depletes natural ecosystems.
(b) It provides unlimited profits to energy companies.
(c) It increases dependency on fossil fuels.

(d) It reduces environmental pollution and conserves resources

Q8. What is the name of the genome-edited rice variety developed to improve yield and productivity in May 2025?

(a) Malaviya Manila Sinchit Dhan-1 and Pusa Basmati 1121
(b) IR64 and Swarna Sub1
(c) Samba Mahsuri and MTU 1010
(d) DRR Dhan 100 (Kamala) and Pusa DST Rice 1

Q9. Which colonial policy is often blamed for the decline of India's traditional handicraft industries?

(a) Zamindari system
(b) Green revolution
(c) Doctrine of lapse
(d) De-industrialisation policy

Q10. Which is the deadliest species of Plasmodium that causes malaria in humans?

(a) Plasmodium inui
(b) Plasmodium ovale
(c) Plasmodium knowlesi
(d) Plasmodium falciparum

Q11. Which of the following statements correctly distinguishes between the Cabinet and the Council of Ministers?

(a) The Cabinet is not part of the executive, but the Council is part of the executive
(b) The Cabinet is larger and includes all ministers, while the Council is a smaller group
(c) The Cabinet includes senior ministers, while the Council includes all categories of ministers
(d) The Council of Ministers does not include the Prime Minister

Q12. The Immigration and Foreigners Bill 2025, repeals which of the following Acts?

(a) The Immigration (Carriers Liability) Amendment Act, 2005
(b) The Emigration Act, 1983
(c) The Passport (Entry into India) Act, 1920
(d) The Foreign Contribution (Regulation) Act, 2010

Q13. Which of the following is a characteristic of primary memory in a computer?

(a) It is slower than secondary memory.
(b) It is used to back up files externally.
(c) It stores data permanently
(d) It holds data temporarily for quick access during processing.

Q14. What is the area around the equator called where the trade winds from both hemispheres converge?

(a) Polar Front
(b) Subtropical High
(c) Horse Latitudes
(d) Inter-Tropical Convergence Zone (ITCZ)

Q15. Which neighbouring country of India is an island nation in the Indian Ocean?

(a) Maldives
(b) Nepal
(c) Myanmar
(d) Bhutan

Q16. Which of the following is an example of an operating system commonly used on laptops?

(a) Microsoft Word
(b) Adobe Photoshop
(c) Windows 11
(d) Google Chrome

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Q17. What feature of Indus Valley town planning indicates advanced civic amenities and engineering skills of the civilisation?

(a) Underground railways
(b) Drainage systems
(c) Temples
(d) Rock-cut caves

Q18. What was India's rank in the Global Gender Gap Report, 2025?

(a) 130th out of 147 nations
(b) 131st out of 148 nations
(c) 129th out of 148 nations
(d) 135th out of 150 nations

Q19. With which country did India conduct a joint military exercise called 'Cyclone-III' at Mahajan Field Firing Range in Rajasthan in February 2025?

(a) Singapore
(b) France
(c) Egypt
(d) Japan

Q20. Which public sector organisation is the largest provider of surface transport services in India?

(a) Shipping Corporation of India
(b) National Highways Authority of India (NHAI)
(c) Indian Railways
(d) State Transport Corporation

Q21. Which of the following Articles of the Indian Constitution defines the money bill?

(a) Article 112
(b) Article 110
(c) Article 117
(d) Article 105

Q22. The term 'License Raj' is related to which sector of the Indian economy?

(a) Services
(b) Foreign Trade
(c) Industry
(d) Agriculture

Q23. Who was sworn in as the Minister of Education, Women and Child Development in the 2025 Delhi cabinet?

(a) Meenakshi Lekhi
(b) Manjinder Singh Sirsa
(c) Rekha Gupta
(d) Ashish Sood

Q24. In May 2025, an Indian medical team contributed to an international study demonstrating that AI can predict life-threatening heart arrhythmias up to two weeks in advance. Which condition was the AI model primarily designed to predict?

(a) Fast Ventricular Tachycardia
(b) Bradycardia
(c) Heart Block
(d) Atrial Fibrillation

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Q25. In May 2025, who took charge as the new Vice Chief of the Air Staff?

(a) Air Marshal Vijay Kumar Garg
(b) Air Marshal Narmdeshwar Tiwari
(c) Air Marshal Sujeet Pushpakar Dharkar
(d) Air Marshal Nagesh Kapoor

Q26. Who among the following was arrested and imprisoned for refusing to give evidence against Aurobindo Ghosh in the Bande Mataram conspiracy case?

(a) Garimella Satyanarayana
(b) Kanaiyalal Maneklal Munshi
(c) Bipin Chandra Pal
(d) Peer Ali Khan

Q27. Which team did the United States defeat to win the gold medal at the 2025 International Ice Hockey Federation (IIHF) World Championship?

(a) Switzerland
(b) Canada
(c) Sweden
(d) Finland

Q28. The Devi Movement took place in which of the following regions of India?

(a) Western Maharashtra
(b) North Gujarat
(c) South Gujarat
(d) Eastern Madhya Pradesh

Q29. Why is the iron and steel industry called a basic industry?

(a) Because it provides essential raw materials, machinery, and tools to a wide range of other industries
(b) Because it processes naturally available iron ores
(c) Because it mainly produces household consumer items
(d) Because it provides raw materials for other industries

Q30. In February 2021, which of the following was amended, enabling the Ministry of Road Transport and Highways to also look after the development of Ropeways and Alternate Mobility Solutions?

(a) Government of India (Allocation of Business) Rules 1951
(b) Government of India (Allocation of Business) Rules 1981
(c) Government of India (Allocation of Business) Rules 1961
(d) Government of India (Allocation of Business) Rules 1971

Q31. Where is the Genome India data officially hosted during its launch in 2025?

(a) National Genome Archive
(b) HealthTech Data Repository
(c) Indian Science Informatics Centre
(d) Indian Biological Data Centre

Q32. What is the focus of the Scheme of Human Resources Development in Sports?

(a) Training and development of sports professionals
(b) Building swimming pools for agile swimmers
(c) Construction of gyms in every part of India
(d) Establishing fitness clubs for youngsters

Q33. Which of the following locations was among the venues that hosted the inaugural Khelo India Beach Games in 2025?

(a) Diu
(b) Chennai

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(c) Kochi
(d) Goa

Q34. What does privatisation mean in the Indian economic context?
(a) Giving more subsidies to farmers
(b) Making all jobs government-based
(c) Nationalising all banks
(d) Selling government companies to private companies

Q35. In January 2025, how many sportspeople were awarded with the Major Dhyan Chand Khel Ratna Award for the year 2024?
(a) 03
(b) 04
(c) 06
(d) 05

Q36. Which of the following continents is located entirely in the Southern Hemisphere?
(a) South America
(b) Australia
(c) Africa
(d) Europe

Q37. Which of the following Vedas mentions the names of some learned ladies like Viswavara, Apala and Ghosa who composed mantras and attained the rank of Rishis?
(a) The Rigveda
(b) The Samaveda
(c) The Yajurveda
(d) The Atharvaveda

Q38. Which of the following elements is found in the p-block?
(a) Barium
(b) Chromium
(c) Nitrogen
(d) Sodium

Q39. What is the phenomenon called when a wire passes through a block of ice without splitting it and the water refreezes after the wire passes?
(a) Fusion
(b) Condensation
(c) Regelation
(d) Sublimation

Q40. Who among the following promoted, raised funds for and ran the Swadeshi Steam Navigation Company (SSNCo) from Tuticorin, a coastal town in southern Tamil Nadu, to take on the might of the British India Steam Navigation Company?
(a) Garimella Satyanarayana
(b) Velu Nachiyar
(c) Alluri Sitarama Raju
(d) VO Chidambaram Pillai

MATHEMATICS

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Q41. If the 6-digit number N29M11 is divisible by 11, then which of the options below can give a possible correct relation between M and N?

(a) M - N = 7
(b) M = N
(c) M - N = 1
(d) M + N = -7

Q42. A cylinder has its radius reduced by 20% while its height is increased by 40%. What is the percentage change in its volume?

(a) 10.4% decrease
(b) No increase or decrease
(c) 14.2% increase
(d) 12% increase

Q43. The average of first 154 even numbers is

(a) 156
(b) 154.5
(c) 155
(d) 155.5

Q44. By availing two successive discounts of 20% and 10%, a customer got a discount of Rs. 23,800. Determine the marked price of the item.

(a) Rs. 75,000
(b) Rs. 80,000
(c) Rs. 90,000
(d) Rs. 85,000

Q45. Given that 103^(0.2)= x, 103^(0.43)= y and x^z = y^6, then the value of z is close to

(a) 12.9
(b) 11.74
(c) 12.45
(d) 14.16

Q46. 4 years ago, the age of a father was 37 years more than twice his son's age. After how many years, from now, will he be twice his son's age?

(a) 31
(b) 33
(c) 30
(d) 35

Q47. ABCD is a quadrilateral in which AB || DC, and E and F are the mid points of the diagonals AC and BD, respectively. If AB = 45 cm, BC = 96 cm, DC = 53 cm, and AD = 37 cm, then what is the length (in cm) of EF?

(a) 4
(b) 3
(c) 7
(d) 5

Q48. Mohan and Nishant start a business. Mohan invests Rs. 89,000 more than Nishant for 3 months and Nishant invests for 2 months. Mohan's share is Rs. 1,070 more than that of Nishant, out of a total profit of Rs. 4,280. Find the capital contributed by Mohan.

(a) Rs. 8,60,000
(b) Rs. 8,10,000
(c) Rs. 8,90,000
(d) Rs. 8,20,000

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Q49. A number, when increased by 100%, gives 2800. The number is:

(a) 1400
(b) 2800
(c) 700
(d) 4200

Q50. Simplify $x(7x - 4) + 2(x^2 - 2) + 11$.

(a) $9x^2 - 4x + 7$
(b) $9x^2 - 4x - 7$
(c) $-9x^2 - 4x - 7$
(d) $-9x^2 - 4x + 7$

Q51. Simplify $(\cos \alpha)/(1-\sin \alpha)-(1+\sin \alpha)/(\cos \alpha)$

(a) $\sin^2 \alpha$
(b) $\cos^2 \alpha$
(c) 1
(d) 0

Q52. Find the simple interest (in Rs.) on Rs. 4,000 at 7.5% per annum rate of interest deposited on 12 February 2024 and withdrawn on 13 April 2024.

(a) 51
(b) 49
(c) 48
(d) 50

Q53. Evaluate 182^2

(a) 33084
(b) 33074
(c) 33094
(d) 33124

Q54. The population of a district is 356000, out of which 178000 are males. 39% of the population is literate. If 59% males are literate, then what percentage of females are literate?

(a) 16%
(b) 17%
(c) 21%
(d) 19%

Q55. An amount of Rs. 638 is divided among three persons in the ratio of 5 : 17 : 7. The difference between the largest and the smallest shares (in Rs.) in the distribution is:

(a) 331
(b) 264
(c) 170
(d) 190

Q56. The number of prime numbers lying between 393 and 401, both included, is:

(a) 1
(b) 3
(c) 7
(d) 2

Q57. The number 956169 is divisible by which of the following?

(a) 3
(b) 12
(c) 2

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(d) 4

Q58. The sum of the squares of two consecutive even natural numbers is 1460. The sum of the numbers is:

(a) 56
(b) 58
(c) 54
(d) 60

Q59. If 40% of first number is equal to two-sevenths of second number, what is the ratio of first number to the second number?

(a) 5 : 7
(b) 4 : 8
(c) 1 : 9
(d) 8 : 4

Q60. An article is marked at Rs. 4,000. Two successive discounts of 25% and 20% are given. What is the final price?

(a) Rs. 2,500
(b) Rs. 2,400
(c) Rs. 2,560
(d) Rs. 2,600

Q61. A cylindrical rod has an outer curved surface area of 2200 cm^2. If the length of the rod is 16 cm, then the outer radius (in cm) of the rod, correct to two places of decimal, is: (Take $\pi = 22/7$)

(a) 23.95
(b) 21.88
(c) 23.29
(d) 21.09

Q62. A man walks to a viewpoint and returns to the starting point by his car maintaining constant speed and thus takes a total time of 5 hours 30 minutes. He would have gained 3 hours by driving both ways. How long would it have taken for him to walk both ways with same walking speed?

(a) 7 hours 15 minutes
(b) 8 hours 30 minutes
(c) 8 hours 45 minutes
(d) 9 hours 30 minutes

Q63. The selling price of 50 books is equal to the cost price of 19 books. Find the loss or gain percentage.

(a) 100/31% gain
(b) 62% gain
(c) 62% loss
(d) 100/31% loss

Q64. The average weight (in kg) of a family of five members whose weights are 40 kg, 49 kg, 56 kg, 74 kg and 36 kg is:

(a) 52
(b) 50
(c) 51
(d) 53

Q65. The number 861616843 is divisible by which of the following?

(a) 43
(b) 36
(c) 50
(d) 47

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Q66. Find the simple interest (in Rs.) if a sum of Rs. 400 is borrowed for 5.5 years at 16% per annum rate of interest.

(a) 452
(b) 402
(c) 352
(d) 332

Q67. Lokesh and Manoj can complete a certain piece of work in 11 and 15 days, respectively. They started to work together, and after 5 days, Manoj left. In how many days will Lokesh complete the remaining work?

(a) 21/3
(b) 22/3
(c) 72/3
(d) 71/3

Q68. Pipe A can fill a tank in 11 hours, pipe B can fill the same tank in 26 hours and pipe C can fill the same tank in 12 hours. The time taken by them to fill the same tank if they operate together is::

(a) 11256/365 hours
(b) 7256/365 hours
(c) 10256/365 hours
(d) 4256/365 hours

Q69. Yash travels 252 km at 63 km/hr, the next 891 km at 99 km/hr and the next 183 km at 61 km/hr. What is his average speed (in km/hr) for the whole journey? (Round off your answer to two decimal places)

(a) 88.59
(b) 84.55
(c) 82.88
(d) 79.83

Q70. Himanshi bought a toy for Rs. 199, decorated it at a cost of Rs. 9, and sold the toy for Rs. 231. Find the loss or gain percentage.

(a) 585/52% loss
(b) 575/52% loss
(c) 575/52% profit
(d) 575% profit

GENERAL INTELLIGENCE AND REASONING

Q71. Seven bo×es, A, B, C, D, E, F and G, are kept one over the other but not necessarily in the same order.

B is kept second from the bottom. Only three bo×es are kept between B and E. C is kept at one of the positions below B. Only A is kept between E and F. G is kept at one of the positions above E.

How many bo×es are kept between C and D?

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

Q72. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, what will come in place of the question mark (?) in the following equation?

99 A 9 C 12 B 2 D 16 = ?

(a) 26
(b) 12
(c) 35
(d) 19

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Q73. H, I, J, K, U, V and W are sitting around a circular table facing the centre of the table. V sits to the immediate left of I. H sits to the immediate left of J. J sits second to the left of K. W sits third to the left of I. Who sits third to the right of U?

(a) W
(b) H
(c) K
(d) V

Q74. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

ZWR VSN ROJ NKF ?

(a) JGB
(b) JHA
(c) JGA
(d) JHB

Q75. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

GDB OLJ WTR EBZ ?

(a) MHJ
(b) HMJ
(c) HJM
(d) MJH

Q76. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only A is kept above D. Only E is kept between D and F. Only B is kept below G. How many boxes are kept below F?

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

Q77. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

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

(a) UNR
(b) QJM
(c) WPS
(d) SLO

Q78. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) # © 8 4 5 % % 3 8 2 8 2 9 4 £ & % © # £ 1 * (Right)

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

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

Q79. In a certain code language, ‘life is good’ is coded as ‘tu ro na’ and ‘she loves life’ is coded as ‘ko ie na’. How is ‘life’ coded in the given language?

(a) ie
(b) ko
(c) tu
(d) na

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Q80. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

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

(a) IEK
(b) LHN
(c) NJO
(d) FBH

Q81. Suman ranked 22nd from the top and 13th from the bottom in his class. How many students are there in his class?

(a) 32
(b) 34
(c) 33
(d) 31

Q82. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

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

How many such symbols are there, each of which is immediately preceded by an odd number but NOT immediately followed by an even number?

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

Q83. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, what will come in place of the question mark (?) in the following equation?

49 A 7 C 24 D 8 B 2 = ?

(a) 21
(b) 37
(c) 15
(d) 28

Q84. In the following triads, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

CUTS - UCTS - CTSU

AVID - VAID - AIDV

(a) PLAY - LPAY - PAYL
(b) LOAD - OLAD - DOAL
(c) JUTE - UJTE - UTEJ
(d) RACK - RCAK - KCAR

Q85. Six people, L, M, N, O, P and Q are sitting in a row, facing north. Only two people sit to the right of P. Q sits second to the left of M. N is not an immediate neighbour of M. O sits on the immediate right of P. Who sits to the immediate right of L?

(a) M
(b) N
(c) Q
(d) P

Q86. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

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

(a) INN
(b) NRS

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(c) UYZ
(d) JNO

Q87. Ram started from Point A and walked 5 km towards the east, and then, after turning to his right, walked 4 km. He then turned to his right and walked 5 km. Again, he turned to his right and walked 5 km to stop at Point P. In which direction should he walk to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) North
(b) South
(c) East
(d) West

Q88. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) 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:

Some paintings are frame.

All frames are decoratives.

Conclusions:

(I) Some paintings are decoratives.

(II) All decoratives are frame.

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

Q89. What should come in place of the question mark (?) in the given series?

22 26 32 40 50 ?

(a) 62
(b) 70
(c) 76
(d) 84

Q90. Select the triad that follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

BI-EK-GJ

EL-HN-JM

(a) HO-KQ-NP
(b) GO-KQ-NP
(c) GO-LQ-NP
(d) HO-KQ-MP

Q91. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

Some Indians are Americans.

Some Americans are Chinese.

Conclusions (I): No Chinese is an American.

Conclusions (II): All Indians are Chinese.

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

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Q92. What should come in place of the question mark (?) in the given series?

59, 60, 64, 73, 89, ?

(a) 113
(b) 114
(c) 116
(d) 115

Q93. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, what will come in place of the question mark (?) in the following equation?

63 A 7 C 18 D 8 B 2 = ?

(a) 18
(b) 26
(c) 11
(d) 5

Q94. Rouf starts from Point A and drives 4 km towards South. He then takes a left turn, drives 9 km, turns left and drives 8 km. He then takes a left turn and drives 16 km. He takes a final left turn, drives 4 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90° turns only unless specified.)

(a) 5 km to the West
(b) 4 km to the South
(c) 6 km to the South
(d) 7 km to the East

Q95. In the following number-pairs, the second number is obtained by applying certain mathematical operation(s) to the first number. Select the number-pair in which the numbers are related in the same way as are the numbers of the following pairs.

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

16, 47

24, 71

(a) 15, 62
(b) 35, 104
(c) 27, 101
(d) 12, 45

Q96. Each of the digits in the number 9238471 is arranged in ascending order from left to right. What will be the sum of the digits that are second from the left and second from the right in the new number thus formed?

(a) 6
(b) 8
(c) 10
(d) 7

Q97. What should come in place of the question mark (?) in the given series?

81 ? 36 21 11 6

(a) 48
(b) 54
(c) 56
(d) 52

Q98. In a certain code language, ‘YORK’ is coded as ‘0834’ and ‘KRAY’ is coded as ‘3458’. What is the code for ‘A’ in the given code language?

(a) 3
(b) 8

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(c) 4
(d) 5

Q99. FRUZ is related to IVXD in a certain way based on the English alphabetical order. In the same way, RHGP is related to ULJT. To which of the given options is ATPB related, following the same logic?
(a) DESW
(b) DXSF
(c) DFSE
(d) DXFS

Q100. In a certain code language,
A + B means ‘A is the daughter of B’
A − B means ‘A is the father of B’
A × B means ‘A is the son of B’
A ÷ B means ‘A is the sister of B’
Based on the above, how is Q related to D if ‘Q + E − R × C ÷ D’?
(a) Mother
(b) Daughter
(c) Sister
(d) Sister's daughter

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) It provides assurance that others will follow the rules.

The correct answer is It provides assurance that others will follow the rules..

Key Points

• Legal enforceability ensures that individuals adhere to societal rules and regulations, fostering a harmonious and orderly environment.
• It creates a system of accountability, deterring people from violating laws due to potential penalties.
• A legally enforced framework maintains fairness and equality by applying rules uniformly to all members of society.
• It provides a sense of security, as individuals trust that disputes or violations will be resolved through an impartial legal process.
• By ensuring compliance, legal enforceability aids in preventing anarchy and upholding social order and justice.

Additional Information

• Legal enforceability: Refers to the formal application of laws by authorities to ensure compliance and address violations.
• Rule of law: A principle under which all individuals, institutions, and entities are accountable to laws that are fairly applied and enforced.
• Justice system: Plays a crucial role in enforcing legal rules, resolving disputes, and penalizing unlawful actions to maintain social

harmony.

• Social contract theory: Suggests that individuals consent to follow rules and laws in exchange for protection and benefits provided by the society and state.

• Consequences of lawlessness: Lack of legal enforceability can lead to chaos, increased crime rates, and the breakdown of societal structures.

Q2. Answer: (a) Zilla Parishad

The correct answer is Zilla Parishad.

Key Points

• Zilla Parishad is the apex body at the district level in the three-tier Panchayati Raj system in India.

• It functions as the governing and administrative authority for rural development and local self-governance at the district level.

• The Zilla Parishad supervises and coordinates the activities of the Panchayat Samiti and Gram Panchayat under its jurisdiction.

• The members of the Zilla Parishad are elected representatives from various constituencies within the district.

• It is headed by the President, who is elected from among its members, with the District Collector serving as the administrative link between the Zilla Parishad and the state government.

Additional Information

• Panchayati Raj System:

• It is a decentralized form of governance introduced by the 73rd Constitutional Amendment Act of 1992.

• It consists of a three-tier structure: Gram Panchayat (village level), Panchayat Samiti (block level), and Zilla Parishad (district level).

• This system empowers local self-governance and promotes participatory democracy.

• Functions of Zilla Parishad:

• Formulates and implements development plans for the district, focusing on areas such as health, education, and agriculture.

• Coordinates the activities of various departments and monitors the execution of government programs.

• Allocates funds to Panchayat Samitis and oversees their utilization.

• Composition of Zilla Parishad:

• It consists of elected members, representatives of Panchayat Samitis, and members of the Legislative Assembly and Parliament from the district.

• Seats are reserved for Scheduled Castes, Scheduled Tribes, and women as per constitutional provisions.

• Key Legislations:

• The Panchayati Raj System operates under the provisions of the 73rd Amendment Act of the Indian Constitution.

• It is governed by state-specific Panchayati Raj Acts, which outline the roles, responsibilities, and powers of the Zilla Parishad.

Q3. Answer: (c) Switzerland

The correct answer is Switzerland.

Key Points

• The 55th World Economic Forum (WEF) Annual Meeting in 2025 was held in Switzerland.

• Switzerland has been the traditional venue for the World Economic Forum, specifically in the town of Davos, which is renowned for hosting global leaders and industry experts.

• The WEF Annual Meeting serves as a platform for addressing global economic, social, and environmental challenges by bringing together leaders from politics, business, and civil society.

• The forum's theme for 2025 continued its focus on fostering international cooperation and addressing pressing global issues such as climate change, technological advancements, and economic inequality.

• The World Economic Forum was founded in 1971 by Klaus Schwab and has its headquarters in Geneva, Switzerland.

Additional Information

• World Economic Forum (WEF):

• It is a Swiss-based international organization committed to improving the state of the world through public-private cooperation.

• WEF organizes annual meetings where global leaders collaborate to address global challenges.

• Key themes include sustainable development, digital transformation, and global economic trends.

• Davos:

• Davos is a mountain resort town in the Swiss Alps, known for hosting the annual WEF meetings since 1971.

• It is recognized for its high-altitude conference facilities and picturesque scenery.

• The event significantly impacts global decision-making and policy formulation.

• Global Agenda of WEF:

• Each WEF meeting focuses on addressing critical global issues such as climate change, technology, health crises, and geopolitical tensions.
• It brings together leaders from government, business, and civil society to foster collaboration and solutions.
• Importance of Switzerland as a Host Country:
• Switzerland is known for its neutrality and stability, making it an ideal location for hosting international events.
• The country's efficient infrastructure and commitment to sustainability align with the goals of the WEF.

Q4. Answer: (b) Chenab

The correct answer is Chenab.

Key Points

• The Chenab River in Jammu and Kashmir is home to the world's highest railway bridge, known as the Chenab Bridge.
• The Chenab Bridge is part of the Udhampur-Srinagar-Baramulla Rail Link (USBRL) project undertaken by the Indian Railways.
• It stands at a height of 359 meters (1,178 feet) above the riverbed, making it taller than the Eiffel Tower.
• The bridge spans 1,315 meters and is designed to withstand wind speeds up to 266 km/h and earthquakes of high intensity.
• Construction of the Chenab Bridge was completed in 2022, marking a significant engineering achievement in challenging terrain.

Additional Information

• Chenab River: It originates from the Baralacha Pass in Himachal Pradesh and flows through Jammu and Kashmir before entering Pakistan.
• USBRL Project: This ambitious rail link aims to connect the Kashmir Valley with the rest of India, enhancing connectivity and boosting regional development.
• Engineering Challenges: The construction of the Chenab Bridge involved overcoming steep gorges, high-altitude conditions, and seismic challenges.
• Steel Arch Design: The bridge has a steel arch design, making it resilient against geological and climatic challenges in the Himalayan region.
• Strategic Importance: The bridge plays a crucial role in improving transportation and economic integration in Jammu and Kashmir.

Q5. Answer: (d) Reduction of inequalities in income and status among individuals and groups

The correct answer is Reduction of inequalities in income and status among individuals and groups.

Key Points

• The Change: It added Article 38(2) to the Constitution.
• The Goal: It tells the government to reduce the gap between the rich and the poor.
• Beyond Money: It’s not just about income; the government must also work to give everyone equal status, better facilities, and fair opportunities.
• It focuses on helping both individuals and groups (like people in different jobs or different regions).

Additional Information

• Directive Principles of State Policy (DPSP): The DPSPs are guidelines for the state to frame policies and laws aimed at establishing social and economic democracy in the country.
• 44th Amendment Act, 1978: In addition to adding Article 38(2), this amendment also made significant changes, such as restoring the right to property as a legal right rather than a fundamental right.
• Article 39: It provides for the principles of policy that aim to ensure adequate means of livelihood, equal pay for equal work, and protection against economic exploitation.
• Legal Aid System in India: The National Legal Services Authority (NALSA) was set up under the Legal Services Authorities Act, 1987, to provide free legal aid to marginalized sections of society.
• Fundamental Rights vs Directive Principles: While Fundamental Rights are enforceable by the courts, DPSPs are non-justiciable but act as guiding principles for governance.

Q6. Answer: (d) Mizo

The correct answer is Mizo.

Key Points

• Mizo is the primary language spoken in Mizoram, a state in northeastern India.
• The Mizo language is a part of the Tibeto-Burman language family, widely spoken by the Mizos.
• Mizo is the official language of Mizoram and is used in government, education, and communication.
• The language is also known as Lushai or Duhlian, although "Mizo" is the preferred term.
• Mizo is written using the Roman script, which was introduced by Christian missionaries during the colonial period.

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Additional Information

• Mizoram: Mizoram is one of the northeastern states of India, with Aizawl as its capital.

• Mizo Culture: The Mizo people have a rich cultural heritage with traditional dances like Cheraw and music playing a significant role.

• Other Languages: While Mizo is predominant, other languages such as Lai, Mara, and Chakma are also spoken in Mizoram.

• Christian Missionaries: Missionaries were instrumental in the spread of Christianity in Mizoram and contributed to the development of the Mizo script.

• Mizo Literature: Mizo literature primarily consists of folk songs, proverbs, and modern writings that reflect the culture and traditions of the Mizo people.

Q7. Answer: (d) It reduces environmental pollution and conserves resources

The correct answer is It reduces environmental pollution and conserves resources.

Key Points

• Renewable energy sources, such as solar, wind, and hydroelectric power, produce little to no greenhouse gas emissions, helping mitigate climate change.

• Unlike fossil fuels, renewable energy sources do not deplete finite natural resources, ensuring long-term availability.

• By reducing air and water pollution, renewable energy contributes to better public health and reduced healthcare costs.

• Renewable energy supports energy security by reducing dependency on imported fuels and diversifying energy sources.

• It promotes economic development by creating jobs in the renewable energy sector and fostering innovation in green technologies.

Additional Information

• Renewable Energy: Energy derived from natural sources that are replenished constantly, such as sunlight, wind, and water.

• Greenhouse Gas Emissions: Gases like carbon dioxide and methane that trap heat in the atmosphere, leading to global warming.

• Energy Security: The ability of a nation to ensure reliable and affordable energy supply for its population and economy.

• Sustainable Development: Development that meets current needs without compromising the ability of future generations to meet their own needs.

• Environmental Pollution: The contamination of air, water, and soil due to harmful substances, which can be reduced by adopting clean energy solutions.

Q8. Answer: (d) DRR Dhan 100 (Kamala) and Pusa DST Rice 1

The correct answer is DRR Dhan 100 (Kamala) and Pusa DST Rice 1.

Key Points

• DRR Dhan 100 (Kamala) and Pusa DST Rice 1 are genome-edited rice varieties developed in May 2025 to improve yield and productivity.

• Both varieties utilize genome editing technologies such as CRISPR/Cas9 to enhance traits like drought tolerance and pest resistance.

• The development of these varieties aligns with India's focus on leveraging advanced biotechnology for sustainable agricultural practices.

• These rice varieties are designed to address challenges such as climate change and diminishing arable land while boosting food security.

• Genome editing in agriculture involves precise modifications to specific genes without introducing foreign DNA, ensuring safety and consumer acceptance.

Additional Information

• Genome Editing: Genome editing involves precise changes to the DNA of an organism, enabling targeted enhancements without introducing foreign DNA.

• CRISPR/Cas9 Technology: A revolutionary genome editing tool that allows researchers to edit specific genes with high accuracy and efficiency.

• Benefits of Genome-edited Crops: Include improved yield, resistance to pests, tolerance to environmental stress, and reduced reliance on chemical fertilizers.

• Importance in Food Security: Such advancements contribute significantly to addressing food shortages and ensuring sustainable agricultural practices in the face of climate change.

• Regulation of Genome-edited Crops: Countries adopt varying regulatory frameworks, with India emphasizing safety, environmental sustainability, and public acceptance in agricultural biotechnology.

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Q9. Answer: (d) De-industrialisation policy

The correct answer is De-industrialisation policy.

Key Points

• The British colonial policy of de-industrialisation led to the systematic decline of India's traditional handicraft industries.

• Under British rule, India was transformed into an exporter of raw materials and an importer of British manufactured goods, disrupting indigenous industries.

• Heavy taxation and the influx of cheap machine-made British goods destroyed the market for handmade Indian products like textiles and handicrafts.

• The decline of handicraft industries led to widespread unemployment among artisans and craftsmen, adversely impacting local economies.

• The de-industrialisation policy was a key factor in the economic stagnation of India during the colonial period, contributing to poverty and dependency on agriculture.

Additional Information

• Industrial Revolution and De-industrialisation: The Industrial Revolution in Britain enabled mass production of goods, replacing handmade Indian products in international markets.

• Drain of Wealth Theory: Economic historian Dadabhai Naoroji highlighted how the British drained India's wealth through unfair trade practices and exploitation.

• Impact on Indian Textile Industry: India’s flourishing textile industry was heavily impacted as British goods flooded the markets, forcing many weavers to abandon their traditional crafts.

• Shift to Agriculture: With the collapse of handicrafts, a significant portion of the population shifted to agriculture, increasing dependency and creating economic imbalances.

• Rise of Famines: The economic policies led to reduced income and widespread poverty, contributing to frequent famines during British rule in India.

Q10. Answer: (d) Plasmodium falciparum

The correct answer is Plasmodium falciparum.

Key Points

• Plasmodium falciparum is the deadliest species of Plasmodium responsible for malaria in humans.

• It causes the most severe form of malaria, known as malignant malaria, which can lead to cerebral malaria and organ failure.

• This species is responsible for the majority of malaria-related deaths globally, especially in sub-Saharan Africa.

• Plasmodium falciparum has a high reproduction rate in red blood cells, leading to severe anemia and complications.

• The parasite has developed resistance to some antimalarial drugs, making treatment and control challenging.

Additional Information

• Plasmodium species: There are five species of Plasmodium known to infect humans: P. falciparum, P. vivax, P. malariae, P. ovale, and P. knowlesi.

• Life cycle of Plasmodium: The parasite has a complex life cycle involving two hosts: the Anopheles mosquito (vector) and humans.

• Cerebral malaria: A severe form of malaria caused by P. falciparum, leading to neurological complications such as seizures, coma, and even death.

• Drug resistance: P. falciparum has shown resistance to multiple antimalarial drugs, including chloroquine, making treatment more difficult.

• Global impact: Malaria caused by P. falciparum is a major public health issue, with the World Health Organization (WHO) estimating over 600,000 deaths annually, mostly among children under five years of age in Africa.

Q11. Answer: (c) The Cabinet includes senior ministers, while the Council includes all categories of ministers

The correct answer is The Cabinet includes senior ministers, while the Council includes all categories of ministers.

Key Points

• The Cabinet is a smaller body within the Council of Ministers, composed of senior ministers holding important portfolios such as Finance, Defence, and Home Affairs.

• The Council of Ministers consists of three categories: Cabinet Ministers, Ministers of State, and Deputy Ministers.

• The Cabinet is the decision-making body responsible for major policies and key issues, while the Council of Ministers assists in broader governmental functions.

• The Prime Minister is part of both the Cabinet and the Council of Ministers, serving as the head of the government.

• The Cabinet exercises executive authority and is collectively responsible to the Parliament, particularly the Lok Sabha.

Additional Information

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• Cabinet Ministers: These are senior members of the Council of Ministers who head important ministries like Finance, Defence, Home, External Affairs, etc.

• Ministers of State: These are junior ministers who either work independently or assist Cabinet Ministers in their duties.

• Deputy Ministers: They assist both Cabinet Ministers and Ministers of State in their specific responsibilities.

• The Council of Ministers, including the Cabinet, is collectively responsible to the Lok Sabha as per Article 75 of the Indian Constitution.

• Prime Minister's Role: The Prime Minister leads the Cabinet and the Council of Ministers, acts as the chief advisor to the President, and coordinates the functioning of all ministries.

Q12. Answer: (c) The Passport (Entry into India) Act, 1920

The correct answer is The Passport (Entry into India) Act, 1920.

Key Points

• The Immigration and Foreigners Bill 2025 aims to modernize and consolidate laws related to immigration and foreigners in India.

• The bill seeks to repeal the Passport (Entry into India) Act, 1920, which governs the entry of foreigners into India through passports and visas.

• This Act was enacted during the colonial era and is considered outdated in addressing modern-day immigration challenges.

• The new bill emphasizes streamlining immigration processes and addressing issues such as illegal immigration and national security concerns.

• The proposed legislation introduces enhanced measures for monitoring, regulating, and facilitating immigration in alignment with current global standards.

Additional Information

• The Passport (Entry into India) Act, 1920:

• It was implemented during British rule in India to regulate the entry of foreigners.

• Required individuals entering India to hold valid passports or travel documents.

• Primarily focused on controlling immigration during colonial times.

• Foreign Contribution (Regulation) Act, 2010:

• Regulates the acceptance and utilization of foreign contributions by individuals, associations, and companies.

• Aims to prevent misuse of foreign funds for activities detrimental to national interests.

• Emigration Act, 1983:

• Deals with the regulation of emigration of Indian citizens for employment abroad.

• Provides safeguards to protect Indian workers from exploitation overseas.

• Immigration (Carriers Liability) Amendment Act, 2005:

• Imposes obligations on carriers to ensure passengers have valid travel documents before entering India.

• Part of efforts to control illegal immigration into the country.

Q13. Answer: (d) It holds data temporarily for quick access during processing.

The correct answer is It holds data temporarily for quick access during processing..

Key Points

• Primary memory is a volatile form of memory, meaning it stores data temporarily and loses data when the power is turned off.

• It facilitates quick access to data, enabling faster execution of processes by the CPU during computation.

• Examples of primary memory include RAM (Random Access Memory) and cache memory, which provide high-speed data retrieval.

• The main function of primary memory is to store data and instructions that are actively being used by the CPU.

• Primary memory is much faster but has limited storage capacity compared to secondary memory.

Additional Information

• Primary Memory: Also called main memory, it includes RAM and ROM. RAM is volatile, while ROM is non-volatile and stores essential system instructions.

• Secondary Memory: Non-volatile storage used for long-term data storage, such as hard drives, SSDs, and external storage devices.

• Cache Memory: A smaller, faster type of volatile memory located close to the CPU, it stores frequently used data for quick access.

• Volatile vs. Non-Volatile Memory: Volatile memory (e.g., RAM) requires power to maintain data, whereas non-volatile memory (e.g., ROM, SSD) retains data even when powered off.

• Memory Hierarchy: Primary memory is at the top of the memory hierarchy due to its speed, followed by secondary and tertiary

storage options.

Q14. Answer: (d) Inter-Tropical Convergence Zone (ITCZ)

The correct answer is Inter-Tropical Convergence Zone (ITCZ).

Key Points

• The Inter-Tropical Convergence Zone (ITCZ) is a region near the equator where trade winds from the northern and southern hemispheres converge.

• This convergence causes warm, moist air to rise, leading to frequent thunderstorms and heavy precipitation.

• The ITCZ shifts north and south of the equator throughout the year due to the Earth's axial tilt and orbit around the Sun.

• It is often referred to as the "doldrums" because of the calm winds and low-pressure conditions that prevail in this region.

• The ITCZ plays a critical role in global weather patterns and is a major factor in the formation of tropical cyclones and monsoon systems.

Additional Information

• Trade Winds: These are steady winds that blow from the east towards the equator, originating from the high-pressure regions in both hemispheres.

• Polar Front: This is the boundary between the cold polar air masses and the warmer air masses of the mid-latitudes, unrelated to the ITCZ.

• Horse Latitudes: These are regions of high pressure and calm winds located at about 30°N and 30°S latitudes, distinct from the ITCZ.

• Monsoons: The shifting of the ITCZ plays a significant role in the development of monsoon systems, especially in regions like South Asia and West Africa.

• Climatic Impact: The ITCZ contributes to the tropical climate and is responsible for the wet and dry seasons in equatorial regions.

Q15. Answer: (a) Maldives

The correct answer is Maldives.

Key Points

• The Maldives is a sovereign island nation located in the Indian Ocean, southwest of India and Sri Lanka.

• It consists of approximately 1,192 coral islands grouped in 26 atolls, making it one of the most geographically dispersed countries in the world.

• Malé is the capital city of the Maldives and is one of the smallest capitals in the world.

• The Maldives is renowned for its tourism industry, featuring luxury resorts and pristine beaches, attracting millions of visitors annually.

• It is also the lowest-lying country globally, with an average elevation of just 1.5 meters above sea level, making it highly vulnerable to climate change and rising sea levels.

Additional Information

• Geographical Location: The Maldives lies strategically in the Indian Ocean, forming an important maritime route between the Middle East and Southeast Asia.

• Economy: Tourism is the largest contributor to the Maldivian economy, with fisheries and agriculture playing secondary roles.

• Historical Significance: The Maldives has a rich cultural heritage influenced by South Asian, Arab, and African cultures due to its location along ancient trade routes.

• Political Structure: The Maldives is a presidential republic, and its current constitution was adopted in 2008.

• Environmental Concerns: The Maldives is actively involved in international efforts to combat climate change, as rising sea levels threaten its existence.

Q16. Answer: (c) Windows 11

The correct answer is Windows 11.

Key Points

• Windows 11 is the latest operating system developed by Microsoft, specifically designed to optimize performance and user experience on laptops and PCs.

• It was officially released on October 5, 2021, as the successor to Windows 10.

• The operating system features a redesigned user interface, including a centered Start menu, updated taskbar, and new window management tools like Snap Layouts.

• Windows 11 supports enhanced security features such as Secure Boot, TPM 2.0, and Windows Hello for biometric authentication.

• It is compatible with most modern laptops and desktops, provided they meet specific hardware requirements, such as a minimum of 4GB RAM and 64GB storage.

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Additional Information

• Operating System (OS):

• An OS is software that acts as an intermediary between hardware and the user, managing system resources and facilitating program execution.

• Common types of operating systems include Windows, macOS, Linux, Android, and iOS.

• Operating systems handle tasks such as memory management, file systems, process scheduling, and security.

• Microsoft Corporation:

• Microsoft is an American multinational technology company founded by Bill Gates and Paul Allen in 1975.

• It is one of the largest software companies globally and is known for its Windows operating system and Office suite.

• Microsoft has expanded into hardware, cloud computing, and artificial intelligence sectors over the years.

• Other Examples of Operating Systems:

• macOS: Developed by Apple Inc., specifically for Mac computers.

• Linux: Open-source operating system widely used for servers, desktops, and embedded systems.

• Chrome OS: A lightweight OS developed by Google, designed for Chromebooks and focused on web-based applications.

• Key Features of Windows 11:

• Virtual Desktops: Allows users to create multiple desktops for different tasks.

• DirectStorage: Optimized for gaming, enabling faster load times and improved graphics performance.

• Microsoft Teams Integration: Built directly into the OS for seamless communication.

• Widgets: Provides quick access to news, weather, and personalized updates.

• Enhanced Touch, Pen, and Voice Support: Designed for hybrid devices and improved accessibility.

Q17. Answer: (b) Drainage systems

The correct answer is Drainage systems.

Key Points

• The Indus Valley Civilization featured advanced drainage systems, showcasing their engineering expertise and focus on urban planning.

• Each house in cities like Mohenjo-Daro and Harappa had access to a private or public drainage system connected to larger drains in the streets.

• The drains were covered with bricks and had inspection holes for regular cleaning and maintenance.

• The systematic layout of these drainage systems ensured hygienic living conditions and effective waste management, demonstrating a deep understanding of sanitation.

• The presence of these systems indicates the importance given to civic amenities by the Indus Valley people.

Additional Information

• Town Planning in the Indus Valley Civilization:

• The cities were planned in a grid pattern, with streets intersecting at right angles.

• Buildings were constructed using standardized baked bricks, indicating advanced architectural techniques.

• Great Bath of Mohenjo-Daro:

• It was a large, rectangular tank believed to be used for ritual bathing, showcasing advanced waterproofing and drainage technology.

• Water Management:

• Wells and reservoirs were common features, ensuring access to clean water across the cities.

• Significance of Urban Planning:

• The structured planning reflects a high level of administrative control and social organization in the civilization.

Q18. Answer: (b) 131st out of 148 nations

The correct answer is 131st out of 148 nations.

Key Points

• India ranked 131st out of 148 countries in the Global Gender Gap Report 2025, reflecting its position in gender parity globally.

• The report is published annually by the World Economic Forum (WEF) and measures gender-based gaps in economic participation, education, health, and political empowerment.

• India's performance showed progress in areas like women's political empowerment, where it has a relatively higher global ranking.

• However, India faced challenges in closing gaps in areas such as economic participation and opportunity, and health and survival metrics.

• The report provides a comprehensive ranking system to help countries identify areas for improvement in gender parity.

Additional Information

• Global Gender Gap Report:

• Published by the World Economic Forum since 2006.

• It benchmarks gender parity across four key dimensions: Economic Participation, Educational Attainment, Health and Survival, and Political Empowerment.

• Uses a scoring system where 1 indicates full parity and 0 indicates disparity.

• India's Gender Parity Challenges:

• Women continue to face barriers in economic participation due to low workforce representation and unequal wage gaps.

• Health and survival metrics are impacted by issues like gender-based violence and access to healthcare.

• Global Trends:

• Iceland has consistently ranked as the most gender-equal country globally.

• The report estimates that it will take over 135 years to achieve global gender parity.

• India's Initiatives for Gender Equality:

• Programs like Beti Bachao, Beti Padhao aim to improve the status of women and girls.

• Legislation such as the Maternity Benefit (Amendment) Act seeks to provide economic security for working women.

• Several schemes like Mahila E-Haat and STEP (Support to Training and Employment Programme for Women) encourage women's empowerment and entrepreneurship.

Q19. Answer: (c) Egypt

The correct answer is Egypt.

Key Points

• Cyclone-III was a joint military exercise conducted between India and Egypt in February 2025.

• The exercise took place at the Mahajan Field Firing Range in Rajasthan, showcasing the military collaboration between the two nations.

• This exercise focused on enhancing interoperability and operational capabilities in counter-terrorism operations.

• India and Egypt signed a strategic partnership agreement in January 2023, which emphasizes cooperation in defense and security.

• Egypt has been strengthening bilateral ties with India, including participation in India's Republic Day celebrations as the Chief Guest in 2023.

Additional Information

• India-Egypt Relations: The two countries share strong cultural and historical ties dating back to ancient civilizations, with cooperation in trade, defense, and diplomacy.

• Defense Cooperation: India and Egypt have conducted joint military exercises, exchanged military delegations, and engaged in defense technology collaboration.

• Mahajan Field Firing Range: Located in Rajasthan, it is one of the largest military training areas in India, used for various military exercises and training programs.

• Counter-Terrorism Operations: Joint exercises like Cyclone-III focus on building capabilities in combating terrorism and addressing asymmetric warfare scenarios.

• Strategic Partnership: The India-Egypt strategic partnership emphasizes areas such as trade, defense, renewable energy, and counter-terrorism cooperation.

Q20. Answer: (c) Indian Railways

The correct answer is Indian Railways.

Key Points

• Indian Railways is the largest provider of surface transport services in India, operating a vast network of trains across the country.

• Founded in 1853, Indian Railways is one of the world's largest railway networks, with over 68,000 kilometers of track.

• It operates passenger trains, freight services, and suburban rail systems, connecting urban and rural areas efficiently.

• Indian Railways carries over 23 million passengers daily and handles more than 1.2 billion tons of freight annually.

• It is managed by the Ministry of Railways, Government of India, and serves as a crucial backbone for India's economy and mobility.

Additional Information

• Indian Railways Zones: The network is divided into 18 zones, including Northern Railway, Southern Railway, Eastern Railway, and Western Railway, each managed by a zonal headquarters.

• Freight Operations: Indian Railways plays a vital role in transporting goods such as coal, iron ore, fertilizers, and agricultural produce across the country.

• Employment: Indian Railways is one of the largest employers globally, with over 1.3 million employees.

• Electrification: More than 80% of India's railway network is electrified, aiming for 100% electrification by 2030 as part of its sustainability goals.

• Technological Advancements: Indian Railways is continuously upgrading its infrastructure, introducing high-speed trains like Vande Bharat Express and improving passenger amenities.

Q21. Answer: (b) Article 110

The correct answer is Article 110.

Key Points

• Article 110 of the Indian Constitution defines what constitutes a Money Bill.

• A Money Bill deals exclusively with matters specified in Article 110(1), such as taxation, public expenditure, and borrowing by the government.

• Money Bills can only be introduced in the Lok Sabha and require the recommendation of the President of India before introduction.

• The Rajya Sabha cannot amend or reject a Money Bill; it can only make recommendations, which the Lok Sabha can accept or reject.

• Speaker of the Lok Sabha has the final authority to decide whether a Bill is a Money Bill or not.

Additional Information

• Money Bill: A type of financial legislation that deals solely with financial matters specified in Article 110, such as imposition, abolition, remission, alteration, or regulation of taxes.

• Difference from Financial Bill: A Financial Bill can include provisions related to money matters but also contains clauses beyond the scope of Article 110. It can be introduced in either House of Parliament.

• Procedure for Money Bill: After passing the Lok Sabha, the Money Bill is sent to the Rajya Sabha, which must return it within 14 days. If not returned, it is deemed to be passed.

• Examples of Money Bills: Appropriation Bill and Finance Bill are examples of Money Bills in India.

• Role of President: The President's recommendation is mandatory for introducing a Money Bill in the Lok Sabha, as per Article 110.

Q22. Answer: (c) Industry

The correct answer is Industry.

Key Points

• The term 'License Raj' refers to the elaborate system of licenses, regulations, and red tape required to set up and run businesses in India, primarily affecting the industrial sector.

• It was introduced after India gained independence in 1947 as part of the country's planned economic development strategy under a socialist framework.

• The License Raj system required businesses to seek approvals from multiple government agencies before starting new projects or expanding existing operations.

• The system was characterized by excessive bureaucratic interference, which often led to inefficiency and corruption in the industrial sector.

• The License Raj was significantly dismantled during the economic reforms initiated in 1991, which aimed to liberalize the Indian economy and reduce government control over industries.

Additional Information

• Economic Reforms of 1991:

• The reforms were introduced by the government of P.V. Narasimha Rao and then Finance Minister Dr. Manmohan Singh.

• They aimed to liberalize the Indian economy by reducing tariffs, deregulating markets, and opening up the economy to foreign investments.

• The policy marked a significant departure from the License Raj system, allowing industries to grow with fewer restrictions.

• Impact of License Raj on Industry:

• Discouraged entrepreneurship and innovation due to excessive bureaucratic control.

• Led to inefficiencies and delays in industrial projects.

• Encouraged corruption as businesses often had to bribe officials to obtain licenses.

• Post-1991 Industrial Growth:

• The economic reforms led to the liberalization of the industrial sector, resulting in increased foreign investments.

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• Industries experienced greater autonomy and growth due to the reduction of restrictive regulations.
• Globalization and the Indian Economy:
• Globalization post-1991 enabled Indian industries to compete in the global market.
• It facilitated the growth of sectors such as information technology and manufacturing.

Q23. Answer: (c) Rekha Gupta

The correct answer is Rekha Gupta.

Key Points

• Rekha Gupta was sworn in as the Minister of Education, Women and Child Development in the Delhi Cabinet in 2025.
• She has been an active political figure, associated with key initiatives related to education and women's empowerment in Delhi.
• Her appointment reflects a focus on improving access to education and addressing issues concerning women and children in the region.
• Rekha Gupta has previously been recognized for her contributions towards social welfare and community development.
• Under her leadership, the Delhi government aims to bring progressive reforms in education and child development sectors.

Additional Information

• Role of Education Minister: Responsible for formulating policies, implementing educational reforms, and improving accessibility and quality of education for all sections of society.
• Women and Child Development Ministry: Focuses on welfare programs for women and children, including schemes related to nutrition, education, and protection from abuse and exploitation.
• Delhi Cabinet: Comprises ministers who oversee various departments and ensure the implementation of policies aligned with the state government's vision.
• Educational Reforms in Delhi: Delhi has been recognized for its efforts in improving public education through initiatives such as "Happiness Curriculum" and upgrading government schools.
• Women Empowerment Initiatives: Focuses on areas such as skill development, safety measures, gender equality, and financial independence for women in Delhi.

Q24. Answer: (a) Fast Ventricular Tachycardia

The correct answer is Fast Ventricular Tachycardia.

Key Points

• Fast Ventricular Tachycardia is a life-threatening cardiac arrhythmia characterized by a rapid heart rate that originates from the ventricles of the heart.
• The AI model used in the study demonstrated the ability to predict the onset of Fast Ventricular Tachycardia up to two weeks in advance, allowing for timely medical intervention.
• Early detection and intervention are crucial as untreated Fast Ventricular Tachycardia can lead to ventricular fibrillation, a condition that can result in cardiac arrest.
• This achievement signifies a major advancement in leveraging AI for predictive healthcare and improved cardiac patient outcomes.
• The study underscores the potential for AI models to analyze complex patterns in cardiac data, such as ECG readings, to identify early warning signs of arrhythmias.

Additional Information

• Ventricular Tachycardia (VT):
• VT is a type of arrhythmia where the lower chambers of the heart (ventricles) beat very fast, reducing the heart's ability to pump blood effectively.
• It is often associated with underlying heart disease, such as coronary artery disease or cardiomyopathy.
• If untreated, VT can progress to ventricular fibrillation, causing cardiac arrest.
• Artificial Intelligence in Healthcare:
• AI tools analyze large datasets, such as medical imaging, patient records, and wearable device data, to detect patterns and predict health outcomes.
• AI-based predictive models can identify potential health risks before symptoms appear, enabling preventive measures and reducing mortality rates.
• In cardiology, AI algorithms are used to interpret ECGs, identify arrhythmias, and predict the likelihood of cardiac events.
• Electrocardiogram (ECG):
• An ECG is a test that records the electrical activity of the heart and is commonly used to diagnose arrhythmias and other heart conditions.
• Abnormal ECG patterns can indicate arrhythmias like Fast Ventricular Tachycardia or other cardiac issues.

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• Significance of Early Detection:

• Early identification of arrhythmias can help prevent complications such as heart failure, stroke, or sudden cardiac death.

• Predictive technologies allow for timely medical interventions, such as the use of implantable cardioverter defibrillators (ICDs) or medications.

• This can significantly improve patient survival rates and quality of life.

Q25. Answer: (b) Air Marshal Narmdeshwar Tiwari

The correct answer is Air Marshal Narmdeshwar Tiwari.

Key Points

• Air Marshal Narmdeshwar Tiwari assumed charge as the Vice Chief of the Air Staff in May 2025.

• He has an extensive career in the Indian Air Force (IAF) and brings decades of experience in operational planning and strategic leadership.

• Prior to this appointment, Air Marshal Tiwari served as the AOC-in-C (Air Officer Commanding-in-Chief) of a key command in the IAF.

• He is recognized for his contributions towards enhancing India's aerial defense capabilities.

• Air Marshal Tiwari has been awarded several prestigious military honors for his service, including the Ati Vishisht Seva Medal (AVSM).

Additional Information

• Vice Chief of the Air Staff

• The Vice Chief of the Air Staff is the second-highest-ranking officer in the Indian Air Force, reporting directly to the Chief of the Air Staff.

• This position is critical in overseeing operations, strategy, and personnel management across the Air Force.

• The Vice Chief plays a pivotal role in executing defense policies and modernizing the air force infrastructure.

• Indian Air Force (IAF)

• The IAF was officially established on October 8, 1932, and is one of the most powerful air forces globally.

• The primary mission of the IAF is to secure Indian airspace and conduct aerial warfare during armed conflicts.

• It operates a wide range of aircraft, including fighter jets, transport planes, helicopters, and UAVs.

• Awards and Honors in the Indian Armed Forces

• The Ati Vishisht Seva Medal (AVSM) is awarded for distinguished service of an exceptional order.

• Other prominent awards include the Param Vishisht Seva Medal (PVSM) and the Vishisht Seva Medal (VSM).

• These awards recognize acts of bravery, leadership, and exemplary service in the armed forces.

• Aerial Defense in India

• India's air defense system includes advanced fighter jets like the Sukhoi Su-30MKI, Rafale, and Tejas.

• India is also focusing on indigenous development of defense technologies under the 'Make in India' initiative.

• Missile defense systems such as Akash and BrahMos are integral to India's defense strategy.

Q26. Answer: (c) Bipin Chandra Pal

The correct answer is Bipin Chandra Pal.

Key Points

• Bipin Chandra Pal was a prominent freedom fighter and one of the leaders of the Indian National Movement.

• He was associated with the Bande Mataram newspaper, which played a critical role in the Swadeshi movement.

• Pal refused to testify against Aurobindo Ghosh during the Bande Mataram conspiracy trial in 1907, displaying his unwavering commitment to the nationalist cause.

• His refusal to testify led to his arrest and imprisonment, making him a symbol of resistance against colonial oppression.

• Pal was one of the Lal-Bal-Pal trio, consisting of Lala Lajpat Rai, Bal Gangadhar Tilak, and Bipin Chandra Pal, who were key figures in advocating aggressive nationalism.

Additional Information

• Bande Mataram newspaper:

• An English-language newspaper started by Aurobindo Ghosh in 1905 during the Swadeshi Movement.

• It was known for its fierce criticism of British colonial rule and advocacy of Indian independence.

• It played a vital role in spreading nationalist ideas during the freedom struggle.

• Aurobindo Ghosh:

• Aurobindo Ghosh was a prominent nationalist leader, philosopher, and spiritual thinker in the Indian independence movement.

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• He actively participated in the Swadeshi movement and was one of the leading figures in the Bengal partition protests.
• Later in his life, he became a spiritual guru and founded the Aurobindo Ashram in Pondicherry.
• Swadeshi Movement:
• Launched in 1905 as a response to the partition of Bengal by the British.
• The movement emphasized the boycott of British goods and the promotion of Indian-made products.
• It marked a significant phase in India's struggle for independence.
• Lal-Bal-Pal:
• A trio of prominent leaders: Lala Lajpat Rai, Bal Gangadhar Tilak, and Bipin Chandra Pal.
• They were known for their radical approach toward achieving independence.
• Their efforts significantly influenced the Indian freedom struggle and inspired the youth to actively participate in the movement.

Q27. Answer: (a) Switzerland

The correct answer is Switzerland.

Key Points

• The United States defeated Switzerland to win the gold medal at the 2025 International Ice Hockey Federation (IIHF) World Championship.
• The USA team displayed exceptional performance throughout the tournament, showcasing their dominance in ice hockey.
• Switzerland reached the finals after defeating high-ranking teams, marking a significant achievement in their history at the IIHF World Championship.
• The victory brought the USA its latest gold medal in the IIHF World Championship, adding to their impressive record in international ice hockey.

Additional Information

• International Ice Hockey Federation (IIHF):
• Founded in 1908, the IIHF is the governing body for international ice hockey competitions and development.
• The IIHF World Championship is one of the most prestigious tournaments in ice hockey, held annually.
• Switzerland's Ice Hockey History:
• Switzerland has been a consistent competitor in the IIHF World Championship, often reaching the playoffs.
• Their appearance in the finals of the 2025 championship was a highlight moment for Swiss ice hockey.
• USA Ice Hockey Team:
• The USA has a strong tradition in ice hockey and is considered one of the top teams globally.
• It has won several gold medals in international competitions, including the Olympics and World Championships.
• IIHF World Championship Format:
• The tournament features top national teams competing in a round-robin format followed by playoffs.
• The championship serves as a platform for showcasing the highest level of ice hockey talent globally.

Q28. Answer: (c) South Gujarat

The correct answer is South Gujarat.

Key Points

• The Devi Movement occurred in South Gujarat, particularly among tribal communities.
• It was a socio-religious reform movement focused on eradicating superstitions and promoting education and social justice.
• The movement was led by tribal leaders and reformers in the region during the mid-20th century.
• The term "Devi Movement" comes from the belief in the goddess (Devi), symbolizing empowerment and transformation within tribal society.
• The movement aimed to improve the status of women and fight against oppressive practices in the tribal communities of South Gujarat.

Additional Information

• Tribal Movements in India: Tribal movements have historically aimed to address exploitation, social injustices, and economic deprivation faced by indigenous communities.
• Social Reform Movements: Such movements often focus on education, gender equality, eradication of harmful practices, and empowerment of marginalized groups.
• South Gujarat Tribes: The region is home to several tribal groups, including Bhils, Chaudhuris, and Dhodias, who were significant participants in the Devi Movement.
• Impact of the Devi Movement: The movement led to significant social changes, such as a decline in superstition and the adoption of modern practices within tribal communities.

• Connection to Tribal Identity: The movement reinforced a sense of cultural pride and identity among South Gujarat's tribal population while encouraging societal progress.

Q29. Answer: (a) Because it provides essential raw materials, machinery, and tools to a wide range of other industries

The correct answer is Because it provides essential raw materials, machinery, and tools to a wide range of other industries.

Key Points

• The iron and steel industry is referred to as a basic industry because it supplies raw materials, machinery, and tools to numerous other industries including construction, transportation, and manufacturing.

• It serves as the backbone of industrial development, enabling the production of goods and infrastructure.

• Steel is integral to the production of equipment, vehicles, and machinery used across industries, highlighting its foundational role.

• Industries like shipbuilding, automobile manufacturing, and heavy engineering rely heavily on iron and steel as their primary materials.

• Its contribution extends to infrastructure development, including bridges, railways, and buildings, making it a key industry in economic growth.

Additional Information

• Iron Ore: The primary raw material used in the production of iron and steel. India is rich in iron ore reserves, making the industry a major contributor to the economy.

• Steel Production: Involves processes such as smelting iron ore in blast furnaces and refining it into steel through various methods like basic oxygen steelmaking or electric arc furnaces.

• Infrastructure Dependency: Modern infrastructure projects, such as bridges, highways, and skyscrapers, heavily depend on steel for durability and strength.

• Employment Generation: The iron and steel industry is a significant source of employment, directly and indirectly supporting millions of workers globally.

• Global Relevance: Countries with advanced iron and steel industries, such as China and the USA, hold competitive positions in global economic development.

Q30. Answer: (c) Government of India (Allocation of Business) Rules 1961

The correct answer is Government of India (Allocation of Business) Rules 1961.

Key Points

• In February 2021, the Government of India (Allocation of Business) Rules, 1961 was amended to include the development and regulation of Ropeways and Alternate Mobility Solutions under the ambit of the Ministry of Road Transport and Highways (MoRTH).

• Prior to the amendment, the development of ropeways was under the Ministry of Railways.

• With the change, MoRTH became responsible for the development, construction, and maintenance of ropeways as a mode of transportation, enhancing connectivity in hilly and remote areas.

• This amendment aimed to facilitate faster implementation of ropeway projects and streamline decision-making processes.

• Ropeways are considered an eco-friendly and sustainable mode of transport, especially in difficult terrains, and play a crucial role in boosting tourism and local economies.

Additional Information

• Government of India (Allocation of Business) Rules, 1961:

• These rules were formulated under Article 77(3) of the Indian Constitution.

• They allocate various subjects and responsibilities to different Ministries and Departments of the Government of India.

• The objective is to ensure a structured and efficient governance system.

• Ministry of Road Transport and Highways (MoRTH):

• MoRTH is responsible for the development of road infrastructure and transport systems in India.

• It oversees policies related to highways, road safety, and motor vehicles.

• With the amendment, MoRTH's scope was expanded to include ropeways and alternate mobility solutions.

• Ropeways:

• Ropeways are aerial transportation systems that use cables for movement, mainly used in hilly terrains and tourist destinations.

• They are cost-effective, environment-friendly, and provide a safer alternative to traditional roads in challenging terrains.

• India has several operational ropeways, such as those in Auli, Gulmarg, and Darjeeling.

• Alternate Mobility Solutions:

• These refer to innovative and sustainable modes of transportation, including ropeways, cable cars, and other low-emission systems.

• They aim to reduce traffic congestion, support eco-friendly travel, and improve connectivity in remote areas.

• Alternate mobility solutions are gaining traction globally as a means to tackle urban mobility challenges.

Q31. Answer: (d) Indian Biological Data Centre

The correct answer is Indian Biological Data Centre.

Key Points

• The Genome India Project was initiated to map the entire genome of the Indian population to create a comprehensive database to aid in personalized medicine, disease prevention, and healthcare research.

• During its launch in 2025, the official repository for the Genome India data was the Indian Biological Data Centre (IBDC), located in Faridabad, Haryana.

• The Indian Biological Data Centre was established by the Department of Biotechnology (DBT), Government of India, and is the first national repository for life science data in the country.

• The IBDC adheres to the principles of data sharing and open access, promoting accessibility for the scientific community while ensuring data security and privacy.

• The Genome India Project is a collaborative effort involving 20 academic and research institutions across India.

Additional Information

• Genome India Project:

• The project aims to collect, decode, and analyze the genetic information of 10,000 Indian individuals, representing the country's diverse population.

• The initiative is expected to play a critical role in advancing precision medicine and understanding genetic factors behind diseases.

• This project aligns with global initiatives like the Human Genome Project and the UK Biobank project.

• Indian Biological Data Centre (IBDC):

• The IBDC is a state-of-the-art data storage and analysis facility, housing biological data generated from Indian research labs and institutions.

• The center supports various domains, including genomics, proteomics, and biomedical data analysis.

• It ensures compliance with international data sharing standards while safeguarding data privacy.

• Applications of Genomic Data:

• Genomic data can be utilized for early disease detection, personalized treatment plans, and drug development.

• It also helps in understanding genetic predispositions to diseases and identifying potential therapeutic targets.

• The data is critical for research in agricultural and environmental science as well.

• Precision Medicine:

• Precision medicine tailors treatment plans based on an individual's genetic makeup, lifestyle, and environment.

• It is particularly effective for complex diseases such as cancer, diabetes, and cardiovascular diseases.

• The Genome India Project is expected to advance precision medicine in India.

Q32. Answer: (a) Training and development of sports professionals

The correct answer is Training and development of sports professionals.

Key Points

• The Scheme of Human Resources Development in Sports focuses on training and developing skilled sports professionals, including athletes, coaches, and support staff.

• The scheme aims to enhance the overall sports ecosystem by providing specialized training, resources, and infrastructure to nurture talent.

• It emphasizes creating opportunities for young athletes to receive professional guidance and participate in national and international competitions.

• Collaboration with national and international organizations is promoted to ensure the adoption of global best practices in sports training.

• Scholarships, financial aid, and other incentives are provided to encourage participation and excellence in sports.

Additional Information

• Sports Authority of India (SAI): The primary body responsible for sports development in India. It oversees training programs and provides infrastructure for athletes.

• Khelo India Programme: Launched by the Government of India to promote sports at the grassroots level and identify young talent for advanced training.

• National Sports Development Fund (NSDF): A fund established to mobilize resources for sports development and assist talented athletes with financial support.

• Role of Coaches: The scheme recognizes the importance of well-trained coaches in developing athletes and conducts regular

workshops and certification programs.

• International Partnerships: The scheme encourages partnerships with foreign sports organizations to facilitate knowledge exchange and advanced training methods.

Q33. Answer: (a) Diu

The correct answer is Diu.

Key Points

• The inaugural Khelo India Beach Games were organized in 2025 to promote coastal sports and tourism in India.

• Diu, a coastal town known for its scenic beauty and rich heritage, was one of the venues chosen for this prestigious event.

• The games featured various beach sports such as beach volleyball, surfing, kiteboarding, and sand wrestling.

• The event aimed to encourage participation in beach sports and bring attention to India's coastal regions as hubs for sporting activities.

• Participants from across the country competed in these games, fostering sportsmanship and cultural exchange.

Additional Information

• Khelo India Programme:

• Launched by the Ministry of Youth Affairs and Sports in 2018.

• Aims to revive the sports culture in India at the grassroots level by building a strong framework for all sports played in the country.

• Focuses on identifying and nurturing young talent and providing them with necessary resources.

• Beach Sports:

• Beach sports are recreational or competitive activities held on sandy shores.

• Popular examples include beach volleyball, surfing, and beach soccer, which are designed to leverage the coastal environment.

• These sports promote physical fitness and draw attention to sustainable tourism practices.

• Diu:

• Located in the union territory of Daman and Diu, known for its Portuguese heritage.

• It is a popular tourist destination with beautiful beaches, forts, and rich cultural history.

• Chosen as a venue for the Beach Games due to its infrastructure and scenic appeal.

• Impact of Khelo India Beach Games:

• The games aim to promote fitness and sports culture in coastal regions.

• Encourage tourism and economic development in hosting cities or towns.

• Foster inclusivity and participation across diverse demographics.

Q34. Answer: (d) Selling government companies to private companies

The correct answer is Selling government companies to private companies.

Key Points

• Privatisation refers to the process of transferring ownership and control of public sector enterprises or government-owned assets to private entities.

• It aims to improve efficiency, profitability, and competitiveness by reducing government interference and encouraging private sector management.

• In India, privatisation started gaining momentum during the 1991 economic reforms, following the liberalisation policy to boost economic growth.

• Examples of privatisation in India include the sale of government stakes in entities such as Air India, Bharat Petroleum Corporation Limited (BPCL), and VSNL.

• The government often uses privatisation to reduce fiscal burden, raise revenue, and promote private sector-led economic development.

Additional Information

• Disinvestment: This involves selling a portion of government equity in public sector undertakings (PSUs) to private investors, often retaining majority ownership.

• Strategic Sale: A form of privatisation where the government sells a significant portion or full ownership of a PSU to a private entity, transferring management control.

• Liberalisation: Refers to the relaxation of government restrictions in areas such as trade, investment, and industrial policies to promote private sector activity.

• Public Sector Undertakings (PSUs): These are companies owned by the government, which may be fully or partially privatised to improve efficiency and profitability.

• Privatisation can lead to increased competition, better services, and more job opportunities, but critics argue it may also result in reduced focus on social welfare and higher costs for essential services.

Q35. Answer: (b) 04

The correct answer is option 2.

Key Points

• In January 2025, 4 sportspeople were awarded the prestigious Major Dhyan Chand Khel Ratna Award for the year 2024.

• The Major Dhyan Chand Khel Ratna Award is the highest sporting honour in India.

• This award is given annually to recognize outstanding achievements in sports and games at the international level.

• The recipients are selected by a committee constituted by the Ministry of Youth Affairs and Sports, Government of India.

• Recipients are honoured with a medal, certificate, and cash prize to acknowledge their contributions and accomplishments in sports.

Additional Information

• The award was instituted in 1991-1992 and was previously known as the Rajiv Gandhi Khel Ratna Award.

• In August 2021, the award was renamed after Major Dhyan Chand, India’s legendary hockey player.

• Major Dhyan Chand is widely regarded as one of the greatest field hockey players of all time, often referred to as the "Hockey Wizard."

• Eligibility for the award includes remarkable performance in sports at the international level over four years preceding the award year.

• Notable past recipients of the award include Sachin Tendulkar (Cricket), PV Sindhu (Badminton), and Mary Kom (Boxing).

• The award highlights the government’s commitment to promoting sports and recognizing the achievements of Indian sportspeople on the global stage.

Q36. Answer: (b) Australia

The correct answer is Australia.

Key Points

• Australia is the smallest continent and is located entirely within the Southern Hemisphere.

• It is surrounded by the Indian Ocean to the west and south and the Pacific Ocean to the east.

• Australia is unique as it is the only continent that is also a country, referred to as the Commonwealth of Australia.

• Its geographical position ensures that all of its landmass lies south of the Equator.

• Major cities in Australia include Sydney, Melbourne, Brisbane, Perth, and Adelaide, all located in the Southern Hemisphere.

Additional Information

• Southern Hemisphere: The portion of Earth south of the Equator; includes continents such as Australia, Antarctica, parts of South America, and Africa.

• Equator: An imaginary line around the Earth, equidistant from the North and South Poles, dividing the planet into the Northern and Southern Hemispheres.

• Unique Flora and Fauna: Australia is known for its endemic species, including kangaroos, koalas, and eucalyptus trees, which are adapted to its specific climatic conditions.

• Climate Zones: Australia features diverse climate zones ranging from tropical in the north, desert in the center, and temperate in the south.

• Great Barrier Reef: Located off the northeastern coast of Australia, it is the world's largest coral reef system and a UNESCO World Heritage Site.

Q37. Answer: (a) The Rigveda

The correct answer is The Rigveda.

Key Points

• The Rigveda is the oldest and most significant of the four Vedas, composed in Sanskrit and dating back to 1500-1200 BCE.

• It contains hymns dedicated to various deities and mentions learned women like Viswavara, Apala, and Ghosa, who composed hymns and attained the status of Rishis.

• These women were considered highly knowledgeable and contributed to spiritual and philosophical discourses during the Vedic period.

• The Rigveda highlights the active participation of women in intellectual and religious activities, showcasing their esteemed position in Vedic society.

• Viswavara, Apala, and Ghosa are notable examples of women who broke societal barriers and achieved recognition as composers of sacred mantras.

Additional Information

• The Rigveda:

• The Rigveda consists of 1,028 hymns organized into ten books called Mandalas.

• It is primarily a collection of praises to deities like Agni, Indra, Varuna, and others.

• Its language is an early form of Sanskrit, considered to be one of the oldest Indo-European languages.

• Women in the Vedic Period:

• Women in the Vedic age were actively involved in religious practices and philosophical discussions.

• They were allowed to participate in yajnas and educate themselves in sacred knowledge.

• Some women, like Gargi and Maitreyi, were also renowned for their philosophical contributions in later texts like the Upanishads.

• Concept of Rishis:

• Rishis were considered sages who composed hymns in praise of deities and imparted spiritual knowledge.

• The Vedas recognize both male and female Rishis, emphasizing gender equality in spiritual attainment.

• Other Vedas:

• The Samaveda is a collection of melodies and chants used in religious rituals.

• The Yajurveda consists of prose and mantras for performing sacrificial rituals.

• The Atharvaveda contains hymns, spells, and charms addressing everyday life and spiritual practices.

Q38. Answer: (c) Nitrogen

The correct answer is Nitrogen.

Key Points

• Nitrogen (N) is an element belonging to Group 15 of the periodic table, which is part of the p-block.

• The p-block elements are characterized by having their valence electrons in the p orbital.

• Nitrogen is a non-metal and forms a variety of compounds, including ammonia (NH_3) and nitric acid (HNO_3).

• It is essential for life as it is a key component of amino acids, proteins, and nucleic acids.

Additional Information

• The p-block is located on the right side of the periodic table and includes Groups 13-18.

• Elements in the p-block exhibit a wide range of properties, including metals, nonmetals, and metalloids.

• The p-block consists of important elements like carbon, oxygen, nitrogen, fluorine, and noble gases.

• The periodic table is divided into blocks (s, p, d, and f) based on the type of atomic orbital that receives electrons last.

• Nitrogen cycle: Nitrogen is a critical element in the environment, cycling through the atmosphere, soil, and living organisms in a process known as the nitrogen cycle.

Q39. Answer: (c) Regelation

The correct answer is Regelation.

Key Points

• Regelation is the phenomenon where ice melts under pressure and refreezes when the pressure is removed.

• When a wire passes through a block of ice, the pressure at the contact point causes the ice to melt momentarily into water.

• The water formed due to melting refreezes after the wire passes, demonstrating the process of regelation.

• This occurs because the melting point of ice decreases when pressure increases, allowing the ice to melt locally without breaking.

• Regelation is a property unique to substances like ice, which expand upon freezing, unlike most materials.

Additional Information

• Fusion: It is the process of changing a solid into a liquid at its melting point by absorbing heat.

• Condensation: This refers to the transformation of water vapor into liquid water, typically due to cooling.

• Sublimation: It is the direct transition of a substance from a solid to a gas without passing through the liquid state.

• The concept of regelation is used in applications such as ice skating, where pressure from the blade momentarily melts the ice, reducing friction.

• Regelation is possible because ice has a negative slope in its pressure-temperature phase diagram, meaning increased pressure lowers its melting point.

Q40. Answer: (d) VO Chidambaram Pillai

The correct answer is VO Chidambaram Pillai.

Key Points

• VO Chidambaram Pillai, also known as "Kappalottiya Tamizhan," was a prominent freedom fighter and businessman from Tamil Nadu who established the Swadeshi Steam Navigation Company (SSNCo).

• SSNCo was founded in 1906 as part of the Swadeshi movement to challenge the dominance of the British India Steam Navigation Company in coastal trade.

• VO Chidambaram Pillai raised funds from local investors and promoted indigenous enterprise to support India's independence and economic self-sufficiency.

• The company operated steamships between Tuticorin and Colombo, providing an affordable alternative to British shipping services.

• Due to his nationalist activities, VO Chidambaram Pillai faced severe persecution by the British and was imprisoned, enduring harsh conditions for his resistance to colonial rule.

Additional Information

• Swadeshi Movement: A nationalist movement in India aimed at promoting indigenous industries and boycotting British goods during the struggle for independence.

• Swadeshi Steam Navigation Company: Founded by VO Chidambaram Pillai, this company symbolized India's resistance to British economic domination and encouraged self-reliance.

• Tuticorin: A coastal town in Tamil Nadu that served as a hub for trade and was strategically chosen as the base for SSNCo operations.

• Impact: Although SSNCo was eventually shut down due to British suppression, it inspired other Indian entrepreneurs and strengthened the Swadeshi movement.

• Legacy: VO Chidambaram Pillai's efforts are remembered as a significant contribution to India's freedom struggle, and he is celebrated as a symbol of economic independence and patriotism.

Q41. Answer: (a) M - N = 7

Shortcut Trick

For divisibility by 11, the difference of the sums of alternate digits must be 0 or a multiple of 11.

Sum of odd position digits = N + 9 + 1 = N + 10

Sum of even position digits = 2 + M + 1 = M + 3

Difference = (N + 10) − (M + 3) = N − M + 7

Equating to 0 for a valid single-digit relation: N − M + 7 = 0 => M − N = 7.

Therefore The correct answer is M − N = 7.

Alternate Method

Given:

The 6-digit number is N29M11, and it is perfectly divisible by 11.

Concept Used:

A number is divisible by 11 if the difference between the sum of its digits at odd places and the sum of its digits at even places is either 0 or a multiple of 11.

Calculations:

=> The given number = N29M11

=> Sum of digits at odd places (from left to right) = N + 9 + 1 = N + 10

=> Sum of digits at even places (from left to right) = 2 + M + 1 = M + 3

=> Difference = (Sum of odd places) − (Sum of even places)

=> Difference = (N + 10) − (M + 3)

=> Difference = N − M + 7

=> For the number to be divisible by 11, this difference must be equal to 0, 11, or a multiple of 11.

=> Case 1: Equating difference to 0

=> N − M + 7 = 0

=> M − N = 7

=> Case 2: Equating difference to 11

=> N − M + 7 = 11

=> N − M = 4

=> Since M and N are single digits, both relations are mathematically possible, but only M − N = 7 is present among the given choices.

Therefore The correct answer is M − N = 7.

Additional Information

Divisibility Rule of 3 and 9

A number is perfectly divisible by 3 or 9 if the sum of all its digits is divisible by 3 or 9, respectively.

Divisibility Rule of 4 and 8

A number is divisible by 4 if its last two digits form a number divisible by 4. It is divisible by 8 if its last three digits form a number divisible by 8.

Combined Divisibility Rule of 7, 11, and 13

If the difference between the number formed by the last three digits and the number formed by the remaining leading digits is divisible by 7, 11, or 13, then the original number is divisible by 7, 11, or 13 respectively.

Q42. Answer: (a) 10.4% decrease

Shortcut Trick

Using the Ratio Method for successive changes (V prop. to r^2h):

Radius ratio (20% decrease = −1/5) => 4/5

Height ratio (40% increase = +2/5) => 7/5

Volume ratio = $(4/5)^2 \times (7/5) = 16/25 \times 7/5 = 112/125$

Decrease = 125 − 112 = 13 parts => % Decrease = (13 ÷ 125) × 100 = 10.4%

Therefore The correct answer is 10.4% decrease.

Alternate Method

r

h

Vol = 100%

→

0.8r

1.4h

Vol = 89.6%

Given:

Radius of cylinder is reduced by 20%.

Height of cylinder is increased by 40%.

Formula Used:

Volume of a cylinder = $\pi \times r^2 \times h$

Calculations:

=> Let original radius = 10 units and original height = 10 units.

=> Original Volume = $\pi \times (10)^2 \times 10 = 1000\pi$ cubic units.

=> New radius = 10 − (20% of 10) = 8 units.

=> New height = 10 + (40% of 10) = 14 units.

=> New Volume = $\pi \times (8)^2 \times 14$

=> New Volume = $\pi \times 64 \times 14 = 896\pi$ cubic units.

=> Decrease in Volume = Original Volume − New Volume

=> Decrease in Volume = $1000\pi - 896\pi = 104\pi$ cubic units.

=> Percentage Decrease = $(104\pi \div 1000\pi) \times 100$

=> Percentage Decrease = 10.4%

Therefore The correct answer is 10.4% decrease.

Additional Information

Volume Dependency in Cylinders

The volume of a cylinder changes in direct proportion to the square of its radius and linearly with its height (V prop. to r^2h). Any change in the radius has a twofold compounded impact on the final volume.

Successive Percentage Formula

To calculate two continuous percentage changes x and y, use the formula: Net % change = x + y + (x × y) ÷ 100. This is useful for analyzing areas but must be applied twice for volumes involving r^2.

Multiplier/Ratio Logic

If values change to fraction 'a' and 'b' of their original, the new final value simply becomes ($a^2 \times b$) of the initial state. This quickly bypasses complex intermediate decimal calculations.

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Q43. Answer: (c) 155

Shortcut Trick

The average of the first n even numbers is directly given by the formula (n + 1).

Here, the number of even numbers (n) = 154.

Average = 154 + 1 = 155.

Therefore The correct answer is 155.

Alternate Method

Given:

Number of terms (n) = 154

Sequence of even numbers = 2, 4, 6, ...

Formula Used:

Average of an Arithmetic Progression (A.P.) = (First term + Last term) ÷ 2

2

1st term

4

2nd term

6

...

308

154th term

Average = (2 + 308) / 2 = 155

Calculations:

=> First term (a) = 2

=> Common difference (d) = 2

=> Last term (154th even number) = 154 × 2 = 308

=> Average = (2 + 308) ÷ 2

=> Average = 310 ÷ 2

=> Average = 155

Therefore The correct answer is 155.

Additional Information

Average of first n natural numbers

The average of the first n natural numbers is given by the formula (n + 1) ÷ 2.

Average of first n odd numbers

The average of the first n odd numbers is exactly equal to n.

Average of squares of first n natural numbers

The formula to find the average of the squares of the first n natural numbers is (n + 1)(2n + 1) ÷ 6.

Sum of first n even numbers

The sum of the first n even numbers is calculated as n(n + 1), which directly leads to the average formula (n + 1).

Q44. Answer: (d) Rs. 85,000

Shortcut Trick

Equivalent discount % for successive discounts of 20% and 10% = 20 + 10 − (20 × 10) ÷ 100 = 28%.

Given that 28% of the Marked Price = Rs. 23,800.

=> MP = (23,800 ÷ 28) × 100 = 850 × 100 = Rs. 85,000.

Therefore The correct answer is Rs. 85,000.

Alternate Method

Given:

Successive discounts = 20% and 10%

Total discount obtained = Rs. 23,800

Formula Used:

Effective Discount % = d1 + d2 − (d1 × d2) ÷ 100

Discount = Marked Price (MP) − Selling Price (SP)

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MP (100%)
−20%
80%
−10%
SP (72%)
Total Discount = 100% − 72% = 28%
28% = Rs. 23,800
Calculations:
=> Let Marked Price (MP) = 100x
=> SP after 20% discount = 100x − 20% of 100x = 80x
=> SP after further 10% discount = 80x − 10% of 80x = 72x
=> Total Discount = MP − Final SP = 100x − 72x = 28x
=> We are given that the discount is Rs. 23,800.
=> 28x = 23,800
=> x = 23,800 ÷ 28 = 850
=> Marked Price (100x) = 850 × 100 = 85,000
Therefore The correct answer is Rs. 85,000.
Additional Information
Successive Discount Formula
When two discounts d1% and d2% are given successively, the equivalent single discount is [d1 + d2 − (d1 × d2) ÷ 100]%.
Marked Price & Selling Price Relation
Selling Price (SP) = Marked Price (MP) × (1 − Discount% ÷ 100).
Buy X Get Y Free
Discount % = [Free Items ÷ Total Items] × 100. This is another popular discount scheme in exams.

Q45. Answer: (a) 12.9

Shortcut Trick
Substitute the given powers directly into x^z = y^6:
=> (103^(0.2))^z = (103^(0.43))^6
=> 0.2 × z = 0.43 × 6
=> 0.2z = 2.58
=> z = 2.58 ÷ 0.2 = 12.9
Therefore The correct answer is 12.9.
Alternate Method
Given:
x = 103^(0.2)
y = 103^(0.43)
x^z = y^6
Formula Used:
(a^m)^n = a^(mn)
If a^m = a^n, then m = n.
Calculations:
Substitute the values of x and y in the equation x^z = y^6:
=> (103^(0.2))^z = (103^(0.43))^6
=> 103^((0.2 × z)) = 103^((0.43 × 6))
=> 103^(0.2z) = 103^(2.58)
Since the bases are identical, their exponents must be equal:
=> 0.2z = 2.58
=> z = 2.58 ÷ 0.2
=> z = 25.8 ÷ 2
=> z = 12.9
Therefore The correct answer is 12.9.

Additional Information

Power of a Power Rule

When an exponent is raised to another exponent, the powers are multiplied: (a^m)^n = a^(mn).

Equality of Exponents

For any non-zero base except 1 and -1, if a^x = a^y, then x = y.

Product Rule for Exponents

When multiplying expressions with the same base, the exponents are added: a^m × a^n = a^(m+n).

Q46. Answer: (b) 33

Shortcut Trick

Let present ages of the father and son be F and S.

Past condition (4 years ago): (F − 4) = 2 × (S − 4) + 37 => F − 2S = 33.

Future condition (after x years): (F + x) = 2 × (S + x) => x = F − 2S.

By directly substituting the value from the past condition, we get x = 33.

Therefore The correct answer is 33 years.

Alternate Method

Given:

4 years ago, the father's age was 37 years more than twice the son's age.

Formula Used:

Future Age = Present Age + Number of Years

Past Age = Present Age − Number of Years

Past (−4 yrs)

F − 4 =

2(S − 4) + 37

Present

F − 2S = 33

Future (+n yrs)

F + n = 2(S + n)

n = F − 2S

Calculation:

Let the present age of the father be F and the son be S.

=> Age of father 4 years ago = F − 4

=> Age of son 4 years ago = S − 4

According to the problem statement:

=> F − 4 = 2 × (S − 4) + 37

=> F − 4 = 2S − 8 + 37

=> F − 2S = 29 + 4

=> F − 2S = 33

Let the required number of years from now be n.

=> F + n = 2 × (S + n)

=> F + n = 2S + 2n

=> F − 2S = 2n − n

=> n = F − 2S

Substitute the value of F − 2S = 33 into the equation:

=> n = 33

Therefore The correct answer is 33 years.

Additional Information

Constant Age Difference

The difference between the absolute ages of two individuals always remains constant regardless of the time period (past, present, or future).

Linear Equation Formation

In age-related problems, you can quickly solve for variables by defining past and future ages strictly in terms of present variables

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(e.g., Age − x for the past, Age + y for the future).

Cross-Multiplication Method

When the ratio of ages changes over a fixed number of years, cross-multiplication efficiently solves for the base ratio without writing full-length algebraic equations.

Q47. Answer: (a) 4

Shortcut Trick

The distance between the midpoints of the diagonals of a trapezium is always equal to half the difference of its parallel sides.

Given parallel sides: AB = 45 cm and DC = 53 cm.

Length of EF = 1/2 × (DC − AB)

Length of EF = 1/2 × (53 − 45) = 1/2 × 8 = 4 cm.

(Note: The lengths of the non-parallel sides AD and BC are given only to distract and are not needed.)

Therefore The correct answer is 4 cm.

Alternate Method

A

B

C

D

E

F

AB = 45 cm

DC = 53 cm

EF = (DC − AB) ÷ 2

Given:

ABCD is a trapezium with AB || DC.

Length of the parallel side AB = 45 cm.

Length of the parallel side DC = 53 cm.

E and F are the midpoints of the diagonals AC and BD respectively.

Formula Used:

If a line segment connects the midpoints of the diagonals of a trapezium, it is parallel to the parallel sides, and its length is equal to half the difference of their lengths.

Calculation:

=> Length of EF = 1/2 × (DC − AB)

=> EF = 1/2 × (53 − 45)

=> EF = 1/2 × 8

=> EF = 4 cm.

Therefore The correct answer is 4 cm.

Additional Information

Mid-segment of a Trapezium

The line segment joining the midpoints of the non-parallel sides of a trapezium is parallel to its bases. Its length is half the sum of the parallel sides. Length = (a + b) ÷ 2.

Area of a Trapezium

The area of a trapezium is calculated as half the product of the sum of its parallel sides and the perpendicular height between them. Area = 1/2 × (a + b) × h.

Isosceles Trapezium Properties

If the non-parallel sides of a trapezium are equal in length, it is called an isosceles trapezium. Its diagonals are of equal length, and the angles at the base are identical.

Q48. Answer: (c) Rs. 8,90,000

Shortcut Trick

Mohan's Profit = (Total + Difference) ÷ 2 = (4280 + 1070) ÷ 2 = Rs. 2675, Nishant's Profit = 4280 − 2675 = Rs. 1605.

Profit Ratio of Mohan to Nishant = 2675 : 1605 = 5 : 3.

Capital Ratio = (P1 ÷ T1) : (P2 ÷ T2) = (5 ÷ 3) : (3 ÷ 2) = 10 : 9.

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Difference in Capital Ratio = 10 − 9 = 1 unit → Rs. 89,000.
Mohan's Capital = 10 units = 10 × 89,000 = Rs. 8,90,000.
Therefore The correct answer is Rs. 8,90,000.
Alternate Method
Given:
Mohan's investment time (T_M) = 3 months
Nishant's investment time (T_N) = 2 months
Total Profit = Rs. 4,280
Difference in profit = Rs. 1,070
Formula Used:
Profit Ratio = (Capital1 × Time1) : (Capital2 × Time2)
Mohan
C + 89,000
×
3 months
→
Profit: 2675
Nishant
C
×
2 months
→
Profit: 1605
Capital Ratio = (P&sub1;/T&sub1;) : (P&sub2;/T&sub2;) = (5/3) : (3/2) = 10 : 9
Calculations:
=> Let Mohan's profit be P_M and Nishant's profit be P_N.
=> P_M + P_N = 4280
=> P_M − P_N = 1070
=> Adding both equations: 2P_M = 5350 => P_M = Rs. 2675
=> P_N = 4280 − 2675 = Rs. 1605
=> Profit ratio (P_M : P_N) = 2675 : 1605 = 5 : 3
=> Let Nishant's capital be C. Then Mohan's capital = C + 89,000.
=> [3 × (C + 89,000)] / (2 × C) = 5 / 3
=> 9 × (C + 89,000) = 10 × C
=> 9C + 8,01,000 = 10C
=> C = Rs. 8,01,000 (Nishant's Capital)
=> Mohan's Capital = 8,01,000 + 89,000 = Rs. 8,90,000
Therefore The correct answer is Rs. 8,90,000.
Additional Information
Partnership Fundamentals
In any business partnership, the profit share is directly proportional to the product of capital invested and the time period. Formula: P1 : P2 = (C1 × T1) : (C2 × T2).
Calculating Individual Values
When the sum (S) and difference (D) of two quantities are known: Larger Quantity = (S + D) ÷ 2, Smaller Quantity = (S − D) ÷ 2.
Capital Ratio Direct Relation
The ratio of capitals can be directly found if profit and time ratios are given by cross-dividing: C1 : C2 = (P1 ÷ T1) : (P2 ÷ T2).

Q49. Answer: (a) 1400

Shortcut Trick
Increasing a number by 100% means the new value becomes 200% of the original.
200% of the number = 2800
=> 2 × Number = 2800

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=> Number = 2800 ÷ 2 = 1400

Therefore The correct answer is 1400.

Alternate Method

Given:

A number when increased by 100% gives 2800.

Original (100%)

• Increase (100%)

Total = 200% = 2800

Number to find = x

Formula Used:

Final Value = Original Value × (1 + Percentage Increase ÷ 100)

Calculation:

Let the original number be x.

=> x + 100% of x = 2800

=> x + (100 ÷ 100) × x = 2800

=> x + x = 2800

=> 2x = 2800

=> x = 2800 ÷ 2

=> x = 1400

Therefore The correct answer is 1400.

Additional Information

Percentage Change

Percentage change = (Final Value − Initial Value) ÷ Initial Value × 100. It is used to calculate the relative difference between a final and initial quantity.

Successive Percentage Change

When a value is sequentially changed by a% and then by b%, the overall net percentage change can be calculated directly using the formula: (a + b + a×b ÷ 100)%.

Base of Percentage

A percentage is simply a ratio where the denominator is always 100. The original value is always considered as the base value (100%) before any modifications.

Q50. Answer: (a) $9x^2 - 4x + 7$

Shortcut Trick

Expand the brackets directly and combine like terms.

=> $7x^2 - 4x + 2x^2 - 4 + 11$

=> $9x^2 - 4x + 7$

Therefore The correct answer is $9x^2 - 4x + 7$.

Alternate Method

Given:

Expression: $x(7x - 4) + 2(x^2 - 2) + 11$

Calculations:

=> Distribute x into the first bracket and 2 into the second bracket:

=> $x(7x) - x(4) + 2(x^2) - 2(2) + 11$

=> $7x^2 - 4x + 2x^2 - 4 + 11$

=> Group the like terms together:

=> $(7x^2 + 2x^2) - 4x + (-4 + 11)$

=> $9x^2 - 4x + 7$

Therefore The correct answer is $9x^2 - 4x + 7$.

Additional Information

Distributive Property

It allows you to multiply a single term by two or more terms inside a set of parentheses: a(b − c) = ab − ac.

Like Terms

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Terms whose variables and their exponents are exactly the same. Only like terms can be added or subtracted to simplify an algebraic expression.

Q51. Answer: (d) 0

Shortcut Trick

Substitute α = 0° in the given expression.

=> cos 0° = 1 and sin 0° = 0

=> 1 / (1 − 0) − (1 + 0) / 1

=> 1 / 1 − 1 / 1 = 0

Therefore The correct answer is 0.

Alternate Method

Given:

cos α / (1 − sin α) − (1 + sin α) / cos α

Formula Used:

=> $a^2 - b^2 = (a - b)(a + b)$

=> $\sin^2 \alpha + \cos^2 \alpha = 1$

Calculations:

=> Taking LCM of denominators: cos α × (1 − sin α)

=> [cos α × cos α − (1 + sin α) × (1 − sin α)] / [cos α × (1 − sin α)]

=> $[\cos^2 \alpha - (1 - \sin^2 \alpha)] / [\cos \alpha \times (1 - \sin \alpha)]$

=> $[\cos^2 \alpha - \cos^2 \alpha] / [\cos \alpha \times (1 - \sin \alpha)]$

=> 0 / [cos α × (1 − sin α)]

=> 0

Therefore The correct answer is 0.

Additional Information

Pythagorean Identities

The three primary trigonometric identities are: $\sin^2 \theta + \cos^2 \theta = 1$, $1 + \tan^2 \theta = \sec^2 \theta$, and $1 + \cot^2 \theta = \text{cosec}^2 \theta$.

Value Substitution Trick

In simplification questions involving trigonometric expressions, substituting standard angles (like 0°, 30°, 45° or 60°) can directly yield the result. Always ensure the chosen angle does not make the denominator zero.

Algebraic Identities in Trigonometry

Identities such as $a^2 - b^2 = (a - b)(a + b)$ are often used to simplify fractions involving (1 − sin θ) and (1 + sin θ), turning them into $\cos^2 \theta$.

Q52. Answer: (d) 50

Shortcut Trick

Calculate total days: Feb (17) + Mar (31) + Apr (13) = 61 days.

Since 2024 is a leap year, Time (T) = 61 ÷ 366 = 1/6 years.

Using the direct formula SI = (P × R × T) ÷ 100:

=> SI = 4000 × (7.5/100) × (1/6)

=> SI = 300 × (1/6) = 50

Therefore The correct answer is Rs. 50.

Alternate Method

Given:

Principal (P) = Rs. 4,000

Rate of interest (R) = 7.5% per annum

Date of deposit = 12 February 2024

Date of withdrawal = 13 April 2024

Formula Used:

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

12 Feb

29 Feb

31 Mar

13 Apr

17 d

31 d

13 d

Total Time = 61 days

P = Rs. 4000

R = 7.5%

SI = (4000 × 7.5 × 61) ÷ (100 × 366) = Rs. 50

Calculations:

=> Total days = Days in Feb (29 − 12) + Days in Mar (31) + Days in Apr (13)

=> Total days = 17 + 31 + 13 = 61 days

=> Since 2024 is a leap year, there are 366 days in the year.

=> Time (T) in years = 61 ÷ 366 = 1/6 years

=> SI = (4000 × 7.5 × 1) ÷ (100 × 6)

=> SI = 30000 ÷ 600

=> SI = 50

Therefore The correct answer is Rs. 50.

Additional Information

Counting Days in Banking

When calculating interest for a specific period of days, generally the day the money is deposited is ignored, and the day of withdrawal is counted (or vice-versa).

Leap Year Rules

A leap year occurs every 4 years and has 366 days instead of 365, with 29 days in February. A century year must be divisible by 400 to be considered a leap year.

Simple Interest (SI) Formula

SI is directly proportional to the principal, rate, and time. SI = (P × R × T) ÷ 100. Time (T) must always be converted into years before substituting it into the standard formula.

Q53. Answer: (d) 33124

Shortcut Trick

Use the $(a - b)^2$ algebraic identity to quickly evaluate squares near multiples of 100.

We can express 182 as (200 − 18).

Using $(a - b)^2 = a^2 - 2ab + b^2$:

=> $(200 - 18)^2 = 200^2 - 2 \times 200 \times 18 + 18^2$

=> 40000 − 7200 + 324 = 33124

Therefore The correct answer is 33124.

Alternate Method

Given:

Expression: 182^2

Formula Used:

$(a + b)^2 = a^2 + 2ab + b^2$

Calculations:

=> $182^2 = (180 + 2)^2$

=> Here, a = 180 and b = 2

=> $(180 + 2)^2 = 180^2 + 2 \times 180 \times 2 + 2^2$

=> $180^2 = 32400$

=> $2 \times 180 \times 2 = 720$

=> $2^2 = 4$

=> Total sum = 32400 + 720 + 4

=> Total sum = 33124

Therefore The correct answer is 33124.

Additional Information

Unit Digit Concept

The unit digit of a square is determined strictly by the unit digit of the base number. Since 182 ends in 2, its square must end in 4 (because $2^2 = 4$).

Algebraic Identities

Key identities for calculation shortcuts: $(a + b)^2 = a^2 + 2ab + b^2$ and $(a - b)^2 = a^2 - 2ab + b^2$.

Squaring Numbers Ending in 5

For any number ending in 5, say n5, the square is formed by multiplying $n \times (n + 1)$ and appending 25 at the end. Example: $85^2 \rightarrow 8 \times 9 = 72 \rightarrow 7225$.

Q54. Answer: (d) 19%

Shortcut Trick

Ratio of Male to Female population = 178000 : (356000 − 178000) = 1 : 1

Since the population is equally divided into two parts, the overall literacy rate is the simple average of their individual literacy rates.

(Male Literacy % + Female Literacy %) ÷ 2 = Overall Literacy %

(59% + Female Literacy %) ÷ 2 = 39%

Female Literacy % = (39% × 2) − 59% = 78% − 59% = 19%

Therefore The correct answer is 19%.

Alternate Method

Given:

Total population = 356000

Total males = 178000

Overall literacy rate = 39%

Male literacy rate = 59%

59%Malex%Female39%Overall39 − x201Ratio1

Calculations:

=> Number of females = 356000 − 178000 = 178000

=> Total literate population = 39% of 356000 = (39 ÷ 100) × 356000 = 138840

=> Literate males = 59% of 178000 = (59 ÷ 100) × 178000 = 105020

=> Literate females = Total literate population − Literate males

=> Literate females = 138840 − 105020 = 33820

=> Percentage of literate females = (Literate females ÷ Total females) × 100

=> Percentage of literate females = (33820 ÷ 178000) × 100 = 19%

Therefore The correct answer is 19%.

Additional Information

Weighted Average Formula

When components have different base quantities, the overall average is determined by: $A_w = (n1A1 + n2A2) \div (n1 + n2)$.

Rule of Alligation

It allows us to quickly find the ratio of two ingredients/groups combined to achieve a mean value. Ratio = (Cheaper diff) : (Dearer diff).

Percentage Change

Calculated as (Final Value − Initial Value) ÷ Initial Value × 100%. Always identify the proper base value for accurate percentage determination.

Q55. Answer: (b) 264

Shortcut Trick

Total sum of the ratio parts = 5 + 17 + 7 = 29 parts.

Value of 29 parts = Rs. 638 => 1 part = 638 ÷ 29 = Rs. 22.

Difference in ratio between the largest (17) and smallest (5) share = 17 − 5 = 12 parts.

Required difference in amount = 12 × 22 = 264.

Therefore The correct answer is Rs. 264.

Alternate Method

Given:

Total amount to be distributed = Rs. 638

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Ratio of the distribution among three persons = 5 : 17 : 7

Total Amount = Rs. 638 (29x)

5x

17x

7x

Smallest

Largest

Diff = 17x − 5x = 12x

Calculations:

=> Let the respective shares of the three persons be 5x, 17x, and 7x.

=> Total sum of their shares = 5x + 17x + 7x = 29x

=> We are given that the total amount is Rs. 638.

=> 29x = 638

=> x = 638 ÷ 29 = 22

=> The largest share = 17x = 17 × 22 = Rs. 374

=> The smallest share = 5x = 5 × 22 = Rs. 110

=> Difference between the largest and the smallest shares = 374 − 110 = 264

Therefore The correct answer is Rs. 264.

Additional Information

Distribution in a Ratio

To divide a total amount T in the ratio a : b : c, the individual shares are (a ÷ (a+b+c)) × T, (b ÷ (a+b+c)) × T, and (c ÷ (a+b+c)) × T respectively.

Compound Ratio

When two or more ratios are multiplied together, the resulting ratio is called a compound ratio. For a:b and c:d, the compound ratio is ac : bd.

Proportion Rule

When two ratios are equal (a:b = c:d), they are in proportion. In any proportion, the product of the extremes equals the product of the means: a × d = b × c.

Q56. Answer: (d) 2

Shortcut Trick

List the odd numbers in the given range: 393, 395, 397, 399, 401.

Eliminate 395 (divisible by 5) and 393, 399 (sum of digits divisible by 3).

The remaining candidates are 397 and 401.

Check divisibility by primes up to √401 ≈ 20 (primes: 7, 11, 13, 17, 19).

Neither 397 nor 401 is divisible by any of these primes, meaning both are prime numbers.

Therefore The correct answer is 2.

Alternate Method

Given:

The numbers from 393 to 401, both included.

Method Used:

Primality test: A number N is prime if it is not divisible by any prime number ≤ √N.

Calculations:

=> Total numbers to check: 393, 394, 395, 396, 397, 398, 399, 400, 401

=> Even numbers greater than 2 are not prime. Discard 394, 396, 398, 400.

=> Numbers ending in 5 are not prime. Discard 395.

=> Numbers whose digit sum is a multiple of 3 are not prime. Discard 393 (3 + 9 + 3 = 15) and 399 (3 + 9 + 9 = 21).

=> Only 397 and 401 remain as potential prime numbers.

=> For 397: √397 ≈ 19.9. Prime numbers ≤ 19 are 2, 3, 5, 7, 11, 13, 17, 19. 397 is not divisible by any of them. Therefore 397 is a prime number.

=> For 401: √401 ≈ 20.02. Prime numbers ≤ 19 are 2, 3, 5, 7, 11, 13, 17, 19. 401 is not divisible by any of them. Therefore 401 is a prime number.

=> Total prime numbers between 393 and 401 = 2 (which are 397 and 401).

Therefore The correct answer is 2.

Additional Information

Prime Numbers

A prime number is a natural number greater than 1 that cannot be formed by multiplying two smaller natural numbers. It has exactly two distinct factors: 1 and itself.

Primality Test

To check if a number 'N' is prime, find its approximate square root (√N). If 'N' is not divisible by any prime number less than or equal to √N, then 'N' is a prime number.

Divisibility Rules

A number is divisible by 3 if the sum of its digits is divisible by 3. A number is divisible by 5 if its last digit is 0 or 5. A number is divisible by 2 if its last digit is 0, 2, 4, 6, or 8.

Q57. Answer: (a) 3

Shortcut Trick

An odd number cannot be divisible by any even number.

Since the unit digit of 956169 is 9 (an odd number), it cannot be divisible by 2, 4, or 12.

Checking divisibility by 3: Sum of its digits = 9 + 5 + 6 + 1 + 6 + 9 = 36.

Since 36 is a multiple of 3, the given number is perfectly divisible by 3.

Therefore The correct answer is 3.

Alternate Method

Given:

Number = 956169

Concept Used:

Basic divisibility rules for the given options.

Calculations:

=> Checking Option 3 (Divisibility by 2):

=> The unit digit of 956169 is 9. Since 9 is not an even number, 956169 is not divisible by 2.

=> Checking Option 4 (Divisibility by 4):

=> The last two digits are 69. Since 69 is not divisible by 4, the entire number is not divisible by 4.

=> Checking Option 2 (Divisibility by 12):

=> A number is divisible by 12 only if it is divisible by both 3 and 4. Since it is not divisible by 4, it is not divisible by 12.

=> Checking Option 1 (Divisibility by 3):

=> Sum of the digits = 9 + 5 + 6 + 1 + 6 + 9 = 36.

=> Since 36 is perfectly divisible by 3 (36 ÷ 3 = 12), the number 956169 is divisible by 3.

Therefore The correct answer is 3.

Additional Information

Divisibility by 3 and 9

A number is divisible by 3 (or 9) if the sum of all its individual digits is perfectly divisible by 3 (or 9).

Divisibility by 4 and 8

A number is divisible by 4 if the number formed by its last two digits is divisible by 4. It is divisible by 8 if the number formed by its last three digits is divisible by 8.

Divisibility by 11

A number is divisible by 11 if the difference between the sum of digits at odd places and the sum of digits at even places is either 0 or a multiple of 11.

Composite Divisors

To check divisibility for composite numbers, check for its co-prime factors. For example, for 12, check 3 and 4; for 72, check 8 and 9.

Q58. Answer: (c) 54

Shortcut Trick

Let the average of the two consecutive even numbers be a. The numbers will be (a − 1) and (a + 1).

Sum of their squares = $(a - 1)^2 + (a + 1)^2 = 2(a^2 + 1)$

=> $2(a^2 + 1) = 1460 \Rightarrow a^2 + 1 = 730 \Rightarrow a^2 = 729 \Rightarrow a = 27$

The numbers are 26 and 28. Their sum is 26 + 28 = 54.

Therefore The correct answer is 54.

Alternate Method

Given:

The sum of the squares of two consecutive even natural numbers is 1460.

Formula Used:

$(a + b)^2 = a^2 + 2ab + b^2$

Calculation:

Let the two consecutive even natural numbers be x and (x + 2).

According to the given condition:

=> $x^2 + (x + 2)^2 = 1460$

=> $x^2 + x^2 + 4x + 4 = 1460$

=> $2x^2 + 4x + 4 = 1460$

=> $2x^2 + 4x - 1456 = 0$

Dividing the entire equation by 2:

=> $x^2 + 2x - 728 = 0$

Factorising the quadratic equation:

=> $x^2 + 28x - 26x - 728 = 0$

=> $x(x + 28) - 26(x + 28) = 0$

=> $(x - 26)(x + 28) = 0$

=> x = 26 or x = −28

Since the numbers are natural numbers, x must be positive. Therefore, x = 26.

=> The second consecutive even number = x + 2 = 26 + 2 = 28.

=> Sum of the numbers = 26 + 28 = 54.

Therefore The correct answer is 54.

Additional Information

Consecutive Even and Odd Numbers

Consecutive even integers are always represented as 2n, 2n+2, 2n+4, etc. Consecutive odd integers are represented as 2n+1, 2n+3, 2n+5, etc.

Quadratic Formula

For a quadratic equation $ax^2 + bx + c = 0$, the exact roots can be found using the formula: $x = (-b \pm \sqrt{(b^2 - 4ac)}) \div 2a$.

Sum and Product of Roots

For the general quadratic equation $ax^2 + bx + c = 0$, the sum of the roots is equal to −b/a and the product of the roots is equal to c/a.

Q59. Answer: (a) 5 : 7

Shortcut Trick

Convert 40% directly to its simplified fraction value: 40% = 2/5

Equate the fractional parts of both numbers: (2/5) × I = (2/7) × II

Cancel out the common numerator 2 from both sides of the equation.

I / II = 5 / 7 => I : II = 5 : 7

Therefore The correct answer is 5 : 7.

Alternate Method

Given:

40% of the first number is equal to 2/7 of the second number.

40% of 1st

=

2/7 of 2nd

2/5 × 1st

2/7 × 2nd

Calculations:

Let the first number be x and the second number be y.

=> 40% of x = 2/7 of y

=> (40 / 100) × x = (2 / 7) × y

=> (2 / 5) × x = (2 / 7) × y

=> x / y = (2 / 7) ÷ (2 / 5)

=> x / y = (2 / 7) × (5 / 2)

=> x / y = 5 / 7

=> x : y = 5 : 7

Therefore The correct answer is 5 : 7.

Additional Information

Percentage to Fraction Conversion

Knowing standard conversion equivalents saves calculation time during exams: 20% = 1/5, 40% = 2/5, 60% = 3/5, 80% = 4/5.

Ratio and Proportion

A ratio simply indicates how many times one number contains another. If a/b = c/d, the ratio of a to b is the same as c to d, represented standardly as a : b :: c : d.

Cross-Multiplication Principle

When comparing or equating two fractions a/b = c/d, you can apply cross-multiplication to rapidly solve for unknown variables: a × d = b × c.

Q60. Answer: (b) Rs. 2,400

Shortcut Trick

Convert the given percentage discounts into fractional multiplying factors:

25% discount → Factor = 1 − 1/4 = 3/4

20% discount → Factor = 1 − 1/5 = 4/5

Final Price = MP × 3/4 × 4/5

Final Price = 4000 × 3/5 = 2400

Therefore The correct answer is Rs. 2,400.

Alternate Method

Given:

Marked Price (MP) = Rs. 4,000

First Discount (D1) = 25%

Second Discount (D2) = 20%

MP = Rs. 4000

−25%

Rs. 3000

−20%

SP = Rs. 2400

Total Equivalent Discount = 40%

Formula Used:

Selling Price (SP) = MP × (1 − D1/100) × (1 − D2/100)

Calculations:

=> SP = 4000 × (1 − 25/100) × (1 − 20/100)

=> SP = 4000 × (75/100) × (80/100)

=> SP = 4000 × (3/4) × (4/5)

=> SP = 4000 × (12/20)

=> SP = 4000 × (3/5)

=> SP = 2400

Therefore The correct answer is Rs. 2,400.

Additional Information

Equivalent Successive Discount

When two discounts D1 and D2 are applied successively, the single equivalent discount percentage is computed as D1 + D2 − (D1 × D2)/100.

Marked Price (MP)

It is the list price or printed tag price of an article. Any discount or promotional offer given by a seller is always calculated on the Marked Price, not the Cost Price.

Buy X Get Y Free

In this common discount format, the equivalent discount percentage is given by the formula [Y ÷ (X + Y)] × 100.

Q61. Answer: (b) 21.88

Shortcut Trick

Curved Surface Area of a cylinder = 2πrh

=> 2 × (22/7) × r × 16 = 2200

=> r = (2200 × 7) ÷ (44 × 16)

=> r = 175 ÷ 8 = 21.875 cm

=> r ≈ 21.88 cm (rounded to two decimal places)

Therefore The correct answer is 21.88 cm.

Alternate Method

Given:

Outer curved surface area (CSA) = 2200 cm²

Length (height) of the rod (h) = 16 cm

Value of π = 22/7

r = ?

h = 16 cm

CSA = 2200 cm²

Formula Used:

Curved Surface Area of a Cylinder = 2πrh

Calculations:

=> 2 × (22/7) × r × 16 = 2200

=> 44/7 × r × 16 = 2200

=> r = (2200 × 7) ÷ (44 × 16)

=> r = (50 × 7) ÷ 16

=> r = 350 ÷ 16

=> r = 21.875 cm

Rounding to two places of decimal:

=> r ≈ 21.88 cm

Therefore The correct answer is 21.88 cm.

Additional Information

Total Surface Area of a Cylinder

The total surface area encompasses both the curved surface and the two circular flat ends (top and base). It is given by the formula: TSA = 2πr(r + h).

Volume of a Cylinder

The total capacity enclosed within the cylinder geometry is calculated by multiplying the base area by its height: Volume = πr²h.

Volume of a Hollow Cylinder

When dealing with a hollow cylindrical pipe or tube having an outer radius R and an inner radius r, the volume of material used is determined by: Volume = πh(R² − r²).

Q62. Answer: (b) 8 hours 30 minutes

Shortcut Trick

Let W be the time to walk one way and D be the time to drive one way.

Given: W + D = 5 hours 30 minutes.

Since replacing one walk with a drive saves 3 hours, conversely, replacing one drive with a walk will add 3 hours.

=> Time to walk both ways (2W) = (W + D) + 3 hours.

=> 2W = 5 hours 30 minutes + 3 hours = 8 hours 30 minutes.

Therefore The correct answer is 8 hours 30 minutes.

Alternate Method

Given:

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Time taken to walk one way and drive back (W + D) = 5 hours 30 minutes = 5.5 hours.

Time gained by driving both ways instead of mixed travel = 3 hours.

Start

Viewpoint

Walk (W)

Drive (D)

W + D = 5 hr 30 min

Calculations:

=> Time to drive both ways (2D) = 5.5 − 3 = 2.5 hours.

=> Time to drive one way (D) = 2.5 ÷ 2 = 1.25 hours = 1 hour 15 minutes.

=> Time to walk one way (W) = 5.5 − 1.25 = 4.25 hours = 4 hours 15 minutes.

=> Time to walk both ways (2W) = 2 × 4.25 = 8.5 hours.

=> 8.5 hours = 8 hours 30 minutes.

Therefore The correct answer is 8 hours 30 minutes.

Additional Information

Average Speed (Constant Distance)

When a person travels a distance at speed S1 and returns at speed S2, the average speed for the whole journey is (2 × S1 × S2) ÷ (S1 + S2).

Relation between Speed and Time

When the distance is constant, speed is inversely proportional to the time taken. If the ratio of speeds is a : b, the respective ratio of time taken will be b : a.

Relative Speed Concept

When two moving bodies travel in the same direction, their relative speed is calculated as the difference of their speeds. When moving in opposite directions, it is the sum of their speeds.

Q63. Answer: (c) 62% loss

Shortcut Trick

Given, 50 × SP = 19 × CP

=> SP / CP = 19 / 50

Here, CP = 50 units and SP = 19 units.

=> Loss = 50 − 19 = 31 units

=> Loss % = (31 / 50) × 100 = 62%

Therefore The correct answer is 62% loss.

Alternate Method

Given:

Selling price of 50 books = Cost price of 19 books

Formula Used:

Loss = CP − SP

Loss % = (Loss ÷ CP) × 100

SP = 19 units

Loss = 31 units

Total CP = 50 units

Loss % = 31/50 × 100 = 62%

Calculations:

Let the Cost Price (CP) of 1 book be Rs. 1.

=> CP of 50 books = Rs. 50

=> SP of 50 books = CP of 19 books = Rs. 19

Since CP > SP, a loss occurs.

=> Loss = CP − SP

=> Loss = 50 − 19 = Rs. 31

=> Loss % = (Loss ÷ CP) × 100

=> Loss % = (31 ÷ 50) × 100

=> Loss % = 31 × 2 = 62%

Therefore The correct answer is 62% loss.

Additional Information

Profit and Loss Formulas

Profit = SP − CP, and Profit % = (Profit ÷ CP) × 100

Dishonest Dealer

If a dealer sells at CP but uses false weight, Profit % = (Error ÷ False Weight) × 100

Marked Price & Discount

Discount = MP − SP, and Discount % = (Discount ÷ MP) × 100

Q64. Answer: (c) 51

Shortcut Trick

Let the assumed average be 50 kg.

Deviations of the given weights from 50 kg are: −10, −1, +6, +24, and −14.

Net deviation = (−10) + (−1) + 6 + 24 + (−14) = +5 kg.

Average deviation = Net deviation ÷ Total members = +5 ÷ 5 = +1 kg.

Actual average = Assumed average + Average deviation = 50 + 1 = 51 kg.

Therefore The correct answer is 51 kg.

Alternate Method

Given:

Weights of the family members = 36 kg, 40 kg, 49 kg, 56 kg, and 74 kg

Total number of members = 5

Formula Used:

Average = (Sum of all observations) ÷ (Total number of observations)

Average as Center of Mass304050607080364049567 4Avg = 51

Calculation:

=> Sum of all weights = 36 + 40 + 49 + 56 + 74

=> Sum of all weights = 255 kg

=> Average weight = 255 ÷ 5

=> Average weight = 51 kg

Therefore The correct answer is 51 kg.

Additional Information

Average of Consecutive Numbers

For numbers arranged in an arithmetic progression with a common difference, the average is simply the middle term or equivalently evaluated as (First term + Last term) ÷ 2.

Combined Average

If two distinct groups have sizes n1 and n2 with respective averages A1 and A2, their combined collective average equals (n1A1 + n2A2) ÷ (n1 + n2).

Effect of Arithmetic Operations on Average

If a uniform constant value is added, subtracted, multiplied, or divided across every individual observation, the overall average of the set directly undergoes the exact same mathematical operation.

Q65. Answer: (a) 43

Shortcut Trick

The unit digit of 861616843 is 3 (an odd number), which immediately eliminates even divisors like 36 and numbers ending in zero like 50.

Between 43 and 47, we can systematically split the given number into simple chunks: 86,00,00,000 + 16,16,800 + 43.

Each chunk is visibly divisible by 43 (86 ÷ 43 = 2 | 16168 ÷ 43 = 376 | 43 ÷ 43 = 1).

Since every single part perfectly divides by 43, the entire number is directly divisible by 43.

Therefore The correct answer is 43.

Alternate Method

Given:

Number = 861616843

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Options provided = 43, 36, 50, 47

Method Used:

Basic divisibility rules and division by separating parts.

Calculations:

=> The given number 861616843 ends with the odd digit 3.

=> Any number ending with an odd digit cannot be completely divided by an even number.

=> Thus, the options 36 (even number) and 50 (ends with 0) are eliminated directly.

=> Now, check for divisibility by 43 by breaking the huge number into smaller, easily identifiable multiples.

=> 861616843 = 86,00,00,000 + 16,16,800 + 43

=> Part 1: 86,00,00,000 ÷ 43 = 2,00,00,000

=> Part 2: 16,16,800 ÷ 43 = (16168 × 100) ÷ 43 = 376 × 100 = 37600

=> Part 3: 43 ÷ 43 = 1

=> Since all individual parts yield an exact integer quotient without any remainder, the complete number is absolutely divisible by 43.

Therefore The correct answer is 43.

Additional Information

Divisibility by 2

A number is perfectly divisible by 2 only if its last digit is an even number (0, 2, 4, 6, or 8).

Divisibility by 10

A number is completely divisible by 10 (and its multiples like 50) strictly if its unit digit is 0.

Prime Number Divisibility Method

For larger primes like 43 or 47, breaking the large dividend into chunks that are easily recognizable multiples of the divisor is the quickest method to verify divisibility during an exam.

Q66. Answer: (c) 352

Shortcut Trick

Effective Rate % = Rate × Time

Effective Rate % = 16% × 5.5 = 88%

Simple Interest = Effective Rate % of Principal

=> SI = 88% of 400 = (88 ÷ 100) × 400 = 352

Therefore The correct answer is Rs. 352.

Alternate Method

Given:

Principal (P) = Rs. 400

Rate of Interest (R) = 16% per annum

Time (T) = 5.5 years

Formula Used:

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

Simple Interest Calculation

P = Rs. 400

T = 5.5 yrs

R = 16% p.a.

SI = ?

SI = (P × R × T) ÷ 100

Calculation:

=> SI = (400 × 16 × 5.5) ÷ 100

=> SI = 4 × 16 × 5.5

=> SI = 64 × 5.5

=> SI = 352

Therefore The correct answer is Rs. 352.

Additional Information

Amount in Simple Interest

The total amount (A) after a certain time is the sum of the Principal (P) and the Simple Interest (SI).

Formula: A = P + SI = P × [1 + (R × T) ÷ 100]

Compound Interest (CI)

Unlike Simple Interest, Compound Interest is calculated on the initial principal and the accumulated interest of previous periods.

Formula: A = P × [1 + (R ÷ 100)]^T, and CI = A − P

Difference Between CI and SI

For 2 years, the difference between Compound Interest and Simple Interest for the same principal and rate is given by:

Difference = P × (R ÷ 100)²

Q67. Answer: (a) 21/3

Shortcut Trick

Total work = LCM(11, 15) = 165 units.

Lokesh's efficiency = 15 units/day, Manoj's efficiency = 11 units/day.

Work done together in 5 days = (15 + 11) × 5 = 130 units.

Remaining work = 165 − 130 = 35 units.

Time for Lokesh to finish remaining work = 35 ÷ 15 = 7/3 = 2¹/3 days.

Therefore The correct answer is 2¹/3 days.

Alternate Method

Given:

Lokesh can complete the work in 11 days.

Manoj can complete the work in 15 days.

They work together for 5 days.

Method Used:

We use the LCM method to find the total work and individual efficiencies.

Person	Days	Total Work	Efficiency
Lokesh	11	165	15
Manoj	15	11	

Calculations:

=> Combined efficiency of Lokesh and Manoj = 15 + 11 = 26 units/day

=> Work completed by both in 5 days = 26 × 5 = 130 units

=> Remaining work = Total work − Work completed

=> Remaining work = 165 − 130 = 35 units

=> Time taken by Lokesh to complete the remaining work = Remaining work ÷ Lokesh's efficiency

=> Time = 35 ÷ 15

=> Time = 7/3 = 2¹/3 days

Therefore The correct answer is 2¹/3 days.

Additional Information

Total Work Concept

Total Work is assumed as the LCM of the days taken by individuals. Efficiency is the work done in one unit of time. (Total Work = Efficiency × Time).

Pipes & Cisterns

This is similar to time and work. An inlet pipe has positive efficiency while an outlet (leak) has negative efficiency.

Alternate Day Work

When individuals work on alternate days, calculate the work done in a complete cycle of 2 days and then determine the remaining work iteratively.

Work and Wages

Wages are always distributed in the ratio of the total work done by each person. If they work for the same duration, wages are distributed in the ratio of their efficiencies.

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Q68. Answer: (d) 4256/365 hours

Shortcut Trick

Total work = LCM(11, 26, 12) = 1716 units.

Efficiency of Pipe A = 1716 ÷ 11 = 156 units/hour.

Efficiency of Pipe B = 1716 ÷ 26 = 66 units/hour.

Efficiency of Pipe C = 1716 ÷ 12 = 143 units/hour.

Total efficiency = 156 + 66 + 143 = 365 units/hour.

Time taken = Total work ÷ Total efficiency = 1716 ÷ 365 = 4 ^(256)/365 hours.

Therefore The correct answer is 4 ^(256)/365 hours.

Alternate Method

Given:

Time taken by Pipe A = 11 hours

Time taken by Pipe B = 26 hours

Time taken by Pipe C = 12 hours

Formula Used:

Time = Total Work ÷ Total Efficiency

Pipe	Hours	Total Work	Efficiency
A	11	1716	156
B	26	66	
C	12	143	

Calculations:

=> Total efficiency of A, B, and C = 156 + 66 + 143 = 365 units/hour

=> Time taken by all three pipes together = Total Work ÷ Total Efficiency

=> Time taken = 1716 ÷ 365

=> Time taken = 4 ^(256)/365 hours

Therefore The correct answer is 4 ^(256)/365 hours.

Additional Information

Inlet vs Outlet Pipes

An inlet pipe fills the tank and its work is considered positive. An outlet pipe empties the tank and its work is considered negative.

Combined Efficiency Method

When multiple pipes operate together, their net rate of filling or emptying is the algebraic sum of their individual efficiencies: Net Efficiency = Σ(Inlet Efficiencies) − Σ(Outlet Efficiencies).

Work Capacity & Volume

If the flow rate (e.g., liters per minute) of a pipe is given, the total capacity of the tank can be found by multiplying the flow rate by the total time taken by that pipe to independently fill the tank.

Q69. Answer: (c) 82.88

Shortcut Trick

Total Distance = 252 + 891 + 183 = 1326 km

Total Time = (252 ÷ 63) + (891 ÷ 99) + (183 ÷ 61) = 4 + 9 + 3 = 16 hours

Average Speed = Total Distance ÷ Total Time = 1326 ÷ 16 = 82.875 km/hr

Rounding off 82.875 to two decimal places gives 82.88 km/hr.

Therefore The correct answer is 82.88 km/hr.

Alternate Method

Given:

Part 1: Distance = 252 km, Speed = 63 km/hr

Part 2: Distance = 891 km, Speed = 99 km/hr

Part 3: Distance = 183 km, Speed = 61 km/hr

Formula Used:

Average Speed = Total Distance ÷ Total Time

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Time = Distance ÷ Speed
252 km
891 km
183 km
63 km/hr
99 km/hr
61 km/hr
T = 4 hr
T = 9 hr
T = 3 hr
Total D = 1326 km | Total T = 16 hr
Calculations:
=> Total Distance = 252 + 891 + 183 = 1326 km
=> Total Time = (252 ÷ 63) + (891 ÷ 99) + (183 ÷ 61)
=> Total Time = 4 + 9 + 3 = 16 hours
=> Average Speed = 1326 ÷ 16
=> Average Speed = 82.875 km/hr
=> Rounding off to two decimal places, we get 82.88 km/hr.
Therefore The correct answer is 82.88 km/hr.
Additional Information
Average Speed for Equal Distances
If a person travels two equal distances at speeds S1 and S2, then Average Speed = (2 × S1 × S2) ÷ (S1 + S2).
Relative Speed
For objects moving in the same direction, Relative Speed = S1 − S2. For objects moving in opposite directions, Relative Speed = S1 + S2.
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.

Q70. Answer: (c) 575/52% profit

Shortcut Trick
Total CP = Cost + Decoration = 199 + 9 = Rs. 208
Profit = Selling Price − Total CP = 231 − 208 = Rs. 23
Profit % = (Profit ÷ Total CP) × 100
Profit % = (23 ÷ 208) × 100 = 575/52%
Therefore The correct answer is 575/52% profit.
Alternate Method
Given:
Cost price of the toy = Rs. 199
Cost of decoration = Rs. 9
Selling price (SP) = Rs. 231
Total CP = 208
199 + 9 (decor)
SP = 231
• 23 Profit
Formula Used:
Total CP = Original Cost Price + Overhead Charges
Profit = SP − Total CP
Profit % = (Profit ÷ Total CP) × 100
Calculations:
=> Total CP = 199 + 9 = Rs. 208
=> Since Selling Price > Total Cost Price, there is a profit.
=> Profit = 231 − 208 = Rs. 23

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=> Profit % = (23 ÷ 208) × 100

=> Profit % = (23 ÷ 52) × 25

=> Profit % = 575/52%

Therefore The correct answer is 575/52% profit.

Additional Information

Overhead Expenses

Any extra money spent on transportation, repairs, or decoration is always added to the base cost price to determine the actual effective cost price (Total CP) before calculating overall profit or loss.

Loss Percentage

When Total CP > SP, there is a loss instead of a profit. Loss = Total CP − SP, and the formula is: Loss % = (Loss ÷ Total CP) × 100.

Marked Price and Discount

A discount is universally calculated on the Marked Price (MP) of an item. The selling price after a discount can be found as: SP = MP × (100 − Discount%) ÷ 100.

Q71. Answer: (c) 1

Given: Seven bo×es, A, B, C, D, E, F and G, are kept one over the other but not necessarily in the same order.

1) B is kept second from the bottom.

2) Only three bo×es are kept between B and E.

3) C is kept at one of the positions below B.

4) Only A is kept between E and F.

5) G is kept at one of the positions above E.

G
E
A
F
B
C

So, D will be in the remaining place.

G
E
A
F
D
B
C

So, there are 'One' bo× are kept between C and D.

Hence, the correct answer is "Option 3".

Q72. Answer: (d) 19

BODMAS Table:

Given equation: 99 A 9 C 12 B 2 D 16 = ?

Now, if '+' and '-' and '×' and '÷' are interchanged, then: 99 ÷ 9 + 12 × 2 - 16 = ?

=> 99 ÷ 9 + 12 × 2 - 16 = ?

=> 11 + 24 - 16 = 35 - 16 = 19

Hence, the correct answer is "Option 4".

Q73. Answer: (a) W

Given: H, I, J, K, U, V and W are sitting around a circular table facing the centre of the table.

1) V sits to the immediate left of I.

2) H sits to the immediate left of J.

3) J sits second to the left of K.

4) W sits third to the left of I.

So, U will sit on the remaining place.

Here, W sits third to the right of U.

Hence, the correct answer is "Option 1".

Q74. Answer: (a) JGB

The logic followed here is:

So, 'JGB' will replace the question mark in the given series.

Hence, the correct answer is "Option 1".

Q75. Answer: (d) MJH

The logic followed here is:

So, 'MJH' will replace the question mark in the given series.

Hence, the correct answer is "Option 4".

Q76. Answer: (a) 3

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.

1) Only A is kept above D.

2) Only E is kept between D and F.

3) Only B is kept below G.

A
D
E
F
G
B

So, C will be in the remaining place.

A
D
E
F
C
G
B

So, there are 'Three' boxes are kept below F.

Hence, the correct answer is "Option 1".

Q77. Answer: (a) UNR

The logic followed here is:

Option 1) UNR

Option 2) QJM

Option 3) WPS

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Option 4) SLO

Here, 'UNR' is odd among the given options.

Hence, the correct answer is "Option 1".

Q78. Answer: (d) 2

Given: (Left) # © 8 4 5 % % 3 8 2 8 2 9 4 £ & % © # £ 1 * (Right)

Now,

Symbols which is immediately preceded by a number and also immediately followed by a symbol.

So, Needed pattern is: Number- Symbol - Symbol.

There are 2 Symbols which are immediately preceded by a number and also immediately followed by a symbol.

Hence, the correct answer is 'Option 4".

Q79. Answer: (d) na

The logic followed here is:

Logic:

‘life is good’ is coded as ‘tu ro na’

‘she loves life’ is coded as ‘ko ie na’

Phrase	Code
life is good	tu ro na
she loves life	ko ie na

As, life is common in both the phrases and na is common in both the codes.

So, ‘life’ is coded in the given language as "na"

Hence, the correct answer is "Option 4".

Q80. Answer: (c) NJO

The logic followed here is:

Option 1) IEK

Option 2) LHN

Option 3) NJO

Option 4) FBH

Here, 'NJO' is odd among the given options.

Hence, the correct answer is "Option 3".

Q81. Answer: (b) 34

The logic followed here is:

Suman's Rank from Top = 22th

Suman's Rank from Bottom = 13th

Total Students = (Rank from the top + Rank from the bottom) - 1

=> (22 + 13) - 1 = 35 -1 = 34.

So, There are 34 students are there in his class.

Hence, the correct answer is "Option 2".

Q82. Answer: (c) Three

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

Now,

Symbols are there, each of which is immediately preceded by an odd number but NOT immediately followed by an even number

So, Needed pattern is: Odd Number (O)=>Symbol (S) => NOT Even Number.

There are three such symbols: (3 * #), (5 * $), and (7 % 9), each of which is immediately preceded by an odd number but not immediately followed by an even number.

Hence, the correct answer is 'Option 3'.

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Q83. Answer: (c) 15

BODMAS Table:

Given equation: 49 A 7 C 24 D 8 B 2 = ?

Now, if '+' and '-' and '×' and '÷' are interchanged, then: 49 ÷ 7 + 24 - 8 × 2 = ?

=> 49 ÷ 7 + 24 - 8 × 2 = ?

=> 7 + 24 - 8 × 2 = ?

=> 7 + 24 - 16 = 15

Hence, the correct answer is "Option 3".

Q84. Answer: (a) PLAY - LPAY - PAYL

Now,

CUTS - UCTS - CTSU

AVID - VAID - AIDV

Let's check each Option One by One.

Option 1) PLAY - LPAY - PAYL

P	L	A	Y
1	2	3	4
L	P	A	Y
2	1	3	4
P	A	Y	L
1	3	4	2

Option 2) LOAD - OLAD - DOAL

L	O	A	D
1	2	3	4
O	L	A	D
2	1	3	4
D	O	A	L
4	2	3	1

Option 3) JUTE - UJTE - UTEJ

J	U	T	E
1	2	3	4
U	J	T	E
2	1	3	4
U	T	E	J
2	3	4	1

Option 4) RACK - RCAK - KCAR

R	A	C	K
1	2	3	4
R	C	A	K
1	3	2	4
K	C	A	R
4	3	2	1

So, Only PLAY - LPAY - PAYL follows the pattern of given letter cluster.

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Hence, the correct answer is 'Option 1'.

Q85. Answer: (a) M

Given: Six people, L, M, N, O, P and Q are sitting in a row, facing north.
1) Only two people sit to the right of P.
2) Q sits second to the left of M.
3) N is not an immediate neighbour of M.
4) O sits on the immediate right of P.
5) M sits to the immediate right of O.
And, N will sit at the remaining place.
So, M will sit to the immediate right of L.
Hence, the correct answer is "Option 1".

Q86. Answer: (a) INN

The logic followed here is:
Option 1) INN
Option 2) NRS
Option 3) UYZ
Option 4) JNO
Here, 'INN' is odd among the given options.
Hence, the correct answer is "Option 1".

Q87. Answer: (b) South

Ram started from Point A and walked 5 km towards the east
He then takes a turn to his right, walked 4 km.
He then turned to his right and walked 5 km.
He turned to his right and walked 5 km to stop at Point P
So, He should walk towards South to reach Point A again.
Hence, the correct answer is "Option 2".

Q88. Answer: (a) Only conclusion (I) follows.

Given Statements:
Some paintings are frame.
All frames are decoratives.
The least possible Venn diagram for the given statement is:
Conclusions:
I. Some paintings are decoratives.
Since some paintings are frames, and all frames are decoratives, the part of paintings that is frames must also be decoratives
II. All decoratives are frame.
This is the converse of "All frames are decoratives." There can be decoratives that are not frames (e.g., statues or vases).
This is not necessarily true.
Only conclusion (I) is a definite logical consequence of the statements.
Hence, the correct answer is "Option 1".

Q89. Answer: (a) 62

The logic followed here is:
thus, "62" will replace the question mark in the given series.
Hence, the correct option is "Option 1".

Q90. Answer: (d) HO-KQ-MP

Now,
BI-EK-GJ
EL-HN-JM
Let's check each Option One by One.

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Option 1) HO-KQ-NP

H + 7 => O
K + 6 => Q
N + 2 => P

Option 2) GO-KQ-NP

G + 7 => O
K + 6 => Q
N + 2 => P

Option 3) GO-LQ-NP

G + 8 => O
L + 5 => Q
N + 2 => P

Option 4) HO-KQ-MP

H + 7 => O
K + 6 => Q
M + 3 => P

So, Only HO-KQ-MP follows the pattern of given letter cluster.
Hence, the correct answer is 'Option 4'.

Q91. Answer: (b) Neither conclusion (I) nor (II) follows.

Given Statements:
Some Indians are Americans.
Some Americans are Chinese.
The least possible Venn diagram for the given statement is:
Conclusions:
I. No Chinese is an American.
The statement "Some Americans are Chinese" explicitly establishes an overlap between Americans and Chinese.
This conclusion, which denies any overlap, is a direct contradiction of Statement 2.
II. All Indians are Chinese.
The statements only establish partial links (Some I are A; Some A are C).
This does not guarantee any relationship between Indians and Chinese, much less a universal one ("All").
The relationship is uncertain.
So, Neither conclusion (I) nor (II) follows.
Hence, the correct answer is "Option 2".

Q92. Answer: (b) 114

The logic followed here is:
thus, "114" will replace the question mark in the given series.
Hence, the correct option is "Option 2".

Q93. Answer: (c) 11

BODMAS Table:
Given equation: 63 A 7 C 18 D 8 B 2 = ?
Now, if '+' and '-' and '×' and '÷' are interchanged, then: 63 ÷ 7 + 18 - 8 × 2 = ?
=> 63 ÷ 7 + 18 - 8 × 2 = ?
=> 9 + 18 - 16 = 27 - 16 = 11.
Hence, the correct answer is "Option 3".

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Q94. Answer: (d) 7 km to the East

Given:

Rouf starts from Point A and drives 4 km towards South.

He then takes a left turn, drives 9 km, turns left and drives 8 km.

He then takes a left turn and drives 16 km.

He takes a final left turn, drives 4 km and stops at Point P.

So, He should drive towards 7 km to the East in order to reach Point A again.

Hence, the correct answer is "Option 4".

Q95. Answer: (b) 35, 104

The logic followed here is:

Logic: (1st number × 3) - 1 = 2nd number.

16, 47

=> (16 × 3) - 1 = 47

24, 71

=> (24 × 3) -1 = 71

Now, checking the options:

Option 1) 15, 62

=> (15 × 3) - 1 ≠ 62

Option 2) 35, 104

=> (35 × 3) - 1 = 104

Option 3) 27, 101

=> (27 × 3) -1 ≠ 101

Option 4) 12, 45

=> (12 × 3) -1 ≠ 45

Hence, the correct option is "Option 2"

Q96. Answer: (c) 10

Solution:

Original Number: 9238471

The constituent digits are: 9, 2, 3, 8, 4, 7, 1

Arrange the Digits in Ascending Order (Left to Right)

The new number formed is 1234789.

Digit second from the left: 2

Digit second from the right: 8

Sum = 2 + 8 = 10

The sum of the digits is 10.

Q97. Answer: (c) 56

The logic followed here is:

thus, "56" will replace the question mark in the given series.

Hence, the correct option is "Option 3".

Q98. Answer: (d) 5

The logic followed here is:

‘YORK’ is coded as ‘0834’

‘KRAY’ is coded as ‘3458’

So, '5' is the code for ‘A’ in the given code language.

Hence, the correct answer is "Option 4".

Q99. Answer: (b) DXSF

The logic followed here is:

For, 'FRUZ is related to IVXD'

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For, 'RHGP is related to ULJT'

Similarly, for 'ATPB'

So, 'ATPB' will be related to 'DXSF'

Hence, the correct answer is "Option 2".

Q100. Answer: (d) Sister's daughter

Family Chart:

Decoding the Symbols:

Symbol	•	•	×	÷
Meaning	Daughter	Father	Son	Sister

Given: Q + E − R × C ÷ D

It means: Q is the Daughter of E, E is the Father of R, R is the Son of C, C is the Sister of R.

So, Q is the 'Sister's daughter' of D.

Hence, the correct answer is "Option 4".

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