RRB NTPC (UG) CBT-I Official Paper (Held On 07 May, 2026 Shift 3) (Previous Year Paper)

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

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MATHEMATICS

Q1. The salary of an employee is increased by 5% in the first year and again by 5% in the second year. What is the overall percentage increase in the salary after two years?

(a) 10%
(b) 10.5%
(c) 10.25%
(d) 11%

Q2. Two numbers are in the ratio 4 : 5. If their LCM is 240, what is the sum of the two numbers?

(a) 108
(b) 96
(c) 120
(d) 100

Q3. During a sale, 40% of the goods are sold at a profit of 10%. Of the remaining goods, 25% are sold at a profit of 15%, and the rest are sold at a loss of 29%. If there is an overall loss of x%, find the value of x.

(a) 3.5
(b) 6.8
(c) 1.5
(d) 2

Q4. The fourth proportional to 1.2, 4.8, and 7.15 is:

(a) 28.6
(b) 28.8
(c) 28.2
(d) 28.4

Q5. Simplify:

(1.5 × 0.2)/0.3

(a) 0.1
(b) 1
(c) 10
(d) 0.01

Q6. A rectangular garden has a length of 25 meters and a width of 18 meters. If a path of uniform width 2 meters is constructed around the outside of the garden, what is the perimeter of the outer edge of the path?

(a) 86 meters
(b) 102 meters
(c) 112 meters
(d) 98 meters

Q7. A and B can do a piece of work in 12 days and 36 days, respectively. Both work for 4 days and then A leaves. How long (in days) will B take to complete the remaining work?

(a) 19
(b) 20
(c) 22
(d) 21

Q8. Simplify:

30 + [{-9 × (26 - 11 + 6)}]

(a) -162
(b) -160
(c) -159
(d) -161

Q9. A tank is normally filled by pipe A in 10 hours. Due to a leak, the tank takes 12 hours to fill. Find the time taken by the leak alone to empty a full tank.

(a) 30 hours
(b) 60 hours
(c) 80 hours
(d) 40 hours

Q10. If a sum of Rs. 70,000 amounts to Rs. 74,263 in X years under compound interest, compounded annually at 3% per annum, find X.

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

Q11. If the third proportional to two numbers is 32 and the second number is 16, find the first number.

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

Q12. A store sells pens and notebooks. If 3 pens and 2 notebooks cost Rs. 120, and 2 pens and 4 notebooks cost Rs. 140, what is the price of one notebook?

(a) Rs. 22.50
(b) Rs. 25.00
(c) Rs. 35.00
(d) Rs. 32.50

Q13. A shopkeeper wants to earn a profit of 11 1/9 % even after giving two successive discounts of 16 2/3 % and 20% on the marked price of an article. If the cost price of the article for the shopkeeper is Rs. 1800, what should its marked price be?

(a) Rs. 3000
(b) Rs. 3200
(c) Rs. 2800
(d) Rs. 2500

Q14. Given the data set: 12, 36, 22, 27, 31, 17.

What is the median value?

(a) 27
(b) 22
(c) 24.5
(d) 26.5

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Q15. The mean proportional between two positive numbers is 30. If the difference between the two numbers is 45, what is the smaller of the two numbers?

(a) 15
(b) 21
(c) 12
(d) 18

Q16. A shopkeeper offers the following schemes on toys of the same marked price.

(A) Successive discounts of 39% and 3% on any number of toys bought.

(B) Successive discounts of 36%, 13% and 8% on any number of toys bought.

(C) 18% discount on the first 2 toys and 41% discount on each toy thereon.

(D) 5 toys free of cost on buying 7 toys.

A customer wants to buy 7 toys. Which of the above schemes is the least beneficial to her?

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

Q17. If Rs. 25,200 is invested at a simple interest rate of 6% per annum for 4 years, find the interest earned.

(a) Rs. 6,025
(b) Rs. 8,021
(c) Rs. 6,048
(d) Rs. 6,070

Q18. If $2\cos^2 x - 1 = 1/2$ for $0° < x < 90°$, then the value of $\sec 2x + \operatorname{cosec} x + \cot^2 x$ is

(a) 11
(b) 7
(c) 9
(d) 5

Q19. The sum of two positive numbers is 30 and their product is 176. The positive difference between them is:

(a) 10
(b) 14
(c) 7
(d) 24

Q20. The total surface area of a cube having side 86 cm is:

(a) 44,325 cm^2
(b) 44,462 cm^2
(c) 44,376 cm^2
(d) 44,294 cm^2

Q21. The cost price of 25 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:

(a) 23
(b) 18
(c) 16
(d) 20

Q22. A train, 380 meters long, crosses a stationary train of length 340 m in 16 seconds. Find the speed of the train.

(a) 160 km/h
(b) 164 km/h
(c) 162 km/h
(d) 166 km/h

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Q23. Three numbers are in the ratio 3 : 2 : 13, and their LCM is 6318. Their HCF is:

(a) 128
(b) 80
(c) 124
(d) 81

Q24. Ravi spends 70% of his income. If his income increases by 25% and his expenditure increases by 10%, by what percentage do his savings increase?

(a) Savings increase by 40%
(b) Savings increase by 30%
(c) Savings increase by 60%
(d) Savings increase by 50%

Q25. The sum of the present ages of a mother and her daughter is 50 years. Five years ago, the mother's age was 7 times the daughter's age. What is the present age of the mother?

(a) 35 years
(b) 42 years
(c) 40 years
(d) 38 years

Q26. If √x of √2601 = (√1089 + √324) × 35. Find the value of x.

(a) 1225
(b) 1227
(c) 1223
(d) 1221

Q27. A 104-metre-long train crosses another 94-metre-long train running in the same direction in 16.2 seconds. If the speed of the first train is 61 kmph, what is the speed of the second train in kmph?

(a) 105 km/hr
(b) 101 km/hr
(c) 17 km/hr
(d) 109 km/hr

Q28. A quadrilateral has one diagonal of length 36 cm, and the perpendiculars from the other two vertices to this diagonal are 20 cm and 10 cm. What is the area of this quadrilateral?

(a) 540 cm^2
(b) 600 cm^2
(c) 360 cm^2
(d) 480 cm^2

Q29. What is the mode of the following data?

40, 41, 42, 51, 45, 43, 45, 43, 51, 40, 51, 54, 46, 50, 55, 47, 42, 46

(a) 51
(b) 42
(c) 40
(d) 41

Q30. The 7-digit number 32A776B is divisible by 24. What is the minimum value of (A + B)?

(a) 4
(b) 2
(c) 6
(d) 8

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GENERAL AWARENESS

Q31. In genetics, a gene refers to which of the following?

(a) A section of DNA that codes for a protein
(b) A sex chromosome
(c) A unit of blood group
(d) A type of chromosome

Q32. Where was the capital of the Estado da India located?

(a) Cochin
(b) Lisbon
(c) Goa
(d) Malacca

Q33. Which of the following memory types is non-volatile?

(a) RAM
(b) PCB
(c) CPU
(d) ROM

Q34. Which metal reacts violently with cold water, producing a metal hydroxide, hydrogen gas, and enough heat for the hydrogen to catch fire?

(a) Calcium
(b) Potassium
(c) Aluminium
(d) Magnesium

Q35. Which prominent Indian reformer founded the Poona Sarvajanik Sabha during the Indian National movement?

(a) Gopal Hari Deshmukh (Lokhitwadi)
(b) Mahadev Govind Ranade
(c) Gopal Krishna Gokhale
(d) Dadabhai Naoroji

Q36. In early July 2025, the 17th BRICS Leaders' Summit convened in which city?

(a) Rio de Janeiro
(b) New Delhi
(c) Johannesburg
(d) Shanghai

Q37. The 106^(th) Constitutional Amendment inserted which of the following new Articles in the Constitution?

(a) 330A, 332A
(b) 325A, 327A
(c) 339A, 341B
(d) 371A, 371B

Q38. How can developing countries like India reduce inter-regional disparities in human development within the education and healthcare sectors in the 21^(st) century?

(a) By implementing region-specific policies and resource allocation
(b) By reducing investments in rural education and health
(c) By centralising economic activities in urban areas
(d) By focusing all development efforts on capital cities

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Q39. In August 2025, India's first-ever grassland bird census using passive acoustic monitoring and AI tools was highlighted by the Prime Minister in his Mann ki Baat address. In which national park was this census conducted?

(a) Kaziranga National Park, Assam
(b) Keoladeo National Park, Rajasthan
(c) Sultanpur National Park, Haryana
(d) Jim Corbett National Park, Uttarakhand

Q40. Which central initiative by Indian Railways has rescued over 260 missing or trafficked children between January 2024 and April 2025?

(a) Mission Vatsalya Rail Drive
(b) Operation Shakti
(c) Operation Nanhe Farishte
(d) Childline Express

Q41. Which of the following statements most accurately describes the social structure of Mauryan society in ancient India?

(a) A completely egalitarian society without any form of social or occupational differentiation
(b) An organised society with distinct social classes and a wide range of occupational groups
(c) Society controlled only by mercantile guilds with no other social groups
(d) Exclusively tribal society with absence of settled agriculture

Q42. Which type of climate characterises the Great Indian Desert?

(a) Equatorial climate
(b) Humid subtropical climate
(c) Arid and semi arid climate
(d) Tropical monsoon climate

Q43. Who among the following has been sworn in as the President of Uruguay on 1 March 2025?

(a) Claudia Sheinbaum
(b) Masoud Pezeshkian
(c) Jair Bolsonaro
(d) Yamandu Orsi

Q44. Which institution handles the promotion of Classical Languages under the Ministry of Education?

(a) Indira Gandhi National Centre for the Arts
(b) Archaeological Survey of India
(c) Sahitya Akademi of India
(d) Central Institute of Indian Languages

Q45. In April 2025, BRIC-InStem in Bengaluru collaborated with which medical institution to successfully conduct India's first gene therapy trial for Haemophilia?

(a) Christian Medical College, Vellore
(b) Gandhi Medical College, Hyderabad
(c) All India Institute of Medical Sciences, New Delhi
(d) Indian Council of Medical Research

Q46. Which of the following features characterises Stage III of demographic transition?

(a) High migration and low death rate
(b) Rapid death rate increase
(c) High mortality and high fertility
(d) Low fertility and low mortality

Q47. What was the venue of the first BIMSTEC Youth Summit held in February 2025?

(a) New Delhi
(b) Bhopal, Madhya Pradesh
(c) Hyderabad, Telangana

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(d) Gandhinagar, Gujarat

Q48. Which circumstance directly triggered Gandhi's decision to launch the Rowlatt Satyagraha in 1919?

(a) The British announcement of new taxation on agricultural harvests.
(b) The enactment of laws enabling detention without trial despite resistance.
(c) The cancellation of wartime recruitment policies in northern India.
(d) The rejection of Indian demands for complete dominion status by Britain.

Q49. Which type(s) of Legislatures can a state have under the Indian Constitution?

(a) Only the Parliament can decide
(b) Only single-house systems
(c) Either a single-house or two-house systems
(d) Only two-house systems

Q50. Which of the following is NOT a true element of Harappan architecture?

(a) Cities included public buildings and well-planned houses
(b) Architecture focused on functional design rather than decoration
(c) Cities had magnificent palaces, monuments and royal tombs
(d) Buildings in Harappan cities were made of standardized baked bricks

Q51. The Tibetan Plateau, often referred to as the Roof of the World, represents which type of natural vegetation region?

(a) Temperate Grassland
(b) Alpine Tundra
(c) Arctic Tundra
(d) Polar Desert

Q52. India signed a Memorandum of Understanding (MoU) on 25 February 2026 to strengthen cooperation in forests, wildlife, environment, biodiversity conservation, and climate change with which country?

(a) Bhutan
(b) Nepal
(c) Bangladesh
(d) Sri Lanka

Q53. A Sultan of Delhi attempted to strengthen control over the Deccan by shifting his capital from Delhi to Deogir (Daulatabad), a decision that later proved controversial due to administrative difficulties. Who took this measure?

(a) Muhammad bin Tughlaq
(b) Ghiyasuddin Tughlaq
(c) Firoz Shah Tughlaq
(d) Alauddin Khalji

Q54. When dilute Hydrochloric acid (HCl) reacts with Sodium Hydrogen Carbonte (NaHCO3), which is the product formed along with Sodium chloride(NaCl) and Water(H2O)?

(a) Ammonium Chloride (NH4Cl)
(b) Carbon Dioxide(CO2)
(c) Hydrogen gas(H2)
(d) Chloroform (CHCl3)

Q55. Control over district and subordinate courts' posting, promotion and leaves of judges vests primarily in which authority?

(a) High Court
(b) President of India
(c) Law Ministry of India
(d) Parliament

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Q56. A computer cannot open a printer without a driver. This driver is an example of a/an:

(a) System software
(b) Document file
(c) Game
(d) Input device

Q57. Which part of the musculoskeletal system is primarily responsible for protecting the brain?

(a) Rib cage
(b) Skull
(c) Spine
(d) Pelvic girdle

Q58. Which one of the following economic factors attracts population to an area?

(a) Lack of job opportunities
(b) High cost of living
(c) Industrial development
(d) Limited transportation facilities

Q59. Provisions for the 'Control over subordinate courts' are provided in which of the following Articles of the Constitution of India?

(a) Article 225
(b) Article 245
(c) Article 255
(d) Article 235

Q60. What was the all-India coal production in the year 2023-24?

(a) 997.826 Million Tonne (MT)
(b) 1435.32 Million Tonne (MT)
(c) 697.82 Million Tonne (MT)
(d) 1200.17 Million Tonne (MT)

Q61. Which digital file format is widely used to save three-dimensional models for 3D printing? It is the standard format supported by most 3D printers.

(a) XLSX
(b) PDF
(c) STL
(d) DOCX

Q62. According to the Constitution of India, which constitutional body advises the President on the principles governing grants-in-aid to States from the Consolidated Fund of India?

(a) NITI Aayog
(b) Comptroller and Auditor General of India
(c) Finance Commission
(d) Planning Commission

Q63. Which feature distinguishes ROM from RAM?

(a) ROM is faster than RAM.
(b) ROM is used for storage; RAM is used for graphics.
(c) ROM is volatile; RAM is non-volatile.
(d) ROM stores permanent instructions; RAM stores temporary data.

Q64. Which of the following wind systems is primarily responsible for the rainfall over the Coromandel coast during the winter season?

(a) Northeast monsoon winds
(b) Western disturbances

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(c) Westerlies
(d) Southwest monsoon winds

Q65. How many Indian languages hold Classical Language status as of October 2025?
(a) 11
(b) 6
(c) 10
(d) 8

Q66. Which of the following is a tertiary sector activity?
(a) Mining
(b) Manufacturing
(c) Farming
(d) Teaching

Q67. The Industrial Policy of 1991 led to:
(a) Abolishing industrial licensing for most industries
(b) Decrease in private sector participation
(c) Establishment of public sector monopolies
(d) Nationalization of key industries

Q68. Who topped the 2025 Times Higher Education Asia University Rankings?
(a) Seoul National University
(b) Tsinghua University
(c) University of Hong Kong
(d) Kyoto University

Q69. Which Article of the Indian Constitution mentions the Power of Parliament to amend the Constitution?
(a) Article 359
(b) Article 368
(c) Article 360
(d) Article 361

Q70. Which of the following Harappan sites yielded excellent examples of metal-cast sculptures?
(a) Daimabad
(b) Nageshwar
(c) Kalibangan
(d) Rangpur

GENERAL INTELLIGENCE AND REASONING

Q71. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

EAW 91 XTP 98 QMI 105 JFB 112 ?

(a) CLV 118
(b) CZT 119
(c) CYU 119
(d) CXT 118

Q72. What should come in place of the question mark (?) in the given series?

26 34 45 53 64 72 ?

(a) 86
(b) 88
(c) 83
(d) 81

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Q73. In a certain code language,

J × Q means 'J is the sister of Q',

J ÷ Q means 'J is the father of Q',

J + Q means 'J is the husband of Q' and

J – Q means 'J is the mother of Q'.

Based on the above, how is S related to W if 'S + T – U ÷ V × W × Y'?

(a) Mother's father
(b) Mother's brother
(c) Wife's brother
(d) Father's father

Q74. Read the given statements and conclusions carefully. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. You have to decide which conclusions logically follow/s from the given statements.

Statements: Some cups are jugs. Some jugs are vases.

Conclusion (I) : Some cups are vases

Conclusion (II) : All vases are jugs

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

Q75. In a certain code language, 'PRIME' is coded as '37862' and 'REMAP' is coded as '87423'. What is the code for 'A' in the given code language?

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

Q76. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group.

Which is the one that DOES NOT belong to that group?

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

(a) MJN
(b) GDH
(c) JGK
(d) DAF

Q77. What should come in place of '?' in the given series?

20 ? 38 56 80 110

(a) 26
(b) 24
(c) 22
(d) 32

Q78. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding / subtracting / multiplying 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.)

18, 325

19, 362

(a) 14, 196

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(b) 21, 440
(c) 22, 485
(d) 20, 399

Q79. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

NFG 49, PIK 36, RLO 25, TOS 16, ?

(a) USW 9
(b) VRV 10
(c) USV 10
(d) VRW 9

Q80. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only two boxes are kept below G. Only one box is kept above B. Only one box is kept between B and A. F is kept immediately above E. D is kept at some place below C. Which box is kept at the top?

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

Q81. Select the triad which follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

JL – MO – PR

EG – HJ – KM

(a) CH – GK – JO
(b) MO – PR – SU
(c) DP – GS – JU
(d) NF – RJ – TL

Q82. Based on the English alphabetical order, three of the following four are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) XTW
(b) PMO
(c) JFI
(d) FBE

Q83. Neha starts from Point A and drives 11 km towards the east. She then takes a right turn, drives 8 km, turns right and drives 14 km. She then takes a right turn and drives 12 km. She takes a final right turn, drives 3 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-degree turns only unless specified.)

(a) 2 km to the north
(b) 3 km to the south
(c) 1 km to the north
(d) 4 km to the south

Q84. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some papers are rains.

All rains are trees.

Conclusions:

(I) Some papers are trees.

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(II) All trees are rains.

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

Q85. Eight people, A, B, M, N, S, T, Y and Z, are sitting in a row, facing north. S sits second to the left of Y and S sits third to the right of N. Y sits at one of the extreme ends. T sits to the immediate right of A. B sits to the immediate left of M and M sits second to the left of Z. Who sits at the extreme left end of the row?

(a) M
(b) S
(c) A
(d) B

Q86. Each of the digits in the number 3147856 is arranged in ascending order from left to right. The position of how many digits will remain unchanged as compared to that in the original number?

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

Q87. Each letter in the word NERVOUS is arranged in the English alphabetical order. How many letters are there in the English alphabetical order between the letter which is fourth from the left and the one which is third from the right in the new letter cluster thus formed?

(a) 0
(b) 4
(c) 3
(d) 1

Q88. In a certain code language, ‘van elf sand’ is coded as 'ld ii ne' and ‘elf poem desk’ is coded as ‘ir le ii’. How is ‘elf’ coded in the given language? (All codes are two-letter codes.)

(a) ii
(b) ir
(c) ne
(d) ld

Q89. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) OS - RV
(b) BU - EY
(c) GV - JZ
(d) YI - BM

Q90. Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) Z Q M H J E K D E L K Z V N E A T Q R Z U (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

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

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Q91. IP 18 is related to KL 4 in a certain way. In the same way, KL 16 is related to MH 2.

To which of the following is AT 9 related, following the same logic?

(a) JO -6
(b) CP -5
(c) TR -1
(d) BK -9

Q92. Each vowel in the word CURRENT is changed to the letter immediately following it in the English alphabetical order and each consonant is changed to the letter immediately preceding it in the English alphabetical order.

Which of the following letters will be fourth from the left in the new group of letters thus formed?

(a) R
(b) S
(c) Q
(d) P

Q93. In a certain code language,

A + B means ‘A is the son of B’,

A – B means ‘A is the brother of B’,

A x B means ‘A is the wife of B’ and

A ÷ B means ‘A is the father of B’.

Based on the above, how is S related to K if ‘S + D ÷ F – H x K’?

(a) Wife's father
(b) Father
(c) Brother
(d) Wife's brother

Q94. Seven boxes B, C, D, E, Q, R and S are kept one over the other but not necessarily in the same order. Only five boxes are kept above D. Only three boxes are kept between D and C. Only four boxes are kept between C and S. Only E is kept between C and B. R is kept at one of the positions above C.

How many boxes are kept between Q and S?

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

Q95. In the following triad, 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.

ROSE - RSEO - OSRE

JUGS - JGSU - UGJS

(a) COLD - OCLD - OLDC
(b) LADY - LDYA - ALYD
(c) PING - PNGI - INPG
(d) BOND - BNOD - DNOB

Q96. Each of the digits in the number 3516472 is arranged in the 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) Three
(b) Two
(c) Zero
(d) One

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Q97. What should come in place of the question mark (?) in the given series to make it logically complete?

MU1, NQ4, PN16, SL64, ?

(a) SK256
(b) WK256
(c) SJ258
(d) RJ256

Q98. Seven people, S, T, I, C, K, E and R, are sitting in a row, facing north. Only E sits to the left of K. Only four people sit between E and T. Only C sits between I and R, and I is not an immediate neighbor of T.

Who sits at the extreme right of the line?

(a) K
(b) S
(c) E
(d) I

Q99. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only two boxes are kept below A. Only one box is kept above E. Only one box is kept between E and B. C is kept immediately above G. D is kept at some place below F.

How many boxes are kept between A and D?

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

Q100. What will come in place of the question mark (?) in the following equation if '+' and '−' are interchanged and '×' and '÷' are interchanged?

215 − 147 ÷ 110 + 1604 × 4 = ?

(a) 19584
(b) 18588
(c) 14948
(d) 15984

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) 10.25%

Shortcut Trick

Use the Successive Percentage formula: Net % Change = a + b + (a × b) ÷ 100

Here, both first and second year increases are 5%, so a = 5 and b = 5.

Net Increase = 5 + 5 + (5 × 5) ÷ 100

Net Increase = 10 + 0.25 = 10.25%

Therefore The correct answer is 10.25%.

Alternate Method

Assume the Initial Salary of the employee is 100 units.

=> Let initial salary = 100

=> Salary after 1^(st) year = 100 + (5% of 100) = 100 + 5 = 105

=> Salary after 2^(nd) year = 105 + (5% of 105) = 105 + 5.25 = 110.25

=> Total Percentage Increase = ((110.25 − 100) ÷ 100) × 100 = 10.25%

Therefore The correct answer is 10.25%.

Additional Information

Successive Percentage Increase/Decrease

When a value changes by x% and then y%, the net change is given by [x + y + (xy/100)]%. Use positive signs for increase and negative signs for decrease.

Multiplying Factor Method

For a 5% increase, the multiplying factor is 1.05. For two successive 5% increases, the final value is Initial × 1.05 × 1.05 = Initial × 1.1025.

Successive Discounts

If two successive discounts of d1% and d2% are given, the single equivalent discount is [d1 + d2 − (d1d2/100)]%.

Q2. Answer: (a) 108

Shortcut Trick

Ratio of numbers = 4 : 5 → LCM of ratio parts = 4 × 5 = 20 units

Given LCM = 240 => 20 units = 240 => 1 unit = 12 (this is the HCF)

Sum of ratio parts = 4 + 5 = 9 units

Sum of numbers = 9 units × 12 = 108

Therefore The correct answer is 108.

Alternate Method

Given: Ratio = 4 : 5 and LCM = 240.

=> Let the two numbers be 4x and 5x (where x is the HCF).

=> LCM of 4x and 5x = 4 × 5 × x = 20x

=> 20x = 240

=> x = 240 ÷ 20 = 12

=> First number = 4 × 12 = 48

=> Second number = 5 × 12 = 60

=> Sum of the numbers = 48 + 60 = 108

Therefore The correct answer is 108.

Additional Information

Product of Two Numbers

For any two numbers, Product of numbers = HCF × LCM.

HCF and LCM Relation

The HCF (Highest Common Factor) is always a factor of the LCM (Least Common Multiple).

LCM of Ratios

If two numbers are in the ratio a : b, then their LCM = a × b × HCF and their Sum = (a + b) × HCF.

Q3. Answer: (b) 6.8

Shortcut Trick

Ratio of goods = 40 : (25% of 60) : (100 − 40 − 15) = 40 : 15 : 45 = 8 : 3 : 9.

Net change % = (Sum of weight × Value) ÷ Total weight

Net change % = (8 × 10 + 3 × 15 − 9 × 29) ÷ 20

Net change % = (80 + 45 − 261) ÷ 20 = −136 ÷ 20 = −6.8%.

Negative sign indicates loss, so x = 6.8.

Therefore The correct answer is 6.8.

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Alternate Method

Given:

Part 1 = 40% of goods, Profit = 10%

Part 2 = 25% of remaining (60%) = 15% of total, Profit = 15%

Part 3 = Rest (100% − 40% − 15%) = 45% of total, Loss = 29%

Formula Used:

Overall Profit/Loss % = (Σ Percentage Part × Profit/Loss %) ÷ 100

Calculations:

=> Let total quantity be 100 units and CP per unit be 1.

=> Total CP = 100

=> Profit from 40 units = 40 × 10% = 4

=> Profit from 15 units = 15 × 15% = 2.25

=> Loss from 45 units = 45 × 29% = 13.05

=> Net Profit/Loss = 4 + 2.25 − 13.05

=> Net Profit/Loss = 6.25 − 13.05 = −6.8

=> Overall Loss % = (6.8 ÷ 100) × 100 = 6.8%

=> Comparing with overall loss of x%, we get x = 6.8.

Therefore The correct answer is 6.8.

Additional Information

Weighted Average Profit/Loss

When goods are divided into different parts sold at different profit/loss rates, the overall result is the weighted average: Net % = (Σ $n_i \times r_i$) ÷ (Σ n_i).

Relation between Loss and x

If a problem states an 'overall loss of x%', the value of x is always positive. The 'loss' keyword itself accounts for the negative sign of the net result.

Successive Percentage vs Weighted Average

Weighted average is used for different parts of a whole, whereas successive percentage change [x + y + (xy/100)] is used when changes occur on the same value one after another.

Q4. Answer: (a) 28.6

Shortcut Trick

Identify the scaling factor between the first two terms: 4.8 ÷ 1.2 = 4.

Since the terms are in proportion, the same factor applies to the third and fourth terms.

Fourth proportional = 7.15 × 4 = 28.6.

Therefore The correct answer is 28.6.

Alternate Method

Given:

First term (a) = 1.2

Second term (b) = 4.8

Third term (c) = 7.15

Formula Used:

If a, b, c, and d are in proportion (a : b :: c : d), then a × d = b × c.

Calculations:

=> Let the fourth proportional be d.

=> 1.2 : 4.8 :: 7.15 : d

=> 1.2 ÷ 4.8 = 7.15 ÷ d

=> 1 ÷ 4 = 7.15 ÷ d

=> d = 7.15 × 4

=> d = 28.6

Therefore The correct answer is 28.6.

Additional Information

Mean Proportional

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The mean proportional between two numbers a and b is given by √(a × b).

Third Proportional

If a, b, and c are in continued proportion (a : b :: b : c), then c is the third proportional, where c = b² ÷ a.

Product Rule of Proportion

In any proportion, the Product of Extremes (first and fourth terms) is always equal to the Product of Means (second and third terms).

Q5. Answer: (b) 1

Shortcut Trick

Directly multiply 1.5 × 0.2 to get 0.3.

Divide the result by the denominator 0.3.

Simplification: 0.3 ÷ 0.3 = 1

Therefore The correct answer is 1.

Alternate Method

Given:

Expression: ((1.5 × 0.2)) / 0.3

Formula Used:

Follow the BODMAS order of operations, starting with multiplication in the numerator followed by division.

Calculations:

=> (1.5 × 0.2) ÷ 0.3

=> 0.3 ÷ 0.3

=> 1

Therefore The correct answer is 1.

Additional Information

BODMAS Rule

The rule defines the correct sequence: Brackets, Of/Orders, Division, Multiplication, Addition, and Subtraction.

Decimal Multiplication

Multiply digits as whole numbers (15 × 2 = 30) and then shift the decimal point left by the total number of decimal places (1 + 1 = 2) to get 0.30.

Division of Decimals

Multiplying both the numerator and denominator by a power of 10 (like 10 or 100) can simplify the division by removing decimals.

Q6. Answer: (b) 102 meters

Shortcut Trick

For a rectangular garden of length L and width W with a path of uniform width w outside:

Outer Perimeter = 2 × (L + W) + 8w

=> Outer Perimeter = 2 × (25 + 18) + 8 × 2

=> Outer Perimeter = 2 × 43 + 16 = 86 + 16 = 102 m

Therefore The correct answer is 102 m.

Alternate Method

Given:

Length of garden (L) = 25 m

Width of garden (W) = 18 m

Width of path (w) = 2 m (outside)

When a path is constructed outside, it adds to the dimensions on both sides:

=> Outer Length = L + 2w = 25 + 2 × 2 = 29 m

=> Outer Width = W + 2w = 18 + 2 × 2 = 22 m

The perimeter of a rectangle is given by the formula: 2 × (Length + Width)

=> Perimeter of outer edge = 2 × (29 + 22)

=> Perimeter of outer edge = 2 × 51 = 102 m

Therefore The correct answer is 102 m.

Additional Information

Area of Outer Path

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The area of a path built outside a rectangle is calculated as: Area = (L + 2w)(W + 2w) − LW = 2w(L + W + 2w).

Area of Inner Path

If the path is built inside the garden, the Inner Dimensions become (L − 2w) and (W − 2w). Area = 2w(L + W − 2w).

Perimeter of Inner Path

The perimeter of the inner edge (when path is inside) is: Perimeter = 2(L + W − 4w) or 2 × (L + W) − 8w.

Q7. Answer: (b) 20

Shortcut Trick

Total work (LCM of 12 and 36) = 36 units.

Efficiency of A = 3 units/day; Efficiency of B = 1 unit/day.

Combined efficiency = 3 + 1 = 4 units/day.

Work done in 4 days = 4 × 4 = 16 units.

Remaining work = 36 − 16 = 20 units.

Days taken by B = 20 ÷ 1 = 20 days.

Therefore The correct answer is 20 days.

Alternate Method

Given:

Time taken by A = 12 days

Time taken by B = 36 days

Working duration together = 4 days

Person	Days	Total Work	Efficiency
A	12	36 (LCM)	3
B	36	1	

Calculations:

=> Efficiency of A + B = 3 + 1 = 4 units/day

=> Work done by A and B in 4 days = 4 × 4 = 16 units

=> Remaining Work = Total Work − Completed Work

=> Remaining Work = 36 − 16 = 20 units

=> Time taken by B = Remaining Work ÷ Efficiency of B

=> Time taken by B = 20 ÷ 1 = 20 days

Therefore The correct answer is 20 days.

Additional Information

Work-Efficiency Relation

Total Work = Efficiency × Time. Efficiency is inversely proportional to the time taken to complete a task.

Pipes and Cisterns

Similar logic applies where efficiency of inlet pipes is positive and outlet/leakage efficiency is negative.

Work and Wages

Wages are distributed in the ratio of work done or the ratio of efficiencies when workers work for the same duration.

Q8. Answer: (c) -159

Shortcut Trick

Apply the BODMAS rule sequence: Brackets → Multiplication → Addition.

Solve inner parentheses first: (26 − 11 + 6) = 21.

Multiply by −9: −9 × 21 = −189.

Final calculation: 30 + (−189) = 30 − 189 = −159.

Therefore The correct answer is −159.

Alternate Method

Given: 30 + [{−9 × (26 − 11 + 6)}]

Method Used: BODMAS/VBODMAS Rule for order of operations.

=> Step 1: Simplify the value inside the small brackets ().

=> (26 − 11 + 6) = 15 + 6 = 21

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=> Step 2: Substitute this value back into the braces {}.
=> {−9 × 21} = −189
=> Step 3: Now the expression is 30 + [−189].
=> 30 − 189 = −159
Therefore The correct answer is −159.
Additional Information
BODMAS Rule
It specifies the order: Brackets, Orders (powers, roots, etc.), Division, Multiplication, Addition, and Subtraction.
Types of Brackets
The order of opening brackets is Bar/Vinculum, then Parentheses (), then Braces { }, and finally Square Brackets [].
Integer Multiplication Rules
Multiplying a positive number by a negative number always results in a negative product (+ × − = −).

Q9. Answer: (b) 60 hours

Shortcut Trick
When an inlet pipe takes T1 hours and with a leak it takes T2 hours:
Time taken by leak alone to empty = (T1 × T2) ÷ (T2 − T1)
Time = (10 × 12) ÷ (12 − 10)
Time = 120 ÷ 2 = 60 hr
Therefore The correct answer is 60 hr.
Alternate Method
Given:
Filling time of Pipe A = 10 hr
Filling time with leakage (A + Leak) = 12 hr
Formula Used:
Total Capacity = LCM of individual times
Efficiency = Total Capacity ÷ Time

Pipe/Leak	Time (hr)	Total Work (units)	Efficiency (units/hr)
Pipe A	10	60	6
Pipe A − Leak	12	5	

=> Efficiency of Pipe A = 6 units/hr
=> Net efficiency with leak = 5 units/hr
=> Efficiency of Leak alone = 6 − 5 = 1 unit/hr
=> Time taken by leak to empty the tank = Total Work ÷ Leak Efficiency
=> Time = 60 ÷ 1 = 60 hr
Therefore The correct answer is 60 hr.
Additional Information
Negative Work Concept
In pipes and cisterns, an outlet pipe or a leak performs negative work, which reduces the overall efficiency of the filling system.
Net Efficiency Rule
If multiple pipes operate, the net efficiency is the algebraic sum of individual efficiencies (positive for inlet, negative for outlet).
Capacity and Time Relation
The time taken to fill or empty is inversely proportional to the efficiency: Time = Work ÷ Efficiency.

Q10. Answer: (b) 2

Shortcut Trick
Total interest earned = Rs. 74,263 − Rs. 70,000 = Rs. 4,263.
Total interest percentage = (4,263 ÷ 70,000) × 100 = 6.09%.
Using successive percentage for 3%: 3 + 3 + (3 × 3)/100 = 6.09%.
This matches for a time period of 2 years.
Therefore The correct answer is 2 years.

Alternate Method
Given:
Principal (P) = Rs. 70,000
Amount (A) = Rs. 74,263
Rate (R) = 3% p.a. compounded annually.
The formula for Amount (A) under Compound Interest is:
A = P(1 + R/100)^X
=> 74263 = 70000(1 + 3/100)^X
=> 74263 ÷ 70000 = (1 + 0.03)^X
=> 10609 ÷ 10000 = (1.03)^X
=> 1.0609 = (1.03)^X
=> $(1.03)^2$ = (1.03)^X
=> X = 2 years.
Therefore The correct answer is 2 years.
Additional Information
Compound Interest Formula
The amount is given by A = P(1 + r/n)^(nt), where n is the number of times interest is compounded per year.
Effective Interest Rate
For compounding annually, the effective rate for 2 years at r% is r + r + (r×r)/100.
Difference between CI and SI
For 2 years, the difference between Compound Interest and Simple Interest is CI − SI = $P(R/100)^2$.

Q11. Answer: (d) 8

Shortcut Trick
The third proportional (c) of two numbers a and b is given by the relation: c = b^2 ÷ a.
Given: Second number (b) = 16 and Third proportional (c) = 32.
Substituting values: 32 = 16^2 ÷ a => 32 = 256 ÷ a.
a = 256 ÷ 32 = 8.
Therefore The correct answer is 8.
Alternate Method
Given:
Second number (b) = 16
Third proportional (c) = 32
Let the first number be a.
Formula Used:
If three numbers a, b, and c are in continued proportion, then a : b = b : c.
Calculations:
=> a ÷ 16 = 16 ÷ 32
=> a × 32 = 16 × 16 (Product of extremes = Product of means)
=> 32a = 256
=> a = 256 ÷ 32
=> a = 8
Therefore The correct answer is 8.
Additional Information
Mean Proportional
The mean proportional between two numbers x and y is defined as √(x × y).
Fourth Proportional
If four numbers a, b, c, and d are in proportion (a:b = c:d), then d is the fourth proportional, calculated as d = (b × c) ÷ a.
Continued Proportion Property
For three numbers to be in continued proportion, the middle term squared must equal the product of the first and third terms: b^2 = a × c.

Q12. Answer: (a) Rs. 22.50

Shortcut Trick

Equate the number of pens by multiplying the first set by 2 and the second set by 3.

First Set: 6 Pens + 4 Notebooks = Rs. 240

Second Set: 6 Pens + 12 Notebooks = Rs. 420

Difference: 8 Notebooks = Rs. 180

Price of 1 Notebook = 180 ÷ 8 = Rs. 22.50

Therefore The correct answer is Rs. 22.50.

Alternate Method

Given:

Cost of 3 pens and 2 notebooks = Rs. 120

Cost of 2 pens and 4 notebooks = Rs. 140

Calculations:

Let the price of one pen be P and one notebook be N.

=> 3P + 2N = 120 --- (Eq. 1)

=> 2P + 4N = 140 --- (Eq. 2)

=> From (Eq. 2), simplify by dividing by 2: P + 2N = 70

=> Express P in terms of N: P = 70 − 2N

=> Substitute P in (Eq. 1): 3 × (70 − 2N) + 2N = 120

=> 210 − 6N + 2N = 120

=> 210 − 4N = 120

=> 4N = 210 − 120

=> 4N = 90

=> N = 90 ÷ 4 = 22.50

Therefore The correct answer is Rs. 22.50.

Additional Information

Linear Equations in Two Variables

Equations in the form ax + by = c that can be solved using substitution, elimination, or cross-multiplication.

Elimination Method

Making the coefficients of one variable equal in both equations and then adding or subtracting them to solve for the other variable.

Substitution Method

Expressing one variable in terms of the other from one equation and substituting this value into the second equation.

Q13. Answer: (a) Rs. 3000

Shortcut Trick

Ratio of Cost Price (CP) to Selling Price (SP) => 100 : 111 1/9 = 9 : 10

Ratio of Marked Price (MP) to Selling Price (SP) => 1 : [(1 − 1/6) × (1 − 1/5)] = 1 : (5/6 × 4/5) = 1 : 2/3 = 3 : 2

Combined ratio CP : SP : MP => 9 : 10 : 15 (as SP is 10 and 2, common SP = 10)

Given CP = 9 units = Rs. 1800 => 1 unit = Rs. 200

Marked Price (MP) = 15 units = 15 × 200 = Rs. 3000

Therefore The correct answer is Rs. 3000.

Alternate Method

Given:

Cost Price (CP) of the article = Rs. 1800

Profit percentage = 11 1/9% = 1/9

Successive discounts = 16 2/3% (1/6) and 20% (1/5)

Formula Used:

1. Selling Price (SP) = CP × (1 + Profit%)

2. Selling Price (SP) = MP × (1 − Discount1%) × (1 − Discount2%)

Calculations:

=> Profit amount = 1/9 × 1800 = Rs. 200

=> Selling Price (SP) = 1800 + 200 = Rs. 2000

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=> Total multiplier for successive discounts = (1 − 1/6) × (1 − 1/5) = 5/6 × 4/5 = 4/6 = 2/3
=> Selling Price (SP) = Marked Price (MP) × 2/3
=> 2000 = MP × 2/3
=> MP = (2000 × 3) ÷ 2 = Rs. 3000
Therefore The correct answer is Rs. 3000.
Additional Information
Effective Successive Discount Formula
For two successive discounts of a% and b%, the single equivalent discount is (a + b − ab/100)%.
CP and MP Relation
The direct ratio of Marked Price to Cost Price is given by MP/CP = (100 + P%) / (100 − D%), where P is profit and D is discount.
Fraction Conversions
Standard percentages to fractions: 11 1/9% = 1/9, 16 2/3% = 1/6, 20% = 1/5, 25% = 1/4, and 33 1/3% = 1/3.

Q14. Answer: (c) 24.5

Shortcut Trick
Arrange the data in ascending order: 12, 17, 22, 27, 31, 36.
Total number of terms (n) = 6 (which is even).
Median = Average of the two middle terms (3^(rd) and 4^(th) terms).
Median = (22 + 27) ÷ 2 = 49 ÷ 2 = 24.5.
Therefore The correct answer is 24.5.
Alternate Method
Given Data: 12, 36, 22, 27, 31, 17
Formula: If n is even, Median = [(n/2)^(th) term + (n/2 + 1)^(th) term] ÷ 2
Calculations:
=> Arranging in Ascending order: 12, 17, 22, 27, 31, 36
=> Number of observations (n) = 6
=> Median = [(6/2)^(th) term + (6/2 + 1)^(th) term] ÷ 2
=> Median = [3^(rd) term + 4^(th) term] ÷ 2
=> Median = [22 + 27] ÷ 2
=> Median = 49 ÷ 2
=> Median = 24.5
Therefore The correct answer is 24.5.
Additional Information
Median for Odd Number of Terms
When n is odd, the median is the exactly middle term: ((n + 1) ÷ 2)^(th) term.
Arithmetic Mean
The average of all values: Mean = (Sum of all observations) ÷ (Total number of observations).
Mode
The value that appears most frequently in a data set. A set can have one mode, more than one, or none.
Range
The difference between the maximum and minimum values in the data set: Range = Max − Min.

Q15. Answer: (a) 15

Shortcut Trick
The product of the two positive numbers is the square of their mean proportional: $30^2 = 900$.
Find factors of 900 whose difference is 45: 60 × 15 = 900 and 60 − 15 = 45.
The numbers are 60 and 15, where 15 is the smaller number.
Therefore The correct answer is 15.
Alternate Method
Given:
Mean proportional = 30
Difference between numbers = 45

Formula Used:

Mean Proportional = √(a × b)

$(a + b)^2 = (a - b)^2 + 4ab$

Calculations:

=> Let the smaller number be b and the larger number be a.

=> √(ab) = 30 => ab = 900

=> a − b = 45

$=> (a + b)^2 = (a - b)^2 + 4ab$

$=> (a + b)^2 = (45)^2 + 4 \times 900$

$=> (a + b)^2 = 2025 + 3600 = 5625$

=> a + b = √5625 = 75

=> Subtracting (a − b) from (a + b): (a + b) − (a − b) = 75 − 45

=> 2b = 30

=> b = 15

Therefore The correct answer is 15.

Additional Information

Mean Proportional

The mean proportional between two numbers x and y is given by the geometric mean, which is √(xy).

Third Proportional

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

Fourth Proportional

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

Algebraic Identity

The relation between sum, difference, and product of two numbers is $(a + b)^2 - (a - b)^2 = 4ab$.

Q16. Answer: (d) C

Shortcut Trick

Net Discount % for each scheme:

(A) 39 + 3 − (39 × 3 / 100) = 42 − 1.17 = 40.83%

(B) Successive 36%, 13%, 8% → First two = 44.32%, Total ≈ 44.3 + 8 − 3.5 = 48.8%

(C) Weighted Average = (18 × 2 + 41 × 5) ÷ 7 = 241 ÷ 7 ≈ 34.4%

(D) Buy 7 Get 5 Free → (5 ÷ 12) × 100 ≈ 41.7%

Comparing the values: 34.4% (C) < 40.83% (A) < 41.7% (D) < 48.8% (B). The least beneficial scheme is the one with the minimum discount.

Therefore The correct answer is C.

Alternate Method

Given: Total toys to buy = 7. Marked Price (MP) per toy = Rs. 100. Total MP = Rs. 700.

Calculation of Selling Price (SP) and Discount for each scheme:

Scheme A: Successive 39% and 3%

=> SP = 700 × (61/100) × (97/100) = 414.19

=> Total Discount = 700 − 414.19 = 285.81

=> Discount % = (285.81 ÷ 700) × 100 = 40.83%

Scheme B: Successive 36%, 13%, and 8%

=> SP = 700 × 0.64 × 0.87 × 0.92 = 358.58

=> Total Discount = 700 − 358.58 = 341.42

=> Discount % = (341.42 ÷ 700) × 100 = 48.77%

Scheme C: 18% on first 2, 41% on remaining 5

=> Discount on 2 toys = 2 × (18% of 100) = 36

=> Discount on 5 toys = 5 × (41% of 100) = 205

=> Total Discount = 36 + 205 = 241

=> Discount % = (241 ÷ 700) × 100 = 34.43%

Scheme D: 5 toys free on buying 7 toys (Standard Buy 7 Get 5 Free)

=> Total items = 7 + 5 = 12
=> Discount % = (Free items ÷ Total items) × 100 = (5 ÷ 12) × 100 = 41.67%
Scheme C provides the lowest discount percentage (34.43%), making it the least beneficial for the customer.
Therefore The correct answer is C.
Additional Information
Successive Discount Formula
For two successive discounts x% and y%, the single equivalent discount is (x + y − xy/100)%.
Buy X Get Y Free
The effective discount percentage for this offer is calculated as: [Y ÷ (X + Y)] × 100.
Weighted Average Discount
When different quantities have different discounts, use (n1d1 + n2d2) ÷ (n1 + n2) to find the total discount percentage.

Q17. Answer: (c) Rs. 6,048

Shortcut Trick
Effective Interest Rate for 4 years = 6% × 4 = 24%.
Interest earned = 24% of the Principal (Rs. 25,200).
Interest = 0.24 × 25200 = 24 × 252 = 6048.
Therefore The correct answer is Rs. 6,048.
Alternate Method
Given:
Principal (P) = Rs. 25,200
Rate (R) = 6% per annum
Time (T) = 4 years
Formula Used:
Simple Interest (SI) = (P × R × T) ÷ 100
=> SI = (25200 × 6 × 4) ÷ 100
=> SI = 25200 × 24 ÷ 100
=> SI = 252 × 24
=> SI = Rs. 6,048
Therefore The correct answer is Rs. 6,048.
Additional Information
Total Amount Calculation
The total sum payable at the end of the tenure is Amount = Principal + Simple Interest. Here, A = 25200 + 6048 = Rs. 31,248.
Calculation of Rate or Time
The rate (R) can be found using R = (SI × 100) ÷ (P × T) and time (T) using T = (SI × 100) ÷ (P × R).
Simple Interest vs Compound Interest
For the first year, Simple Interest and Compound Interest are identical if the compounding is annual.

Q18. Answer: (b) 7

Shortcut Trick
Simplify the equation: $2\cos^2 x - 1 = 1/2 \Rightarrow \cos 2x = 1/2$.
Identify the angle: $\cos 60° = 1/2$, so $2x = 60°$ and $x = 30°$.
Substitute $x = 30°$ into the expression $\sec 2x + \text{cosec } x + \cot^2 x$.
Calculation: $\sec 60° + \text{cosec } 30° + \cot^2 30° = 2 + 2 + 3 = 7$.
Therefore The correct answer is 7.
Alternate Method
Given: $2\cos^2 x - 1 = 1/2$ and $0° < x < 90°$
Formula Used: $\cos 2x = 2\cos^2 x - 1$
=> $2\cos^2 x - 1 = 1/2$
=> $\cos 2x = 1/2$
=> $2x = 60°$ (Since $\cos 60° = 1/2$)
=> $x = 30°$

=> sec 2x = sec 60° = 2
=> cosec x = cosec 30° = 2
=> $\cot^2 x = (\cot 30°)^2 = (\sqrt{3})^2 = 3$
=> Value of expression = 2 + 2 + 3 = 7
Therefore The correct answer is 7.
Additional Information
Double Angle Formulas
Fundamental identities include $\cos 2x = 2\cos^2 x - 1 = 1 - 2\sin^2 x = \cos^2 x - \sin^2 x$.
Reciprocal Identities
Trigonometric ratios are related as sec x = 1/cos x, cosec x = 1/sin x, and cot x = 1/tan x.
Standard Trigonometric Values
For 30°: sin = 1/2, cos = √3/2, tan = 1/√3. For 60°: sin = √3/2, cos = 1/2, tan = √3.

Q19. Answer: (b) 14

Shortcut Trick
Identify factors of 176 that add up to 30.
Pairs of factors for 176: (1, 176), (2, 88), (4, 44), (8, 22), (11, 16).
Check the Sum: 8 + 22 = 30.
Required Positive Difference = 22 − 8 = 14.
Therefore The correct answer is 14.
Alternate Method
Given:
Sum of numbers (x + y) = 30
Product of numbers (xy) = 176
Formula Used:
$(x - y)^2 = (x + y)^2 - 4xy$
Calculations:
=> $(x - y)^2 = (30)^2 - 4 \times 176$
=> $(x - y)^2 = 900 - 704$
=> $(x - y)^2 = 196$
=> $(x - y) = \sqrt{196}$
=> x − y = 14
Therefore The correct answer is 14.
Additional Information
Quadratic Relation
If the sum (S) and product (P) of two numbers are known, the numbers are the roots of the quadratic equation $z^2 - Sz + P = 0$.
Algebraic Identity
The relationship between the square of the sum and square of the difference is given by: $(a + b)^2 - (a - b)^2 = 4ab$.
Difference of Squares
$a^2 - b^2 = (a - b)(a + b)$. This is useful when the difference and sum are both known to find the difference of their squares.

Q20. Answer: (c) 44,376 cm²

Shortcut Trick
Given side (a) = 86 cm.
Total Surface Area (TSA) = $6 \times a^2 = 6 \times 86^2$.
Apply unit digit method: 6 × (...6 × ...6) = 6 × 36 = 216 → last digit is 6.
The final result must end with the digit 6.
Only the value 44376 satisfies this condition.
Therefore The correct answer is 44376 cm².
Alternate Method
Given:
Side (a) of the cube = 86 cm

Formula Used:

Total Surface Area (TSA) of a cube = 6 × a²

Calculations:

=> TSA = 6 × (86)²

=> TSA = 6 × (86 × 86)

=> TSA = 6 × 7396

=> TSA = 44376 cm²

Therefore The correct answer is 44376 cm².

Additional Information

Lateral Surface Area (LSA)

It is the sum of the areas of all the side faces of the cube, excluding the top and bottom: LSA = 4 × a².

Volume of a Cube

The total space occupied by the cube in three dimensions is given by the formula: Volume = a³.

Diagonal of a Cube

The longest distance between any two corners of the cube is calculated as: Diagonal = a√3.

Q21. Answer: (d) 20

Shortcut Trick

Profit % = 25% = 1/4

Ratio of Price per article (CP : SP) = 4 : 5

Since Total Cost Price = Total Selling Price, the quantity ratio is inversely proportional to the price ratio.

Quantity Ratio (CP items : SP items) = 5 : 4

According to the question, 5 units = 25 articles => 1 unit = 5 articles

Therefore, x = 4 units = 4 × 5 = 20

Therefore The correct answer is 20.

Alternate Method

Given:

Cost Price (CP) of 25 articles = Selling Price (SP) of x articles.

Profit percentage = 25%.

Formula Used:

Profit % = [(Articles Bought − Articles Sold) ÷ Articles Sold] × 100

Calculations:

=> Let the Cost Price of 1 article be Rs. 1.

=> Total Cost Price of 25 articles = 25 × 1 = Rs. 25.

=> Given, Selling Price of x articles = Rs. 25.

=> Cost Price of x articles = x × 1 = Rs. x.

=> Profit = SP − CP = 25 − x.

=> Profit % = [(25 − x) ÷ x] × 100

=> 25 = [(25 − x) ÷ x] × 100

=> 25 ÷ 100 = (25 − x) ÷ x

=> 1 ÷ 4 = (25 − x) ÷ x

=> x = 4 × (25 − x)

=> x = 100 − 4x

=> 5x = 100

=> x = 20

Therefore The correct answer is 20.

Additional Information

Profit/Loss on Articles

When the Cost Price of m items equals the Selling Price of n items, the Profit/Loss % = [(m − n) ÷ n] × 100. If positive, it is a profit; if negative, it is a loss.

Inverse Variation

For a constant total amount, the quantity of articles is inversely proportional to the price per article. Ratio of Price (a:b) => Ratio of

Quantity (b:a).

Markup and Discount

The relationship between Marked Price, Cost Price, and Selling Price is defined by: SP = CP × (1 + Profit%) and SP = MP × (1 − Discount%).

Q22. Answer: (c) 162 km/h

Shortcut Trick

Total Distance = 380 + 340 = 720 m

Speed (m/s) = 720 ÷ 16 = 45 m/s

Speed (km/h) = 45 × (18/5) = 162 km/h

Therefore The correct answer is 162 km/h.

Alternate Method

Given:

Length of the moving train (L1) = 380 m

Length of the stationary train (L2) = 340 m

Time taken (t) = 16 sec

Formula Used:

Speed = Total Distance ÷ Total Time

To convert m/s to km/h, multiply by 18/5.

Calculations:

=> Total Distance = L1 + L2

=> Total Distance = 380 + 340 = 720 m

=> Speed = 720 ÷ 16

=> Speed = 45 m/s

=> Speed in km/h = 45 × (18/5)

=> Speed in km/h = 9 × 18

=> Speed in km/h = 162 km/h

Therefore The correct answer is 162 km/h.

Additional Information

Speed Conversion

To convert speed from m/s to km/h, multiply by 18/5. To convert from km/h to m/s, multiply by 5/18.

Train Crossing a Pole/Point Object

When a train crosses a pole, tree, or person, the distance covered is equal to the length of the train itself.

Relative Speed

If two objects move in the opposite direction, relative speed = S1 + S2. If they move in the same direction, relative speed = |S1 − S2|.

Q23. Answer: (d) 81

Shortcut Trick

The given ratio is 3 : 2 : 13.

Since the numbers in the ratio are pairwise co-prime (GCD of any two is 1).

LCM of ratio parts = 3 × 2 × 13 = 78 units.

Given LCM = 6318.

1 unit (HCF) = 6318 ÷ 78 = 81.

Therefore The correct answer is 81.

Alternate Method

Given: Ratio of three numbers = 3 : 2 : 13 and their LCM = 6318.

Formula Used: LCM of (ax, bx, cx) = x × LCM(a, b, c), where x is the HCF of the numbers.

=> Let the three numbers be 3x, 2x, and 13x, where x is the HCF.

=> LCM of (3x, 2x, 13x) = x × LCM(3, 2, 13).

=> Since 3, 2, and 13 are prime numbers (or pairwise co-prime), their LCM is their product.

=> LCM(3, 2, 13) = 3 × 2 × 13 = 78.

=> Given that the LCM is 6318, we have: 78x = 6318.

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=> x = 6318 ÷ 78.

=> x = 81.

Therefore The correct answer is 81.

Additional Information

Relationship between HCF and LCM

For any two numbers a and b, the product of the numbers is equal to the product of their HCF and LCM: a × b = HCF × LCM.

HCF of Co-prime Numbers

The Highest Common Factor (HCF) of any two or more co-prime numbers is always 1.

LCM of Fractions

To find the LCM of fractions, use the formula: LCM = (LCM of Numerators) ÷ (HCF of Denominators).

Q24. Answer: (c) Savings increase by 60%

Shortcut Trick

Let Income = 100, then Expenditure = 70 and Savings = 30.

Change in Income = 25% of 100 = 25.

Change in Expenditure = 10% of 70 = 7.

Change in Savings = 25 − 7 = 18.

Percentage Increase in Savings = (18 ÷ 30) × 100 = 60%.

Therefore The correct answer is 60%.

Alternate Method

Given:

Initial Expenditure = 70% of Income

Increase in Income = 25%

Increase in Expenditure = 10%

Let initial Income be Rs. 100.

=> Initial Expenditure = 70% of 100 = Rs. 70

=> Initial Savings = 100 − 70 = Rs. 30

=> New Income = 100 + 25% of 100 = Rs. 125

=> New Expenditure = 70 + 10% of 70 = 70 + 7 = Rs. 77

=> New Savings = 125 − 77 = Rs. 48

=> Increase in Savings = 48 − 30 = Rs. 18

=> Percentage Increase = (18 ÷ 30) × 100 = 60%

Therefore The correct answer is 60%.

Additional Information

Income, Expenditure and Savings Relation

The fundamental relation is Income = Expenditure + Savings. Any change in one or two components directly affects the third.

Percentage Change Formula

Percentage Change = [(Final Value − Initial Value) ÷ Initial Value] × 100. It is used to calculate the relative growth or decline.

Net Deviation Method

For weighted averages or income problems, Net Change in Income = (Weight of Exp × % Change in Exp) + (Weight of Sav × % Change in Sav).

Q25. Answer: (c) 40 years

Shortcut Trick

Sum of ages 5 years ago = 50 − (5 × 2) = 40 years.

Ratio of Mother : Daughter (5 years ago) = 7 : 1.

Total ratio parts = 7 + 1 = 8 units.

8 units = 40 years => 1 unit = 5 years.

Mother's age 5 years ago = 7 units = 7 × 5 = 35 years.

Mother's present age = 35 + 5 = 40 years.

Therefore The correct answer is 40 years.

Alternate Method

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Given:

Sum of present ages = 50 years.

Condition: 5 years ago, Mother = 7 × Daughter.

Calculations:

Let the present age of the daughter be x years.

Then, the present age of the mother = (50 − x) years.

5 years ago:

=> Daughter's age = (x − 5)

=> Mother's age = (50 − x − 5) = (45 − x)

According to the problem:

=> (45 − x) = 7 × (x − 5)

=> 45 − x = 7x − 35

=> 7x + x = 45 + 35

=> 8x = 80

=> x = 10

Mother's present age = 50 − 10 = 40 years.

Therefore The correct answer is 40 years.

Additional Information

Sum of Ages Change

If there are n people, the sum of their ages changes by n × t years over a period of t years.

Age Difference Property

The difference between the ages of two individuals remains constant regardless of the number of years passed.

Ratio Method for Ages

When ratios at two different times are given, use the constant age difference to balance the ratio units for faster calculation.

Q26. Answer: (a) 1225

Shortcut Trick

Convert perfect squares to integers: √2601 = 51 and (√1089 + √324) = 33 + 18 = 51.

The equation becomes: √x × 51 = 51 × 35.

Divide both sides by 51: √x = 35.

Square both sides: x = 35^2 = 1225.

Therefore The correct answer is 1225.

Alternate Method

Given Expression: √x of √2601 = (√1089 + √324) × 35

Formula Used: √a × √b = √(a × b) and $(n5)^2$ = [n × (n+1)]25

=> First, calculate the square root of the constants:

=> √2601 = 51

=> √1089 = 33

=> √324 = 18

=> Substitute these values into the equation: √x × 51 = (33 + 18) × 35

=> √x × 51 = 51 × 35

=> √x = (51 × 35) ÷ 51

=> √x = 35

=> x = 35^2

=> x = 1225

Therefore The correct answer is 1225.

Additional Information

Squaring Numbers ending in 5

For a number ending in 5 (say A5), the square is calculated by multiplying A with (A + 1) and suffixing 25. Example: 35^2 = (3 × 4)25 = 1225.

Square Root Estimation

To find √2601, note that 50^2 = 2500. Since 2601 ends in 1, the possible root is 51 or 59. Since 2601 is very close to 2500, the root

is 51.

BODMAS Rule

Always follow the order: Brackets, Of, Division, Multiplication, Addition, and Subtraction for multi-step calculations.

Q27. Answer: (c) 17 km/hr

Shortcut Trick

Total distance = Sum of lengths = 104 + 94 = 198 m.

Relative Speed (kmph) = (Distance ÷ Time) × (18 ÷ 5)

Relative Speed = (198 ÷ 16.2) × (18 ÷ 5) = 110/9 × 18/5 = 44 kmph.

In same direction, Speed Difference = 44 kmph.

Speed of second train = 61 − 44 = 17 kmph.

Therefore The correct answer is 17 km/hr.

Alternate Method

Given:

Length of Train 1 (L1) = 104 m

Length of Train 2 (L2) = 94 m

Speed of Train 1 (S1) = 61 kmph

Time taken (T) = 16.2 seconds

Formula Used:

Relative Speed = Total Distance ÷ Total Time

To convert m/s to kmph, multiply by 18/5.

Calculations:

=> Total Distance = L1 + L2 = 104 + 94 = 198 m

=> Relative Speed (V_(rel)) = Distance ÷ Time

=> V_(rel) = 198 ÷ 16.2 m/s

=> V_(rel) in kmph = (198 ÷ 16.2) × (18 ÷ 5)

=> V_(rel) = (1980 ÷ 162) × (18 ÷ 5)

=> V_(rel) = (110 ÷ 9) × (18 ÷ 5)

=> V_(rel) = 22 × 2 = 44 kmph

=> Since trains are in the same direction, V_(rel) = S1 − S2 (assuming Train 1 is faster)

=> 44 = 61 − S2

=> S2 = 61 − 44 = 17 kmph

Therefore The correct answer is 17 km/hr.

Additional Information

Relative Speed Rules

When two objects move in the same direction, Relative Speed = S1 − S2. When they move in the opposite direction, Relative Speed = S1 + S2.

Unit Conversion

To convert Speed from km/hr to m/s, multiply by 5/18. To convert from m/s to km/hr, multiply by 18/5.

Train Crossing Distance

When a train crosses another train or a bridge, the total distance covered is the sum of the lengths of both entities.

Q28. Answer: (a) 540 cm²

Shortcut Trick

The Area of a Quadrilateral given one diagonal (d) and two offsets (h1 and h2) is calculated using the formula: 1/2 × d × (h1 + h2).

Given: diagonal (d) = 36 cm, perpendiculars (h1) = 20 cm and (h2) = 10 cm.

Area = 1/2 × 36 × (20 + 10)

Area = 18 × 30 = 540 cm².

Therefore The correct answer is 540 cm².

Alternate Method

Given:

Length of the diagonal (AC) = 36 cm

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Perpendicular distance (h1) from vertex B to AC = 20 cm
Perpendicular distance (h2) from vertex D to AC = 10 cm
Formula Used:
Area of quadrilateral = Area of ΔABC + Area of ΔADC
Area of a triangle = 1/2 × base × height
Calculations:
=> Area of ΔABC = 1/2 × 36 × 20
=> Area of ΔABC = 36 × 10 = 360 cm²
=> Area of ΔADC = 1/2 × 36 × 10
=> Area of ΔADC = 18 × 10 = 180 cm²
=> Total Area = 360 + 180
=> Total Area = 540 cm²
Therefore The correct answer is 540 cm².
Additional Information
Area of a Rhombus
If the diagonals of a quadrilateral are perpendicular to each other (like in a rhombus), the area is 1/2 × d1 × d2.
Area of a Trapezium
For a quadrilateral with one pair of parallel sides, Area = 1/2 × (sum of parallel sides) × height.
Heron's Formula for Quadrilaterals
For a cyclic quadrilateral with sides a, b, c, and d, Area = √((s−a)(s−b)(s−c)(s−d)), where s is the semi-perimeter.

Q29. Answer: (a) 51

Shortcut Trick
Identify the number that repeats the maximum number of times (highest frequency).
Count occurrences: 40 (2), 42 (2), 43 (2), 45 (2), 46 (2), and 51 (3).
Since 51 has the highest frequency (3), it is the mode.
Therefore The correct answer is 51.
Alternate Method
Given: Data set = 40, 41, 42, 51, 45, 43, 45, 43, 51, 40, 51, 54, 46, 50, 55, 47, 42, 46
Formula Used: Mode = Value with the maximum frequency.
=> Frequency of 40 = 2
=> Frequency of 42 = 2
=> Frequency of 43 = 2
=> Frequency of 45 = 2
=> Frequency of 46 = 2
=> Frequency of 51 = 3
=> Other values (41, 54, 50, 55, 47) appear only 1 time each.
=> Maximum frequency = 3, which corresponds to the value 51.
Therefore The correct answer is 51.
Additional Information
Definition of Mode
The mode is the observation that occurs most frequently in a data set. A set can have no mode, one mode (unimodal), or multiple modes (bimodal/multimodal).
Empirical Relationship
The relationship between the three measures of central tendency is: Mode = 3 × Median − 2 × Mean.
Median
The median is the middle value of a data set when it is arranged in ascending or descending order.
Mean
The arithmetic mean is the sum of all observations divided by the total number of observations.

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Q30. Answer: (b) 2

Shortcut Trick

A number is divisible by 24 if it is divisible by its coprime factors, 3 and 8.

For divisibility by 8, the last three digits 76B must be divisible by 8 => B = 0 (760) or B = 8 (768).

For divisibility by 3, the sum of digits (25 + A + B) must be divisible by 3.

Case 1: If B = 0, then 25 + A + 0 = 27 => A = 2. Here, A + B = 2.

Case 2: If B = 8, then 25 + A + 8 = 33 => A = 0. Here, A + B = 8.

Comparing both cases, the minimum value of (A + B) is 2.

Therefore The correct answer is 2.

Alternate Method

Given: The 7-digit number 32A776B is divisible by 24.

Formula Used:

1. Divisibility by 8: The number formed by the last three digits must be divisible by 8.

2. Divisibility by 3: The sum of all digits must be divisible by 3.

Calculations:

=> For 32A776B to be divisible by 24, it must be divisible by 8 and 3.

=> Checking divisibility by 8 for 76B: 760 ÷ 8 = 95 (rem = 0) and 768 ÷ 8 = 96 (rem = 0). Thus, B in {0, 8}.

=> Checking divisibility by 3: Sum = 3 + 2 + A + 7 + 7 + 6 + B = 25 + A + B.

=> If B = 0, Sum = 25 + A + 0 = 25 + A. For 25 + A to be divisible by 3, A can be 2, 5, or 8.

=> Value of (A + B) for B = 0: (2 + 0) = 2, (5 + 0) = 5, (8 + 0) = 8.

=> If B = 8, Sum = 25 + A + 8 = 33 + A. For 33 + A to be divisible by 3, A can be 0, 3, 6, or 9.

=> Value of (A + B) for B = 8: (0 + 8) = 8, (3 + 8) = 11, (6 + 8) = 14, (9 + 8) = 17.

=> The possible values for (A + B) are {2, 5, 8, 11, 14, 17}.

=> The minimum value among these is 2.

Therefore The correct answer is 2.

Additional Information

Divisibility Rule of 3

A number is divisible by 3 if the sum of its digits is a multiple of 3.

Divisibility Rule of 8

A number is divisible by 8 if the number formed by its last three digits is divisible by 8 or if the last three digits are 000.

Composite Divisibility

To check divisibility by a composite number N, check divisibility by its coprime factors a and b where a × b = N and HCF(a, b) = 1.

Q31. Answer: (a) A section of DNA that codes for a protein

The correct answer is A section of DNA that codes for a protein.

Key Points

• A gene is the fundamental physical and functional unit of heredity, consisting of a specific sequence of nucleotides in DNA (or RNA in some viruses).

• In molecular genetics, a gene is defined as a segment of DNA that contains the necessary instructions to synthesize a functional product, which is usually a protein or a functional RNA molecule.

• The process of decoding a gene begins with transcription, where the DNA sequence is copied into messenger RNA (mRNA), followed by translation, where the ribosome uses the mRNA template to assemble amino acids into a polypeptide chain.

• Genes are located at specific positions called loci (singular: locus) on chromosomes, and they act as the blueprint for an organism's phenotypic traits, such as eye color or enzyme production.

• Structurally, eukaryotic genes are composed of exons (coding regions), introns (non-coding intervening sequences), and regulatory sequences like promoters and enhancers that control when and how a gene is expressed.

Additional Information

• Chromosomes and Sex Chromosomes:

• A chromosome is a thread-like structure made of DNA and histone proteins that carries hundreds or thousands of genes; it is the container for genes, not the gene itself.

• Sex chromosomes (such as X and Y in humans) are a specific category of chromosomes that determine biological sex and carry sex-linked genes.

• Blood Groups:

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• Blood groups like ABO and Rh are phenotypes or inherited traits determined by the expression of specific alleles (variant forms of a gene) located on Chromosome 9 and Chromosome 1 respectively.

• Genotype and Alleles:

• The term genotype refers to the actual genetic makeup of an individual, while alleles are different versions of the same gene that can lead to variations in inherited characteristics.

Q32. Answer: (c) Goa

The correct answer is Goa.

Key Points

• The Estado da India (State of India) was a colonial entity of the Portuguese Empire established to manage their commercial and territorial interests across the Indian Ocean and East Africa.

• While Cochin (Kochi) served as the initial headquarters from 1505, the strategic importance of Goa led to its conquest by Afonso de Albuquerque in 1510 from the Adil Shahi dynasty of Bijapur.

• In 1530, during the tenure of Governor Nuno da Cunha, the capital of the Estado da India was officially transferred from Cochin to Goa.

• Goa was favored due to its central location on the western coast of India, its deep natural harbor, and its suitability as a naval base to enforce the Cartaz system (maritime trade licenses) in the Arabian Sea.

• It remained the principal administrative, religious, and commercial hub for the Portuguese Eastern Empire until its annexation by the Indian Armed Forces in 1961.

Additional Information

• Cochin:

• It was the first European colonial settlement in India and the site of Fort Emmanuel, established in 1503.

• It served as the primary residence of the first Portuguese Viceroy, Francisco de Almeida, before the capital shift.

• Lisbon:

• It was the metropolitan capital of the Kingdom of Portugal and the central authority for all overseas colonies.

• The Casa da India in Lisbon managed the logistics and monopoly of the lucrative spice trade.

• Malacca:

• Captured by the Portuguese in 1511, it was a vital maritime chokepoint controlling trade between the Indian Ocean and the South China Sea.

• While it was a major administrative center in Southeast Asia, it operated under the jurisdiction of the Governor-General in Goa.

Q33. Answer: (d) ROM

The correct answer is ROM.

Key Points

• Non-volatile memory is a type of computer memory that has the capability to hold saved data even if the power supply is turned off.

• ROM (Read-Only Memory) is a prominent example of non-volatile memory because it stores critical start-up instructions, such as the BIOS (Basic Input/Output System), which must remain intact every time the computer is powered on.

• Data stored in ROM is generally written during the manufacturing process or through specialized methods, ensuring that the firmware and essential operating instructions are not lost during a system crash or power failure.

• In contrast to RAM, which is used for temporary data processing, ROM serves as a permanent storage medium for the core functional code of electronic devices.

Additional Information

• RAM (Random Access Memory):

• Identified as volatile memory, meaning all data stored in it is wiped clean immediately when the power is disconnected.

• It serves as the primary memory where the system loads the operating system and active applications for high-speed access by the processor.

• CPU (Central Processing Unit):

• Known as the brain of the computer, it is the electronic circuitry that executes instructions of a computer program.

• While it contains internal high-speed storage units like registers and Cache, the CPU itself is a processing unit rather than a memory type.

• PCB (Printed Circuit Board):

• A PCB is the foundational hardware component that mechanically supports and electrically connects various electronic parts using conductive tracks.

• It is not a form of memory storage but rather the motherboard or circuit carrier for components like the CPU and RAM.

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Q34. Answer: (b) Potassium

The correct answer is Potassium.

Key Points

• Potassium is a highly reactive alkali metal located in Group 1 of the periodic table, characterized by having a single valence electron which it loses very easily.

• When placed in cold water, it undergoes an instantaneous and violent chemical reaction to produce Potassium Hydroxide (a strong base) and Hydrogen gas.

• The reaction is categorized as highly exothermic, meaning it releases a massive amount of thermal energy in a very short duration.

• The heat generated during this process is so intense that it immediately reaches the ignition temperature of the liberated Hydrogen gas, causing it to catch fire and burn with a distinctive lilac (pale violet) flame due to the presence of potassium ions.

• The chemical representation of this reaction is: $2K(s) + 2H_2O(l) \rightarrow 2KOH(aq) + H_2(g) + \text{Heat energy}$.

Additional Information

• Reactivity Series Comparison:

• Sodium: Similar to potassium, it reacts vigorously with cold water and the hydrogen often catches fire (burning with a yellow flame), though it is slightly less reactive than potassium.

• Calcium: It reacts with cold water to form Calcium Hydroxide and hydrogen, but the reaction is less violent and the heat produced is insufficient to ignite the hydrogen gas. The metal often floats because bubbles of hydrogen stick to its surface.

• Magnesium: It does not react with cold water at all; it requires hot water or steam to react, forming magnesium hydroxide or magnesium oxide.

• Aluminium: This metal does not react with cold or hot water due to a stable, protective Aluminium Oxide layer on its surface, though it will react with steam at high temperatures.

Q35. Answer: (b) Mahadev Govind Ranade

The correct answer is Mahadev Govind Ranade.

Key Points

• The Poona Sarvajanik Sabha was a prominent socio-political organization founded on April 2, 1870, in Pune, Maharashtra.

• The organization was established by Mahadev Govind Ranade, along with Ganesh Vasudeo Joshi (popularly known as Sarvajanik Kaka) and S. H. Chiplunkar.

• It was created with the primary objective of serving as a mediating body between the British Government and the people of India to represent public grievances.

• The Sabha played a significant role in advocating for peasant rights and was a key precursor to the formation of the Indian National Congress in 1885.

• Under the guidance of Ranade, the organization focused on legal education, social reform, and the promotion of Swadeshi products.

Additional Information

• Gopal Hari Deshmukh (Lokhitwadi):

• He was a social reformer and writer from Maharashtra who promoted rationalism and modern education.

• He is famous for his Shatapatre (Hundred Letters) published in the weekly Prabhakar, addressing social and religious issues.

• Gopal Krishna Gokhale:

• A Moderate leader of the Indian National Congress and the founder of the Servants of India Society in 1905.

• He was considered the political guru of Mahatma Gandhi and advocated for reforms through constitutional means.

• Dadabhai Naoroji:

• Known as the Grand Old Man of India, he was a key figure in the nationalist movement and a founding member of the Indian National Congress.

• He authored Poverty and Un-British Rule in India and developed the Drain of Wealth theory.

Q36. Answer: (a) Rio de Janeiro

The correct answer is Rio de Janeiro.

Key Points

• The 17th BRICS Leaders' Summit was hosted by Brazil in Rio de Janeiro during early July 2025.

• Brazil held the Pro Tempore Presidency of the BRICS group for the year 2025, succeeding Russia, which chaired the 16th summit in Kazan in 2024.

• This summit was the second major gathering following the BRICS+ expansion, which officially integrated Egypt, Ethiopia, Iran, and the United Arab Emirates on January 1, 2024.

• The Brazilian Presidency prioritized themes such as global governance reform, sustainable development, energy transition, and the reduction of economic inequality.

• Leaders discussed the continued development of a BRICS common currency or payment system to facilitate trade in local currencies and reduce reliance on the US Dollar.

• The choice of Rio de Janeiro as the venue followed the city's successful hosting of the G20 Summit in November 2024, utilizing its established diplomatic and security infrastructure.

Additional Information

• New Delhi

• Served as the host for the 4th BRICS Summit in 2012 and the 13th BRICS Summit in 2021 (held virtually).

• India is a founding member and has played a pivotal role in establishing the New Development Bank (NDB).

• Johannesburg

• Hosted the 15th BRICS Summit in August 2023, which was a turning point for the bloc as it formally invited new member nations.

• The city is a critical economic hub in South Africa and hosted the 10th Summit in 2018.

• Shanghai

• Serves as the permanent headquarters for the New Development Bank (NDB), commonly known as the BRICS Bank.

• The city is a focal point for the group's financial integration and technological cooperation efforts.

Q37. Answer: (a) 330A, 332A

The correct answer is 330A, 332A.

Key Points

• The 106^(th) Constitutional Amendment Act, 2023, officially known as the Constitution (One Hundred and Sixth Amendment) Act, 2023 or the Nari Shakti Vandan Adhiniyam, marks a historic shift in Indian legislative representation by mandating 33 percent reservation for women.

• The Act inserted Article 330A into the Constitution to provide for the reservation of seats for women in the House of the People (Lok Sabha). This includes a sub-reservation for women belonging to the Scheduled Castes and Scheduled Tribes within the seats already reserved for those categories.

• The Act also inserted Article 332A, which extends the one-third reservation for women to the Legislative Assemblies of every State in India, ensuring gender-balanced representation at the state level.

• Furthermore, Article 334A was added to specify the commencement of these provisions. The reservation will be implemented after the first census conducted after the Act's commencement and the subsequent delimitation exercise is completed.

• The amendment modified Article 239AA of the Constitution to ensure that the reservation policy also applies to the Legislative Assembly of the National Capital Territory of Delhi.

Additional Information

• Legislative Background:

• The bill was introduced as the Constitution (One Hundred and Twenty-Eighth Amendment) Bill, 2023, during a special session of Parliament.

• It received Presidential assent on September 28, 2023, following nearly unanimous support in both the Lok Sabha and the Rajya Sabha.

• The primary objective is to enhance women's participation in policy-making and governance at the national and state levels.

• Operational Features:

• The reservation is mandated for a period of 15 years from the date of its commencement, though it can be extended by a law passed by Parliament.

• Seats reserved for women shall be allocated by rotation to different constituencies within a State or Union Territory as determined by Parliament.

• This amendment fulfills a long-standing demand for women's quotas that had been pending in various forms for nearly three decades.

Q38. Answer: (a) By implementing region-specific policies and resource allocation

The correct answer is By implementing region-specific policies and resource allocation.

Key Points

• Inter-regional disparities in human development refer to the unequal distribution of educational opportunities and healthcare services across different geographical areas. In a country like India, states like Kerala often outperform others, necessitating localized strategies.

• Region-specific policies are essential because they address the unique socio-economic and geographical constraints of lagging regions, such as topography, population density, and existing infrastructure gaps.

• Effective resource allocation involves redirecting financial and human capital toward underdeveloped areas. This is often

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managed through the Finance Commission of India, which uses horizontal devolution to support states with lower fiscal capacity.

• The Aspirational Districts Programme, launched by NITI Aayog in 2018, is a prime example of this approach. It focuses on 112 districts across the country to improve their performance in Health & Nutrition and Education through competitive federalism.

• Decentralized planning via Panchayati Raj Institutions ensures that Primary Health Centres (PHCs) and rural schools are managed according to the actual needs of the local community, rather than through a top-down, centralized model.

Additional Information

• Human Development Index (HDI):

• A composite index created by the UNDP that measures Life Expectancy, Expected/Mean Years of Schooling, and Gross National Income (GNI) per capita.

• Reducing disparities directly improves a nation's overall HDI ranking and Human Capital.

• Urban Bias and Centralization:

• Centralizing economic activities in urban areas or capital cities (Options 3 & 4) exacerbates the Rural-Urban Divide and leads to unplanned migration.

• Neglecting rural education (Option 2) hinders the long-term economic productivity of the workforce and violates the Right to Education Act, 2009.

Q39. Answer: (a) Kaziranga National Park, Assam

The correct answer is Kaziranga National Park, Assam.

Key Points

• The first-ever grassland bird census utilizing Passive Acoustic Monitoring (PAM) and Artificial Intelligence (AI) tools was conducted in Kaziranga National Park and Tiger Reserve (KNPTR), located in Assam.

• This initiative focused on documenting the avian diversity within the park's unique alluvial grasslands, specifically targeting elusive and critically endangered species like the Bengal Florican.

• Prime Minister Narendra Modi featured this conservation milestone in his Mann ki Baat address in August 2025, highlighting how Digital India and Wildlife Conservation are merging to protect biodiversity.

• The methodology involved deploying Automated Recording Units (ARUs) across various ranges of the park to capture bird calls, which were then analyzed using AI-driven software to identify species without human presence, ensuring zero disturbance to the habitat.

• This technological leap allows for 24/7 monitoring and provides a more accurate population density estimate compared to traditional visual encounter surveys.

Additional Information

• Kaziranga National Park:

• It was declared a UNESCO World Heritage Site in 1985 and is renowned for hosting two-thirds of the world's population of Great Indian One-horned Rhinoceroses.

• The park is an Important Bird Area (IBA) as designated by BirdLife International.

• Passive Acoustic Monitoring (PAM):

• A non-invasive technique used to monitor ecosystem health by recording sounds over long periods.

• It is particularly effective in dense grasslands where visibility is limited for traditional binoculars-based surveys.

• Other National Parks:

• Keoladeo National Park: Located in Bharatpur, Rajasthan, it is primarily famous for its wetland ecosystem and migratory waterfowl.

• Sultanpur National Park: A significant bird sanctuary in Haryana known for its lake and resident/migratory birds.

• Jim Corbett National Park: Situated in Uttarakhand, it is India's oldest national park and a flagship site for Project Tiger.

Q40. Answer: (c) Operation Nanhe Farishte

The correct answer is Operation Nanhe Farishte.

Key Points

• Operation Nanhe Farishte is a flagship initiative launched by the Railway Protection Force (RPF) of the Indian Railways aimed at rescuing children who are found in vulnerable conditions at railway stations and on trains.

• The primary objective of this mission is to identify children who have run away from home, are missing, or have been victims of human trafficking, and to ensure their immediate safety and rehabilitation.

• Between January 2024 and April 2025, localized reporting from zones such as the South Western Railway (SWR) confirmed that over 260 children (specifically 267 in certain quarterly reports) were successfully rescued under this banner, highlighting the initiative's consistent impact.

• Under the Standard Operating Procedure (SOP) issued by the Ministry of Railways, rescued children are provided with medical care and counseling before being handed over to the Child Welfare Committee (CWC) or recognized Non-Governmental

Organizations (NGOs).

• The RPF utilizes data from the Track Child portal and coordinates with Childline 1098 to reunite these children with their families or provide them with institutional care under the Juvenile Justice (Care and Protection of Children) Act.

Additional Information

• Mission Vatsalya:

• This is an umbrella scheme launched by the Ministry of Women and Child Development to strengthen the child protection ecosystem in India.

• It supports the infrastructure of Child Help Desks (CHD) at major railway stations, which work in tandem with the Railway Protection Force.

• Operation Shakti:

• While the term is used for various state-level security drives (such as in Uttar Pradesh), the Indian Railways specifically deploys Operation Meri Saheli and Operation Mahila Suraksha to ensure the safety of women passengers.

• Railway Protection Force (RPF):

• The RPF is an Armed Force of the Union constituted under the RPF Act, 1957, and it holds the legal mandate to protect railway property, passenger areas, and the passengers themselves.

Q41. Answer: (b) An organised society with distinct social classes and a wide range of occupational groups

The correct answer is An organised society with distinct social classes and a wide range of occupational groups.

Key Points

• The Mauryan society was characterized by a sophisticated and hierarchical structure as documented in contemporary literature like Megasthenes' Indika and Kautilya's Arthashastra.

• Megasthenes, the Greek ambassador in the court of Chandragupta Maurya, observed that the society was divided into seven distinct classes: philosophers, farmers, herdsmen, artisans, soldiers, overseers, and councillors, primarily categorized by their functional roles in the state.

• While the traditional Varna system (Brahmins, Kshatriyas, Vaishyas, and Shudras) remained the ideological foundation, the era saw the proliferation of various Jatis (sub-castes) arising from the integration of tribal groups and occupational specialization.

• The state exercised significant control over social life, with Kautilya emphasizing the duties of different classes to maintain Dharma and social stability within the vast Mauryan Empire.

Additional Information

• Social Hierarchy and Governance:

• Contrary to being an egalitarian society, the Mauryan period featured sharp socio-economic disparities; the Brahmins and Kshatriyas occupied the top tier, while Shudras and untouchables were at the bottom.

• The economy was predominantly agrarian, but the rise of urban centers like Pataliputra, Taxila, and Ujjain facilitated the growth of powerful mercantile guilds (Srenis) that regulated trade and crafts.

• Ancient India during this period had moved far beyond an exclusively tribal society; it was the era of the first great centralized empire with a professional standing army and a complex bureaucracy.

• Evidence from Ashokan Edicts suggests a society where moral conduct and religious tolerance were promoted through the policy of Dhamma, aimed at unifying a diverse population.

• The status of women was varied; while they had certain rights to property (Stridhana), the society remained largely patriarchal, though some women served as guards or spies for the king.

Q42. Answer: (c) Arid and semi arid climate

The correct answer is Arid and semi arid climate.

Key Points

• The Great Indian Desert, also known as the Thar Desert, is located in the northwestern part of the Indian subcontinent, primarily covering the state of Rajasthan.

• The region is characterized by an Arid and semi arid climate where the annual rainfall is extremely low, generally remaining below 25 cm or 250 mm.

• The climate is marked by a high diurnal range of temperature, where daytime temperatures in summer can soar above 45°C while night temperatures can drop significantly.

• High rates of evapotranspiration and low humidity levels prevent the retention of moisture, resulting in sparse vegetation dominated by xerophytic plants and thorny bushes.

• The Aravalli Range plays a crucial role in creating these conditions as it lies parallel to the Southwest Monsoon winds, causing them to pass over the region without shedding much moisture.

Additional Information

• Equatorial climate:

• Features high temperatures and heavy convectional rainfall exceeding 200 cm throughout the year, found near the Equator.
• Humid subtropical climate:
• Characterized by hot, humid summers and mild to cool winters, typically found in the Indo-Gangetic Plains of Northern India.
• Tropical monsoon climate:
• Defined by seasonal reversal of winds and distinct wet and dry seasons, covering much of coastal and central India.
• Luni River:
• The only significant river in the Thar Desert, which is ephemeral and disappears into the Rann of Kutch.

Q43. Answer: (d) Yamandu Orsi

The correct answer is Yamandu Orsi.

Key Points

• Yamandú Orsi was officially sworn in as the 43rd President of the Oriental Republic of Uruguay on March 1, 2025, for a five-year term ending in 2030.
• He represents the Broad Front (Frente Amplio), a center-left political coalition, marking the return of the left to power after five years of conservative governance under Luis Lacalle Pou.
• Orsi secured his victory in the second-round runoff election held on November 24, 2024, where he defeated Álvaro Delgado of the National Party with approximately 49.8% of the vote.
• A former history teacher and a two-term mayor of Canelones (Uruguay's second-most populous department), Orsi has pledged to focus on economic growth, social equity, and citizen security.
• The inauguration ceremony took place at the Legislative Palace in Montevideo and was attended by regional leaders including the presidents of Brazil, Chile, and Colombia.
• His running mate, Carolina Cosse, the former mayor of Montevideo, was also sworn in as the Vice President of the country.

Additional Information

• Claudia Sheinbaum:
• She is the first female President of Mexico, sworn into office on October 1, 2024.
• She belongs to the Morena party and previously served as the Head of Government of Mexico City.
• Masoud Pezeshkian:
• He is the President of Iran, having assumed office in July 2024 following a special election after the death of Ebrahim Raisi.
• He is recognized as a reformist politician and is a cardiac surgeon by profession.
• Jair Bolsonaro:
• He served as the 38th President of Brazil from 2019 to 2022.
• He is a prominent right-wing leader who was succeeded by Luiz Inácio Lula da Silva in January 2023.

Q44. Answer: (d) Central Institute of Indian Languages

The correct answer is Central Institute of Indian Languages.

Key Points

• The Central Institute of Indian Languages (CIIL), established in 1969, is a subordinate office of the Ministry of Education (formerly MHRD) located in Mysuru, Karnataka.
• The institute is the designated nodal agency for the promotion and preservation of Classical Languages in India, specifically managing the Centres of Excellence for Kannada, Telugu, Malayalam, and Odia.
• Its primary objective is to assist the Government of India in language planning and to provide linguistic support for the development of Indian languages through research, training, and material production.
• CIIL oversees the implementation of schemes that provide fellowships and awards to scholars for their contribution to classical and modern Indian languages.

Additional Information

• Indira Gandhi National Centre for the Arts (IGNCA)
• Founded in 1987, it is an autonomous body under the Ministry of Culture that serves as a major resource center for the arts.
• It focuses on the study and experience of all arts—visual, performing, and literary—across various cultural contexts.
• Archaeological Survey of India (ASI)
• Established in 1861 by Alexander Cunningham, it functions under the Ministry of Culture.
• It is responsible for archaeological research and the conservation of centrally protected monuments of national importance.
• Sahitya Akademi of India
• Inaugurated in 1954, this autonomous organization under the Ministry of Culture acts as the National Academy of Letters.
• It promotes literature in 24 Indian languages and presents the annual Sahitya Akademi Award, the second-highest literary honor

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in India.

Q45. Answer: (a) Christian Medical College, Vellore

The correct answer is Christian Medical College, Vellore.

Key Points

• In April 2025, a significant milestone in Indian biotechnology was achieved when BRIC-InStem (Institute for Stem Cell Science and Regenerative Medicine), Bengaluru, collaborated with Christian Medical College (CMC), Vellore, to conduct India's first indigenous gene therapy clinical trial.

• The trial specifically targeted Haemophilia A, a hereditary bleeding disorder caused by the deficiency or absence of clotting Factor VIII, which historically required expensive lifelong protein replacement therapies.

• The therapy utilizes a novel Adeno-Associated Virus (AAV) vector developed in India to deliver a functional copy of the F8 gene into the patient's liver cells, enabling the body to produce the missing clotting factor naturally.

• This collaborative effort was spearheaded by the Centre for Stem Cell Research (CSCR), a unit of BRIC-InStem located at the CMC Vellore campus, facilitating the bridge between laboratory research and clinical application.

• The project received crucial support from the Department of Biotechnology (DBT) and the Biotechnology Industry Research Assistance Council (BIRAC), aiming to make advanced genetic treatments accessible and affordable for the Indian population.

Additional Information

• Haemophilia A:

• It is an X-linked recessive genetic disorder that primarily affects males, impairing the blood clotting process and leading to internal bleeding, especially in joints.

• The condition is characterized by mutations in the gene responsible for Coagulation Factor VIII.

• Gene Therapy:

• A medical field focusing on the genetic modification of cells to produce a therapeutic effect by repairing, replacing, or regenerating defective genetic sequences.

• BRIC-InStem:

• An autonomous institute of the Department of Biotechnology, Government of India, dedicated to high-end research in stem cell biology and regenerative medicine.

• Indian Council of Medical Research (ICMR):

• The apex body in India for the formulation and coordination of biomedical research; while it sets guidelines for trials, it was not the primary clinical partner for this specific indigenous gene therapy trial.

Q46. Answer: (d) Low fertility and low mortality

The correct answer is Low fertility and low mortality.

Key Points

• The Demographic Transition Model (DTM) describes the historical shift from high birth and death rates to low birth and death rates as societies progress through industrialization and urbanization.

• Stage III, often referred to as the Late Expanding stage, is characterized by a significant decline in the fertility rate (birth rate) and a continued low or declining mortality rate (death rate).

• In this stage, the natural increase of the population begins to slow down because the gap between birth rates and death rates narrows.

• Social changes such as increased female literacy, higher status of women, and improved access to contraception and family planning services lead to smaller family sizes.

• Economic shifts from agricultural to industrial and service-based economies make children an economic liability rather than an asset, further driving down the birth rate.

• As per NCERT and standard geographical models, by the end of this stage, the society becomes highly urbanized and literate, with the population becoming stable or increasing very slowly.

Additional Information

• Stage I (High Stationary):

• Characterized by High Fertility and High Mortality.

• Population growth is very slow because high birth rates are offset by high death rates caused by epidemics, famines, and lack of medical technology.

• Stage II (Early Expanding):

• Features a High Birth Rate and a Rapidly Declining Death Rate.

• The improvement in sanitation, healthcare, and food security leads to a population explosion during this phase.

• Migration:

• While not a defining metric of DTM stages, Rural-to-Urban Migration typically peaks during Stage II and Stage III as the labor force moves toward industrial centers.

• Stage IV (Low Stationary):

• Both birth and death rates are very low, leading to a stable or even declining population in some developed nations.

Q47. Answer: (d) Gandhinagar, Gujarat

The correct answer is Gandhinagar, Gujarat.

Key Points

• The first-ever BIMSTEC Youth Summit was successfully hosted in Gandhinagar, Gujarat, from February 7 to 11, 2025.

• The summit was formally inaugurated on February 8, 2025, by the Union Minister of Youth Affairs & Sports, Dr. Mansukh Mandaviya, in the presence of Gujarat Chief Minister Shri Bhupendrabhai Patel.

• The central theme of the event was 'Youth as a Bridge for Intra-BIMSTEC Exchange', aimed at fostering regional integration and bilateral relations among young leaders.

• This inaugural summit was a direct follow-up to the announcement made by the Prime Minister of India during the 4th BIMSTEC Summit held in Kathmandu in 2018.

• The event was organized by the Department of Youth Affairs (Ministry of Youth Affairs & Sports) in collaboration with the Ministry of External Affairs and Young Indians (CII Yi) as the knowledge partner.

Additional Information

• BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation):

• Member States: The organization comprises seven nations: India, Bangladesh, Myanmar, Sri Lanka, Thailand, Nepal, and Bhutan.

• Establishment: It was formed on June 6, 1997, following the Bangkok Declaration to promote rapid economic development in the region.

• Secretariat: The permanent headquarters of BIMSTEC is located in Dhaka, Bangladesh.

• Summit Highlights:

• Participation: Approximately 70 youth delegates (10 from each member state) including entrepreneurs, influencers, and young parliamentarians participated.

• Site Visits: Delegates visited the GIFT City (Gujarat International Finance Tec-City), Dandi Kutir, and Sabarmati Ashram to understand India's technological and historical heritage.

• MY Bharat: The summit highlighted the Mera Yuva Bharat (MY Bharat) platform as a technology-driven institutional mechanism for youth development.

Q48. Answer: (b) The enactment of laws enabling detention without trial despite resistance.

The correct answer is The enactment of laws enabling detention without trial despite resistance.

Key Points

• The Anarchical and Revolutionary Crimes Act of 1919, popularly known as the Rowlatt Act, was passed by the Imperial Legislative Council in March 1919.

• This legislation granted the British colonial government enormous powers to repress political activities and allowed the detention of political prisoners without trial for a duration of up to two years.

• Despite the unanimous opposition of Indian members within the council, such as Madan Mohan Malaviya, Mazhar-ul-Haq, and Mohammed Ali Jinnah (who resigned in protest), the bill was hurried through.

• Mahatma Gandhi criticized the act as 'unjust', 'tyrannical', and a 'Black Act' that violated fundamental civil rights, prompting him to form the Satyagraha Sabha to organize a nationwide protest.

• The Rowlatt Satyagraha was launched as a non-violent movement involving hartals (strikes), fasting, and prayer, officially commencing with a massive national strike on 6th April 1919.

Additional Information

• Rowlatt Act Context:

• The act was based on recommendations by the Sedition Committee headed by Justice S.A.T. Rowlatt to investigate 'revolutionary conspiracies'.

• It replaced the temporary provisions of the Defence of India Act (1915) with permanent repressive measures.

• Consequences:

• The intense anti-Rowlatt agitation in the Punjab region led to the arrest of leaders like Dr. Saifuddin Kitchlew and Dr. Satyapal.

• The subsequent civil unrest and government crackdown culminated in the Jallianwala Bagh Massacre on 13th April 1919 in Amritsar.

• Incorrect Scenarios:

• Issues regarding agricultural harvests and taxation were central to the Kheda Satyagraha and Champaran Satyagraha (1917–1918).

• Demands for Dominion Status were key features of later constitutional debates, such as the Nehru Report (1928) and the Simon Commission era.

Q49. Answer: (c) Either a single-house or two-house systems

The correct answer is Either a single-house or two-house systems.

Key Points

• According to Article 168 of the Indian Constitution, every state shall have a legislature which consists of the Governor and either one or two houses.

• A Unicameral Legislature refers to a system with only one house, known as the Legislative Assembly (Vidhan Sabha). The majority of Indian states currently function under this system.

• A Bicameral Legislature consists of two houses: the Legislative Assembly (Lower House) and the Legislative Council (Vidhan Parishad or Upper House).

• The Constitution provides flexibility, allowing states to have different structures based on their specific needs and historical context. Currently, six states possess a bicameral setup: Andhra Pradesh, Bihar, Karnataka, Maharashtra, Telangana, and Uttar Pradesh.

• The Parliament of India has the authority to create or abolish the Legislative Council in a state under Article 169, provided the state's Legislative Assembly passes a resolution to that effect with a special majority.

Additional Information

• Legislative Assembly (Vidhan Sabha)

• It is the popular house where members are directly elected by the people for a term of five years.

• The maximum strength is capped at 500 members, while the minimum is generally 60, though exceptions exist for smaller states like Sikkim and Goa.

• Legislative Council (Vidhan Parishad)

• It is a permanent body and is not subject to dissolution; one-third of its members retire every two years.

• The total number of members in the Council cannot exceed one-third of the total membership of the Assembly but must not be less than 40.

• Members are elected through a complex process involving Local Bodies, Graduates, Teachers, and nomination by the Governor.

Q50. Answer: (c) Cities had magnificent palaces, monuments and royal tombs

The correct answer is Cities had magnificent palaces, monuments and royal tombs.

Key Points

• The Indus Valley Civilization (IVC) was primarily a secular and egalitarian society where urban planning prioritized civic amenities over the glorification of rulers or deities.

• Unlike contemporary civilizations in Egypt (known for Pyramids) or Mesopotamia (known for Ziggurats), Harappan sites lack evidence of monumental palaces, royal tombs, or massive religious temples.

• The architectural focus was strictly utilitarian and functional, emphasizing public health, sanitation, and efficient resource storage rather than aesthetic ornamentation or grand monuments.

• Harappan cities were divided into a raised Citadel for public buildings and a Lower Town for residential quarters, reflecting a highly organized social structure based on administrative or trade needs rather than hereditary monarchy.

• Structural remains like the Great Bath at Mohenjo-Daro and the Granaries at Harappa served communal purposes, confirming that architecture was geared toward the welfare of the general population.

Additional Information

• Standardized Construction Materials:

• The Harappans used standardized baked bricks with a fixed ratio of 1:2:4 (thickness to width to length), which was consistent across hundreds of miles from Kalibangan to Lothal.

• While sun-dried bricks were common in other cultures, the IVC is unique for its extensive use of kiln-fired bricks, ensuring the longevity of structures.

• Urban Planning and Sanitation:

• Cities featured a grid system where streets ran north-south and east-west, intersecting at 90-degree angles.

• Every house was connected to a sophisticated underground drainage system lined with bricks and provided with removable stone slabs for cleaning, representing the highest standard of sanitary engineering in the ancient world.

• Domestic Architecture:

• Houses were built with several rooms around a central courtyard, often featuring private wells and separate bathing areas, showcasing a high level of privacy and comfort.

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Q51. Answer: (b) Alpine Tundra

The correct answer is Alpine Tundra.

Key Points

• The Tibetan Plateau, located in Central Asia, is the worlds highest and largest plateau, with an average elevation exceeding 4,500 meters (14,800 feet).

• It represents the Alpine Tundra vegetation region, a biome characterized by the absence of trees due to extreme environmental conditions found at high altitudes.

• The region sits above the alpine tree line, where factors such as low temperatures, high wind speeds, and a short growing season limit biological productivity to low-growing plants.

• The vegetation primarily consists of perennial grasses, sedges, mosses, lichens, and cushion plants specifically adapted to withstand high ultraviolet radiation and thin air.

• Large sections of the plateau contain permafrost (permanently frozen ground), which is a hallmark of tundra ecosystems, making it ecologically similar to the polar regions but driven by elevation rather than latitude.

Additional Information

• Arctic Tundra

• Found in the high latitudes of the Northern Hemisphere (e.g., Siberia and Northern Canada), this region is defined by its proximity to the North Pole.

• It shares similar flora with alpine tundra but is characterized by polar nights and polar days.

• Temperate Grassland

• These include the Steppes of Eurasia and the Prairies of North America, located in mid-latitude regions with moderate rainfall and richer soil compared to the plateau.

• Polar Desert

• These are the coldest and driest regions on Earth, primarily found in Antarctica and the High Arctic, where vegetation is almost entirely absent due to permanent ice and extreme aridity.

• Roof of the World

• The plateau is also known as the Third Pole because it contains the largest storage of fresh water and glacier ice outside the North and South Poles.

Q52. Answer: (b) Nepal

The correct answer is Nepal.

Key Points

• On 25 February 2026, India and Nepal formalized a comprehensive Memorandum of Understanding (MoU) aimed at bolstering bilateral cooperation across critical ecological sectors.

• The agreement focuses on several key pillars, including forestry management, protection of wildlife, environmental sustainability, and the conservation of biodiversity in the Trans-boundary landscape.

• A major component of the MoU is the joint effort to combat Climate Change, acknowledging the shared vulnerability of the Himalayan ecosystem to rising global temperatures and shifting weather patterns.

• The partnership facilitates the exchange of technical expertise, sharing of best practices in community-based forest management, and collaborative research on endangered species such as the Bengal Tiger and One-horned Rhinoceros.

• This initiative strengthens the Terai Arc Landscape (TAL) conservation efforts, ensuring ecological connectivity between the protected areas of both nations.

Additional Information

• Nepal and India share a long history of environmental collaboration:

• The Terai Arc Landscape covers approximately 24,710 square kilometers in India and 26,289 square kilometers in Nepal.

• Both nations are members of the Global Tiger Forum and work together to prevent illegal wildlife trade across the open border.

• The Ministry of Environment, Forest and Climate Change (MoEFCC) of India and the Ministry of Forests and Environment of Nepal are the primary executing agencies for this MoU.

• The agreement also includes provisions for capacity building and training of forest officials to handle human-wildlife conflict, which is a frequent challenge in the border regions.

Q53. Answer: (a) Muhammad bin Tughlaq

The correct answer is Muhammad bin Tughlaq.

Key Points

• Muhammad bin Tughlaq (reigned 1325–1351) was the second ruler of the Tughlaq dynasty and is known for his ambitious administrative experiments.

• In 1327 CE, he decided to shift his capital from Delhi to Deogir in the Deccan, which he renamed Daulatabad (City of Fortune).

• The primary objective of this move was to establish a central administrative hub from which both North India and the newly annexed territories in the Deccan and South India could be effectively governed.

• The Sultan ordered a forced mass migration of the entire population of Delhi, including elite officials, scholars, and commoners, to travel the distance of approximately 1500 kilometers.

• The project proved to be a failure due to the extreme hardships faced by the people during the journey, the lack of adequate water supply in Daulatabad, and the realization that the North-Western frontiers were vulnerable to Mongol invasions when the capital was in the south.

• Ultimately, in 1335 CE, the Sultan abandoned Daulatabad and ordered the survivors to return to Delhi.

Additional Information

• Ghiyasuddin Tughlaq:

• He was the founder of the Tughlaq dynasty (1320) and is credited with building the massive fortified city of Tughlaqabad near Delhi.

• Firoz Shah Tughlaq:

• Successor to Muhammad bin Tughlaq, he focused on internal reforms, the construction of irrigation canals, and the establishment of new cities like Hisar, Fatehabad, and Firozabad.

• Alauddin Khalji:

• The first Sultan to cross the Vindhyas and raid the Deccan, he introduced rigorous market control regulations and a standing army, but he ruled from his capital in Delhi (Siri).

Q54. Answer: (b) Carbon Dioxide(CO2)

The correct answer is Carbon Dioxide(CO2).

Key Points

• When dilute Hydrochloric acid (HCl) reacts with Sodium Hydrogen Carbonate (NaHCO3), it undergoes a chemical reaction where the acid decomposes the bicarbonate.

• The general chemical principle is that the reaction between an acid and a metal hydrogen carbonate always produces a salt, water, and carbon dioxide gas.

• The balanced chemical equation for this reaction is: HCl (aq) + NaHCO3 (s) → NaCl (aq) + H2O (l) + CO2 (g).

• In this specific process, Sodium Chloride (NaCl) is the salt formed in the solution, and the gas evolved is Carbon Dioxide (CO2), which causes brisk effervescence.

Additional Information

• Carbon Dioxide (CO2):

• It is a colorless, odorless gas that is heavier than air.

• It can be tested by passing it through Lime Water [Ca(OH)2]; the lime water turns milky due to the formation of insoluble Calcium Carbonate (CaCO3).

• It is widely utilized in fire extinguishers and the carbonation of beverages.

• Sodium Hydrogen Carbonate (NaHCO3):

• Commonly known as Baking Soda, it acts as a mild base.

• It is a primary ingredient in antacids used to neutralize excess stomach acidity.

• Analysis of Incorrect Options:

• Ammonium Chloride (NH4Cl): This is a white crystalline salt typically formed by the reaction of Ammonia (NH3) and Hydrochloric acid (HCl).

• Hydrogen gas (H2): This gas is released when dilute acids react with active metals like Zinc or Iron, rather than carbonates.

• Chloroform (CHCl3): An organic compound used historically as an anesthetic; it is not produced in simple inorganic acid-base reactions.

Q55. Answer: (a) High Court

The correct answer is High Court.

Key Points

• According to Article 235 of the Constitution of India, the control over district courts and courts subordinate thereto is vested in the High Court.

• This administrative control specifically includes the posting, promotion, and the grant of leave to persons belonging to the judicial service of a State and holding any post inferior to the post of District Judge.

• The High Court exercises this authority to ensure the independence of the judiciary from the executive branch at the lower levels of the judicial hierarchy.

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• The power of control also encompasses disciplinary jurisdiction, allowing the High Court to initiate inquiries and recommend punishments for judicial officers in the subordinate judiciary.

• While the Governor remains the formal authority for certain appointments, the actual day-to-day management and personnel decisions are handled by the High Court to maintain judicial integrity.

Additional Information

• Article 233 (Appointment of District Judges):

• The Governor of the State makes appointments, postings, and promotions of District Judges in consultation with the High Court.

• President of India:

• The President appoints judges to the Supreme Court and High Courts under Article 124 and Article 217, but does not manage the subordinate courts.

• Law Ministry of India:

• The Ministry of Law and Justice handles policy, legal reforms, and budgetary allocations, but has no constitutional authority over the postings or leaves of judges.

• Parliament:

• Parliament has the power to create an All India Judicial Service (AIJS) under Article 312 and regulate the jurisdiction of courts, but it does not exercise administrative control over individual judges.

Q56. Answer: (a) System software

The correct answer is System software.

Key Points

• A Device Driver is a specialized type of System Software that acts as an essential interface between the computer's Operating System (OS) and the hardware components attached to it.

• The primary function of a driver is to translate high-level commands from the OS or an Application into the specific low-level machine language instructions that the hardware, such as a Printer, can interpret and execute.

• Since System Software is defined as the programs that manage the resources of the computer system and provide a platform for application software, drivers are categorized here because the system cannot interact with peripheral hardware without them.

• When a user sends a print command, the Printer Driver converts the document's data into a format specific to the printer's Control Language (e.g., PostScript or PCL), ensuring the hardware functions as intended.

• Most modern operating systems use Kernel-mode drivers for stability, allowing the driver to have direct access to system memory and hardware registers to manage data flow efficiently.

Additional Information

• Application Software:

• This includes programs designed for end-users to perform specific tasks, such as Web Browsers, Media Players, and Games. Unlike system software, it does not manage hardware directly.

• Input Device:

• This refers to physical Hardware components used to provide data and control signals to an information processing system. Common examples include the Keyboard, Mouse, and Scanner.

• Document File:

• This is a type of data file created by applications (e.g., .docx, .pdf, .txt) that contains user-generated content like text, images, or formatting, rather than executable code for hardware management.

Q57. Answer: (b) Skull

The correct answer is Skull.

Key Points

• The skull is a specialized bony structure of the human skeletal system that functions as the primary protective enclosure for the brain.

• It is divided into two main parts: the neurocranium (or cranium), which surrounds and protects the brain, and the viscerocranium, which forms the facial skeleton.

• The cranium is composed of eight specific cranial bones that are joined together by immovable fibrous joints called sutures, creating a rigid, shock-resistant vault.

• This rigid shell protects vital neural components, including the cerebrum, cerebellum, and brainstem, from mechanical injuries and external pressure.

• The foramen magnum is a large opening at the base of the skull that allows the brain to connect with the spinal cord.

Additional Information

• Rib cage

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• Formed by the sternum, 12 pairs of ribs, and thoracic vertebrae.

• Its primary role is the protection of the thoracic viscera, specifically the heart and lungs.

• Spine

• Commonly known as the vertebral column, it consists of 33 vertebrae.

• Its core biological function is to protect the spinal cord and provide axial support for the body weight.

• Pelvic girdle

• Composed of the hip bones (ilium, ischium, and pubis) and connects the axial skeleton to the lower limbs.

• It provides a protective basin for internal reproductive organs and the urinary bladder while facilitating locomotion.

Q58. Answer: (c) Industrial development

The correct answer is Industrial development.

Key Points

• Industrial development is a major economic factor that functions as a powerful pull factor, attracting people to specific regions by offering vast employment opportunities.

• Industrial centers require a diverse range of workers, including skilled technicians, unskilled laborers, engineers, and administrative staff, leading to significant rural-to-urban migration.

• The concentration of industries leads to the growth of the tertiary sector, creating additional jobs in banking, transportation, healthcare, and educational services to support the growing population.

• Regions such as the Kobe-Osaka industrial belt in Japan and the Chota Nagpur Plateau in India are classic examples where industrialization has resulted in high population density.

• Areas with high industrial activity typically offer higher wage rates and improved standards of living, which act as incentives for the working-age population to relocate.

Additional Information

• Classification of Migration Factors:

• Push Factors: These are negative conditions that drive people away from their current location. Examples include lack of job opportunities, political instability, harsh climate, and limited transportation facilities.

• Pull Factors: These are positive attributes that attract people to a new destination, such as industrial growth, urbanization, and better social infrastructure.

• Other Influencing Factors:

• Geographical Factors: People prefer living in areas with fresh water availability, fertile soil for agriculture, and flat plains rather than mountainous terrain.

• Social and Cultural Factors: Locations with religious importance or cultural heritage often attract a steady influx of residents.

• Urbanization: Cities provide better civic amenities and vocational training, making them centers of attraction compared to underdeveloped rural areas.

Q59. Answer: (d) Article 235

The correct answer is Article 235.

Key Points

• Article 235 of the Constitution of India mandates that the control over district courts and courts subordinate thereto shall be vested in the High Court.

• This control encompasses administrative matters such as the posting, promotion, and grant of leave to persons belonging to the judicial service of a State holding any post inferior to the post of district judge.

• The provision is a vital component of the independence of the judiciary, ensuring that the subordinate judiciary remains free from executive influence regarding their career prospects and disciplinary matters.

• While the Governor of the State formally appoints district judges under Article 233, the High Court retains the functional authority to supervise the working and conduct of the officers in the lower tiers of the judicial hierarchy.

Additional Information

• Article 225:

• It pertains to the jurisdiction of existing High Courts, stating that their jurisdiction and the law administered in them shall be the same as immediately before the commencement of the Constitution.

• Article 245:

• This article defines the extent of laws made by Parliament and by the Legislatures of States, establishing the territorial limits of their respective legislative powers.

• Article 255:

• It addresses the requirements as to recommendations and previous sanctions, stating that the absence of such procedural

formalities does not invalidate an Act if it eventually receives the President's or Governor's assent.

Q60. Answer: (a) 997.826 Million Tonne (MT)

The correct answer is 997.826 Million Tonne (MT).

Key Points

• In the financial year 2023-24, India achieved a historic milestone in energy production by recording a total coal output of 997.826 Million Tonne (MT).

• This performance marks a significant growth of 11.65% compared to the 893.19 MT produced during the previous financial year, 2022-23.

• The state-owned Coal India Limited (CIL) played a pivotal role, contributing 773.6 MT to the total, which reflects a 10% growth over its performance in the preceding year.

• Production from Captive and Other mines saw the highest percentage increase, rising by approximately 27% to reach 147.19 MT, significantly boosting the overall national availability.

• The Ministry of Coal set an ambitious target of 1 Billion Tonne (BT) for the year 2023-24, and the final production of 997.826 MT brought the country to the doorstep of this landmark achievement.

Additional Information

• Ministry of Coal:

• Responsible for the overall policy, planning, and development of coal and lignite resources in India.

• Oversees major Public Sector Undertakings (PSUs) such as Coal India Limited (CIL) and Singareni Collieries Company Limited (SCCL).

• Strategic Energy Security:

• Coal accounts for over 70% of India’s electricity generation, making domestic production critical for energy security and industrial growth.

• The government aims to eliminate substitutable coal imports by the year 2025-26 through increased domestic excavation.

• Growth Enablers:

• The record production was facilitated by the fast-tracking of environmental and forest clearances and the implementation of First Mile Connectivity (FMC) projects.

• Infrastructure improvements under the PM Gati Shakti initiative have optimized the logistics and transport of coal from mine-heads to thermal power plants across India.

Q61. Answer: (c) STL

The correct answer is STL.

Key Points

• STL, which stands for Stereolithography, is the most widely used file format for 3D printing and Rapid Prototyping. It was originally created by 3D Systems in 1987 for their computer-aided design (CAD) software.

• The format functions by describing the surface geometry of a three-dimensional object through a process known as tessellation. It uses a series of linked triangles (facets) to approximate the surfaces of a solid model.

• It is considered a universal language for 3D printers because it provides the raw geometric data that slicing software requires to generate G-code, which guides the printer's nozzle or laser.

• One defining characteristic of an STL file is that it only contains information about the shape and geometry. It does not store data regarding color, texture, material, or internal structures.

• The resolution of the 3D model in this format is determined by the number of triangles used; a higher count of triangles results in a smoother surface but a larger file size.

Additional Information

• XLSX

• This is a compressed XML-based spreadsheet format developed by Microsoft.

• It is the default file extension for Microsoft Excel workbooks since the 2007 version, used for data analysis, calculations, and graphing.

• PDF

• Standing for Portable Document Format, it was developed by Adobe to ensure documents appear identical across all platforms.

• It supports fixed-layout documents including text, vector graphics, and raster images, but it is not a native 3D modeling format for hardware.

• DOCX

• This is the standard file format for Microsoft Word, replacing the older .doc format.

• It is an Open XML format used for word processing and document creation, focusing on text editing and typography.

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Q62. Answer: (c) Finance Commission

The correct answer is Finance Commission.

Key Points

• The Finance Commission is a constitutional body established by the President of India under Article 280 of the Constitution of India.

• According to Article 280(3)(b), it is the primary duty of the Commission to make recommendations to the President regarding the principles that should govern the grants-in-aid of the revenues of the States out of the Consolidated Fund of India.

• These grants-in-aid are provided to States that are in need of assistance, and the amounts may vary between different States as determined by the Commission.

• The Commission also advises on the distribution of the net proceeds of taxes between the Union and the States (vertical devolution) and the allocation among the States themselves (horizontal devolution).

• It serves as a balancing wheel of fiscal federalism in India, aiming to reduce financial disparities between the central government and the regional states.

• The Commission consists of a Chairman and four other members who are appointed by the President every five years or earlier as deemed necessary.

Additional Information

• NITI Aayog (National Institution for Transforming India):

• It was established on January 1, 2015, as a successor to the Planning Commission.

• It is an executive body that serves as the premier policy Think Tank of the Government of India, providing both directional and policy inputs.

• Comptroller and Auditor General of India (CAG):

• The CAG is an independent constitutional authority established under Article 148.

• It is responsible for auditing all receipts and expenditures of the Government of India and the State Governments to ensure financial accountability.

• Planning Commission:

• Established in March 1950 via an executive resolution, it was an extra-constitutional body.

• Its main function was to formulate Five-Year Plans for India's economic development before it was dissolved in 2014.

Q63. Answer: (d) ROM stores permanent instructions; RAM stores temporary data.

The correct answer is ROM stores permanent instructions; RAM stores temporary data.

Key Points

• ROM (Read-Only Memory) is a type of non-volatile memory, meaning it retains its stored information even after the power supply is turned off. It is primarily used to store the BIOS (Basic Input/Output System) and other essential firmware required to boot the computer. Hence, it stores permanent instructions.

• RAM (Random Access Memory) is a volatile memory device, which means all stored data is lost once the power is disconnected. It serves as the primary memory where the operating system, application programs, and data in current use are kept so they can be quickly reached by the CPU. Hence, it stores temporary data.

• The fundamental distinction lies in their persistence and functionality: ROM handles the startup process and fixed system instructions, while RAM facilitates the real-time execution of active tasks and multitasking.

• While RAM allows for both reading and writing at high speeds, standard ROM is traditionally limited to reading, although modern variants like Flash memory have evolved.

Additional Information

• Types of Memory:

• RAM Varieties: Includes SRAM (Static RAM), which is faster and used for cache, and DRAM (Dynamic RAM), which is slower and used for main system memory.

• ROM Varieties: Includes PROM (Programmable ROM), EPROM (Erasable Programmable ROM), and EEPROM (Electrically Erasable Programmable ROM).

• Performance Characteristics:

• Speed: RAM is significantly faster than ROM, allowing the processor to access data in nanoseconds.

• Capacity: Modern systems require large amounts of RAM (e.g., 8GB, 16GB) to run software, whereas ROM chips are much smaller in capacity.

Q64. Answer: (a) Northeast monsoon winds

The correct answer is Northeast monsoon winds.

Key Points

• The Northeast Monsoon, also frequently referred to as the Retreating Monsoon, is the primary weather system responsible for winter rainfall along the Coromandel Coast of India.

• This seasonal wind system typically operates during the months of October, November, and December, marking the transition from the summer monsoon to the winter season.

• As the high-pressure system develops over the Tibetan Plateau and Central Asia, winds begin to blow from the land towards the ocean in a northeasterly direction.

• While these winds are initially dry as they originate over land, they pick up significant moisture as they traverse the Bay of Bengal.

• Upon reaching the Coromandel Coast (which includes the coastal regions of Tamil Nadu and Andhra Pradesh), these moisture-laden winds strike the land, causing widespread and heavy orographic rainfall.

• For the state of Tamil Nadu, this season is crucial as it accounts for nearly 48% to 60% of its total annual precipitation, supporting major Rabi crops and filling local reservoirs.

Additional Information

• Southwest Monsoon Winds:

• Active from June to September, these winds bring the majority of India's rainfall.

• The Coromandel Coast remains largely dry during this period because it lies in the rain-shadow region of the Western Ghats.

• Western Disturbances:

• These are extratropical cyclones that originate over the Mediterranean Sea.

• Driven by the Subtropical Westerly Jet Stream, they bring winter rain and snow to Northwest India (e.g., Punjab, Haryana, and Kashmir) rather than the southern coast.

• Westerlies:

• These are permanent planetary winds blowing from the subtropical high-pressure belts toward the sub-polar low-pressure belts (between 30° and 60° latitude).

• In the Indian context, their influence is primarily felt through the jet streams that steer Western Disturbances into the subcontinent during winter.

Q65. Answer: (a) 11

The correct answer is 11.

Key Points

• As of October 2025, the total number of languages recognized with Classical Language status in India stands at 11.

• Historically, only six languages held this prestigious status: Tamil (notified in 2004), Sanskrit (2005), Telugu (2008), Kannada (2008), Malayalam (2013), and Odia (2014).

• In a landmark decision in October 2024, the Union Cabinet approved the inclusion of five additional languages: Marathi, Pali, Prakrit, Assamese, and Bengali.

• This expansion was aimed at preserving the rich linguistic heritage and diverse cultural fabric of India, recognizing the deep historical and literary roots of these newly added languages.

• To qualify for this status, a language must demonstrate high antiquity of its early texts/recorded history over a period of 1500 to 2000 years and possess a body of ancient literature/epics considered a valuable heritage by generations of speakers.

Additional Information

• The Ministry of Culture oversees the criteria for Classical Languages, ensuring the literary tradition is original and not borrowed from another speech community.

• Benefits of Classical Status:

• Two major International Awards are given annually to scholars of eminence in the respective languages.

• A Centre of Excellence for Studies in Classical Languages is established to promote research and preservation.

• The University Grants Commission (UGC) creates a certain number of Professional Chairs for Classical Languages in Central Universities.

• Linguistic Significance:

• Marathi is the official language of Maharashtra and has a literary history spanning over a millennium.

• Pali and Prakrit are vital for understanding ancient Indian philosophy, particularly Buddhist and Jain scriptures.

• Assamese and Bengali are key Indo-Aryan languages with profound impacts on the cultural identity of Northeast India and West Bengal.

Q66. Answer: (d) Teaching

The correct answer is Teaching.

Key Points

• The tertiary sector, commonly referred to as the service sector, encompasses activities that provide services to businesses and consumers rather than producing tangible goods.

• Teaching is a fundamental tertiary activity because it involves the delivery of educational services and the development of intellectual capital, focusing on the dissemination of knowledge and skills.

• Activities in this sector provide intangible value and are essential for supporting the primary and secondary sectors through infrastructure, logistics, and professional expertise.

• According to economic classification, the tertiary sector includes a wide range of services such as banking, insurance, transportation, communication, and healthcare.

• In many modern economies, the tertiary sector is the largest contributor to the Gross Domestic Product (GDP) and employs a significant portion of the workforce due to the rising demand for professional services.

Additional Information

• Primary Sector:

• Farming: This is a primary activity as it involves the direct utilization of natural resources from the earth to produce food and raw materials.

• Mining: This involves the extraction of minerals and ores from the lithosphere, making it a core component of the primary sector.

• Secondary Sector:

• Manufacturing: This sector focuses on processing raw materials obtained from the primary sector into finished products through industrial operations and factories.

• Common examples include automobile assembly, textile production, and steel fabrication, where the form of the resource is changed to add utility and value.

• Quaternary and Quinary Sectors:

• The Quaternary Sector is a specialized sub-segment of the tertiary sector focusing on information technology, research and development (R&D), and consultancy.

• The Quinary Sector involves high-level decision-making by top officials in government, science, and corporate industries.

Q67. Answer: (a) Abolishing industrial licensing for most industries

The correct answer is Abolishing industrial licensing for most industries.

Key Points

• The New Industrial Policy (NIP) was announced on July 24, 1991, under the leadership of Prime Minister P.V. Narasimha Rao and Finance Minister Dr. Manmohan Singh, marking the beginning of economic reforms in India.

• The core objective of the policy was to dismantle the License Raj, which was a system of licenses, regulations, and accompanying red tape that hindered industrial growth and private enterprise.

• A major feature of this policy was the abolition of industrial licensing for all projects, irrespective of the level of investment, except for a short list of 18 industries related to security, strategic concerns, and social reasons.

• This reform aimed to enhance industrial efficiency and international competitiveness by allowing entrepreneurs to make production decisions based on market signals rather than government directives.

• The policy also drastically reduced the number of industries reserved exclusively for the Public Sector from 17 to just 8, opening up crucial sectors like mining, telecommunications, and transport to private investment.

• It introduced the concept of Liberalization, Privatization, and Globalization (LPG) to integrate the Indian economy with the global market and attract Foreign Direct Investment (FDI).

Additional Information

• Liberalization:

• Removal of restrictive trade barriers and government intervention in the economy.

• Simplification of export-import procedures and rationalization of tax structures.

• Currently, only five industries require compulsory licensing, including electronic aerospace, gunpowder/explosives, and hazardous chemicals.

• Privatization:

• Involves disinvestment, where the government sells its equity in Public Sector Undertakings (PSUs) to private entities or the general public.

• It aims to improve the managerial efficiency and financial discipline of enterprises.

• Globalization:

• Encouraged the entry of Multinational Corporations (MNCs) through Automatic Approval routes for foreign technology agreements.

• Established the Foreign Investment Promotion Board (FIPB) to negotiate with international firms and facilitate FDI inflows.

• MRTP Act:

• The 1991 policy scrapped the requirement for Monopolies and Restrictive Trade Practices (MRTP) companies to seek prior approval for expansion or establishment of new undertakings.

Q68. Answer: (b) Tsinghua University

The correct answer is Tsinghua University.

Key Points

• Tsinghua University, located in Beijing, China, has officially topped the 2025 Times Higher Education (THE) Asia University Rankings, maintaining its status as the premier academic institution in the region.

• This victory marks the sixth consecutive year that the university has held the number one position, a streak that began in 2020 when it first overtook the National University of Singapore.

• The 2025 rankings utilized the WUR 3.0 methodology, which evaluates institutions across 18 performance indicators grouped into five key pillars: Teaching, Research Environment, Research Quality, International Outlook, and Industry.

• The university achieved particularly high scores in the Research Quality and Industry categories, reflecting its significant contribution to global innovation and its strong ties with the corporate sector for knowledge transfer.

• The 2025 results highlight the continued dominance of Mainland China in higher education, with Peking University consistently securing the second position behind Tsinghua.

• The assessment also noted a significant rise in the performance of universities from South Asia and Southeast Asia, although the top tier remains dominated by East Asian institutions.

Additional Information

• Times Higher Education (THE) Asia University Rankings:

• It is a specialized subset of the World University Rankings, specifically designed to reflect the unique attributes and growth of the Asian higher education sector.

• The 2025 edition featured an expanded list of participants, reflecting the increased transparency and global integration of universities in India, Japan, and South Korea.

• Comparison of Other Options:

• University of Hong Kong: Located in the Hong Kong SAR, it remains one of the most internationalized universities globally and typically ranks within the top five in Asia due to its high citation impact.

• Seoul National University: As the top-ranked institution in South Korea, it is recognized for its rigorous STEM programs and significant output in applied sciences.

• Kyoto University: A leading research institution in Japan, it is world-renowned for its legacy of Nobel Prize-winning alumni and its focus on fundamental research.

Q69. Answer: (b) Article 368

The correct answer is Article 368.

Key Points

• Article 368, located in Part XX of the Constitution of India, grants the Parliament the constituent power to amend the Constitution by way of addition, variation, or repeal of any provision.

• The power under this article is not absolute; in the Kesavananda Bharati case (1973), the Supreme Court ruled that Parliament cannot use its power under Article 368 to alter the Basic Structure of the Constitution.

• Amendments to the Constitution can be initiated only by the introduction of a Bill for the purpose in either House of Parliament (Lok Sabha or Rajya Sabha) and not in the state legislatures.

• Under Article 368, a bill must be passed in each House by a special majority, which is a majority of the total membership of that House and a majority of not less than two-thirds of the members of that House present and voting.

• For amendments affecting the federal character of the Constitution (such as the election of the President or distribution of legislative powers), the bill also requires ratification by the legislatures of at least one-half of the States.

• The 24th Constitutional Amendment Act, 1971 made it mandatory for the President to give his assent to a Constitutional Amendment Bill once it is passed by both Houses.

Additional Information

• Article 359:

• Deals with the Suspension of the enforcement of the rights conferred by Part III (Fundamental Rights) during National Emergencies.

• It stipulates that the President may by order declare that the right to move any court for the enforcement of such rights shall remain suspended.

• Article 360:

• Relates to provisions for a Financial Emergency.

• If the President is satisfied that a situation has arisen whereby the financial stability or credit of India or any part of its territory is

threatened, he may declare a Financial Emergency.

• Article 361:

• Provides protection and immunity to the President and Governors.

• It ensures that the President or the Governor of a State shall not be answerable to any court for the exercise and performance of the powers and duties of their office.

Q70. Answer: (a) Daimabad

The correct answer is Daimabad.

Key Points

• Daimabad is a significant archaeological site located in the Ahmednagar district of Maharashtra on the left bank of the Pravara River, which is a major tributary of the Godavari River.

• The site is globally renowned in archaeology for the discovery of the Daimabad Bronzes in 1974, which represent some of the most sophisticated examples of metal-cast sculptures from the Harappan era.

• The cache consists of four massive, solid-cast copper/bronze figures: a chariot driven by a human and pulled by two bulls, a water buffalo, an elephant, and a rhinoceros.

• These sculptures were created using the advanced lost-wax technique (cire perdue), demonstrating the high level of metallurgical skill achieved during the Late Harappan phase (approximately 1900−1600 BCE).

• The chariot is particularly notable for its detail, measuring approximately 45 cm in length and featuring solid wheels with projecting hubs, highlighting the transition of Harappan influence into the Deccan region.

Additional Information

• Nageshwar:

• Located in the Jamnagar district of Gujarat near the coast.

• It was a specialized Harappan shell-working center dedicated to the production of bangles, ladles, and decorative inlay pieces.

• Kalibangan:

• Situated in the Hanumangarh district of Rajasthan on the banks of the Ghaggar River.

• Famous for the discovery of the world earliest ploughed field, fire altars, and unique terracotta bangles.

• Rangpur:

• Located in the Limbdi Taluka of Gujarat.

• Significant for providing botanical evidence of rice husk and marking the transition into the Post-Harappan culture through its Lustrous Red Ware pottery.

Q71. Answer: (c) CYU 119

The logic followed here is

Hence, the correct answer is "Option 3".

The correct answer is option 3

Q72. Answer: (c) 83

The logic followed here is,

• 26 + 8 = 34

• 34 + 11 = 45

• 45 + 8 = 53

• 53 + 11 = 64

• 64 + 8 = 72

• 72 + 11 = 83

Hence, the correct answer is option 3.

Q73. Answer: (d) Father's father

Family Chart:

Symbol	×	÷	•	–
Meaning	Sister	Father	Husband	Mother

Given: S + T − U ÷ V × W × Y

The family tree diagram is,

Therefore, S is the father of U, who is the father of W .S is the Father's father of W.

Hence, the correct answer is 'Option 4'.

Q74. Answer: (a) Neither conclusion (I) nor (II) follows

The least possible Venn diagram for the given statements is:

Conclusion:

(I) Some cups are vases - Does not follow

(As there is no direct relation between cups and vases, maybe it is possible but not definite. Hence, it does not follow.)

(II) All vases are jugs - Does not follow (Some jugs are vases and some vases are jugs. All vases are jugs is false)

Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 1"

Q75. Answer: (c) 4

The logic followed here,

Logic: The code for each word is determined by comparing the given sentences to find common words and their corresponding codes across different sentences.

Therefore, the code for the letter A is 4.

Hence, the correct answer is option 3

Q76. Answer: (d) DAF

The logic followed here is,

Logic: The difference between the positional values of consecutive letters in each cluster is −3 and +4

For MJN:

For GDH:

For JGK:

For DAF:

The, Odd one out is DAF

Hence, the correct answer is option 4

Q77. Answer: (a) 26

The logic followed here is.

Logic: The series follows a adding successive multiples of 6

• 20 + 6 = 26

• 26 + 12 = 38

• 38 + 18 = 56

• 56 + 24 = 80

• 80 + 30 = 110.

Hence, the correct answer is "Option 1"

Q78. Answer: (c) 22, 485

The logic followed here is:

Logic: Second Number = (First Number)² + 1

For the first set 18, 325

=> $(18)^2 + 1$

=> 324 + 1 = 325.

For the second set 19, 362

=> $(19)^2 + 1$

=> 361 + 1 = 362.

Following same logic,

Option 3: 22, 485

=> $(22)^2 + 1$

=> 484 + 1 = 485.

Hence, the correct answer is 'Option 3'.

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Q79. Answer: (d) VRW 9

The logic followed here is:

Hence, the correct answer is option 4

Q80. Answer: (c) C

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other.

1) Only two boxes are kept below G.

2) Only one box is kept above B.

Position	Box
7	_
6	B
5	_
4	_
3	G
2	_
1	_

3) Only one box is kept between B and A.

4) F is kept immediately above E.

5) D is kept at some place below C.

Final Arrangement:

Position	Box
7	C
6	B
5	D
4	A
3	G
2	F
1	E

Thus, the box kept at the top is C.

Hence, the correct answer is 'Option 3'.

Q81. Answer: (b) MO – PR – SU

The logic followed is adding 3 to the positional values of the letters in the previous pair.

For 'JL - MO - PR':

J(10)	L(12)
+3 ↓	+3 ↓
M(13)	O(15)
+3 ↓	+3 ↓
P(16)	R(18)

For the triad 'EG - HJ - KM':

E(5)	G(7)
+3 ↓	+3 ↓
H(8)	J(10)

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+3 ↓	+3 ↓
K(11)	M(13)

Applying the same logic to the options:

Option 2: 'MO - PR - SU':

M(13)	**O(15)**
+3 ↓	+3 ↓
P(16)	R(18)
+3 ↓	+3 ↓
S(19)	U(21)

Thus, the triad MO - PR - SU follows the same pattern as the given triads.

Hence, the correct answer is 'Option 2'.

Q82. Answer: (b) PMO

The logic followed here is,

For XTW

For JFI

For FBE

For PMO

However, PMO follows a different pattern. Thus, PMO is the odd one out.

Hence, the correct answer is "Option 2"

Q83. Answer: (d) 4 km to the south

Given:

• Neha starts from Point A and drives 11 km towards the east. She then takes a right turn, drives 8 km, turns right and drives 14 km.

• She then takes a right turn and drives 12 km.

• She takes a final right turn, drives 3 km and stops at Point P

• The final Diagram,

Therefore, she should drive 4 km to the South to reach Point A again.

Hence, the correct answer is "Option 4"

Q84. Answer: (c) Only conclusion (I) follows

The least possible Venn diagram for the given statements is:

Conclusion:

(I) Some papers are trees - Follows (Some papers are rains, and all rains are trees. Hence, Some papers are trees is true)

(II) All trees are rains - Doesn't Follow (All rains are trees, but all trees are rains may be possible but not definite. Hence, it is false.

Therefore, only conclusion (I) follows.

Hence, the correct answer is "Option 3."

Q85. Answer: (c) A

Given: Eight people, A, B, M, N, S, T, Y, and Z, are sitting in a row, facing north.

1. Y sits at one of the extreme ends.

2. S sits second to the left of Y, and S sits third to the right of N.

3. T sits to the immediate right of A.

4. B sits to the immediate left of M, and M sits second to the left of Z.

The Final Arrangement is,

From the arrangement, we can see that A sits at the extreme left end of the row.

Hence, the correct answer is option 3.

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Q86. Answer: (d) One

Given number: 3147856

	Numbers
Original	3 1 4 7 8 5 6
Ascending Order	1 3 4 5 6 7 8

The digit at the third position remains 4 in both cases.

So, the total number of digits whose position remains unchanged is:1

Hence, the correct answer is 'Option 4'.

Q87. Answer: (a) 0

Given: NERVOUS

Arranging in alphabetical order:

Left E N O R S U V Right

The letter 'R' is fourth from the left, and the letter 'S' is second from the right.

So, there are no letters in the English alphabetical order between them

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

Q88. Answer: (a) ii

The logic follows here,

Code for elf is ii.

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

Q89. Answer: (a) OS - RV

The logic followed here is,

For OS - RV,

For BU - EY,

For GV - JZ,

For YI - BM,

Therefore, the letter-cluster pair that is different from the others is OS - RV.

Hence, the correct answer is 'Option 1'.

Q90. Answer: (b) Four

The logic followed here is,

Required Condition: Consonant → Consonant → Vowel.

(Left) Z Q M H J E K D E L K Z V N E A T Q R Z U (Right)

H J E, K D E, V N E, R Z U

Hence, the correct answer is "Option 2"

Q91. Answer: (b) CP -5

The logic follows here,

Hence, the correct answer is 'Option 2'.

Q92. Answer: (c) Q

Given Word: CURRENT

Original Letter	C	U	R	R	E	N	T
New Letter	B	V	Q	Q	F	M	S

Left B V Q Q F M S Right

Fourth from the left in the new group: Q

Hence, the correct answer is "Option 3."

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Q93. Answer: (d) Wife's brother

Family Chart,

Let us first decode the given symbols and then draw a family tree.

Symbol	**•**	**−**	**×**	**÷**
Meaning	Son	Brother	Wife	Father

Given: S + D ÷ F − H × K

D is the father of S, F, and H. Since H is the wife of K, and S is H's brother, S is the Wife's brother of K.

Hence, the correct answer is "Option 4".

Q94. Answer: (a) One

Given:Seven boxes B, C, D, E, Q, R, and S, are kept one over the other but not necessarily in the same order.

1. Only five boxes are kept above D.
2. Only three boxes are kept between D and C.
3. Only four boxes are kept between C and S.
4. | Position | Box |

7	
6	C
5	
4	
3	
2	D
1	S

5. Only E is kept between C and B.
6. R is kept at one of the positions above C.
7. Box Q is the only one remaining, so it is kept at the 3rd position.

The Final Arrangement:

7	**R**
6	C
5	E
4	B
3	Q
2	D
1	S

Thus, the number of boxes between Q and S is one.

Hence, the correct answer is 'Option 1'.

Q95. Answer: (c) PING - PNGI - INPG

The logic followed here,

ROSE - RSEO - OSRE,

JUGS - JGSU - UGJS,

Applying the same logic as PING.

PING - PNGI - INPG.

Hence, the correct answer is 'Option 3'.

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Q96. Answer: (c) Zero

Given original number: 3 5 1 6 4 7 2

Given Original Number	3 5 1 6 4 7 2
Ascending Order (Left to Right)	1 2 3 4 5 6 7

Left 1 2 3 4 5 6 7 Right

So, the number of digits whose position remains unchanged is: 0 (Zero).

Hence, the correct answer is 'Option 3'.

Q97. Answer: (b) WK256

The logic followed here is,

The next term in the series is WK256.

Hence, the correct answer is "Option 2"

Q98. Answer: (b) S

Given: Seven people, S, T, I, C, K, E and R, are sitting in a row, facing north.

• Only E sits to the left of K.

• Only four people sit between E and T.

• Only C sits between I and R, and I is not an immediate neighbor of T.

The Final Arrangement is,

S sits at the extreme right of the line.

Hence, the correct answer is "Option (2)".

Q99. Answer: (d) 1

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order.

1. Only two boxes are kept below A.
2. Only one box is kept above E.
3. Only one box is kept between E and B.

Position	Box
7 (Top)	
6	E
5	
4	B
3	A
2	
1 (Bottom)	

1. C is kept immediately above G.
2. D is kept at some place below F.

Final Arrangement:

7	F
6	E
5	D
4	B
3	A
2	C
1	G

The only box kept between A and D is B

Hence, the correct answer is 'Option 4'.

Q100. Answer: (d) 15984

Given : 215 − 147 ÷ 110 + 1604 × 4 = ?

After +' and '−' are interchanged and '×' and '÷' are interchanged.

Follow BODMAS rule,

= 215 + 147 × 110 - 1604 ÷ 4

= 215 + 147 × 110 - 401

= 215 + 16,170 - 401

=16,385 - 401

= 15894

Hence, the correct answer is "Option 4"

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