RRB NTPC (UG) CBT-I Official Paper (Held On: 04 Sept, 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. Infrastructure development is essential for sustaining high growth and reducing regional disparities. Which of the following sectors is NOT typically included in the core infrastructure sectors in India?

(a) Cement
(b) Tourism
(c) Electricity
(d) Iron and Steel

Q2. In which of the following years was the town of Madrasapatnam, which later expanded and developed into modern-day Chennai, purchased by the East India Company (EIC) from local kings?

(a) 1639
(b) 1690
(c) 1620
(d) 1658

Q3. Which of the following services is jointly controlled by both the Union and State Governments?

(a) State Medical Service
(b) Indian Economic Service
(c) Central Engineering Service
(d) Indian Administrative Service

Q4. Which missile defence system, named Sudarshan Chakra, was used by India to intercept drones and missiles during Pakistan’s attempted strikes in May 2025?

(a) Prithvi Air Defence
(b) Akashteer
(c) S-400 systems
(d) Barak 8

Q5. Which copper-based alloy is a preferred material for making standard resistors because of its high resistivity and low temperature coefficient?

(a) Alnico
(b) Manganin
(c) Tungsten
(d) Brass

Q6. At the time of independence, India's economy was predominantly:

(a) service-based
(b) agricultural
(c) industrial
(d) trade-based

Q7. Which pair of scientists first proposed the double-helix model for the structure of DNA?

(a) Darwin and Wallace
(b) Mendel and Avery
(c) Watson and Crick
(d) Franklin and Chargaff

Q8. Which of the following is located in the west of the Deccan Plateau?

(a) Mahadeo hills
(b) Western Ghats
(c) Maikal range
(d) Eastern Ghats

Q9. The World Meteorological Organization's (WMO) report, Global Annual to Decadal Climate Update (2025-2029), warns that the Earth's average temperature may rise by how much above pre-industrial levels?

(a) 2.5°C to 3.0°C
(b) 1.2°C to 1.9°C
(c) 0.8°C to 1.2°C
(d) 2.0°C to 2.5°C

Q10. What was the main focus of India's Second Five Year Plan with respect to the economy?

(a) Heavy industrialisation
(b) Expansion of services
(c) Promotion of tourism
(d) Green revolution

Q11. Which shortcut key combination allows you to quickly switch between open applications on a Windows computer?

(a) Alt + Tab
(b) Alt + F4
(c) Alt + Del
(d) Ctrl + Tab

Q12. Who among the following is known for popularising Bharatanatyam on the global stage?

(a) Mallika Sarabhai
(b) Sonal Mansingh
(c) Hema Malini
(d) Rukmini Devi Arundale

Q13. Which of the following statements about succession in the Gupta dynasty is true?

(a) Sons had to prove their eligibility before an assembly
(b) The eldest son was always crowned Yuvraj at priority
(c) Only the eldest son could become king
(d) The ruler always declared himself divine to get the throne

Q14. Who piloted Vasco da Gama's ship to Calicut during his first successful voyage to India in 1498?

(a) Francisco Xavier
(b) Zamorin
(c) Abdul Majid
(d) De Almeida

Q15. The indigenous inhabitants of India who were hostile, dark skinned and did not follow the Vedic system are referred to in Vedic texts as:

(a) Dasyus
(b) Dasas
(c) Dravidas
(d) Aryans

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Q16. A small portion of the Singrauli Coalfield, which is located mainly in the Singrauli district of Madhya Pradesh, falls in which other State?

(a) Chhattisgarh
(b) Jharkhand
(c) Uttar Pradesh
(d) Odisha

Q17. Which of the following countries does NOT share a land border with India?

(a) Afghanistan
(b) Bhutan
(c) Thailand
(d) Myanmar

Q18. In which of the following national parks were eight African cheetahs translocated from Namibia in September 2022?

(a) Banni grasslands
(b) Kuno National Park
(c) Mukundara Tiger Reserve
(d) Gandhi Sagar Wildlife Sanctuary

Q19. Who launched the e-SeHAT application for accessible digital healthcare?

(a) Bhupendra Patel
(b) Hemant Soren
(c) Pema Khandu
(d) Omar Abdullah

Q20. A user wants to rename multiple files in a folder on Windows. What is the correct approach to do this efficiently?

(a) Open each file and save it with a new name
(b) Select all files → Right-click → Rename → Type a base name
(c) Drag files to another folder and rename them there
(d) Press Ctrl + Alt + R to rename all files

Q21. Which state hosted the 7^(th) edition of the Khelo India Youth Games in 2025?

(a) Bihar
(b) Karnataka
(c) Gujarat
(d) Maharashtra

Q22. Who launched Prismix, an AI-driven media company?

(a) Salman Khan
(b) Amir Khan
(c) Ajay Devgn
(d) Shahrukh Khan

Q23. Which organisation released the State of the World's Children report, 2025?

(a) UNDP
(b) UNESCO
(c) UNICEF
(d) WHO

Q24. Who was named Songwriter of the Year at the 2025 Ivor Novello Awards, held at Grosvenor House, London?

(a) Ed Sheeran
(b) Sam Smith
(c) RAYE
(d) Charli XCX

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Q25. Which social activist was awarded the Rammohan Acarya Sanman 2025 for service to rural tribal communities?

(a) Medha Patkar
(b) Aruna Roy
(c) Parbati Mahato
(d) Irom Sharmila

Q26. According to Article 130 of the Constitution of India, the Supreme Court shall sit in Delhi or in such other place or places as may be appointed by:

(a) the President, in consultation with the Prime Minister
(b) the Parliament, through legislation
(c) the Union Cabinet, with advice from the Law Ministry
(d) the Chief Justice of India, with the approval of the President

Q27. Manganese nodules are primarily found on:

(a) river deltas
(b) ocean beds
(c) glacier surfaces
(d) mountain slopes

Q28. Who is regarded as the chief architect of India's Green Revolution?

(a) Dr. Manmohan Singh
(b) PV Narasimha Rao
(c) Dr. Verghese Kurien
(d) MS Swaminathan

Q29. Which Article establishes the office of the President?

(a) Article 75
(b) Article 53
(c) Article 74
(d) Article 52

Q30. Which of the following Schedules deals with the administration and control of Scheduled Areas and Tribes?

(a) Ninth
(b) Sixth
(c) Fifth
(d) Seventh

Q31. On May 20, 2025, the Supreme Court reinstated which requirement for candidates aspiring to become civil judges (junior division)?

(a) Mandatory Ph.D. in Law
(b) Three years of legal practice experience
(c) Minimum age of 30 years
(d) Passing a national-level judicial service exam

Q32. September [2024] the Atacama Desert, where construction of the Extremely Large Telescope (ELT) is underway, is located in which country?

(a) Chile
(b) Argentina
(c) Peru
(d) Bolivia

Q33. How is the vast distance between galaxies measured?

(a) In light years
(b) In seconds
(c) In miles

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(d) In kilometres

Q34. Which Indian leader emphasised a 'Nation First' ethos during a seminar in Lucknow in May 2025?

(a) Amit Shah
(b) Rajnath Singh
(c) Narendra Modi
(d) Yogi Adityanath

Q35. Murlikant Rajaram Petkar of Maharashtra was awarded with Arjuna Award 2024 in which of the following fields?

(a) Shooting
(b) Para-Swimming
(c) Swimming
(d) Para-Shooting

Q36. What does VLSRSAM stand for, which was successfully tested by the Indian Navy and Defence Research & Development Organisation (DRDO) in 2025?

(a) Vertical-Launch Short-Range Surface-to-Air Missile
(b) Variable Launch Strategic Recon Missile
(c) Very Large Surface Recon Air Missile
(d) Versatile Launch System for Rocket Missiles

Q37. Which of the following gases is released when baking soda reacts with vinegar?

(a) Carbon dioxide
(b) Carbon monoxide
(c) Ammonia
(d) Hydrogen

Q38. Which Amendment of the Indian Constitution added Article 39A (free legal aid)?

(a) 86^(th) Amendment
(b) 44^(th) Amendment
(c) 73^(rd) Amendment
(d) 42^(nd) Amendment

Q39. Hool Diwas is celebrated on June 30 every year in India to commemorate the Santhal Hool (rebellion) of _____.

(a) 1840
(b) 1855
(c) 1845
(d) 1850

Q40. The Warli painting tradition gained international recognition, largely due to the efforts of which of the following renowned painters?

(a) Jivya Soma Mashe
(b) MF Husain
(c) Amrita Sher-Gil
(d) SH Raza

MATHEMATICS

Q41. Find the simple interest (in Rs.) on Rs. 1,200 at an interest rate of 3% per month in 5 months.

(a) 15
(b) 35
(c) 30
(d) 180

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Q42. A shopkeeper offers a scheme discount of 'Buy goods worth Rs. 6000 and get Rs. 1000 worth of goods free'. What is the effective discount percentage (rounded off to two decimals)?

(a) 12%
(b) 16.67%
(c) 20%
(d) 14.29%

Q43. Rupesh got an increase of 4% in his sales amount in the first year and 25% in the second year; also with this, his current sales are Rs. 1,35,200, what was his sales (in Rs.) two years ago?

(a) Rs. 84,000
(b) Rs. 1,04,000
(c) Rs. 1,30,000
(d) Rs. 1,08,160

Q44. A trader claims to sell spices at a profit of 68%, but also dishonestly uses a weight which is 12% less than what is mentioned on it. Find the total percentage of profit earned by the trader. (Round off the answer to the nearest whole number.)

(a) 91%
(b) 96%
(c) 88%
(d) 89%

Q45. The value of $(\sin^3 A - \cos^3 A)/(1 + \sin A \cdot \cos A) + 2\sin^2 54° \sec^2 36°$ is:

(a) $\sin A + \cos A - 2$
(b) $2(1 + \sin A \cdot \cos A)$
(c) $\sin A - \cos A + 2$
(d) $\sin A \cdot \cos A + 2$

Q46. Shifa can do a certain piece of work in 20 days. Shifa and Afiya can together do the same work in 12 days, and Shifa, Afiya and Mariyam can do the same work together in 9 days. In how many days can Shifa and Mariyam do the same work together?

(a) 83/8
(b) 85/9
(c) 90/7
(d) 80/7

Q47. Shahid and Mira have to travel from Delhi to Kanpur in their respective cars. Shahid is driving at 132 km/hr while Mira is driving at 60 km/hr. Find the time taken by Mira to reach Kanpur if Shahid takes 5 hours.

(a) 4 hours
(b) 8 hours
(c) 11 hours
(d) 1 hours

Q48. 6 years ago, the age of a father was 40 years more than twice his son's age. After how many years, from now, will he be twice his son's age?

(a) 30
(b) 37
(c) 33
(d) 34

Q49. An amount of Rs. 456 is divided among three persons in the ratio of 16 : 14 : 8. The difference between the largest and the smallest shares (in Rs.) in the distribution is:

(a) 48
(b) 120
(c) 96
(d) 133

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Q50. A number when increased by 100% gives 2690. The number is:

(a) 2690
(b) 672.5
(c) 1345
(d) 4035

Q51. A can lay railway track between two given stations in 19 days and B can do the same job in 15 days. With the help of C, they did the job in 3 days only. Then, C alone can do the job in

(a) 1341/61 days
(b) 741/61 days
(c) 441/61 days
(d) 1141/61 days

Q52. A sum of money triples itself at a certain rate of compound interest in 3 years. In how many years will it amount to 27 times of itself?

(a) 9 years
(b) 3 years
(c) 17 years
(d) 11 years

Q53. Ishan bought some pens at the rate of Rs. 150/dozen. He sold them for Rs. 17 each. His profit percentage is _____%.

(a) 38
(b) 36
(c) 40
(d) 34

Q54. If the third proportional of 8 and 56 be x, then what is the value of x?

(a) 392
(b) 394
(c) 390
(d) 393

Q55. The sum of five numbers is 655. The average of the first two numbers is 80, and the third number is 103. Find the average of the remaining two numbers.

(a) 184
(b) 196
(c) 197
(d) 183

Q56. The value of $\sqrt{196} + \sqrt{0.0324} - \sqrt{5.76}$ =

(a) 16.52
(b) 11.78
(c) 3.21
(d) 8.04

Q57. The sum of two numbers is 81 and their L.C.M. is 420. What are the two numbers?

(a) 14, 67
(b) 26, 55
(c) 19, 62
(d) 21, 60

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Q58. M and N started a business. M invested Rs. 66,000 more than N for 5 months, while N invested for 7 months. M's share is Rs. 205 more than that of N, out of a total profit of Rs. 3,895. Find the capital contributed by M.

(a) Rs. 1,84,910
(b) Rs. 1,84,849
(c) Rs. 1,84,800
(d) Rs. 1,84,602

Q59. The sum of two numbers is 115 and their L.C.M. is 600. What are the two numbers?

(a) 38, 77
(b) 45, 70
(c) 33, 82
(d) 40, 75

Q60. The value of $7^2 + \sqrt{(10^2)} - 2\sqrt{64} - 6$ is

(a) 38
(b) 29
(c) 37
(d) 46

Q61. The product of two consecutive natural numbers is 30. The greater of the two numbers is:

(a) 12
(b) 3
(c) 6
(d) 24

Q62. Aryan has to reach Ahmedabad which is 977 km away in 11 hours. His starting speed for 4 hours was 39 km/hr. For the next 140 km his speed was 35 km/hr. By what speed he must travel now so as to reach Ahmedabad in the decided time of 11 hours?

(a) 227 km/hr
(b) 231 km/hr
(c) 221 km/hr
(d) 229 km/hr

Q63. Find the area of a triangle whose sides are of lengths 5 cm, 12 cm and 13 cm.

(a) 32.5 cm^2
(b) 78 cm^2
(c) 30 cm^2
(d) 60 cm^2

Q64. Simplify: $3((4/3)x^2 - 25x + 12) - 4(x^2 + 7x - 18)$.

(a) $103x + 108$
(b) $103x - 108$
(c) $-103x - 108$
(d) $-103x + 108$

Q65. The LCM of the numbers 14.2 and 0.05 is:

(a) 142
(b) 1.42
(c) 0.142
(d) 14.2

Q66. The marked price of a ceiling fan is Rs. 2,500. During off season, it is sold for Rs. 1,360. Find the discount percentage.

(a) 44.5%
(b) 45%

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(c) 45.6%
(d) 42%

Q67. The LCM of the numbers 10.8 and 0.06 is:
(a) 108
(b) 1.08
(c) 10.8
(d) 0.108

Q68. The average runs scored by a batsman in 23 matches is 44. In the next 10 matches, the batsman scored an average of 14 runs. Find his average runs scored (rounded off to two decimal places) in all the 33 matches.
(a) 36.91
(b) 33.91
(c) 35.91
(d) 34.91

Q69. The sum of all interior angles of a regular polygon is equal to twice the sum of all its exterior angles. The number of sides of the polygon is:
(a) 6
(b) 4
(c) 3
(d) 8

Q70. If the radius of the base of a right circular cylinder is decreased by 19% and its height is increased by 122%, then what is the percentage increase (closest integer) in its volume?
(a) 33%
(b) 40%
(c) 50%
(d) 46%

GENERAL INTELLIGENCE AND REASONING

Q71. Sophie starts from Point A and drives 8 km towards south. She then takes a right turn, drives 6 km, turns left and drives 5 km. She then takes a left turn and drives 6 km. She takes a final right turn, drives 9 km and stops at Point P. How far (shortest distance) and towards which direction should she drive in order to reach Point A again? (All turns are 90° turns only unless specified.)
(a) 18 km towards south
(b) 22 km towards south
(c) 18 km towards east
(d) 22 km towards north

Q72. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster pair.)
(a) SV-YD
(b) BE-HM
(c) DG-JO
(d) FI-LO

Q73. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the 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 its constituent digits. E.g., 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)
96, 12

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184, 23

(a) 164, 20
(b) 144, 18
(c) 172, 21
(d) 130, 16

Q74. Seven people A, B, C, D, E, F and G are sitting in a row, facing the north. Only five people sit to the left of B. Only five people sit to the right of A. C sits to the immediate left of F but right of D. E does not sit to the right of D. How many people sit to the right of G?

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

Q75. If 1 is added for each even digit and 1 is subtracted from each odd digit of the number 56218643, how many digits are repeated more than once in the new number thus formed?

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

Q76. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

All fans are lights.

No fan is a bulb.

Conclusions:

(I) No light is an bulb.

(II) No bulb is a fan.

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

Q77. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

PHZ 3, SKC 7, VNF 15, YQI 31, BTL 63, ?

(a) EWO 127
(b) FWO 127
(c) EHO 127
(d) EWO 128

Q78. 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.

HARD - AHRD - DRAH

ITEM - TIEM - METI

(a) WENT - EWNT - TENW
(b) DUSK - UDSK - KSUD
(c) BITE - BTIE - ETIB
(d) LONG - OLNG - ONGL

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Q79. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

All pins are bricks.

All pins are rulers.

Conclusions:

(I) Some bricks are rulers.

(II) All rulers are pins.

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

Q80. Yusif starts from Point A and drives 9 km towards North. He then takes a left turn, drives 4 km, turns left and drives 11 km. He then takes a left turn and drives 5 km. He takes a final left turn, drives 2 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) 1 km to the West
(b) 1 km to the East
(c) 2 km to the North
(d) 2 km to the South

Q81. Refer to the following number, symbol series and answer the question. Counting to be done from left to right only.

(Left) 2 / \ < > 2 5 $ % + 6 3 / 6 5 6 9 3 @ < & (Right)

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

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

Q82. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GNU 11, DKR 21, AHO 41, XEL 81, UBI 161, ?

(a) RYF 320
(b) ROF 321
(c) YYF 321
(d) RYF 321

Q83. In a row of 172 students facing north, Mr. Maxi is 21^(st) from the right end. If Mr. Han is 61^(st) to the left of Mr. Maxi, what is Mr. Han's position from the left end of the line?

(a) 91^(st)
(b) 92^(nd)
(c) 90^(th)
(d) 93^(rd)

Q84. What should come in place of the question mark (?) in the given series?

48 69 94 123 156 ?

(a) 223
(b) 213
(c) 193
(d) 203

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Q85. Seven people D, E, F, G, H, I and O are sitting around a circular table, facing the centre of the table. Only one person sits between H and O when counted from the left of O. I sits third to the right of D. F sits third to the left of E. I sits to the immediate right of F. G is not an immediate neighbour of F. How many people sit between G and O when counted from the right of G?

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

Q86. If 1 is added to each even digit and 1 is subtracted from each odd digit of the number 56218643, how many digits are repeated more than once in the new number formed?

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

Q87. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

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

(a) QU-YE
(b) MI-QW
(c) GK-OU
(d) VZ-DJ

Q88. Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

FCV : KZQ

ZQB : ENW

(a) MUV : QPZ
(b) PWL : UTG
(c) YNQ : BIT
(d) FLH : KHM

Q89. In a certain code language,

'A = B' means ‘A is the brother of B’,

'A ¥ B' means ‘A is the father of B’,

'A # B' means ‘A is the wife of B’ and

'A % B' means ‘A is the sister of B’.

How is B related to S if 'B ¥ O % A = T # S'?

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

Q90. Seven boxes I, J, K, L, M, N and P are kept one over the other but not necessarily in the same order. Only L is kept above M. Only P is kept between M and J. Only N is kept below K. How many boxes are kept between I and N?

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

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Q91. In a certain code language, 'youth shirt knife' is coded as 'nv to wh' and 'shirt son night' is coded as 'ch rb to'. How is 'shirt' coded in the given code language?

(a) nv
(b) wh
(c) to
(d) ch

Q92. All 119 students in a class are standing in a straight line facing north. Tika is 20th from the right end while Vishnu is 29th from the left end. How many people stand between Tika and Vishnu?

(a) 70
(b) 71
(c) 72
(d) 69

Q93. What should come in place of the question mark (?) in the given series?

92 83 74 ? 56 47 38

(a) 67
(b) 62
(c) 65
(d) 69

Q94. 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) JNT
(b) CGM
(c) WAG
(d) NRY

Q95. What should come in place of the question mark (?) in the given series?

6 6 12 36 ? 720

(a) 108
(b) 120
(c) 172
(d) 144

Q96. Select the pair that follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

EGO : FHP

WSD : XTE

(a) POI : QPK
(b) TYC : UZE
(c) JUG : KVI
(d) CUT : DVU

Q97. Each of the digits in the number 7841236 is arranged in ascending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

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

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Q98. In a certain code language, 'ALSO' is coded as '4367' and 'SLOT' is coded as '2347'. What is the code for 'T' in the given code language?

(a) 4
(b) 7
(c) 3
(d) 2

Q99. If 2 is added to each even digit and 2 is subtracted from each odd digit in the number 4792536, what will be the sum of all the even digits in the new number thus formed?

(a) 16
(b) 18
(c) 14
(d) 12

Q100. This question is based on the five, three-digit numbers given below.

(Left) 781 752 642 105 864 (Right)

(Example: 697 – First digit = 6, second digit = 9 and third digit = 7)

(Note: All operations to be done from left to right.)

In how many of the given numbers is the third digit of a number a factor of the first digit as well as second digit of the same number?

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

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (b) Tourism

The correct answer is Tourism.

Key Points

• Core infrastructure sectors in India are primarily those sectors that have a significant impact on the overall economy and are critical for its functioning.

• The core infrastructure sectors in India include coal, crude oil, natural gas, refinery products, fertilizers, steel, cement, and electricity.

• Tourism is not classified as a core infrastructure sector in India. While it contributes significantly to the economy, it is not categorized as a core sector due to its nature and dependence on services.

• Core sectors typically involve industries that are capital-intensive, resource-based, and foundational to the industrial and economic development of a nation.

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• The performance of the core sectors is measured using the Index of Eight Core Industries (ICI), which is a key indicator of economic activity.

Additional Information

• Cement

• Cement is one of the core industries in India and plays a pivotal role in the infrastructure and construction sectors.

• India is the second-largest producer of cement globally, with the industry contributing significantly to GDP growth.

• It is essential for the development of roads, bridges, dams, and buildings.

• Electricity

• Electricity is a critical component of India's core infrastructure sectors and is a driving force behind industrial and economic growth.

• The power sector in India includes thermal, hydro, nuclear, and renewable energy sources.

• The availability and reliability of electricity are essential for industrial operations and improving the quality of life for citizens.

• Iron and Steel

• Iron and steel are vital core industries in India, forming the backbone of industrial growth.

• These materials are extensively used in construction, automobiles, infrastructure, and manufacturing industries.

• India is among the largest producers of crude steel in the world, and the industry plays a significant role in economic development.

Q2. Answer: (a) 1639

The correct answer is 1639.

Key Points

• The town of Madrasapatnam, which later evolved into modern-day Chennai, was purchased by the East India Company (EIC) in the year 1639.

• The purchase was facilitated by Francis Day, who was an agent of the East India Company, and the land was acquired from the local Nayak rulers of the Vijayanagara Empire.

• The land was acquired to establish a trading post and fortification, which eventually became known as Fort St. George.

• Fort St. George, established in 1644, became the first major English settlement in India and played a pivotal role in the expansion of British influence in the region.

• Chennai, originally Madrasapatnam, grew around Fort St. George and became a significant administrative and commercial hub for the British in southern India.

Additional Information

• 1690

• In 1690, Job Charnock of the East India Company established a settlement in Bengal, which eventually developed into the city of Kolkata (formerly Calcutta).

• It marked the beginning of British influence in the Bengal region and the establishment of another major administrative hub of the British Empire in India.

• 1620

• In 1620, the British East India Company set up a factory at Masulipatnam (Machilipatnam) on the Coromandel Coast, which was one of their earliest trading posts in India.

• Masulipatnam played a critical role in the early trade of textiles and spices between India and Europe.

• 1658

• 1658 marks the period during which the Mughal emperor Aurangzeb seized the throne after defeating his brothers in the war of succession.

• This year is significant in Indian history for the beginning of Aurangzeb's reign, which marked the expansion of the Mughal Empire to its largest territorial extent.

Q3. Answer: (d) Indian Administrative Service

The correct answer is Indian Administrative Service.

Key Points

• The Indian Administrative Service (IAS) is one of the three All India Services, along with the Indian Police Service (IPS) and Indian Forest Service (IFS).

• All India Services such as the IAS are jointly controlled by the Union and State Governments. Officers are recruited by the Union Government but work under both Union and State Governments during their careers.

• The IAS officers are responsible for implementing central and state government policies, advising ministers, and handling day-to-day administrative affairs.

• The recruitment for IAS is conducted by the Union Public Service Commission (UPSC) through the Civil Services Examination.

• IAS officers are posted in various capacities, such as district collectors, secretaries in state governments, and secretaries in central ministries, ensuring coordination between the Union and State Governments.

Additional Information

• State Medical Service

• This service is primarily under the control of the State Governments. It involves the management and administration of healthcare services within a particular state.

• State Medical Service officials are responsible for implementing state-level health programs and overseeing public healthcare facilities.

• Unlike All India Services, this service is not jointly controlled by the Union and State Governments.

• Indian Economic Service

• The Indian Economic Service (IES) is a Group A Central Service that is fully under the control of the Union Government.

• IES officers are recruited by the UPSC to provide economic advice and policy support to various ministries and departments of the Central Government.

• Since the IES is a Central Service, it is not jointly managed by both the Union and State Governments.

• Central Engineering Service

• The Central Engineering Service (CES) is a Group A Central Service under the Union Government.

• It primarily deals with engineering services in various central ministries, such as railways, road transport, and public works.

• CES is not an All India Service and does not involve joint control by Union and State Governments.

Q4. Answer: (c) S-400 systems

The correct answer is S-400 systems.

Key Points

• The S-400 Triumf is an advanced air and missile defense system developed by Russia's Almaz-Antey Corporation, widely regarded as one of the most effective surface-to-air missile systems in the world.

• India signed a deal with Russia in October 2018 to procure five units of the S-400 air defense systems under the framework of the India-Russia defense cooperation.

• The S-400 is designed to intercept and destroy a variety of targets, including stealth aircraft, ballistic missiles, and drones, making it a crucial part of India’s air defense strategy.

• The system can engage targets at a range of up to 400 kilometers and at altitudes of up to 30 kilometers, providing comprehensive protection against aerial threats.

• During Pakistan's attempted strikes in May 2025, the S-400 played a pivotal role by successfully intercepting incoming drones and missiles, showcasing its advanced targeting and interception capabilities.

Additional Information

• Prithvi Air Defence (PAD)

• The Prithvi Air Defence system is part of India’s indigenous Ballistic Missile Defence (BMD) program developed by DRDO.

• It is designed to intercept incoming ballistic missiles in their terminal phase of flight.

• The PAD system uses advanced radar and interceptor missiles such as the Prithvi Defence Vehicle (PDV) and is capable of engaging targets at altitudes up to 80 kilometers.

• However, it is not specifically designed to counter drones or low-altitude threats like the S-400.

• Akashteer

• Akashteer is an indigenous air defense control and reporting system developed by DRDO for the Indian Army.

• It is designed for detecting, tracking, and neutralizing aerial threats using Akash missile systems and other surface-to-air missiles.

• While Akashteer enhances India’s air defense capabilities, it is not a standalone missile system and does not have the multi-layered interception capabilities of the S-400.

• Barak 8

• The Barak 8 is an Indo-Israeli developed long-range surface-to-air missile system designed to counter aircraft, helicopters, UAVs, anti-ship missiles, and ballistic missiles.

• It is a key component of India’s naval air defense and is used onboard warships to provide a protective shield.

• While highly effective in naval operations, the Barak 8 does not match the long-range and multi-target capabilities of the S-400.

Q5. Answer: (b) Manganin

The correct answer is Manganin.

Key Points

• Manganin is a copper-based alloy primarily composed of copper (approximately 84%), manganese (12%), and nickel (4%).

• It is widely used for making standard resistors due to its high resistivity, which allows it to limit the flow of electric current effectively.

• The material exhibits an exceptionally low temperature coefficient of resistance, meaning its resistance remains stable over a wide temperature range, ensuring accuracy in electrical measurements.

• Manganin is also known for its long-term stability, which makes it suitable for precision instruments and electrical applications requiring consistency over time.

• Due to its properties, manganin is commonly utilized in standard resistors, precision shunts, and Wheatstone bridges in laboratories and industrial setups.

Additional Information

• Alnico

• Alnico is an alloy composed of aluminum, nickel, cobalt, and iron, with small amounts of other elements like copper and titanium.

• This alloy is primarily used in the manufacturing of permanent magnets due to its high magnetic strength and stability over a wide temperature range.

• It is not suitable for resistors because it lacks the necessary high resistivity and stable resistance properties.

• Tungsten

• Tungsten is a metal known for its extremely high melting point (3422°C) and excellent tensile strength.

• It is commonly used in applications requiring high-temperature resistance, such as filaments in incandescent light bulbs and electrodes in welding.

• While tungsten does have high resistivity, its primary use is not in standard resistors but in specialized equipment.

• Brass

• Brass is an alloy of copper and zinc, with varying proportions of each element depending on the specific application.

• It is valued for its corrosion resistance, malleability, and attractive appearance, making it suitable for plumbing, decorative items, and musical instruments.

• Brass is not used for standard resistors due to its relatively low resistivity and lack of thermal stability.

Q6. Answer: (b) agricultural

The correct answer is Agricultural.

Key Points

• At the time of independence in 1947, India had an agriculturally dominated economy, with over 70% of the population engaged in agriculture and related activities.

• The agricultural sector contributed approximately 50% of the Gross Domestic Product (GDP) during this period.

• India's economy was largely rural, with a subsistence farming system where farmers produced crops primarily for their own consumption rather than for trade or export.

• The agricultural practices were traditional, with limited use of modern tools, irrigation facilities, or scientific advancements, leading to low productivity and efficiency.

• The industrial and service sectors were underdeveloped, contributing minimally to the economy, as India lacked substantial industrial infrastructure and skilled workforce at that time.

Additional Information

• Service-based Economy:

• At the time of independence, India’s service sector was not a significant contributor to the economy.

• Services like banking, insurance, and trade existed but were limited to urban areas and largely controlled by foreign companies.

• The service sector gained prominence in the post-reform period, particularly after 1991, contributing significantly to India’s GDP in the modern era.

• Industrial Economy:

• India had a weak industrial base during independence, with limited industries such as textiles, jute, and steel.

• Industrialization was stifled during British colonial rule, as policies favored the export of raw materials and the import of finished goods.

• Post-independence, the government focused on industrial development through initiatives like the Five-Year Plans.

• Trade-based Economy:

• India's trade during colonial rule was largely structured to benefit the British economy.

• Exports were dominated by raw materials such as cotton, jute, and spices, while imports consisted of British manufactured goods.

• After independence, India aimed to diversify its trade and reduce dependency on foreign imports.

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Q7. Answer: (c) Watson and Crick

The correct answer is Watson and Crick.

Key Points

• James Watson and Francis Crick proposed the double-helix model of DNA in 1953, which revolutionized molecular biology.

• Their model described DNA as a helical structure composed of two strands running in opposite directions, held together by complementary base pairing.

• The discovery was based on X-ray diffraction data generated by Rosalind Franklin and Maurice Wilkins.

• The double-helix model demonstrated how genetic information is stored and replicated, providing the foundation for understanding heredity at the molecular level.

• Watson and Crick received the Nobel Prize in Physiology or Medicine in 1962, shared with Maurice Wilkins, for their groundbreaking contribution to genetics.

Additional Information

• Charles Darwin and Alfred Russel Wallace:

• Darwin and Wallace are renowned for the theory of evolution by natural selection, not DNA structure.

• Darwin's seminal work, On the Origin of Species, published in 1859, laid the foundation for evolutionary biology.

• Wallace independently proposed a similar idea and collaborated with Darwin, but their work is unrelated to molecular genetics.

• Gregor Mendel and Oswald Avery:

• Mendel is regarded as the father of genetics for his experiments on pea plants, which established the fundamental laws of inheritance.

• Avery, in the 1940s, demonstrated that DNA (not protein) is the genetic material, paving the way for later discoveries about its structure.

• Neither Mendel nor Avery contributed directly to the double-helix model of DNA.

• Rosalind Franklin and Erwin Chargaff:

• Franklin's X-ray diffraction images of DNA were critical to Watson and Crick's discovery, though she did not receive due recognition during her lifetime.

• Chargaff identified the base pairing rules (adenine with thymine, and cytosine with guanine) that were key to understanding DNA's structure.

• While their contributions were vital, neither Franklin nor Chargaff proposed the double-helix model themselves.

Q8. Answer: (b) Western Ghats

The correct answer is Western Ghats.

Key Points

• The Western Ghats, also known as the Sahyadri Hills, are a mountain range located along the western coast of India, running parallel to the Arabian Sea.

• This range extends from the state of Gujarat in the north to Kerala in the south, passing through Maharashtra, Goa, Karnataka, and Tamil Nadu.

• It is a UNESCO World Heritage Site and is known for its biodiversity, being one of the eight “hottest hotspots” of biological diversity in the world.

• Geographically, the Western Ghats are located to the west of the Deccan Plateau, forming a natural boundary.

• These hills play a critical role in influencing the monsoon weather patterns in India and are a vital source of water for peninsular rivers like the Godavari, Krishna, and Kaveri.

Additional Information

• Mahadeo Hills

• The Mahadeo Hills are located in the Satpura range in Madhya Pradesh, central India.

• These hills are not situated on the west of the Deccan Plateau but are part of the central Indian landscape.

• The hills are known for their dense forests and wildlife and serve as a source of the Narmada and Tapti rivers.

• Maikal Range

• The Maikal Range is located in central India, primarily in Madhya Pradesh and Chhattisgarh.

• It forms the eastern extension of the Satpura ranges and is not located in the western part of the Deccan Plateau.

• This range is known for the Amarkantak Plateau, the origin point of the Narmada and Son rivers.

• Eastern Ghats

• The Eastern Ghats are a discontinuous range of mountains located along India’s eastern coast, spanning Odisha, Andhra Pradesh, Tamil Nadu, and parts of Karnataka.

• They are situated to the east of the Deccan Plateau, running parallel to the Bay of Bengal.

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• Famous peaks in the Eastern Ghats include Araku Valley and the Nallamala Hills.

Q9. Answer: (b) 1.2°C to 1.9°C

The correct answer is 1.2ºC to 1.9ºC.

Key Points

• The World Meteorological Organization's (WMO) report, Global Annual to Decadal Climate Update (2025-2029), highlights that the global average temperature is expected to rise by 1.2ºC to 1.9ºC above pre-industrial levels.

• This projection aligns with the ongoing trend of increasing global temperatures due to human-induced climate change, primarily caused by greenhouse gas emissions.

• The report warns of significant consequences, including more frequent extreme weather events, rising sea levels, and ecosystem disruptions.

• WMO emphasizes that reaching these temperature thresholds would make it increasingly challenging to achieve the Paris Agreement goals of limiting global warming to below 2ºC, preferably 1.5ºC.

• The findings serve as a critical call to action for governments to implement stronger climate mitigation and adaptation strategies to curb the impact of global warming.

Additional Information

• The WMO's Global Annual to Decadal Climate Update provides crucial insights into the trajectory of global warming.

• It is an essential tool for policymakers to understand climate risks, adapt to changing conditions, and make informed decisions to combat climate change.

• Emphasis is placed on reducing greenhouse gas emissions, transitioning to renewable energy, and enhancing global cooperation to achieve climate goals.

Q10. Answer: (a) Heavy industrialisation

The correct answer is Heavy industrialisation.

Key Points

• The Second Five Year Plan of India (1956-1961) was based on the Nehru-Mahalanobis model, which emphasized the growth of heavy industries and industrialization.

• Its primary goal was to establish a strong industrial base to accelerate economic development and achieve self-reliance in production.

• The plan focused on the development of core industries such as steel, heavy machinery, chemicals, and engineering goods.

• It aimed to reduce dependency on foreign imports by promoting indigenous production in heavy industries.

• The plan also emphasized the role of the public sector in industrial development, with major investments in infrastructure and factories.

Additional Information

• Expansion of services:

• While the service sector contributes significantly to India's economy today, it was not the focus during the Second Five Year Plan.

• Services like healthcare, education, and transportation were emphasized in later plans to complement industrial and agricultural growth.

• Promotion of tourism:

• Tourism was not a priority under the Second Five Year Plan as it focused on industrialization and economic self-reliance.

• Tourism development emerged as a focus area in later decades as the government recognized its potential for generating revenue and employment.

• Green Revolution:

• The Green Revolution was introduced in India during the mid-1960s, after the Second Five Year Plan, to address food security and agricultural productivity.

• The revolution primarily focused on high-yielding crops, irrigation, and the use of fertilizers and pesticides.

Q11. Answer: (a) Alt + Tab

The correct answer is Alt + Tab.

Key Points

• The Alt + Tab shortcut key combination is used in Windows operating systems to switch between open applications quickly.

• Pressing and holding the Alt key while repeatedly pressing the Tab key cycles through all currently open windows.

• Releasing the Alt key selects the currently highlighted application window, bringing it to the forefront.

• This feature is highly efficient for multitasking and allows users to manage multiple applications without using a mouse.

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• The functionality of Alt + Tab has been a core feature of Windows since early versions and has undergone enhancements in newer Windows versions, such as showing previews of open windows.

Additional Information

• Alt + F4

• This shortcut key combination is used to close the currently active application window or program in Windows.

• It is a quick method to exit programs without using the mouse to click on the close button.

• Alt + Del

• This combination does not have a predefined function in Windows operating systems.

• It may be used in specific software applications for custom functions.

• Ctrl + Tab

• This shortcut key combination is used to navigate between tabs in tabbed applications such as web browsers or file explorers.

• Pressing Ctrl + Tab cycles forward through open tabs, while Ctrl + Shift + Tab cycles backward.

• It is especially useful for users working with multiple tabs in a single application.

Q12. Answer: (d) Rukmini Devi Arundale

The correct answer is Rukmini Devi Arundale.

Key Points

• Rukmini Devi Arundale (1904–1986) is widely regarded as the person who revived and popularized Bharatanatyam, transforming it into a globally recognized classical dance form.

• She was instrumental in removing the stigma associated with Bharatanatyam, which was earlier performed in temples as a form of religious offering and had declined during the colonial era.

• Rukmini Devi introduced innovations such as incorporating themes from Indian epics like the Ramayana and Mahabharata, making Bharatanatyam accessible to a wider audience.

• She established the Kalakshetra Foundation in 1936, a premier institution for the study and performance of classical arts, which continues to train Bharatanatyam dancers globally.

• Her contributions led to the recognition of Bharatanatyam as one of India's classical dance forms, and she was awarded the Padma Bhushan in 1956 for her contributions to Indian art and culture.

Additional Information

• Mallika Sarabhai:

• Mallika Sarabhai is a renowned Indian classical dancer and activist known for her proficiency in Bharatanatyam and Kuchipudi.

• She is the daughter of Mrinalini Sarabhai and Vikram Sarabhai, a prominent scientist, and contributed significantly to using dance and theatre for social change.

• Although an acclaimed performer, Mallika Sarabhai is not credited with popularizing Bharatanatyam globally like Rukmini Devi Arundale.

• Sonal Mansingh:

• Sonal Mansingh is a celebrated Indian classical dancer known for her expertise in Odissi and Bharatanatyam.

• She has been recognized for her thematic productions that blend traditional dance with contemporary issues.

• While Sonal Mansingh has made significant contributions to Indian classical dance, her primary focus has not been on the global popularization of Bharatanatyam.

• Hema Malini:

• Hema Malini is a renowned Bollywood actress and trained classical dancer in Bharatanatyam, Kuchipudi, and Odissi.

• She has performed extensively in India and abroad, showcasing Indian classical dance on global platforms.

• However, her contributions are more related to promoting Indian culture rather than the revival or transformation of Bharatanatyam as seen in the work of Rukmini Devi Arundale.

Q13. Answer: (a) Sons had to prove their eligibility before an assembly

The correct answer is Sons had to prove their eligibility before an assembly.

Key Points

• During the Gupta dynasty, succession was not strictly hereditary, and the eldest son did not always inherit the throne automatically.

• Sons of the ruler had to prove their eligibility for kingship by demonstrating their competence and gaining the approval of an assembly or council.

• This system of proving eligibility ensured that the most capable and deserving son would ascend to the throne, maintaining the stability and prosperity of the empire.

• The Gupta dynasty promoted meritocracy within the royal family, reflecting their administrative and political efficiency.

• Historical texts and inscriptions suggest that assemblies or councils played a significant role in legitimizing the choice of the heir to the throne.

Additional Information

• Succession in the Gupta Dynasty:

• The Gupta dynasty, known as the "Golden Age of India," was marked by remarkable achievements in arts, science, and governance.

• The succession practices in the Gupta dynasty reflected a blend of hereditary and meritocratic principles, ensuring capable leadership.

• This system contributed to the stability and prosperity of the empire, enabling it to achieve great cultural and political heights.

Q14. Answer: (c) Abdul Majid

The correct answer is Abdul Majid.

Key Points

• Abdul Majid was a local navigator from India who guided Vasco da Gama's ship to Calicut during his first successful voyage to India in 1498.

• Vasco da Gama arrived at the port of Calicut (present-day Kozhikode) on May 20, 1498, marking the first direct sea route between Europe and India.

• Abdul Majid played a crucial role as an expert in navigating through the Indian Ocean, ensuring the Portuguese fleet reached Calicut successfully.

• The discovery of the sea route to India was significant for the Portuguese, as it enabled direct trade in spices, bypassing the traditional land routes controlled by Middle Eastern powers.

• Abdul Majid's contribution is often overlooked, but his knowledge of the local waters and navigation techniques was instrumental in the success of Vasco da Gama's expedition.

Additional Information

• Francisco Xavier

• Francisco Xavier was a Jesuit missionary and one of the first Jesuits in India, arriving much later than Vasco da Gama (in 1542).

• He is known for his efforts to spread Christianity in India, particularly in Goa, but he had no connection to Vasco da Gama’s expedition.

• His work involved converting locals to Christianity and establishing the Jesuit mission in the region.

• Zamorin

• The Zamorin was the hereditary ruler of Calicut (Kozhikode) during the time of Vasco da Gama's arrival.

• He was not involved in piloting Vasco da Gama’s ship but played a key role in the initial trade negotiations between the Portuguese and the local merchants.

• The Zamorin welcomed Vasco da Gama’s fleet and allowed trade activities to take place, although relations later soured due to conflicts over trade privileges.

• De Almeida

• Francisco de Almeida was a Portuguese nobleman and later became the first Viceroy of Portuguese India in 1505.

• He was not associated with Vasco da Gama’s first voyage to India but played a significant role in establishing Portuguese dominance in the Indian Ocean afterward.

• De Almeida contributed to expanding Portuguese influence through naval warfare and administrative reforms.

Q15. Answer: (a) Dasyus

The correct answer is Dasyus.

Key Points

• The term Dasyus is used in Vedic texts to refer to groups of people who were hostile to the Vedic Aryans.

• Dasyus were described as dark-skinned, non-Aryan inhabitants of the Indian subcontinent who opposed the Vedic system and lifestyle.

• They are often depicted in Vedic literature as enemies of the Aryans, standing against their religious practices and cultural expansion.

• The Dasyus were considered to be non-believers in Vedic rituals and were often associated with different customs and languages compared to the Aryans.

• The conflict between Aryans and Dasyus is frequently mentioned in the Rigveda, where the Aryan gods, particularly Indra, are said to have helped the Aryans defeat the Dasyus.

Additional Information

• Dasas:

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• The term "Dasas" is also found in Vedic literature and is sometimes used interchangeably with Dasyus.

• However, Dasas were often described as a specific group of people enslaved or subjugated by the Aryans.

• Later, the term "Dasa" came to mean a servant or subordinate in the context of the caste system.

• Dravidas:

• The term "Dravidas" refers to the people of South India who speak Dravidian languages such as Tamil, Telugu, Kannada, and Malayalam.

• Although some scholars historically linked the Dravidians with the pre-Aryan inhabitants of India, they are distinct from the Dasyus mentioned in Vedic texts.

• Dravidians have a rich cultural and linguistic heritage, which is separate from the Vedic Aryan tradition.

• Aryans:

• The Aryans were a group of Indo-European-speaking people who migrated into the Indian subcontinent around 1500 BCE.

• They are credited with composing the Vedas, which form the foundation of Hinduism.

• The term "Arya" is often used in Vedic literature to describe noble or civilized people, distinguishing them from the Dasyus and Dasas.

Q16. Answer: (c) Uttar Pradesh

The correct answer is Uttar Pradesh.

Key Points

• The Singrauli Coalfield is primarily located in the Singrauli district of Madhya Pradesh, known for its rich coal reserves.

• A small portion of the Singrauli Coalfield extends into the neighboring state of Uttar Pradesh, specifically in the Sonbhadra district.

• Singrauli Coalfield is part of the northern portion of the Son basin and is one of the largest coalfields in India.

• The coal from this region is of high quality and is extensively used for thermal power generation in nearby power plants.

• Important power plants like NTPC Singrauli and Rihand Super Thermal Power Project are located in proximity to this coalfield.

Additional Information

• Chhattisgarh:

• Chhattisgarh is known for its rich mineral resources, including coal, iron ore, and bauxite.

• The Korba Coalfield and Mand-Raigarh Coalfield are prominent coal reserves located in Chhattisgarh.

• Jharkhand:

• Jharkhand is another state with abundant coal reserves and houses coalfields like Jharia, Bokaro, and Dhanbad.

• Odisha:

• Odisha is rich in coal and other minerals, with notable coalfields like Talcher and Ib Valley.

Q17. Answer: (c) Thailand

The correct answer is Thailand.

Key Points

• Thailand does not share a land border with India as it is geographically separated by Myanmar, which lies between the two countries.

• India shares its land borders with seven countries: Afghanistan, Pakistan, China, Nepal, Bhutan, Bangladesh, and Myanmar.

• Although Thailand is located in Southeast Asia and is part of the Indo-Pacific region, it is separated from India by the Bay of Bengal and the Andaman Sea.

• India and Thailand maintain strong bilateral relations, including cultural, economic, and strategic ties, but they do not have any direct land connection.

• The closest geographical point between India and Thailand is across the Andaman Sea, which connects India's Andaman and Nicobar Islands to Thailand's west coast.

Additional Information

• Afghanistan

• Afghanistan shares a land border with India along the Wakhan Corridor, which connects the two countries.

• The border is approximately 106 kilometers long, but it is currently not operational due to geopolitical reasons and Pakistan's intervening territory.

• India and Afghanistan share cultural and historical ties, and India has been actively involved in Afghanistan's development projects.

• Bhutan

• Bhutan shares a 699-kilometer-long border with India along the Indian states of Sikkim, West Bengal, Assam, and Arunachal

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Pradesh.

• India and Bhutan enjoy a special relationship marked by cultural, economic, and strategic cooperation.

• India is Bhutan's largest trading partner and provides significant financial assistance for Bhutan's development projects.

• Myanmar

• Myanmar shares a 1,643-kilometer-long border with India along the northeastern states of Arunachal Pradesh, Nagaland, Manipur, and Mizoram.

• The Indo-Myanmar border is significant for trade and connectivity, with projects like the India-Myanmar-Thailand trilateral highway enhancing regional integration.

• Both countries collaborate on security, trade, and cultural exchanges, as well as on addressing border-related challenges.

Q18. Answer: (b) Kuno National Park

The correct answer is Kuno National Park.

Key Points

• In September 2022, eight African cheetahs were translocated from Namibia to India as part of an ambitious wildlife conservation effort.

• The cheetahs were released in Kuno National Park, located in the state of Madhya Pradesh, India.

• This project marked the first intercontinental translocation of cheetahs, aiming to reintroduce the species to India after their extinction in the country in 1952.

• Kuno National Park was selected due to its suitable habitat, prey availability, and low human disturbance, making it an ideal location for the reintroduction program.

• The project is part of India’s larger plan to conserve wildlife and restore ecosystems, with support from the Government of Namibia and wildlife conservation organizations.

Additional Information

• Banni Grasslands:

• Located in Gujarat, India, Banni Grasslands are known for their unique arid ecosystem and rich biodiversity.

• They are one of the largest grassland ecosystems in Asia and are part of the Rann of Kutch.

• The grasslands are home to numerous species of birds, mammals, and reptiles but are not associated with the cheetah reintroduction project.

• Mukundara Tiger Reserve:

• Located in Rajasthan, the Mukundara Tiger Reserve is known for its tiger population and other wildlife species.

• It is part of the Ranthambore-Kuno-Mukundara landscape but was not selected for the cheetah reintroduction program due to habitat considerations.

• The reserve primarily focuses on tiger conservation efforts.

• Gandhi Sagar Wildlife Sanctuary:

• This sanctuary is located in Madhya Pradesh and is known for its diverse flora and fauna.

• It is situated near the Gandhi Sagar Dam on the Chambal River and provides a habitat for various bird and animal species.

Q19. Answer: (d) Omar Abdullah

The correct answer is Omar Abdullah.

Key Points

• Omar Abdullah, the former Chief Minister of Jammu and Kashmir, launched the e-SeHAT application aimed at providing accessible digital healthcare services.

• The initiative focuses on offering telemedicine services to patients, especially those residing in remote and underserved areas.

• The e-SeHAT application aims to bridge the gap between patients and healthcare providers by ensuring consultation services through digital platforms.

• It is designed to enhance healthcare delivery, reduce the burden on physical healthcare facilities, and ensure timely medical advice.

• Omar Abdullah played a pivotal role in promoting technological advancements and digital infrastructure in the healthcare sector during his tenure.

Additional Information

• Bhupendra Patel:

• Bhupendra Patel is the current Chief Minister of Gujarat.

• He has spearheaded various development programs in Gujarat, including infrastructure projects and initiatives for education and agriculture.

• Hemant Soren:

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• Hemant Soren is the Chief Minister of Jharkhand.
• He has focused on social welfare programs, tribal upliftment, and schemes to improve healthcare and education in Jharkhand.
• Pema Khandu:
• Pema Khandu is the Chief Minister of Arunachal Pradesh.
• He has worked on promoting regional connectivity and enhancing digital infrastructure in the state.

Q20. Answer: (b) Select all files → Right-click → Rename → Type a base name

The correct answer is Select all files → Right-click → Rename → Type a base name.

Key Points

• Renaming multiple files simultaneously in Windows can be efficiently done by selecting all the files, right-clicking, choosing the Rename option, and typing a base name.
• When you rename files using this method, all selected files are renamed with the base name followed by a number in parentheses (e.g., File (1), File (2), etc.).
• This process is built into Windows and does not require additional software or tools.
• It is a fast and efficient way to rename multiple files when dealing with grouped or similar items, such as photos, documents, or videos.
• The renaming action ensures consistency in file naming, which is particularly useful for organizing files systematically.

Additional Information

• Renaming Files in Windows
• Windows provides a simple and user-friendly interface for renaming files, either individually or in bulk.
• For advanced renaming requirements, users can explore third-party software such as Bulk Rename Utility or PowerShell scripting.
• Maintaining a consistent naming convention improves file organization and retrieval efficiency.

Q21. Answer: (a) Bihar

The correct answer is Bihar.

Key Points

• Bihar was the host state of the 7th Khelo India Youth Games 2025.
• It marked the first time Bihar hosted the event, held across multiple cities in the state.
• The games were co-hosted with New Delhi, bringing together youth athletes from across India.

Additional Information

• Karnataka
• Hosted the 1st Khelo India Youth Games (2018).
• Regular contributor to India's medal tally.
• Gujarat
• Hosted the Khelo India Youth Games (2022).
• Known for strong sports infrastructure and medal performance.
• Maharashtra
• Hosted KIYG in 2019.
• State has a high participation base in school and college sports.

Important Points

• Khelo India Youth Games
• The Khelo India Youth Games is a flagship initiative by the Government of India to promote sports culture and identify talent at the grassroots level.
• Launched in 2018, the games feature athletes under the age of 21 competing in various disciplines.
• The event serves as a platform to scout young talent, who are then trained under the Khelo India Talent Development program.

Q22. Answer: (c) Ajay Devgn

The correct answer is Ajay Devgn.

Key Points

• Ajay Devgn, a renowned Bollywood actor, producer, and director, launched Prismix, an AI-driven media company.
• Prismix focuses on leveraging artificial intelligence to create innovative solutions for the media and entertainment industry.
• The company aims to explore technological advancements such as AI and machine learning to enhance storytelling and digital content creation.

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• Ajay Devgn has been actively involved in expanding his ventures beyond acting, including film production and digital platforms, showcasing his entrepreneurial skills.

• Prismix reflects Devgn's vision for the future of media, combining creativity with cutting-edge technology to revolutionize content consumption.

Additional Information

• Salman Khan:

• Salman Khan is a prominent Bollywood actor known for his blockbuster movies and charitable initiatives.

• He launched the Being Human Foundation, which focuses on healthcare and education initiatives for underprivileged children.

• Salman is also involved in producing films and has hosted popular TV shows like Bigg Boss.

• Aamir Khan:

• Aamir Khan is an acclaimed actor and filmmaker, often referred to as the "Perfectionist" of Bollywood.

• He spearheaded the social awareness talk show Satyamev Jayate, addressing critical societal issues.

• Aamir has been actively advocating for various causes, including education and water conservation.

• Shahrukh Khan:

• Shahrukh Khan, popularly known as the "King of Bollywood," is a versatile actor and producer.

• He is the co-owner of the IPL team Kolkata Knight Riders and has ventured into film production with Red Chillies Entertainment.

• Shahrukh has received numerous accolades, including international recognition, for his contributions to cinema.

Q23. Answer: (c) UNICEF

The correct answer is UNICEF.

Key Points

• UNICEF (United Nations Children's Fund) is the organization responsible for releasing the State of the World's Children report.

• The report provides a comprehensive analysis of the challenges faced by children worldwide, focusing on themes like health, education, nutrition, and safety.

• UNICEF was established in 1946 and works across 190 countries and territories to protect the rights of children and promote their well-being.

• The State of the World's Children report highlights issues such as child poverty, malnutrition, access to education, and the impact of climate change on children.

• UNICEF collaborates with governments, NGOs, and local communities to implement policies and programs that address the issues highlighted in the report.

Additional Information

• UNDP (United Nations Development Programme):

• UNDP works to eradicate poverty and reduce inequalities through sustainable development initiatives.

• Its focus areas include governance, climate change adaptation, disaster risk reduction, and poverty alleviation.

• While UNDP publishes reports like the Human Development Report, it is not responsible for the State of the World's Children report.

• UNESCO (United Nations Educational, Scientific and Cultural Organization):

• UNESCO focuses on promoting international collaboration in education, science, and culture.

• It is known for reports such as the Global Education Monitoring Report, but it does not release the State of the World's Children report.

• UNESCO works to enhance access to quality education and preserve cultural heritage worldwide.

• WHO (World Health Organization):

• WHO is a specialized agency of the United Nations responsible for public health.

• It publishes reports like the World Health Statistics and provides guidelines for global health standards.

• WHO addresses issues such as pandemics, maternal health.

Q24. Answer: (d) Charli XCX

The correct answer is Charli XCX.

Key Points

• Charli XCX, the British singer-songwriter, was named Songwriter of the Year at the 2025 Ivor Novello Awards, held at Grosvenor House, London.

• The Ivor Novello Awards are one of the most prestigious accolades recognizing excellence in songwriting and composing in the UK.

• Charli XCX, known for her innovative and genre-defying music, was recognized for her contributions to several hit songs,

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reflecting her influence in shaping modern pop music.

• She has consistently delivered critically acclaimed albums and singles, including her 2022 album "Crash", which showcased her evolution as an artist.

• Her ability to write compelling lyrics and create unique melodies has earned her widespread recognition and a dedicated fan base.

Additional Information

• Ed Sheeran

• Ed Sheeran is one of the world's most successful singer-songwriters, known for hits like "Shape of You", "Thinking Out Loud", and "Perfect".

• He has won multiple Ivor Novello Awards in the past, including Songwriter of the Year in previous editions.

• Sam Smith

• Sam Smith is a Grammy-winning artist known for their soulful voice and emotional ballads such as "Stay With Me" and "Too Good at Goodbyes."

• RAYE

• RAYE is a British singer and songwriter who gained recognition for her work on hits like "Secrets" and "Escapism."

• She has been vocal about her struggles in the music industry and has emerged as an independent artist with a growing reputation for her songwriting skills.

Q25. Answer: (c) Parbati Mahato

The correct answer is Parbati Mahato.

Key Points

• Parbati Mahato, an eminent social activist, was honored with the Rammohan Acarya Sanman 2025 for her outstanding service to rural tribal communities.

• She is widely recognized for her significant contributions towards the upliftment and empowerment of tribal populations, focusing on education, healthcare, and sustainable development.

• Her initiatives have led to remarkable progress in the socio-economic conditions of tribal communities in rural areas.

• The Rammohan Acarya Sanman is awarded annually to individuals or organizations that demonstrate exceptional dedication to societal welfare, particularly in the field of community development.

• Parbati Mahato's efforts align with the principles of promoting equality and justice, values championed by Raja Ram Mohan Roy, the inspiration behind the award.

Additional Information

• Medha Patkar

• Medha Patkar is an Indian social activist known for her role in the Narmada Bachao Andolan (Save Narmada Movement), which aimed to protect the rights of people displaced by the construction of dams on the Narmada River.

• She has been actively involved in issues related to human rights, environmental protection, and rural development.

• Her efforts have highlighted the challenges faced by marginalized communities, focusing on equitable development and sustainable resource management.

• Aruna Roy

• Aruna Roy is an Indian political and social activist credited with founding the Mazdoor Kisan Shakti Sangathan (MKSS), a grassroots organization working on transparency and accountability in governance.

• She played a pivotal role in the enactment of the Right to Information Act (RTI) in India, empowering citizens to access government records and hold authorities accountable.

• Her activism focuses on issues such as women's rights, labor rights, and democratic governance.

• Irom Sharmila

• Irom Sharmila, often referred to as the "Iron Lady of Manipur," is a civil rights and political activist.

• She is known for her 16-year-long hunger strike against the Armed Forces (Special Powers) Act (AFSPA), which she argued led to human rights violations in Manipur.

• Her dedication to non-violent protest gained international attention and highlighted the need for reforms in laws governing military operations in civilian areas.

Q26. Answer: (d) the Chief Justice of India, with the approval of the President

The correct answer is the Chief Justice of India, with the approval of the President.

Key Points

• As per Article 130 of the Indian Constitution, the Supreme Court shall sit in Delhi or such other place or places as the Chief Justice of India (CJI), with the approval of the President, may appoint.

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• This provision grants the Chief Justice of India the authority to decide on the location of the Supreme Court's sittings, subject to Presidential approval.

• The Constitution originally envisaged the Supreme Court to be located in Delhi, but Article 130 allows flexibility for the Court to sit in other parts of the country if necessary.

• The provision ensures that the Supreme Court is accessible to people across India, facilitating better access to justice.

• Such relocation of sittings, however, has not been exercised so far, and the Supreme Court primarily operates from its premises in New Delhi.

Additional Information

• Supreme Court (Composition & Appointment):

• Judges: Chief Justice of India (CJI) + up to 33 other Judges (total 34).

• Appointment: Appointed by the President, with significant consultation from the Collegium (CJI & senior judges).

• Tenure: Judges retire at 65 years of age.

• Removal: Only by Parliament through a rigorous impeachment process for proven misbehavior or incapacity.

Q27. Answer: (b) ocean beds

The correct answer is ocean beds.

Key Points

• Manganese nodules, also known as polymetallic nodules, are rock concretions found on the deep ocean floor, typically at depths of 4,000 to 6,000 meters.

• These nodules are composed mostly of manganese and iron oxides, along with smaller amounts of nickel, copper, cobalt, and other valuable metals.

• The largest deposits of manganese nodules are found in the Pacific Ocean, the Indian Ocean, and the Atlantic Ocean, with the Clarion-Clipperton Zone in the Pacific being particularly rich in these nodules.

• Manganese nodules are formed by the precipitation of metal compounds from seawater or pore water in sediments, a process that takes millions of years.

• These nodules are of significant economic interest due to their high concentration of rare and valuable metals, which are essential for various industries, including electronics and renewable energy.

Additional Information

• River deltas:

• River deltas are landforms created at the mouth of a river, where it deposits sediment as it flows into a larger body of water such as an ocean, sea, or lake.

• They are rich in organic material and are crucial for agriculture and biodiversity but are not a source of manganese nodules.

• Examples include the Ganges-Brahmaputra Delta and the Nile Delta.

• Glacier surfaces:

• Glaciers are large masses of ice that move slowly over land, found in polar regions and at high altitudes.

• They are known for transporting rock and sediment but do not host manganese nodules.

• Glacier surfaces are studied for climate change research rather than mineral deposits.

• Mountain slopes:

• Mountain slopes are regions of high elevation and steep gradients, often rich in minerals such as gold, copper, and iron.

• However, manganese nodules are not found here as they form exclusively in deep-sea environments.

• Mountain slopes are more associated with terrestrial mining rather than deep-sea mining.

Q28. Answer: (d) MS Swaminathan

The correct answer is MS Swaminathan.

Key Points

• MS Swaminathan, an eminent Indian geneticist and agricultural scientist, is regarded as the chief architect of the Green Revolution in India.

• He is known for introducing and promoting the use of high-yielding variety (HYV) seeds and advanced agricultural techniques, which significantly increased agricultural productivity in India during the 1960s and 1970s.

• Swaminathan worked closely with Nobel laureate Norman Borlaug and facilitated the adaptation of Mexican wheat varieties to Indian climatic conditions.

• His efforts helped India achieve self-sufficiency in food production and reduced dependence on food imports, especially during times of famine.

• He was the founder of the MS Swaminathan Research Foundation (MSSRF), which focuses on sustainable agriculture, food security, and rural development.

Additional Information

• Dr. Manmohan Singh

• He was the 13th Prime Minister of India, serving from 2004 to 2014.

• Dr. Singh is a renowned economist and played a key role in the economic liberalization of India in 1991 as the Finance Minister under PV Narasimha Rao's government.

• He is credited with introducing reforms that opened up India's economy to globalization and foreign investment.

• PV Narasimha Rao

• Rao served as the 9th Prime Minister of India from 1991 to 1996.

• He is often referred to as the "Father of Indian Economic Reforms" for initiating landmark liberalization policies that transformed India's economy.

• His tenure is also marked by significant political and economic reforms, including the dismantling of the License Raj.

• Dr. Verghese Kurien

• Known as the "Father of the White Revolution in India," Dr. Kurien was instrumental in making India the largest producer of milk in the world.

• He spearheaded the Operation Flood program, which revolutionized India's dairy industry and strengthened rural economies.

• Dr. Kurien was the founder of the National Dairy Development Board (NDDB) and the architect of the Amul brand.

Q29. Answer: (d) Article 52

The correct answer is Article 52.

Key Points

• Article 52 of the Indian Constitution establishes the office of the President of India.

• The President is the head of state and the highest constitutional authority in India.

• The article specifically mentions that India shall have a President, ensuring a parliamentary system of governance under the Constitution.

• The President is elected indirectly by an electoral college consisting of elected members of both Houses of Parliament and the Legislative Assemblies of States and Union territories.

• The President holds office for a tenure of five years and serves as the formal head of the executive, legislative, and judiciary branches, as well as the commander-in-chief of the Indian Armed Forces.

Additional Information

• Article 75

• Article 75 deals with the appointment of the Prime Minister and other Ministers by the President.

• It states that the President shall appoint the Prime Minister, and the other Ministers shall be appointed on the advice of the Prime Minister.

• It also mentions that the Ministers shall hold office during the pleasure of the President.

• The article further provides that the Council of Ministers is collectively responsible to the Lok Sabha.

• Article 53

• Article 53 states that the executive power of the Union shall be vested in the President.

• The President exercises this power either directly or through officers subordinate to him, in accordance with the Constitution.

• This article establishes the President as the formal executive authority while the real powers are exercised by the Council of Ministers headed by the Prime Minister.

• Article 74

• Article 74 defines the role of the Council of Ministers in aiding and advising the President.

• It states that there shall be a Council of Ministers headed by the Prime Minister to aid and advise the President in the exercise of his functions.

• The President is bound to act according to the advice given by the Council of Ministers.

• This article ensures the functioning of the parliamentary form of government in India.

Q30. Answer: (c) Fifth

The correct answer is Fifth Schedule.

Key Points

• The Fifth Schedule of the Indian Constitution deals with the administration and control of Scheduled Areas and Scheduled Tribes in any state other than those in the Sixth Schedule.

• Scheduled Areas are defined as areas identified by the President of India as having a significant population of Scheduled Tribes (STs) that require special protection and development.

• The Fifth Schedule empowers the Governor of a state to make regulations for the peace and good governance of Scheduled Areas, subject to the assent of the President.

• This schedule also provides for the establishment of a Tribes Advisory Council (TAC) in states having Scheduled Areas to advise on matters pertaining to the welfare and advancement of Scheduled Tribes.

• The provisions under the Fifth Schedule aim to ensure that tribal populations are protected from exploitation and that their rights over land, forests, and resources are safeguarded.

Additional Information

• Ninth Schedule:

• The Ninth Schedule was added to the Constitution by the First Amendment Act of 1951 to protect certain laws related to land reforms and the abolition of the zamindari system from judicial review.

• Laws included in the Ninth Schedule cannot be challenged in courts on the ground that they violate fundamental rights.

• This schedule is often used to protect progressive land reform laws and other socio-economic measures from being invalidated.

• Sixth Schedule:

• The Sixth Schedule deals with the administration of tribal areas in the northeastern states of Assam, Meghalaya, Tripura, and Mizoram.

• It provides for the establishment of Autonomous District Councils (ADCs) and Regional Councils to govern these areas, ensuring self-governance for tribal populations.

• The councils have legislative, judicial, and executive powers over specified subjects, such as land, forests, inheritance, and village administration.

• Seventh Schedule:

• The Seventh Schedule of the Indian Constitution divides the powers and functions of the government into three lists: the Union List, State List, and Concurrent List.

• The Union List contains subjects on which only the central government can legislate, such as defense, foreign affairs, and banking.

• The State List includes subjects under the purview of state governments, such as police, public health, and agriculture.

• The Concurrent List includes subjects on which both the central and state governments can legislate, such as education, criminal law, and marriage.

Q31. Answer: (b) Three years of legal practice experience

The correct answer is Three years of legal practice experience.

Key Points

• The Supreme Court on May 20, 2025, reinstated the requirement of three years of legal practice experience for candidates aspiring to become civil judges (junior division).

• This decision was made to ensure that candidates possess adequate practical legal knowledge and understanding before serving as judicial officers.

• The requirement was previously in place but had been removed in several states, leading to debates about the readiness of fresh law graduates for judicial roles.

• The ruling aligns with the need to enhance the quality of judicial services by incorporating practical exposure into the eligibility criteria for civil judges.

• States and union territories will now need to implement this requirement in their judicial service examinations.

Additional Information

• Supreme Court (Composition & Appointment):

• Judges: Chief Justice of India (CJI) + up to 33 other Judges (total 34).

• Appointment: Appointed by the President, with significant consultation from the Collegium (CJI & senior judges).

• Tenure: Judges retire at 65 years of age.

• Removal: Only by Parliament through a rigorous impeachment process for proven misbehavior or incapacity.

Q32. Answer: (a) Chile

The correct answer is Chile.

Key Points

• The Atacama Desert, where the Extremely Large Telescope (ELT) is under construction, is located in Chile, South America.

• The Atacama Desert is considered one of the driest places on Earth, making it an ideal location for astronomical observations due to minimal atmospheric interference.

• The Extremely Large Telescope (ELT) is being built by the European Southern Observatory (ESO) and is expected to be the world’s largest optical/near-infrared telescope once completed.

• The ELT, with a primary mirror of 39 meters in diameter, aims to advance scientific understanding of the universe, including the study of exoplanets, black holes, and the early stages of galaxy formation.

• The high altitude and clear skies of the Atacama Desert, particularly at the Cerro Armazones site, provide optimal conditions for cutting-edge astronomical research.

Additional Information

• Argentina

• Argentina is known for its diverse landscapes, including the Andes Mountains and the Pampas grasslands.

• The country does host other observatories, such as the Pierre Auger Observatory, which studies cosmic rays.

• Peru

• Peru is famous for the Andes Mountains and the Amazon Rainforest, as well as archaeological sites like Machu Picchu.

• Bolivia

• Bolivia is known for its high-altitude salt flats, such as Salar de Uyuni, and the Andes Mountains.

Q33. Answer: (a) In light years

The correct answer is In light years.

Key Points

• The vast distances between galaxies are measured in light years because these distances are incredibly large, and using conventional units like kilometers or miles would result in impractically large numbers.

• One light year is the distance that light travels in one year, which is approximately 9.46 trillion kilometers or 5.88 trillion miles.

• Light years are commonly used in astronomy to express distances between celestial objects, such as stars, galaxies, and other cosmic entities.

• This unit of measurement is essential for understanding the scale of the universe, as many galaxies are located millions or even billions of light years away from Earth.

• For example, the Andromeda Galaxy, the nearest major galaxy to the Milky Way, is located approximately 2.5 million light years away.

Additional Information

• Core Characteristics of Galaxies:

• Composition: Billions to trillions of stars, stellar remnants, gas, dust, and significant dark matter, orbiting a common center of mass.

• Gravity: The dominant force, binding everything together, with stars orbiting the galactic core.

• Size & Scale: Range from dwarf galaxies (thousands of stars) to giant ellipticals (trillions of stars, millions of light-years across).

• Age: Most are billions of years old, some almost as old as the universe itself (around 13.8 billion years).

Q34. Answer: (d) Yogi Adityanath

The correct answer is Yogi Adityanath.

Key Points

• Yogi Adityanath, the Chief Minister of Uttar Pradesh, is known for his strong emphasis on nationalism and the "Nation First" ethos.

• During a seminar in Lucknow in May 2025, he highlighted the importance of prioritizing national interests above individual or regional interests.

• He reiterated that development, unity, and cultural preservation must align with the vision of a strong, self-reliant India.

• Yogi Adityanath has frequently propagated the "Nation First" ideology in various spheres, promoting government policies that strengthen national security and social harmony.

• The seminar focused on the role of leadership in promoting values of patriotism and national integration in the socio-political landscape.

Additional Information

• Amit Shah

• Amit Shah is the Union Home Minister of India and a prominent leader of the Bharatiya Janata Party (BJP).

• He is known for his role in the abrogation of Article 370 in Jammu and Kashmir and the introduction of the Citizenship Amendment Act (CAA).

• His contributions focus on national security, internal affairs, and policy reforms.

• Rajnath Singh

• Rajnath Singh is the Union Minister of Defence of India and a senior leader in the BJP.

• He has been instrumental in strengthening India's defense capabilities and promoting indigenization in defense manufacturing under the "Atmanirbhar Bharat" initiative.

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• He has also served as the Chief Minister of Uttar Pradesh and the Union Home Minister in the past.

• Narendra Modi

• As the Prime Minister of India, Narendra Modi has been a strong proponent of the "Nation First" ideology.

• He has launched several landmark initiatives such as Digital India, Make in India, and Swachh Bharat Abhiyan, all aimed at strengthening India's global standing and development.

• His leadership is characterized by a focus on economic growth, nationalism, and inclusive governance.

Q35. Answer: (b) Para-Swimming

The correct answer is Para-Swimming.

Key Points

• Murlikant Rajaram Petkar is a renowned Indian para-athlete and the first Indian to win a gold medal at the Paralympics Games.

• He achieved this milestone in 1972 Munich Paralympics in the sport of Para-Swimming, clocking a world record time of 37.33 seconds in the 50m freestyle swimming event.

• Petkar hails from Maharashtra and was initially a soldier in the Indian Army. He suffered severe injuries during the 1965 India-Pakistan war, leading to his disability.

• Despite his physical challenges, he continued to pursue sports and excelled in swimming, table tennis, and other disciplines.

• Recognizing his remarkable contributions to Indian sports, he was honored with the prestigious Arjuna Award in 2024.

Additional Information

• Shooting

• Shooting is a competitive sport involving tests of accuracy and speed in aiming at targets using firearms or air guns.

• India has produced world-class shooters like Abhinav Bindra (India's first individual Olympic gold medalist), Rajyavardhan Singh Rathore, and Manu Bhaker.

• The sport is governed by the International Shooting Sport Federation (ISSF) globally.

• Swimming

• Swimming is one of the most popular water sports and an integral part of the Summer Olympics since its inception in 1896.

• India has notable swimmers like Sajan Prakash and Virdhawal Khade who have represented the country in international events.

• Swimming events include freestyle, backstroke, breaststroke, and butterfly, along with medley events.

• Para-Shooting

• Para-Shooting is an adaptive sport for athletes with physical impairments, governed by the International Paralympic Committee (IPC).

• It involves precision shooting by athletes using air pistols or rifles.

• India’s para-shooters, such as Avani Lekhara, have achieved significant success in global events, including the Paralympics.

Important Points

• Arjuna Award

• The Arjuna Award is one of the highest sporting honors in India, instituted in 1961.

• It recognizes outstanding achievement in national sports, and recipients are awarded a bronze statue of Arjuna, a certificate, and a cash prize.

• The award covers a wide range of sports, including able-bodied and para-sports.

Q36. Answer: (a) Vertical-Launch Short-Range Surface-to-Air Missile

The correct answer is Vertical-Launch Short-Range Surface-to-Air Missile.

Key Points

• The Vertical-Launch Short-Range Surface-to-Air Missile (VLSRSAM) is an indigenously developed air defense missile system by the Defence Research and Development Organisation (DRDO) of India.

• It was successfully tested by the Indian Navy in 2025, marking a significant step in strengthening the naval defense capabilities of India.

• VLSRSAM is designed to neutralize various aerial threats, including fighter aircraft, drones, helicopters, and low-speed aerial targets, at close ranges.

• The missile is equipped with advanced technologies, such as an active radar seeker, which enables it to track and engage targets with high precision.

• The system operates with a canisterized design, allowing for easy storage, transportation, and deployment on naval vessels, making it highly versatile for maritime operations.

Additional Information

• VLSRSAM

• The VLSRSAM is part of India's effort to strengthen its indigenous defense capabilities under the ‘Aatmanirbhar Bharat’ initiative.

• It represents a critical advancement in air defense technology, providing the Indian Navy with the ability to protect its fleet against aerial threats in a variety of combat scenarios.

• DRDO has also developed other missile systems like Akash, Astra, and BrahMos, showcasing India's growing expertise in missile technology.

Q37. Answer: (a) Carbon dioxide

The correct answer is Carbon dioxide.

Key Points

• When baking soda (sodium bicarbonate) reacts with vinegar (acetic acid), carbon dioxide (CO2) gas is released.

• The reaction is a classic example of an acid-base reaction, where acetic acid (acid) reacts with sodium bicarbonate (base).

• The chemical equation for the reaction is: CH3COOH + NaHCO3 → CH3COONa + H2O + CO2.

• The release of carbon dioxide is often observed as bubbling or fizzing during the reaction.

• This reaction is commonly used in baking to help dough rise, as the carbon dioxide gas creates air pockets in the dough.

Additional Information

• Carbon monoxide:

• Carbon monoxide (CO) is a colorless, odorless, and toxic gas formed by the incomplete combustion of carbon-containing fuels like coal, wood, or gasoline.

• It is not produced in the reaction between baking soda and vinegar.

• Exposure to carbon monoxide can cause serious health problems such as headaches, dizziness, and even death in high concentrations.

• Ammonia:

• Ammonia (NH3) is a compound of nitrogen and hydrogen, commonly used in fertilizers, cleaning agents, and industrial applications.

• It has a pungent smell and is not involved in the reaction of baking soda and vinegar.

• Ammonia is produced industrially via the Haber process, which combines nitrogen and hydrogen gases under high pressure and temperature.

• Hydrogen:

• Hydrogen (H2) is the lightest and most abundant element in the universe, commonly used as a fuel and in industrial processes.

• It is not produced in the reaction between baking soda and vinegar.

• Hydrogen gas is typically produced via processes such as electrolysis of water or steam methane reforming.

Q38. Answer: (d) 42^(nd) Amendment

The correct answer is 42nd Amendment.

Key Points

• The 42nd Amendment of the Indian Constitution, enacted in 1976 during the Emergency period under Prime Minister Indira Gandhi, is one of the most comprehensive amendments in India's constitutional history.

• It introduced Article 39A to the Directive Principles of State Policy, which mandates the state to ensure that the legal system promotes justice on the basis of equal opportunity and provides free legal aid to economically weaker sections.

• This amendment is often referred to as the "Mini Constitution" due to its extensive impact on various parts of the Constitution.

• Article 39A emphasizes the importance of equal justice and free legal aid and aims to reduce the inequality of access to justice caused by economic or other disabilities.

• It highlights the responsibility of the state to ensure justice for all, irrespective of financial or social status, and aligns with the constitutional goal of securing social, economic, and political justice for citizens.

Additional Information

• 86th Amendment (2002)

• The 86th Amendment added Article 21A to the Constitution, making the right to education a fundamental right for children aged 6 to 14 years.

• It also modified Article 45, requiring the state to provide early childhood care and education for children below 6 years.

• This amendment ensures free and compulsory education for all children in the specified age group.

• 44th Amendment (1978)

• The 44th Amendment was enacted to revoke many provisions of the 42nd Amendment and restore the original spirit of the Constitution.

• It removed the Right to Property from the list of Fundamental Rights and made it a legal right under Article 300A.

• This amendment also strengthened civil liberties and restored judicial independence.

• 73rd Amendment (1992)

• The 73rd Amendment introduced the Panchayati Raj system in India, giving constitutional status to rural local self-government.

• It added Part IX (The Panchayats) and the Eleventh Schedule to the Constitution, listing 29 subjects under Panchayat jurisdiction.

• This amendment provided for a three-tier system of Panchayati Raj Institutions (PRIs) and ensured regular elections and reservation of seats for Scheduled Castes, Scheduled Tribes, and women.

Q39. Answer: (b) 1855

The correct answer is 1855.

Key Points

• The Santhal Hool (rebellion) took place in 1855 and was one of the most significant tribal uprisings against the British colonial rule in India.

• The rebellion was led by the Santhal brothers – Sidhu, Kanhu, Chand, and Bhairav Murmu, who mobilized the Santhal community.

• The Santhals rose in revolt due to exploitation by zamindars, moneylenders, and the British revenue policies, which caused severe hardships to the tribal community.

• On June 30, 1855, the Santhal leaders formally declared rebellion against the British and their allies by organizing a meeting at Bhognadih in the present-day state of Jharkhand.

• The rebellion was eventually suppressed by the British using military force, but it became a symbol of tribal resistance and is commemorated annually as Hool Diwas.

Additional Information

• Key examples of other significant tribal revolts:

• Munda Rebellion (Ulgulan) (1899-1900): Led by the iconic Birsa Munda in the Chotanagpur region, it aimed to establish Munda Raj and fight against land alienation and forced labor.

• Kol Rebellion (1831): Occurred in the Chota Nagpur region, protesting land acquisition and the influx of non-tribal people.

• Bhil Uprisings (Various times, e.g., 1825-1857): A series of revolts by the Bhil people in Western India against British encroachment and new revenue systems.

• Chuar Uprising (1768-1816): Known as the Jungle Mahal Revolt in Bengal, it involved farmers and hunters resisting high revenue demands and alien rule.

• Rampa Rebellion (1922-1924): A major revolt in the Rampa region of Andhra Pradesh led by Alluri Sitarama Raju against forest laws and forced labor.

• Paika Rebellion (1817): An armed uprising in Odisha against the British land revenue policies.

Q40. Answer: (a) Jivya Soma Mashe

The correct answer is Jivya Soma Mashe.

Key Points

• Jivya Soma Mashe was a celebrated Indian artist known for his significant contributions to Warli painting, a traditional tribal art form originating from Maharashtra.

• He played a pivotal role in bringing the Warli art style to the global stage by adapting its traditional motifs to contemporary forms without losing its essence.

• Mashe received widespread recognition for using Warli art to depict themes of harmony between humans and nature, as well as daily tribal life.

• In 1976, he was honored with the Padma Shri, one of India's highest civilian awards, for his contributions to Indian tribal art.

• His works have been exhibited internationally, including in prestigious galleries in Paris, Japan, and Germany, thus popularizing Warli art worldwide.

Additional Information

• MF Husain:

• Known as the "Picasso of India," Maqbool Fida Husain was one of India's most renowned modernist painters.

• He was famous for his bold and vibrant paintings depicting Indian culture, mythology, and contemporary themes.

• Amrita Sher-Gil:

• Amrita Sher-Gil was a prominent Indian painter considered one of the greatest avant-garde women artists of the early 20th century.

• Her works, often depicting rural Indian life, were influenced by both Indian and European styles.

• SH Raza:

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• Sayed Haider Raza was a globally acclaimed Indian modern artist known for his abstract art and geometric patterns, particularly the "Bindu" symbol.

• Raza's works primarily focused on themes of spirituality and Indian heritage.

Important Points

• Warli Painting:

• Warli painting is a tribal art form originating from the Warli tribe in Maharashtra, India.

• It is characterized by its use of simple geometric shapes like circles, triangles, and squares to depict scenes of daily life, nature, and rituals.

• Traditionally, Warli paintings are monochromatic, made using white paint on mud or cow-dung-coated surfaces.

• The art form has a deep cultural significance, often portraying themes of harmony, community, and coexistence with nature.

Q41. Answer: (d) 180

Shortcut Trick

Calculate the Total Interest Percentage for the given period.

Total Interest % = Rate per month × Number of months = 3% × 5 = 15%

Simple Interest (SI) = 15% of Rs. 1,200

SI = 1200 × 15/100 = 12 × 15 = 180

Therefore The correct answer is Rs. 180.

Alternate Method

Given:

Principal (P) = Rs. 1,200

Interest Rate (R) = 3% per month

Time (T) = 5 months

Formula Used:

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

Calculations:

=> SI = (1200 × 3 × 5) ÷ 100

=> SI = 1200 × 15 ÷ 100

=> SI = 12 × 15

=> SI = 180

Therefore The correct answer is Rs. 180.

Additional Information

Total Amount Formula

The total Amount (A) accumulated is the sum of Principal and Interest: A = P + SI.

Consistency of Units

Ensure the Interest Rate (R) and Time (T) are in the same time units (both in months or both in years). If Rate is annual and Time is in months, divide Time by 12.

Simple Interest Nature

In Simple Interest, the interest is always calculated only on the original Principal amount, making the interest earned every month constant.

Q42. Answer: (d) 14.29%

Shortcut Trick

In Buy-Free schemes, the Effective Discount% is calculated on the Total Value of goods handed over.

Discount% = (Value of Free Goods ÷ Total Value of Goods) × 100

Here, Free Goods = Rs. 1000 and Paid Goods = Rs. 6000.

Total Value = 6000 + 1000 = Rs. 7000.

Discount% = (1000 ÷ 7000) × 100 = 100 ÷ 7 = 14.2857%.

Therefore The correct answer is 14.29%.

Alternate Method

Given → Formulas → SVG → Steps (=> each) → Final Answer.

Formulas: Discount% = (Discount ÷ MP) × 100 | MP = Price of all goods (Paid + Free).

=> The Marked Price (MP) is the sum of the value of the paid goods and the free goods.

=> MP = 6000 + 1000 = Rs. 7000.

=> The Selling Price (SP) is the actual amount paid by the customer.

=> SP = Rs. 6000.

=> Discount = MP − SP = 7000 − 6000 = Rs. 1000.

=> Discount% = (1000 ÷ 7000) × 100 = 14.285...% ≈ 14.29%.

Therefore The correct answer is 14.29%.

Additional Information

Effective Discount in "Buy X Get Y Free"

The formula is Discount% = [Y ÷ (X + Y)] × 100. Here Y represents the free items and (X+Y) represents the total items.

Marked Price Concept

In any free-item scheme, the shopkeeper incurs the cost of all items, so the total Marked Price must include the value of the free items.

Q43. Answer: (b) Rs. 1,04,000

Shortcut Trick

First year increase = 4% → Multiplying factor = 104/100 = 26/25

Second year increase = 25% → Multiplying factor = 125/100 = 5/4

Initial Sales × (26/25) × (5/4) = 1,35,200

Initial Sales = 1,35,200 × (25/26) × (4/5) = 5200 × 5 × 4 = 1,04,000

Therefore The correct answer is Rs. 1,04,000.

Alternate Method

Given:

Current sales amount = Rs. 1,35,200

First year growth = 4%

Second year growth = 25%

Formula Used:

Final Value = Initial Value × (1 + r1/100) × (1 + r2/100)

Calculations:

=> Let the sales two years ago be x.

=> x × (1 + 4/100) × (1 + 25/100) = 1,35,200

=> x × (104/100) × (125/100) = 1,35,200

=> x × (26/25) × (5/4) = 1,35,200

=> x × (130/100) = 1,35,200

=> x × 1.3 = 1,35,200

=> x = 1,35,200 / 1.3

=> x = 1,04,000

Therefore The correct answer is Rs. 1,04,000.

Additional Information

Successive Percentage Change

When a value changes by a% and then by b%, the net effective change is (a + b + ab/100)%.

Effective Rate Calculation

In this case: 4 + 25 + (4 × 25)/100 = 29 + 1 = 30%. Thus, final value is 130% of the initial value.

Reverse Percentage

To find the initial value from the final value, divide the final value by the product of individual growth factors (1 + r/100).

Q44. Answer: (a) 91%

Shortcut Trick

Use the Successive Ratio method for dishonest dealers.

Profit due to price = 100 : 168 (Since 68% profit).

Profit due to weight = (100 − 12) : 100 = 88 : 100 (Since 12% less weight).

Net Ratio (CP : SP) = (100 × 88) : (168 × 100) = 88 : 168.

Profit% = (Difference ÷ CP) × 100 = (80 ÷ 88) × 100 = 90.90%.

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Rounding off to the nearest whole number, we get 91%.
Therefore The correct answer is 91%.
Alternate Method
Given → Profit claimed = 68%, Weight error = 12% less.
Formulas: Profit% = (Total Gain ÷ Actual Weight Used) × 100 | Effective Profit = [(100 + P%) ÷ (100 − Less%)] − 1
=> Let the True Weight be 1000g and Cost Price be 1 per gram.
=> Selling Price (SP) = 1.68 × 1000 = 1680 (selling 1000g at 68% profit).
=> Actual weight delivered = 1000 − (12% of 1000) = 880g.
=> Cost Price (CP) of 880g = 880.
=> Total Profit = SP − CP = 1680 − 880 = 800.
=> Profit% = (800 ÷ 880) × 100 = (10 ÷ 11) × 100 = 90.909...%
=> Rounding to nearest whole number = 91%.
Therefore The correct answer is 91%.
Additional Information
Dishonest Dealer Concept
When a dealer uses less weight, the profit% is calculated on the actual weight given to the customer, not the marked weight.
Combined Profit Formula
Total Profit% = [(Claimed Profit% + Weight Error%) ÷ (100 − Weight Error%)] × 100.

Q45. Answer: (c) sin A - cos A + 2

Shortcut Trick
Using Algebraic identity: $a^3 - b^3 = (a - b)(a^2 + b^2 + ab)$ where a = sin A and b = cos A.
First term: $(\sin A - \cos A)(\sin^2 A + \cos^2 A + \sin A \cos A) \div (1 + \sin A \cos A) = \sin A - \cos A$.
Second term: Since $\sin 54° = \cos 36°$, then $2 \sin^2 54° \sec^2 36° = 2 \cos^2 36° \times (1/\cos^2 36°) = 2$.
Final sum: sin A − cos A + 2.
Therefore The correct answer is sin A − cos A + 2.
Alternate Method
Given: Expression = $(\sin^3 A - \cos^3 A)/(1 + \sin A \cdot \cos A) + 2 \sin^2 54° \sec^2 36°$
Formula Used: $a^3 - b^3 = (a - b)(a^2 + b^2 + ab)$; $\sin^2 \theta + \cos^2 \theta = 1$; $\sin(90° - \theta) = \cos \theta$.
=> Term 1 = $[(\sin A - \cos A)(\sin^2 A + \cos^2 A + \sin A \cos A)] / (1 + \sin A \cos A)$
=> Term 1 = $[(\sin A - \cos A)(1 + \sin A \cos A)] / (1 + \sin A \cos A) = \sin A - \cos A$
=> Term 2 = $2 \sin^2(90° - 36°) \times (1/\cos^2 36°)$
=> Term 2 = $2 \cos^2 36° \times (1/\cos^2 36°) = 2$
=> Result = sin A − cos A + 2
Therefore The correct answer is sin A − cos A + 2.
Additional Information
Complementary Angles
For any angle θ, $\sin \theta = \cos(90° - \theta)$, $\tan \theta = \cot(90° - \theta)$, and $\sec \theta = \operatorname{cosec}(90° - \theta)$.
Algebraic Cubes
$a^3 + b^3 = (a + b)(a^2 + b^2 - ab)$ and $a^3 - b^3 = (a - b)(a^2 + b^2 + ab)$ are fundamental identities in trigonometry simplification.

Q46. Answer: (c) 90/7

Shortcut Trick
Total Work = LCM(20, 12, 9) = 180 units.
Efficiency: Shifa = 9, Shifa + Afiya = 15, Shifa + Afiya + Mariyam = 20.
Efficiency of Mariyam = (S+A+M) − (S+A) = 20 − 15 = 5 units/day.
Combined Efficiency (Shifa + Mariyam) = 9 + 5 = 14 units/day.
Time = 180 ÷ 14 = 90/7 days.
Therefore The correct answer is 90/7 days.
Alternate Method
Given: Shifa (S) = 20 days, S + Afiya (A) = 12 days, S + A + Mariyam (M) = 9 days.
Formula Used: Total Work = LCM of individual days; Efficiency = Total Work ÷ Days.

Person	Days	Total Work	Efficiency
Shifa	20	180	9
Shifa + Afiya	12	15	
Shifa + Afiya + Mariyam	9	20	

=> Efficiency of Shifa = 9
=> Efficiency of Afiya = (S + A) − S = 15 − 9 = 6
=> Efficiency of Mariyam = (S + A + M) − (S + A) = 20 − 15 = 5
=> Combined Efficiency of Shifa + Mariyam = 9 + 5 = 14
=> Days required = Total Work ÷ Combined Efficiency = 180 ÷ 14
=> Days = 90/7
Therefore The correct answer is 90/7 days.
Additional Information
Work and Efficiency Relation
Efficiency is inversely proportional to the time taken to complete the work. Efficiency = Work ÷ Time.
Combined Work Formula
If two people can do work in x and y days respectively, together they do it in (x × y) ÷ (x + y) days.
Work and Wages
Wages are generally distributed in the ratio of the efficiency of the workers if they work for the same amount of time.

Q47. Answer: (c) 11 hours

Shortcut Trick
When distance is constant, Speed is inversely proportional to Time (S1T1 = S2T2).
Shahid (S1) = 132 km/hr, Time (T1) = 5 hr
Mira (S2) = 60 km/hr, Time (T2) = ?
132 × 5 = 60 × T2 => T2 = 660 ÷ 60 = 11 hr
Therefore The correct answer is 11 hr.
Alternate Method
Given:
Speed of Shahid = 132 km/hr
Time taken by Shahid = 5 hr
Speed of Mira = 60 km/hr
Formula Used:
Distance = Speed × Time
Calculations:
=> Total Distance (Delhi to Kanpur) = 132 × 5
=> Total Distance = 660 km
=> Time taken by Mira = Total Distance ÷ Speed of Mira
=> Time taken by Mira = 660 ÷ 60
=> Time taken by Mira = 11 hr
Therefore The correct answer is 11 hr.
Additional Information
Constant Distance Relation
If distance is constant, speed (S) and time (T) are inversely proportional: S1/S2 = T2/T1.
Average Speed
When a journey is covered at two different speeds x and y for equal distances, Average Speed = 2xy/(x + y).
Unit Conversion
To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.

Q48. Answer: (d) 34

Shortcut Trick

Let son's age 6 years ago be x. Then father's age was 2x + 40.

The age difference between them was (2x + 40) − x = x + 40.

Since the age difference remains constant, when the father becomes twice the son's age, the difference must equal the son's age at that time.

So, at that future point, the son will be x + 40 years old.

Current age of son = x + 6. Years from now = (x + 40) − (x + 6) = 34 years.

Therefore The correct answer is 34 years.

Alternate Method

Given: 6 years ago, Father (F_{-6}) = 2 × Son (S_{-6}) + 40.

Formula: Age Difference (D) = Father's Age − Son's Age (always constant).

=> Let S_{-6} = x. Then F_{-6} = 2x + 40.

=> Difference (D) = (2x + 40) − x = x + 40.

=> Present ages: Son = x + 6, Father = 2x + 46.

=> In 'n' years from now, Father = 2 × Son.

=> (2x + 46 + n) = 2 × (x + 6 + n).

=> 2x + 46 + n = 2x + 12 + 2n.

=> 46 − 12 = 2n − n.

=> n = 34.

Therefore The correct answer is 34 years.

Additional Information

Constant Age Difference

The numerical difference between the ages of two persons remains the same at any point in time.

Ratio of Ages

While age difference is constant, the ratio of ages changes as time passes (except when the difference is zero).

Future/Past Calculations

To find age 'n' years ago, subtract n. To find age 'n' years hence, add n to the present age.

Q49. Answer: (c) 96

Shortcut Trick

Total ratio units − 16 + 14 + 8 = 38 units.

Total amount − Rs. 456.

Value of 1 unit − 456 ÷ 38 = Rs. 12.

Difference between largest (16) and smallest (8) − 16 − 8 = 8 units.

Difference in amount − 8 × 12 = Rs. 96.

Therefore The correct answer is Rs. 96.

Alternate Method

Given: Total amount = Rs. 456, Ratio = 16 : 14 : 8.

Formula Used: Share = (Individual Ratio ÷ Sum of Ratios) × Total Amount.

=> Sum of ratio terms = 16 + 14 + 8 = 38

=> Largest share = (16 ÷ 38) × 456 = 16 × 12 = Rs. 192

=> Smallest share = (8 ÷ 38) × 456 = 8 × 12 = Rs. 96

=> Difference = 192 − 96 = Rs. 96

Therefore The correct answer is Rs. 96.

Additional Information

Ratio and Proportion

A ratio compares two quantities. If a sum S is divided in the ratio a:b:c, the shares are [a/(a+b+c)]×S, [b/(a+b+c)]×S, and [c/(a+b+c)]×S.

Simplified Ratio

Ratios can be simplified by dividing all terms by their HCF. Here, 16 : 14 : 8 can also be written as 8 : 7 : 4 for easier calculation.

Direct Variation

In division problems, the actual value of each part is directly proportional to its ratio value relative to the total sum.

Q50. Answer: (c) 1345

Shortcut Trick

An increase of 100% means the value becomes double (100% + 100% = 200%).

Original Number × 2 = 2690

Original Number = 2690 ÷ 2 = 1345

Therefore The correct answer is 1345.

Alternate Method

Given:

New value after 100% increase = 2690

Formula Used:

New Value = Original Value × (1 + Percentage Increase / 100)

Calculations:

Let the original number be x.

=> x + (100% of x) = 2690

=> x + x = 2690

=> 2x = 2690

=> x = 2690 ÷ 2

=> x = 1345

Therefore The correct answer is 1345.

Additional Information

Percentage Increase

To increase a quantity by n%, multiply the original value by (1 + n/100). For 100% increase, the factor is (1 + 1) = 2.

Percentage Decrease

To decrease a quantity by n%, multiply the original value by (1 − n/100). A 50% decrease reduces the value by half.

Base Change Rule

If a number is increased by 100%, it must be decreased by 50% of the new value to return to the original value.

Q51. Answer: (c) 441/61 days

Shortcut Trick

Total Work = LCM of (19, 15, 3) = 855 units.

Efficiency of A = 855 ÷ 19 = 45; Efficiency of B = 855 ÷ 15 = 57.

Efficiency of A + B + C = 855 ÷ 3 = 285.

Efficiency of C = 285 − (45 + 57) = 183.

Time for C = 855 ÷ 183 = 285 ÷ 61 = 4(41/61) days.

Therefore The correct answer is 4(41/61) days.

Alternate Method

Given: Time taken by A = 19 days, B = 15 days, A+B+C = 3 days.

Person	Days	Total Work	Efficiency
A	19	855	45
B	15	57	
A + B + C	3	285	

=> Total combined efficiency of A, B and C = 285 units/day.

=> Efficiency of C = (A + B + C) efficiency − (A + B) efficiency

=> Efficiency of C = 285 − (45 + 57) = 285 − 102 = 183 units/day.

=> Time taken by C alone = Total Work ÷ Efficiency of C

=> Time = 855 ÷ 183

=> Time = 285 ÷ 61 = 4(41/61) days.

Therefore The correct answer is 4(41/61) days.

Additional Information

Work and Efficiency Relation

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Efficiency is inversely proportional to time taken. Efficiency = Total Work ÷ Time.

Combined Work Formula

If C helps A and B, the equation is 1/A + 1/B + 1/C = 1/Total Time.

Time & Wages

Wages are always distributed in the ratio of the efficiency of the workers if they work for the same duration.

Q52. Answer: (a) 9 years

Shortcut Trick

Under Compound Interest, if a sum becomes n times in t years, it will become n^x times in x × t years.

Given: Money becomes 3 times (3^1) in 3 years.

Required: Money to become 27 times (which is 3^3) of itself.

Here, n = 3, t = 3, and x = 3 (since $27 = 3^3$).

=> Total time = x × t = 3 × 3 = 9 years.

Therefore The correct answer is 9 years.

Alternate Method

Given: Sum triples in 3 years.

Let the Principal be P and the Rate of Interest be r% per annum.

Using Compound Interest formula: A = P(1 + r/100)^t

=> $3P = P(1 + r/100)^3$

=> $3 = (1 + r/100)^3$ ... (i)

For the sum to become 27 times, let the time be n years:

=> $27P = P(1 + r/100)^n$

=> $27 = (1 + r/100)^n$

=> $(3)^3 = (1 + r/100)^n$

Substitute the value of 3 from equation (i):

=> $[(1 + r/100)^3]^3 = (1 + r/100)^n$

=> (1 + r/100)^9 = $(1 + r/100)^n$

=> n = 9 years.

Therefore The correct answer is 9 years.

Additional Information

Standard CI Formula

The amount A is calculated as A = P(1 + r/n)^(nt), where n is the number of times interest is compounded per year.

Simple Interest vs Compound Interest

In SI, the principal remains constant, so growth is linear. In CI, interest is added to the principal, leading to exponential growth.

Rule of 72

A quick way to estimate the doubling time of an investment is t ≈ 72 ÷ r, where r is the annual interest rate.

Q53. Answer: (b) 36

Shortcut Trick

CP of 12 pens = 150 => CP of 1 pen = 150 ÷ 12 = 12.5

SP of 1 pen = 17

Profit = 17 − 12.5 = 4.5

Profit% = (4.5 ÷ 12.5) × 100 = 36%

Therefore The correct answer is 36%.

Alternate Method

Given: Cost Price (CP) = 150 per dozen; Selling Price (SP) = 17 per unit.

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

=> CP of 12 pens = 150

=> SP of 12 pens = 17 × 12 = 204

=> Total Profit = 204 − 150 = 54

=> Profit% = (54 ÷ 150) × 100 = 36%

Therefore The correct answer is 36%.

Additional Information

Unitary Method in Profit and Loss

Always ensure that the Cost Price and Selling Price are calculated for the same number of units before finding the profit percentage.

Profit Percentage Formula

Profit% is always calculated on the Cost Price unless specified otherwise. Formula: [(SP − CP) ÷ CP] × 100.

Q54. Answer: (a) 392

Shortcut Trick

For two numbers a and b, the third proportional x is calculated as $b^2 \div a$.

Here, a = 8 and b = 56.

$x = (56 \times 56) \div 8$

$\Rightarrow x = 7 \times 56 = 392$.

Therefore The correct answer is 392.

Alternate Method

Given: First number (a) = 8, Second number (b) = 56, Third proportional = x.

Formula Used: If a, b, x are in continued proportion, then a : b = b : x.

$\Rightarrow 8 : 56 = 56 : x$

$\Rightarrow 8 \div 56 = 56 \div x$

$\Rightarrow 8 \times x = 56 \times 56$

$\Rightarrow x = (56 \times 56) \div 8$

$\Rightarrow x = 3136 \div 8$

$\Rightarrow x = 392$

Therefore The correct answer is 392.

Additional Information

Mean Proportional

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

Fourth Proportional

For three numbers a, b, and c, the fourth proportional d is calculated as $(b \times c) \div a$, where a:b = c:d.

Duplicate Ratio

The duplicate ratio of a : b is $a^2 : b^2$, used in various geometric and scaling problems.

Q55. Answer: (b) 196

Shortcut Trick

Sum of first two numbers = 80 × 2 = 160

Sum of first three numbers = 160 + 103 = 263

Sum of remaining two numbers = 655 − 263 = 392

Required Average = 392 ÷ 2 = 196

Therefore The correct answer is 196.

Alternate Method

Given:

Sum of five numbers = 655

Average of first two numbers = 80

Third number = 103

Formula Used:

Average = (Sum of all observations) ÷ (Total number of observations)

Sum = Average × Number of observations

$\Rightarrow$ Sum of first two numbers = 80 × 2 = 160

$\Rightarrow$ Sum of first three numbers = 160 + 103 = 263

$\Rightarrow$ Sum of remaining two numbers = 655 − 263 = 392

$\Rightarrow$ Average of remaining two numbers = 392 ÷ 2 = 196

Therefore The correct answer is 196.

Additional Information

General Average Concept

The average is the central value of a set of data, calculated by dividing the sum of values by the count of values. Formula: Sum = Average × Total Observations.

Missing Term Calculation

To find missing terms in a group, subtract the sum of known subsets from the overall total sum of the group.

Properties of Average

If every number in a set is increased or decreased by a constant value 'k', the average also increases or decreases by 'k'.

Q56. Answer: (b) 11.78

Given:

√196 + √0.0324 - √5.76

Formula Used:

√a × √a = a

√(a ÷ b) = √a ÷ √b

Calculation:

=> √196 + √0.0324 - √5.76 =

=> 14 + 0.18 - 2.4

=> Required value = 11.78

Therefore The correct answer is 11.78.

Q57. Answer: (d) 21, 60

Shortcut Trick

Check options for Sum = 81 and LCM = 420.

Option 4: 21 + 60 = 81.

LCM(21, 60): 21 = 3 × 7 and 60 = 3 × 20.

LCM = 3 × 7 × 20 = 420.

Therefore The correct answer is 21, 60.

Alternate Method

Given: Sum of numbers = 81, LCM = 420.

Formula: Product of two numbers = HCF × LCM.

=> Let the numbers be x and y.

=> x + y = 81

=> Since HCF must divide both the Sum and the LCM:

=> HCF is a factor of HCF(81, 420).

=> 81 = 3 × 3 × 3 × 3

=> 420 = 2^2 × 3 × 5 × 7

=> Common factor is 3, so HCF = 3.

=> Let numbers be 3a and 3b, where a and b are co-prime.

=> 3a + 3b = 81 => a + b = 27

=> LCM = 3 × a × b = 420 => ab = 140

=> We need two numbers whose sum is 27 and product is 140.

=> Quadratic eq: $k^2 - 27k + 140 = 0$ => (k − 20)(k − 7) = 0

=> a = 20, b = 7

=> Numbers = 3 × 20 and 3 × 7 => 60 and 21.

Therefore The correct answer is 21, 60.

Additional Information

HCF and Sum Property

The HCF of two numbers is always a factor of their sum and their LCM.

Product Rule

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

Co-prime factors

If HCF is h, then numbers are ha and hb where LCM = h × a × b and (a, b) are co-prime.

Q58. Answer: (c) Rs. 1,84,800

Shortcut Trick

Total profit = 3,895 and difference (M − N) = 205.

M profit share = (3,895 + 205) ÷ 2 = 2,050; N profit share = 1,845.

Ratio of profits M : N = 2,050 : 1,845 = 410 : 369 = 10 : 9.

Profit = Capital × Time => Capital = Profit ÷ Time.

Capital ratio M : N = (10/5) : (9/7) = 2 : 1.2857... or 14 : 9.

Difference 5 units = 66,000 => 1 unit = 13,200. M capital = 14 × 13,200 = 1,84,800.

Therefore The correct answer is Rs. 1,84,800.

Alternate Method

Given → Total Profit = Rs. 3,895, Diff = Rs. 205, M Time = 5m, N Time = 7m, M Capital = N + 66,000.

Formulas: Profit = Capital × Time | Capital = Profit ÷ Time

=> Let M profit be P_M and N profit be P_N. P_M + P_N = 3895, P_M − P_N = 205.

=> Adding both: 2P_M = 4100 => P_M = 2050. Then P_N = 1845.

=> Ratio P_M : P_N = 2050 : 1845 = 10 : 9.

=> Let M capital be C_M and N capital be C_N.

=> (C_M × 5) ÷ (C_N × 7) = 10 ÷ 9.

=> C_M ÷ C_N = (10 × 7) ÷ (9 × 5) = 70 ÷ 45 = 14 ÷ 9.

=> Let C_M = 14x and C_N = 9x. Difference = 5x = 66,000.

=> x = 13,200.

=> Capital of M = 14 × 13,200 = 1,84,800.

Therefore The correct answer is Rs. 1,84,800.

Additional Information

Partnership Basics

In a partnership, profits are shared in the ratio of the product of Capital and Time. Ratio = (C1 × T1) : (C2 × T2).

Capital Calculation

If profits and time periods are known, the ratio of capitals can be found by dividing profit parts by their respective time parts.

Q59. Answer: (d) 40, 75

Shortcut Trick

Check options for Sum = 115 and LCM = 600.

Option 1: 38 + 77 = 115, but 38 is not a factor of 600.

Option 2: 45 + 70 = 115, but 45 is not a factor of 600.

Option 4: 40 + 75 = 115 and LCM(40, 75) = 600.

Therefore The correct answer is 40, 75.

Alternate Method

Given: Sum of two numbers (x + y) = 115 and LCM(x, y) = 600.

Formula: Product of two numbers = HCF × LCM.

=> Let HCF be h. The numbers are ha and hb, where a and b are co-prime.

=> Sum = h(a + b) = 115

=> LCM = hab = 600

=> Possible value for h is a common factor of 115 and 600. Factors of 115: 1, 5, 23.

=> If h = 5, then a + b = 23 and ab = 120.

=> Solving the quadratic equation $k^2 - 23k + 120 = 0$: (k − 8)(k − 15) = 0.

=> So, a = 8 and b = 15. The numbers are 5 × 8 and 5 × 15.

=> Numbers = 40 and 75.

Therefore The correct answer is 40, 75.

Additional Information

Fundamental Property of LCM and HCF

The product of two numbers is always equal to the product of their HCF and LCM (Product = H × L).

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HCF as a Factor

The HCF of two numbers is always a factor of their Sum, Difference, and LCM.

Co-prime Property

If two numbers are expressed as ha and hb (where h is HCF), then a and b must be co-prime (HCF(a,b)=1).

Q60. Answer: (c) 37

Given:

$7^2 + \sqrt{(10^2)} - 2\sqrt{64} - 6$

Formula Used:

$a^2 = a \times a$

$\sqrt{(a^2)} = a$

Calculation:

$7^2 + \sqrt{(10^2)} - 2\sqrt{64} - 6$

=> $40 + 10 - 2 \times 8 - 6$

=> Required value = 37

Therefore The correct answer is 37.

Q61. Answer: (c) 6

Shortcut Trick

Find two consecutive numbers whose product is 30.

Check factors of 30: $5 \times 6 = 30$.

Since 5 and 6 are consecutive natural numbers, the greater number is 6.

Therefore The correct answer is 6.

Alternate Method

Let the two consecutive natural numbers be x and (x + 1).

Given: $x \times (x + 1) = 30$

=> $x^2 + x - 30 = 0$

=> $x^2 + 6x - 5x - 30 = 0$

=> $x(x + 6) - 5(x + 6) = 0$

=> $(x - 5)(x + 6) = 0$

=> $x = 5$ (since it is a natural number, $x \neq -6$)

=> Greater number = $x + 1 = 5 + 1 = 6$

Therefore The correct answer is 6.

Additional Information

Consecutive Numbers

Numbers that follow each other in order without gaps. For natural numbers, the difference is always 1.

Quadratic Roots

For $ax^2 + bx + c = 0$, roots are found by factorisation or using $x = (-b \pm \sqrt{(b^2 - 4ac)}) / 2a$.

Natural Numbers

Positive integers starting from 1 (1, 2, 3, ...). Negative values and zero are excluded.

Q62. Answer: (a) 227 km/hr

Shortcut Trick

Total distance = 977 km, Total time = 11 hours.

Phase 1 distance = $39 \times 4 = 156$ km; Phase 2 distance = 140 km.

Remaining distance = $977 - (156 + 140) = 681$ km.

Time taken = $4 + (140 \div 35) = 4 + 4 = 8$ hours.

Remaining time = $11 - 8 = 3$ hours.

Required speed = $681 \div 3 = 227$ km/hr.

Therefore The correct answer is 227 km/hr.

Alternate Method

Given: Total Distance = 977 km, Total Time = 11 hours.

Formula Used: Distance = Speed × Time | Time = Distance ÷ Speed

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=> Distance covered in 1^(st) part = 39 × 4 = 156 km
=> Time taken for 2^(nd) part = 140 ÷ 35 = 4 hours
=> Total distance covered so far = 156 + 140 = 296 km
=> Remaining distance = 977 − 296 = 681 km
=> Total time elapsed = 4 + 4 = 8 hours
=> Remaining time = 11 − 8 = 3 hours
=> Required Speed = 681 ÷ 3 = 227 km/hr
Therefore The correct answer is 227 km/hr.
Additional Information
Average Speed
Average Speed is defined as Total Distance ÷ Total Time. It is not the simple average of speeds.
Speed-Time Relationship
For a constant distance, Speed is inversely proportional to Time (S1/S2 = T2/T1).
Unit Conversion
To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.

Q63. Answer: (c) 30 cm²

Shortcut Trick
Identify the Pythagorean triplet: 5, 12, 13 satisfy $5^2 + 12^2 = 13^2$ (25 + 144 = 169).
Since it is a right-angled triangle, Area = 1/2 × base × height.
Area = 1/2 × 5 × 12 = 30 cm².
Therefore The correct answer is 30 cm².
Alternate Method
Given: Sides a = 5 cm, b = 12 cm, c = 13 cm.
Formula Used: Heron's Formula → Area = √[s(s−a)(s−b)(s−c)], where s = (a+b+c)/2.
=> Semi-perimeter (s) = (5 + 12 + 13) ÷ 2
=> s = 30 ÷ 2 = 15 cm
=> Area = √[15 × (15 − 5) × (15 − 12) × (15 − 13)]
=> Area = √[15 × 10 × 3 × 2]
=> Area = √900
=> Area = 30 cm²
Therefore The correct answer is 30 cm².
Additional Information
Pythagorean Triplets
Common sets of three positive integers that satisfy $a^2 + b^2 = c^2$ include (3, 4, 5), (5, 12, 13), (8, 15, 17), and (7, 24, 25).
Area of Equilateral Triangle
For a triangle with all sides equal to 'a', Area = (√3 ÷ 4) × a².
Right-Angled Triangle Property
The area is always half the product of the two sides forming the 90-degree angle (base and altitude).

Q64. Answer: (d) −103x + 108

Shortcut Trick
Multiply the first term: 3 × (4/3)x² = 4x².
Multiply the second term: −4 × x² = −4x².
Notice the x² terms cancel out (4x² − 4x² = 0).
Calculate remaining constant: (3 × 12) − (4 × −18) = 36 + 72 = 108.
Check linear terms: (3 × −25x) − (4 × 7x) = −75x − 28x = −103x.
Therefore The correct answer is −103x + 108.
Alternate Method
Given: 3((4/3)x² − 25x + 12) − 4(x² + 7x − 18)
Formula Used: Distributive Property of multiplication over addition/subtraction: a(b + c) = ab + ac.
=> Open the first bracket: 3 × (4/3)x² − 3 × 25x + 3 × 12

=> $4x^2 - 75x + 36$

=> Open the second bracket: $-4 \times x^2 - 4 \times 7x - 4 \times (-18)$

=> $-4x^2 - 28x + 72$

=> Combine all terms: $(4x^2 - 4x^2) + (-75x - 28x) + (36 + 72)$

=> $0 - 103x + 108$

=> $-103x + 108$

Therefore The correct answer is $-103x + 108$.

Additional Information

BODMAS Rule

Always solve Brackets first, then Orders, followed by Division, Multiplication, Addition, and Subtraction.

Combining Like Terms

Only terms with the same variable and exponent (like x^2 and x^2) can be added or subtracted together.

Sign Multiplication

Remember that a negative multiplied by a negative results in a positive value (− × − = +).

Q65. Answer: (d) 14.2

Shortcut Trick

To find the LCM of decimals, make the number of decimal places equal for all numbers.

14.2 → 14.20 and 0.05 → 0.05

Consider them as integers: 1420 and 5.

Since 1420 is exactly divisible by 5, the LCM of 1420 and 5 is 1420.

Placing the decimal back at 2 places: 14.20.

Therefore The correct answer is 14.2.

Alternate Method

Given: Numbers are 14.2 and 0.05.

Formula Used: LCM of fractions = (LCM of Numerators) ÷ (HCF of Denominators)

=> Convert decimals into fractions: 14.2 = 142/10 and 0.05 = 5/100.

=> Simplify or equate denominators: 1420/100 and 5/100.

=> LCM = LCM(1420, 5) ÷ 100

=> Since 1420 = 5 × 284, the LCM of 1420 and 5 is 1420.

=> LCM = 1420 ÷ 100 = 14.2.

Therefore The correct answer is 14.2.

Additional Information

LCM of Fractions

LCM = (LCM of Numerators) ÷ (HCF of Denominators). Always ensure fractions are in their simplest form or have common denominators.

HCF of Fractions

HCF = (HCF of Numerators) ÷ (LCM of Denominators).

Relationship between LCM and HCF

For two numbers A and B: A × B = HCF(A, B) × LCM(A, B).

Q66. Answer: (c) 45.6%

Shortcut Trick

Identify Marked Price (MP) as 2,500 and Selling Price (SP) as 1,360.

Calculate Discount = 2,500 − 1,360 = 1,140.

Apply Discount% = (1,140 ÷ 2,500) × 100.

Simplify: 1,140 ÷ 25 = 45.6%.

Therefore The correct answer is 45.6%.

Alternate Method

Given → Marked Price (MP) = Rs. 2,500, Selling Price (SP) = Rs. 1,360.

Formulas: Discount = MP − SP | Discount% = (Discount ÷ MP) × 100.

=> Total Discount = 2,500 − 1,360 = 1,140.

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=> Discount Percentage = (1,140 ÷ 2,500) × 100.
=> Discount Percentage = 114,000 ÷ 2,500 = 45.6%.
Therefore The correct answer is 45.6%.
Additional Information
Marked Price & Discount
The Marked Price (MP) is the price listed on the product. Discount is always calculated on the MP unless stated otherwise.
Selling Price Calculation
Selling Price (SP) can be found using: SP = MP × (100 − Discount%) ÷ 100.

Q67. Answer: (c) 10.8

Shortcut Trick
Make the number of decimal places equal for both numbers: 10.80 and 0.06.
Remove the decimals to get 1080 and 6.
LCM of 1080 and 6 is 1080.
Place the decimal point back after 2 places: 10.80.
Therefore The correct answer is 10.8.
Alternate Method
Given: Numbers are 10.8 and 0.06.
Formula: LCM of Fractions = LCM of Numerators ÷ HCF of Denominators.
=> Convert decimals to fractions with same denominators: 1080/100 and 6/100.
=> Numerators: 1080, 6 | Denominator: 100.
=> LCM(1080, 6) = 1080.
=> HCF(100, 100) = 100.
=> Required LCM = 1080 ÷ 100 = 10.8.
Therefore The correct answer is 10.8.
Additional Information
LCM of Decimals
Always convert decimal numbers to like decimals (same number of digits after the decimal point) before calculating LCM or HCF.
HCF of Fractions
HCF = HCF of Numerators ÷ LCM of Denominators.
Product Rule
For two numbers A and B: A × B = HCF(A,B) × LCM(A,B).

Q68. Answer: (d) 34.91

Shortcut Trick
Assume a base average of 44 for all 33 matches.
Total deviation in the last 10 matches = 10 × (14 − 44) = −300.
Net change in average = −300 ÷ 33 ≈ −9.09.
Final average runs = 44 − 9.09 = 34.91.
Therefore The correct answer is 34.91 runs.
Alternate Method
Given:
Runs in first 23 matches = 44 per match
Runs in next 10 matches = 14 per match
Formula Used:
Total Average = (Total Runs) ÷ (Total Matches)
=> Total runs in 23 matches = 23 × 44 = 1012
=> Total runs in 10 matches = 10 × 14 = 140
=> Total runs in 33 matches = 1012 + 140 = 1152
=> Combined Average = 1152 ÷ 33
=> Average = 34.9090...
=> Average ≈ 34.91

Therefore The correct answer is 34.91 runs.

Additional Information

Weighted Average Formula

When two groups are combined, the total average is calculated as A_(avg) = (n1a1 + n2a2) ÷ (n1 + n2).

Relationship between Average and Sum

The Sum of observations is always equal to the Average × Number of observations (Sum = Avg × n).

Deviation Method

New Average = Assumed Average + (Net Deviation ÷ Total Count). This reduces calculation complexity.

Q69. Answer: (a) 6

Shortcut Trick

Sum of interior angles = (n − 2) × 180°

Sum of exterior angles = 360°

Given: (n − 2) × 180° = 2 × 360°

=> n − 2 = 4

=> n = 6

Therefore The correct answer is 6.

Alternate Method

Given:

Sum of interior angles = 2 × Sum of exterior angles

Formula Used:

Sum of interior angles of an n-sided polygon = (n − 2) × 180°

Sum of exterior angles of any convex polygon = 360°

Calculations:

=> (n − 2) × 180° = 2 × 360°

=> (n − 2) × 180° = 720°

=> n − 2 = 720° ÷ 180°

=> n − 2 = 4

Q70. Answer: (d) 46%

Shortcut Trick

Net change in Volume = (Base area change) × (Height change) as V prop. to r^2h.

Radius change = −19%, so r^2 factor = 0.81 × 0.81 = 0.6561.

Height change = +122%, so h factor = 2.22.

New Volume = 0.6561 × 2.22 = 1.456542 ≈ 1.46 times original.

Percentage Increase = (1.46 − 1) × 100 = 46%.

Therefore The correct answer is 46%.

Alternate Method

Given: Decrease in Radius (r) = 19%, Increase in Height (h) = 122%.

Formula Used: Volume of Cylinder (V) = $\pi r^2 h$

=> Let initial radius = 100 and initial height = 100.

=> Initial Volume (V1) = π × $(100)^2$ × 100 = 1,000,000π.

=> New radius = 100 − 19 = 81.

=> New height = 100 + 122 = 222.

=> New Volume (V2) = π × $(81)^2$ × 222.

=> V2 = π × 6561 × 222 = 1,456,542π.

=> Increase in Volume = 1,456,542π − 1,000,000π = 456,542π.

=> Percentage Increase = (456,542π / 1,000,000π) × 100 = 45.65%.

=> Closest Integer = 46%.

Therefore The correct answer is 46%.

Additional Information

Successive Percentage Change

For two variables x and y, the net change is given by (x + y + xy/100)%. For three variables, apply the formula successively.

Cylinder Surface Area

The Curved Surface Area (CSA) is 2πrh and the Total Surface Area (TSA) is 2πr(h + r).

Percentage to Fraction Conversion

A 19% decrease means multiplying by (1 − 19/100) = 0.81. A 122% increase means multiplying by (1 + 122/100) = 2.22.

Q71. Answer: (d) 22 km towards north

• Sophie starts from Point A and drives 8 km towards south.
• She then takes a right turn, drives 6 km, turns left and drives 5 km.
• She then takes a left turn and drives 6 km.
• She takes a final right turn, drives 9 km and stops at Point P.

The Final Diagram,

Hence, the correct answer is "Option 4"

Q72. Answer: (d) FI-LO

The logic followed here is:

Hence, the correct answer is "Option 4"

Q73. Answer: (b) 144, 18

Logic : First Number ÷ 8 = Second Number

Similarly,

Hence, the correct answer is "Option 2"

Q74. Answer: (b) Zero

Seven people A, B, C, D, E, F and G are sitting in a row, facing the north.
• Only five people sit to the left of B.
• Only five people sit to the right of A.
• C sits to the immediate left of F but right of D.
• E does not sit to the right of D

The Final Arrangement is,

Hence, the correct answer is "Option 2"

Q75. Answer: (d) One

Given Number- 56218643

1 is added for each even digit and 1 is subtracted from each odd digit of the number

The digit that are repeated more than once in the new number is 7 repeated two times.

Hence, the correct answer is "Option 4"

Q76. Answer: (a) Only conclusion II follows.

The least possible diagram for the given statements is as follows:

Conclusions:

(I) No light is an bulb. - False (As their is no direct relation between light and bulb, maybe it is possible but not definite. Hence, it is false)

(II) No bulb is a fan. - True (No fan is a bulb. No bulb is a fan.Hence, it is True)

Only conclusion II follows.

Hence, the correct answer is "Option 1".

Q77. Answer: (a) EWO 127

The logic followed here is:

Hence, the correct answer is "Option 1".

Q78. Answer: (b) DUSK - UDSK - KSUD

The Logic follows here,

Similarly,

Hence, the correct answer is "Option 2".

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Q79. Answer: (a) Only conclusion (I) follows.

The least possible diagram for the given statements is as follows:

Conclusions:

(I) Some bricks are rulers. - True (All Pins are Rulers. All Rulers are Brick. Some Brick are rulers. Hence, it is True)

(II) All rulers are pins.- False (All Pins are rulers. All rulers are Pins is may be true but not definite. Hence, it is false.

Only conclusion (I) follows.

Hence, the correct answer is "Option 1".

Q80. Answer: (a) 1 km to the West

• Yusif starts from Point A and drives 9 km towards North.

• He then takes a left turn, drives 4 km, turns left and drives 11 km.

• He then takes a left turn and drives 5 km.

• He takes a final left turn, drives 2 km and stops at Point P

The Final Diagram,

Hence, the correct answer is "Option 1".

Q81. Answer: (d) Three

Given Series - (Left) 2 / \ < > 2 5 $ % + 6 3 / 6 5 6 9 3 @ < & (Right)

Required Conditions: Number - Another Number - Symbol.

(Left) 2 / \ < > 2 5 $ % + 6 3 / 6 5 6 9 3 @ < & (Right)

Hence, the correct answer is "Option 4".

Q82. Answer: (d) RYF 321

The logic followed here is:

Hence, the correct answer is "Option 4"

Q83. Answer: (a) 91^(st)

Total students = 172

Mr. Maxi = 21st from the right end

To find Maxi's position from the left:

"Position from left"=172-21+1=152

So Mr. Maxi is 152nd from the left.

Mr. Han is 61st to the left of Mr. Maxi,

"Mr.Han's position"=152-61=91

Mr. Han is 91st from the left end.

Hence, the correct answer is "Option 1"

Q84. Answer: (c) 193

The logic follows here,

Hence, the correct answer is "Option 3"

Q85. Answer: (b) Three

Seven people D, E, F, G, H, I and O are sitting around a circular table, facing the centre of the table.

• Only one person sits between H and O when counted from the left of O.

• I sits third to the right of D.

• F sits third to the left of E.

• I sits to the immediate right of F.

• G is not an immediate neighbour of F.

The Final Arrangement is,

Hence, the correct answer is "Option 2"

Q86. Answer: (b) One

Given number 56218643

1 is added to each even digit and 1 is subtracted from each odd digit of the number

Hence, the correct answer is "Option 2"

Q87. Answer: (b) MI-QW

The logic followed here is:

Hence, the correct answer is "Option 2"

Q88. Answer: (b) PWL : UTG

The logic followed here is:

Similarly,

Hence, the correct answer is "Option 2"

Q89. Answer: (b) Wife's father

By using the symbols in the table given below, we can draw the following family tree:

As per the given information,

Hence, the correct answer is "Option 2"

Q90. Answer: (b) One

Seven boxes I, J, K, L, M, N and P are kept one over the other but not necessarily in the same order.

• Only L is kept above M.

• Only P is kept between M and J.

• Only N is kept below K.

The Final Arrangement is,

L
M
P
J
I
K
N

Hence, the correct answer is "Option 2"

Q91. Answer: (c) to

Given 'youth shirt knife' is coded as 'nv to wh' and 'shirt son night' is coded as 'ch rb to'.

'youth shirt knife' - 'nv to wh'

'shirt son night' - 'ch rb to'.

The Code for Shirt is 'to'.

Hence, the correct answer is "Option 3"

Q92. Answer: (a) 70

Let’s find their positions from the left first.

Tika is 20th from the right in a line of 119 students.

"Position from left"=

119 - 20 + 1 = 100

So Tika is 100th from the left.

Vishnu is already 29th from the left.

"People between"

= (100-29) - 1

= 71 - 1

= 70

Hence, the correct answer is "Option 1"

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Q93. Answer: (c) 65

The logic follows here,

Hence, the correct answer is "Option 3"

Q94. Answer: (d) NRY

The logic followed here is:

Hence, the correct answer is "Option 4"

Q95. Answer: (d) 144

The logic folows here,

Hence, the correct answer is "Option 4"

Q96. Answer: (d) CUT : DVU

The logic followed here is:

Similarly,

Hence, the correct answer is "Option 4"

Q97. Answer: (a) None

Given number 7841236

Ascending order from left to right

Hence, the correct answer is "Option 1"

Q98. Answer: (d) 2

'ALSO' is coded as '4367' and 'SLOT' is coded as '2347.

'ALSO' - '4367'

'SLOT' -'2347

The Code for T is 2.

Hence, the correct answer is "Option 4"

Q99. Answer: (b) 18

Given number 4792536,

2 is added to each even digit and 2 is subtracted from each odd digit in the number

sum of all the even digits in the new number thus formed is = 6 + 4 + 8.

= 18.

Hence, the correct answer is "Option 2"

Q100. Answer: (a) Two

Given - (Left) 781 752 642 105 864 (Right)

Numbers is the third digit of a number a factor of the first digit as well as second digit of the same number.

1) 781 → digits: 7, 8, 1

Third digit = 1

1 divisible by both 7 and 8

2) 752 → digits: 7, 5, 2

3) 642 → digits: 6, 4, 2

Third digit = 2

2 divisible by 6 and 4

4) 105 → digits: 1, 0, 5

5) 864 → digits: 8, 6, 4

Hence, the correct answer is "Option 1"

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