RRB NTPC (UG) CBT-I Official Paper (Held On: 28 Aug, 2025 Shift 1) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. Which of the following Constitutional provisions can be amended by an ordinary Act of Parliament (simple majority), rather than through the special procedure under Article 368?

(a) Article 2 (Parliament may by law admit new states)
(b) Article 356 (President's Rule in states)
(c) Article 368 (the Amendment procedure itself)
(d) Article 14 (equality before law)

Q2. Which shortcut key opens System Settings quickly in Windows 10/11?

(a) Alt + F4
(b) Ctrl + Alt + Del
(c) Windows + D
(d) Windows + I

Q3. Which book written in Kannada received the 2025 International Booker Prize?

(a) The Girl with the Seven Lives
(b) Diotima
(c) Heart Lamp
(d) Cascades

Q4. Through which of the following states do the Western Ghats pass?

(a) Punjab
(b) Bihar
(c) Tamil Nadu
(d) Uttar Pradesh

Q5. Which of the following agencies collaborated on India's first Quantum Key Distribution over a Multi-Core Fibre in 2025?

(a) CSIR & ISRO
(b) DRDO & IIT-B
(c) C-DOT & Sterlite Technologies Ltd.
(d) NIC & BEL

Q6. Article 371A of the Indian Constitution grants special provisions for the state of _____.

(a) Punjab
(b) Rajasthan
(c) Nagaland
(d) Kerala

Q7. The famous slogan "Swaraj is my birthright and I shall have it " was given by _____.

(a) Mahatma Gandhi
(b) Bal Gangadhar Tilak
(c) Subhas Chandra Bose
(d) Dadabhai Naoroji

Q8. During 1950–1990, India mainly exported which type of goods?

(a) Automobiles
(b) Primary products
(c) Capital goods
(d) Crude oil

Q9. During the Chola rule, which of the following was the land donated to Jaina institutions?

(a) Pallichchhandam
(b) Tirunamattukkani
(c) Shalabhoga
(d) Vellanvagai

Q10. Which of the following indicators is NOT directly included in the calculation of the Human Development Index (HDI)?

(a) Life expectancy at birth
(b) Infant mortality rate
(c) Mean years of schooling
(d) Gross National Income per capita

Q11. In April 2025, DOT announced funding of two specialised national testbeds for 6G R&D. One focuses on THz communication; which domain does the other explore?

(a) Visible-light communication
(b) Satellite backhaul
(c) Advanced optical communication
(d) Quantum key distribution

Q12. Proteins are mainly responsible for which of the following?

(a) Providing quick energy
(b) Growth and repair of tissues
(c) Improving digestion
(d) Enhancing memory power

Q13. Where was the bilateral naval exercise SLINEX 24 conducted between India and Sri Lanka in December 2024?

(a) Visakhapatnam
(b) Colombo
(c) Kochi
(d) Chennai

Q14. Why is canal irrigation more suitable in the northern plains of India?

(a) The rivers flow only during monsoon season.
(b) The area suffers from very low annual rainfall.
(c) The surface is uneven and covered with hills.
(d) The flat land and perennial rivers support canal networks

Q15. Which of the following pollutants is/are primarily responsible for causing acid rain?

(a) Carbon monoxide
(b) Sulphur dioxide and nitrogen oxides
(c) Methane
(d) Ozone

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Q16. Which of the following events is known as India's biggest multi-sport national competition?

(a) Khelo India Youth Games
(b) National Games
(c) Pro Kabaddi League
(d) Indian Premier League

Q17. Which acid and its salts are widely used as food preservatives to prevent the growth of mould, yeast and fungi?

(a) Perchloric acid
(b) Boric Acid
(c) Malic acid
(d) Sorbic acid

Q18. Who among the following has been appointed as the International Trade Negotiator by China in April 2025?

(a) Li Chenggang
(b) Jiang Zaidong
(c) Xu Feihong
(d) Wang Shouwen

Q19. Which Indian athlete set a new national record in the 200m sprint at the 2025 Asian Athletics Championships?

(a) Animesh Kujur
(b) Gurindervir Singh
(c) Amlan Borgohain
(d) Amiya Mallick

Q20. What happens when you double-click an icon on the desktop?

(a) It gets deleted.
(b) It goes to the Taskbar.
(c) It opens the application or file.
(d) It minimizes the window.

Q21. Which leader founded the Servants of India Society to train Indians for national service and political awareness?

(a) BR Ambedkar
(b) Motilal Nehru
(c) Bal Gangadhar Tilak
(d) Gopal Krishna Gokhale

Q22. Chilika Lake and Pulicat Lake are located in which of the following?

(a) West Coast of India
(b) Malabar Coast
(c) Konkan Coast
(d) East Coast of India

Q23. Which of the following sectors has been classified as infrastructure by the Government of India for improved financing access?

(a) Warehousing
(b) Education
(c) Apparel
(d) Retail

Q24. Who among the following threw 19.59 m to bag Silver medal in Shot Put at Asian U-18 Athletics Championship in April 2025?

(a) Anuragh G
(b) VS Anupriya
(c) Vidhi
(d) Nishchay

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Q25. What was the capital of Awadh when it was established in 1722?

(a) Faizabad
(b) Bareilly
(c) Gorakhpur
(d) Fatehpur

Q26. Which organelle is responsible for photosynthesis in plants?

(a) Mitochondria
(b) Chloroplast
(c) Leucoplast
(d) Chromoplast

Q27. Why does a diverse society need a constitution?

(a) To impose religious uniformity
(b) To eliminate all differences
(c) To provide basic rules for coordination and assurance
(d) To allow rulers to dominate others

Q28. Software Technology Parks of India (STPI) is a premier S&T organisation under which of the following ministries of the Government of India?

(a) Ministry of Home Affairs
(b) Ministry of Electronics and Information Technology (MeitY)
(c) Ministry of Communications
(d) Ministry of Science and Technology

Q29. In which of the following years was Ishwar Chandra Vidyasagar born, who is remembered for his efforts in widow remarriage and the abolition of polygamy in Hindu society?

(a) 1812
(b) 1820
(c) 1849
(d) 1835

Q30. Which of the following options correctly describes the scope of judicial review under the Constitution of India?

(a) Only the Supreme Court can declare laws unconstitutional.
(b) Judicial review is explicitly mentioned in the Constitution (Article 13).
(c) Both, Supreme Court and High Courts can strike down unconstitutional laws.
(d) Courts can review any law only after approval by the Parliament

Q31. On May 27, 2025, the Rajasthan High Court issued a directive regarding FIRs and financial transactions. What was one of the key mandates?

(a) All FIRs must be approved by a magistrate before registration.
(b) All property transactions must be conducted through digital payments
(c) FIRs can only be filed for criminal offenses, not civil disputes.
(d) Courts must report cash transactions over Rs. 2 lakh to the Income Tax Department.

Q32. Which Article of the Indian Constitution states that a person who had voluntarily acquired the citizenship of a foreign State shall NOT be considered a citizen of India at the commencement of the Constitution under Articles 5, 6, or 8?

(a) Article 9
(b) Article 10
(c) Article 12
(d) Article 11

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Q33. Which Indian State/Union Territory inaugurated modern sports facilities, including chess centres and a snooker hall, in 2025?

(a) Maharashtra
(b) Punjab
(c) Chandigarh
(d) Andaman and Nicobar

Q34. Which special representation in the Lok Sabha and State Assemblies was discontinued by the 104th Constitutional Amendment Act, 2020?

(a) Reservation for Women
(b) SC/ST Reservation
(c) Anglo-Indian Reservation
(d) OBC Reservation

Q35. Which force will get the Ashwini radar system under the Rs. 2,906-crore deal signed in March 2025?

(a) Indian Navy
(b) Indian Army
(c) Indian Air Force
(d) Indian Coast Guard

Q36. In the K. Umadevi v. Government of Tamil Nadu case, 2022, the Supreme Court granted maternity benefits for the third child under the Maternity Benefit (Amendment) Act, 2017, stating it is a constitutional right. Which fundamental right did the Court link this benefit to?

(a) Right to Education under Article 21A
(b) Right to Life under Article 21
(c) Right to Equality under Article 14
(d) Right against Exploitation under Article 23

Q37. Colonial policies led to the commercialisation of agriculture. Which of the following crops was encouraged for export during British rule?

(a) Maize
(b) Indigo
(c) Barley
(d) Pulses

Q38. Which of the following traditional folk theatre forms is famous in Maharashtra?

(a) Tamasha
(b) Yakshagana
(c) Nautanki
(d) Bhavai

Q39. The neighbouring countries Peru and Chile are located in which continent?

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

Q40. PM Modi’s review of NTEP in May 2025 urged volunteers called _____ to adopt AI tools for patient follow-up.

(a) Nikshay Mitras
(b) Swasth Sanginis
(c) TB Mitra
(d) Arogya Sahayaks

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MATHEMATICS

Q41. A company earns a profit (in Rs.) that is distributed among the company's three partners in the ratio of 12 : 3 : 14. If the difference between the smallest and the largest shares is Rs. 61,699, the total profit (in Rs.) of the company is:

(a) 1,62,661
(b) 1,62,566
(c) 1,62,581
(d) 1,62,673

Q42. Rs. 21,300 were divided among A, B and C, such that 2 times the share of A = 4 times the share of B = 7 times the share of C. Find the share of A.

(a) Rs. 11,868
(b) Rs. 11,919
(c) Rs. 12,099
(d) Rs. 11,928

Q43. A number, when increased by 60%, gives 3640. The number is:

(a) 4550
(b) 1137.5
(c) 6825
(d) 2275

Q44. A shopkeeper offers the following four discount schemes to his customers for the purchase of articles in his shop.

(i) Buy 5 and get 3 free
(ii) Buy 6 and get 3 free
(iii) Buy 20 and get 5 free
(iv) Buy 8 and get 6 free

Which scheme is the most beneficial to the customers?

(a) (ii)
(b) (i)
(c) (iv)
(d) (iii)

Q45. The sum of the squares of two consecutive even natural numbers is 452. The sum of the numbers is:

(a) 48
(b) 30
(c) 44
(d) 26

Q46. Evaluate: (-9) - (-60) ÷ (-12) + (-2) × 9

(a) -34
(b) -32
(c) -31
(d) -35

Q47. The LCM of the numbers 8.6 and 0.12 is:

(a) 2.58
(b) 258
(c) 25.8
(d) 0.258

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Q48. Sapna invested Rs. 20,000 on simple interest, partly at 12% per annum and partly at 13% per annum. If she earns equal interests from the two investments after 7 years, then find the sum invested at 12% per annum (in Rs.).

(a) 10,398
(b) 10,403
(c) 10,400
(d) 10,399

Q49. The diameter of a sphere is 12 cm. Find its volume.

(a) 144π cm³
(b) 288π cm³
(c) 576π cm³
(d) 192π cm³

Q50. Simplify: $2((7/2)x^2-28x+17)-7(x^2+6x-11)$

(a) $-98x - 111$
(b) $98x - 111$
(c) $-98x + 111$
(d) $98x + 111$

Q51. A trader claims to sell flour at a profit of 44%, but also dishonestly uses a weight which is 10% less than what is mentioned on it. Find the total percentage of profit earned by the trader. (Round off the answer to the nearest whole number.)

(a) 62%
(b) 62%
(c) 63%
(d) 60%

Q52. I bought two bicycles for Rs. 1,200. I sold the first one at a loss of 9% and the second at a gain of 27%. If, on the whole I made neither a loss nor a gain, find the cost price (in Rs.) of the first bicycle.

(a) 920
(b) 924
(c) 884
(d) 900

Q53. A chair was sold for Rs. 4,600 after giving two successive discounts of 12% and 9%. What is the marked price? (Rounded up to two decimal places.)

(a) Rs. 8,008.39
(b) Rs. 7,820.12
(c) Rs. 7,948.74
(d) Rs. 5,744.26

Q54. If the sum of all interior angles of a regular polygon is 28 right angles, then its number of sides is:

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

Q55. A sum of money triples itself at a certain rate of compound interest in 16 years. In how many years will it amount to 9 times of itself?

(a) 29 years
(b) 26 years
(c) 27 years
(d) 32 years

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Q56. A train that has a length of 150 m overtakes a man moving at a speed of 9 km/hr (in the same direction) in 36 seconds. How much time (in seconds) will it take this train to completely cross another train that is 185 m long, moving in the opposite direction at a speed of 43 km/hr?

(a) 35
(b) 18
(c) 23
(d) 12

Q57. The marks scored by 10 students are given below.

11, 11, 14, 12, 20, 19, 16, 18, 11, 12

The mode of the data is:

(a) 12
(b) 14
(c) 10
(d) 11

Q58. If 3 times Mary's present age is 27 years more than 9 times Diya's present age, and 4 times Diya's present age is 7 years less than Mary's present age, then what is the difference (in years) between the ages of Mary and Diya?

(a) 13
(b) 10
(c) 8
(d) 17

Q59. Simplify:

$\sec\theta\,(1 + \sin\theta)(\sec\theta - \tan\theta)$

(a) $\sec\theta$
(b) -1
(c) 1
(d) $\tan\theta$

Q60. A man goes to Lucknow from Kanpur at a speed of 18 km/hr and returns to Kanpur at speed of 36 km/hr, through the same route. What is his average speed (in km/hr) of the entire journey?

(a) 18
(b) 24
(c) 22
(d) 27

Q61. The average of first 164 even numbers is

(a) 165
(b) 164.5
(c) 166
(d) 165.5

Q62. Pipe P can fill 5/6 part of a tank in 30 hours, and pipe Q can fill 3/4 part of the same tank in 27 hours. Both P and Q were kept open for 2 hours, then both were closed. Pipe R alone was then opened and it emptied the water in the tank in 4 hours. Pipes P, Q and R together can fill the empty tank in:

(a) 54 hours
(b) 44 hours
(c) 36 hours
(d) 48 hours

Q63. If 51% of first number is equal to six-sevenths of second number, what is the ratio of first number to the second number?

(a) 205: 116
(b) 195: 114

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(c) 199: 124
(d) 200: 119

Q64. A can lay railway track between two given stations in 19 days and B can do the same job in 11 days. With the help of C, they did the job in 2 days only. Then, C alone can do the job in
(a) 11120/149 days
(b) 2120/149 days
(c) 12120/149 days
(d) 6120/149 days

Q65. A man makes a monthly payment equal to 25% of his monthly salary towards debt repayment. He spends 52% of the remaining salary and saves Rs. 288. His monthly salary (in Rs.) is
(a) 811
(b) 816
(c) 800
(d) 888

Q66. Which of the following numbers divides 747579723?
(a) 13
(b) 9
(c) 8
(d) 11

Q67. If the 6-digit number N42M47 is divisible by 11, then which of the options below can give a possible correct relation between M and N?
(a) M - N = 1
(b) M + N = 5
(c) M = N
(d) M - N = -5

Q68. Find the value of [960 ÷ {28 + 5 × (7 − 3)}].
(a) 29
(b) 20
(c) 23
(d) 15

Q69. Five solid cubes, each of volume 216000 cm^3, are joined end to end to form a cuboid. What is the lateral surface area (in cm^2) of the cuboid?
(a) 43045
(b) 43464
(c) 43245
(d) 43200

Q70. The sum of two numbers is 66 and their L.C.M. is 400. What are the two numbers?
(a) 21, 45
(b) 14, 52
(c) 16, 50
(d) 9, 57

GENERAL INTELLIGENCE AND REASONING

Q71. What should come in place of the question mark (?) in the given series? 21 23 33 51 77 ?
(a) 131
(b) 111
(c) 112

(d) 140

Q72. W is the daughter of A. A is the brother of K. K is the wife of E. E is the father of S. How is W related to S?

(a) Mother's sister's son
(b) Mother's sister's daughter
(c) Mother's brother's daughter
(d) Mother's brother's son

Q73. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

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

(a) UWS
(b) MOJ
(c) SUP
(d) PRM

Q74. Pranay starts from Point A and drives 7 km towards the south. He then takes a left turn and drives 6 km, then turns left and drives 12 km. He then takes a left turn and drives 10 km. He takes a final left turn, drives 5 km and stops at Point P. How far (shortest distance) and in which direction should he drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

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

Q75. DACB is related to FCED in a certain way based on the English alphabetical order. In the same way, YVXW is related to AXZY. To which of the given options is VSUT related, following the same logic?

(a) XUWV
(b) XUVV
(c) XTVV
(d) XVVE

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 letter-cluster DOES NOT belong to that group?

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

(a) RMH
(b) DYT
(c) AVO
(d) IDY

Q77. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) VZFM
(b) PTZG
(c) SWCI
(d) IMSZ

Q78. Seven boxes, N, O, T, F, A, R and M, are kept one over the other but not necessarily in the same order. M is kept immediately above A. N is kept immediately above O. Only T is kept above F. Only two boxes are kept above M. N is not kept at third position from the bottom.

How many boxes are kept between R and T?

(a) Three
(b) One
(c) Zero

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(d) Two

Q79. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 7856413, what will be the sum of the digits which are third from the left and third from the right in the new number thus formed?

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

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

73 76 81 90 107 ?

(a) 139
(b) 123
(c) 155
(d) 140

Q81. In a row of 22 students facing north, Mayank is 15th from the left end. If Payal is 7th to the right of Mayank, what is Payal's position from the right end of the line?

(a) 1st
(b) 3rd
(c) 4th
(d) 2nd

Q82. Refer to the following number and symbol series and answer the question that follows.

Counting to be done from left to right only.

(Left) / 8 5 2 1 1 4 < $ 2 & 8 # 7 5 & 3 + 1 6 ^ (Right)

How many such numbers are there that are immediately preceded by a symbol and also immediately followed by another number?

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

Q83. Refer to the following number and symbol series and answer the question that follows.

Counting to be done from left to right only.

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

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

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

Q84. What should come in place of ? in the given series based on the English alphabetical order?

ELY FNX GPW HRV ?

(a) HYV
(b) HGU
(c) IUV
(d) ITU

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Q85. What should come in place of the question mark (?) in the given series?

819 829 830 840 841 851 852 ?

(a) 853
(b) 854
(c) 862
(d) 861

Q86. In a certain code language, ‘TEMP’ is coded as ‘3129’ and ‘ITEM’ is coded as ‘1396’. What is the code for ‘I’ in the given code language?

(a) 1
(b) 3
(c) 9
(d) 6

Q87. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

All magnets are rocks.

All rocks are soils.

Conclusions:

(I) Some soils are rocks.

(II) All magnets are soils.

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

Q88. 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 conclusion(s) logically follow(s) from the statement(s).

Statements:

Some Beetroots are Radishes.

Some Radishes are Onions.

Conclusions:

I. Some Beetroots are Onions.

II. No Beetroots are Onions.

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

Q89. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

TKF 4, SJE 8, RID 12, QHC 16, ?

(a) OGB 20
(b) PFA 18
(c) OFA 18
(d) PGB 20

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Q90. In the following number-pairs, the second number is obtained by applying certain mathematical operation(s) to the first number. Select the number-pair in which the numbers are related in the same way as are the numbers of the following pairs. (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

12, 134

9, 71

(a) 15, 235
(b) 13, 170
(c) 16, 246
(d) 11, 130

Q91. 211 people are standing in a row facing north. Mr. Maxi is 9th from the left end while Mr. Han is 91st from the right end. How many people are there between Mr. Maxi and Mr. Han?

(a) 112
(b) 111
(c) 109
(d) 110

Q92. SKEA is related to PGBW in a certain way based on the English alphabetical order. In the same way, GUSK is related to DQPG. To which of the given options is XIJY related, following the same logic?

(a) PPOI
(b) UGEU
(c) UIOP
(d) UEGU

Q93. What will come in the place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

26 × 4 ÷ 8 − 15 + 6 = ?

(a) 62
(b) 59
(c) 61
(d) 60

Q94. Seven people A, B, C, D, E, F and G are sitting in a row, facing the north. Only one person sits to the right of B. E sits third from the left end of the row. G is the immediate neighbour of F and B. C sits to the immediate left of A. How many people sit to the left of D?

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

Q95. Satheesh starts from his home and drives 5 km towards north. He then takes a left turn, drives 6 km, turns left, and drives 4 km. He then takes a right turn and drives 5 km and turns right, then drives 3 km to reach his office. In which direction is the office with respect to his home?

(Note: All turns are 90° turns only, unless specified.)

(a) North-west
(b) North
(c) South
(d) West

Q96. In a certain code language, 'LIKE' is coded as '7029' and 'KAIL' is coded as '1279'. What is the code for 'A' in the given code language?

(a) 1
(b) 2

(c) 9
(d) 7

Q97. Five people, A, B, C, D and E are sitting in a straight line, facing North. B is sitting to the extreme left end. Only two people are sitting between D and B. E is seated second to the right of B. A is not an immediate neighbour of E. How many people are sitting to the right of C?

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

Q98. CROWD is related to HWTBI in a certain way based on the English alphabetical order. In the same way, DRAWN is related to IWFBS. To which of the given options is BRUSH related, following the same logic?

(a) GWZXM
(b) FVYWL
(c) GWZYM
(d) HXAYN

Q99. Each of the digits in the number 9231475 is arranged in ascending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

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

Q100. If 1 is added to each even digit and 3 is subtracted from each odd digit in the number 943372856, what will be difference between the highest and lowest digits thus formed?

(a) 9
(b) 7
(c) 8
(d) 0

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (a) Article 2 (Parliament may by law admit new states)

The correct answer is Article 2.

Key Points

• Article 2 of the Constitution of India provides Parliament the power to admit new states into the Union of India or establish new states.

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• This article grants Parliament the authority to enact laws for the creation or admission of states through a simple majority, not requiring the special amendment process under Article 368.

• The provision under Article 2 is utilized when India integrates new territories or regions. For example, Sikkim was admitted as a state of India in 1975 under this article. Hence, Article 2 can be amended by an ordinary Act of Parliament. Statement 1 is correct.

• Article 356 and Article 368 require constitutional processes and cannot be amended by a simple majority. These provisions are subject to stricter conditions. Hence, Article 356 and Article 368 cannot be amended by an ordinary Act of Parliament. Statement 2 and 3 are incorrect.

• Article 14, which guarantees equality before the law, is a fundamental right enshrined in Part III of the Constitution. It cannot be amended by a simple Act of Parliament as it forms part of the basic structure of the Constitution. Statement 4 is also incorrect.

Additional Information

• Article 2 of the Constitution:

• Article 2 grants Parliament the authority to admit new states or establish new states within the Union of India.

• It is a procedural article allowing the expansion of India's territorial boundaries through legislative action.

• Examples include the integration of Sikkim and creation of new states such as Telangana through reorganization.

• Article 356:

• This article empowers the President to impose President's Rule in a state under certain circumstances.

• It requires specific legal and constitutional grounds, such as the breakdown of constitutional machinery in the state.

• It cannot be amended through a simple majority, as it forms a critical aspect of the federal structure.

• Article 368:

• Article 368 provides the procedure for amending the Constitution.

• It outlines a special procedure requiring a two-thirds majority in both Houses of Parliament and ratification by at least half of the state legislatures.

• Hence, amendments to fundamental provisions cannot be done via a simple majority.

• Article 14:

• Article 14 guarantees equality before law and equal protection of the laws to all individuals within the territory of India.

• It is a fundamental right forming part of the basic structure of the Constitution.

• Any amendment or change to this article requires the special procedure outlined in Article 368.

Important Points

• Key Provisions for Constitutional Amendments:

• Constitutional provisions are categorized into two types for amendments: those amendable by a simple majority and those requiring the special procedure under Article 368.

• Provisions related to the organization of states, such as Articles 2 and 3, can be amended via a simple majority.

• Fundamental rights and structural provisions, such as Articles 14, 368, and others, require a special procedure for amendment.

• The basic structure doctrine, established in the Keshavananda Bharati case (1973), ensures that certain provisions cannot be altered.

• Examples of Reorganization:

• Reorganization of states has been carried out under Articles 2 and 3, such as the formation of Chhattisgarh (2000), Uttarakhand (2000), and Telangana (2014).

• Such reorganizations are based on socio-political considerations, linguistic factors, or administrative needs.

Q2. Answer: (d) Windows + I

The correct answer is Windows + I.

Key Points

• Windows + I is the shortcut key used to quickly open the System Settings in Windows 10 and Windows 11. It allows users to access various system configurations and options in one centralized location.

• The System Settings menu in Windows includes options like Display settings, Network settings, Personalization, Updates, and Security, among others.

• Using Windows + I is a faster alternative to manually navigating through the Start menu to find the settings application.

• This shortcut is highly efficient for users who frequently need to modify system configurations or check for updates.

• Unlike the other options provided, Windows + I is specifically designed for opening the Settings menu, making it the correct and most relevant choice.

Additional Information

• Alt + F4:

• This shortcut is used to close the currently active window or application. If no windows are open, pressing Alt + F4 will bring up

the shutdown menu in Windows.

• It is not related to accessing the System Settings.

• Ctrl + Alt + Del:

• This combination brings up a menu that includes options like Task Manager, Lock, Sign Out, and Change Password.

• It is primarily used for security and system management purposes, not for accessing System Settings.

• Windows + D:

• Pressing Windows + D minimizes all open windows and shows the desktop.

• This shortcut is helpful for quickly accessing the desktop but does not open the System Settings.

• Windows + I:

• This shortcut is specifically designed to open the Settings menu in Windows, allowing users to configure and personalize their system.

• It is a universally recognized shortcut across both Windows 10 and Windows 11.

• System Settings in Windows:

• The Settings app is the central hub for managing system preferences, including network settings, display options, user accounts, and security updates.

• It was introduced in Windows 8 as a replacement for the traditional Control Panel and has become more comprehensive in Windows 10 and 11.

Important Points

• The Settings app in Windows is distinct from the traditional Control Panel. While the Control Panel is still available, Microsoft is gradually transitioning most settings to the new interface.

• Windows 11 introduced a redesigned Settings app with a more modern and user-friendly interface compared to its predecessor.

• Shortcut keys like Windows + I are part of Microsoft's effort to enhance productivity by providing quick access to frequently used features.

• Knowing these shortcuts can significantly streamline system navigation and reduce the time spent searching for specific options.

Q3. Answer: (c) Heart Lamp

The correct answer is Heart Lamp.

Key Points

• Heart Lamp, a book written in Kannada, was awarded the prestigious 2025 International Booker Prize.

• The International Booker Prize is a globally recognized award that honors outstanding works of fiction translated into English, celebrating the collaborative efforts of authors and translators.

• This recognition highlights the rich literary tradition of Kannada literature, bringing global attention to the language and its creative heritage.

• The book's themes, narrative style, and cultural depth were highly commended by the jury, showcasing the universal appeal of regional literature.

• The translator of Heart Lamp, whose efforts made the book accessible to a global audience, also received equal recognition and a share of the prize money.

Additional Information

• International Booker Prize:

• The International Booker Prize is awarded annually for a book of fiction translated into English and published in the UK or Ireland.

• The prize money of £50,000 is split equally between the author and translator, emphasizing the importance of translation in global literature.

• The award aims to encourage the reading of quality global literature in English translation and promote cultural exchange through storytelling.

• Kannada Literature:

• Kannada is one of the oldest Dravidian languages, with a literary history spanning more than 1,500 years.

• It has a rich heritage of classical and modern literature, with works ranging from epic poetry to contemporary novels.

• Renowned Kannada writers like Kuvempu, U. R. Ananthamurthy, and Girish Karnad have received national and international recognition for their contributions.

• Heart Lamp:

• The book explores themes of identity, love, and cultural heritage, resonating with readers across the globe.

• Its narrative style blends traditional storytelling techniques with modern literary elements, making it a unique piece of fiction.

• The book's success at the International Booker Prize highlights the global appeal of regional languages and their ability to

convey universal human emotions.

• Significance of Translation:

• Translation plays a critical role in bridging cultural gaps and introducing diverse literary works to a global audience.

• It helps preserve linguistic diversity and ensures that regional stories reach readers worldwide.

• Efforts of translators are increasingly recognized, as seen in awards like the International Booker Prize, which equally rewards authors and translators.

Important Points

• Other Kannada Writers Recognized Internationally:

• U. R. Ananthamurthy: Known for his novel Samskara, which gained global attention.

• Kuvempu: First Kannada writer to receive the Jnanpith Award for his work Ramayana Darshanam.

• Girish Karnad: A playwright and author whose works are celebrated for their cultural and historical depth.

• Impact of the International Booker Prize:

• Boosts the global visibility of regional literature and authors.

• Encourages publishers to invest in translations, expanding the reach of diverse literary works.

• Inspires new writers to experiment with storytelling and explore universal themes through their cultural lens.

Q4. Answer: (c) Tamil Nadu

The correct answer is Tamil Nadu.

Key Points

• The Western Ghats is a mountain range that runs parallel to the western coast of the Indian peninsula, covering a total of six states in India: Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.

• Tamil Nadu is one of the key states where the Western Ghats extend. The range in Tamil Nadu is known for its rich biodiversity and is home to various hill stations like Ooty (Nilgiris), Kodaikanal, and Coimbatore hills.

• The Western Ghats in Tamil Nadu include the Nilgiri Hills, Anamalai Hills, and Cardamom Hills, which are significant for their ecological and economic importance.

• The range has been designated as a UNESCO World Heritage Site due to its exceptional biodiversity and is considered one of the eight hottest hotspots of biological diversity in the world.

• The states mentioned in the other options, such as Punjab, Bihar, and Uttar Pradesh, are located in the northern and eastern parts of India and are not traversed by the Western Ghats.

Additional Information

• Geographical Coverage of the Western Ghats:

• The Western Ghats stretch across six states: Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu, covering a total length of approximately 1,600 km.

• It forms the watershed for the Peninsular Rivers, including the Godavari, Krishna, and Kaveri, which are crucial for irrigation and drinking water.

• Ecological Significance:

• The Western Ghats is home to a large number of endemic species of flora and fauna, including the Nilgiri Tahr and the Lion-tailed Macaque.

• The range plays a critical role in influencing the monsoon weather patterns in the region and acts as a barrier to the southwest monsoon winds.

• UNESCO World Heritage Site:

• The Western Ghats was inscribed as a UNESCO World Heritage Site in 2012 for its exceptional natural beauty and unique ecosystem.

• It is recognized as one of the eight hottest hotspots of biological diversity in the world.

• Hill Stations and Tourism:

• The Western Ghats in Tamil Nadu is a significant tourist attraction due to the presence of popular hill stations such as Ooty, Kodaikanal, and Valparai.

• These hill stations are known for their pleasant climate, tea plantations, and scenic beauty.

• Other States in the Question:

• Punjab: Located in northern India, dominated by plains and does not feature the Western Ghats.

• Bihar: Situated in the eastern part of India, characterized by the Gangetic plains, and not traversed by the Western Ghats.

• Uttar Pradesh: A northern state predominantly covered by the Indo-Gangetic plains and not connected to the Western Ghats.

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Q5. Answer: (c) C-DOT & Sterlite Technologies Ltd.

The correct answer is C-DOT & Sterlite Technologies Ltd..

Key Points

• C-DOT (Centre for Development of Telematics) and Sterlite Technologies Ltd. collaborated to achieve India's first Quantum Key Distribution (QKD) over a Multi-Core Fibre. This significant milestone in secure communication was achieved in 2025.

• Quantum Key Distribution (QKD) is a cutting-edge technique that leverages the principles of quantum mechanics to ensure secure data transmission. It is a key enabler for secure communication in sectors such as defense, finance, and governance.

• QKD over a Multi-Core Fibre (MCF) is an innovative advancement that uses multiple cores within a single optical fibre to enhance the efficiency and security of quantum communication. This technology reduces latency and increases data transmission capacity.

• C-DOT, a premier R&D organization under the Ministry of Communications, has been pivotal in advancing India's telecom technologies, including secure communication systems.

• Sterlite Technologies Ltd. is an Indian multinational company specializing in optical fibre and network solutions, playing a significant role in developing advanced telecom infrastructure and innovations in quantum communication.

Additional Information

• Quantum Key Distribution (QKD):

• QKD is based on the principles of quantum mechanics, particularly the Heisenberg Uncertainty Principle and quantum entanglement, ensuring that any eavesdropping attempt disrupts the data, making it detectable.

• It provides absolute security in data exchange, unlike traditional encryption methods that depend on computational difficulty.

• QKD applications include secure communication in banking, defense, critical infrastructure, and governmental data.

• Multi-Core Fibre (MCF):

• MCF technology uses multiple cores within a single optical fibre, enabling simultaneous data transmission across multiple pathways, increasing bandwidth and reducing latency.

• This technology is especially beneficial for quantum communication systems, which require high-speed and secure data transfer.

• C-DOT (Centre for Development of Telematics):

• C-DOT was established in 1984 as an autonomous telecom R&D center by the Government of India.

• The organization has been instrumental in developing indigenous telecom technologies and contributing to India's secure communication systems.

• Sterlite Technologies Ltd:

• Sterlite Technologies Ltd. is a global leader in optical fibre and network solutions headquartered in Pune, India.

• The company has been actively involved in 5G infrastructure, quantum communication, and digital transformation projects worldwide.

Important Points

• Global advancements in Quantum Communication:

• Countries like China and USA have made significant progress in quantum communication, deploying QKD networks for secure inter-city communications.

• China launched the Micius satellite in 2016, the world's first quantum communication satellite.

• India's Quantum Communication Initiatives:

• The Government of India has earmarked Rs. 8000 crore for the National Quantum Mission to foster research and development in quantum technologies, including QKD.

• Collaborations between organizations like C-DOT, ISRO, and other research institutions are strengthening India's position in quantum technology.

Q6. Answer: (c) Nagaland

The correct answer is Nagaland.

Key Points

• Article 371A of the Indian Constitution provides special provisions for the state of Nagaland. It was inserted by the 13th Constitutional Amendment Act of 1962.

• The article ensures that no act of Parliament relating to religious or social practices, customary laws, administration of civil and criminal justice, or ownership and transfer of land and its resources shall apply to Nagaland unless approved by the state legislature.

• This special provision was aimed at safeguarding the distinct culture and traditions of the Naga people.

• The provision empowers the Nagaland Legislative Assembly to decide on the applicability of Parliamentary acts on the mentioned matters.

• Nagaland attained statehood on 1 December 1963, and Article 371A was a crucial aspect of its statehood agreement to preserve

the ethnic and cultural identity of the Nagas.

Additional Information

• Other Provisions of Article 371A:

• Customary Laws: The article ensures that the Naga customary laws are protected and remain unaffected by central legislation unless the Nagaland Legislative Assembly decides otherwise.

• Land and Resources: The ownership and transfer of land and its resources in Nagaland remain under the control of the local population, safeguarding their traditional rights.

• Religious and Social Practices: The religious and social practices of Nagas are safeguarded, ensuring their distinct identity and traditions are preserved.

• Other Articles Granting Special Provisions to States:

• Article 371: Special provisions for Maharashtra and Gujarat regarding the establishment of development boards.

• Article 371B: Special provisions for Assam, particularly for the administration of the tribal areas.

• Article 371C: Special provisions for Manipur for the administration of the hill areas.

• Article 371G: Special provisions for Mizoram, similar to Nagaland, concerning religious practices, customary laws, and land ownership.

• Historical Context:

• The special provisions for Nagaland were introduced after the 1960 Naga People's Convention Agreement, which sought to preserve the unique identity of the Nagas.

• The agreement led to the creation of Nagaland as the 16th state of India.

• Importance of Article 371A:

• It ensures that the autonomy and cultural heritage of Nagaland are maintained.

• It also respects the aspirations of the Naga people while integrating them into the Indian Union.

Q7. Answer: (b) Bal Gangadhar Tilak

The correct answer is Bal Gangadhar Tilak.

Key Points

• The famous slogan "Swaraj is my birthright and I shall have it" was given by Bal Gangadhar Tilak, a prominent leader in the Indian freedom struggle.

• This slogan became a rallying cry for the Indian independence movement and inspired millions of Indians to fight against British colonial rule.

• Tilak, often referred to as the "Father of Indian Unrest," was one of the first leaders to demand full independence for India.

• The slogan was used by Tilak in the context of his speeches and writings, particularly during the Home Rule Movement of 1916-1918, which aimed at achieving self-governance for India within the British Empire.

• Tilak's emphasis on Swaraj (self-rule) was instrumental in uniting people across the country against the British colonial government.

Additional Information

• About Bal Gangadhar Tilak:

• Tilak was born on 23 July 1856 in Ratnagiri, Maharashtra, and is considered one of the most influential leaders of the Indian independence movement.

• He was a scholar, nationalist, and social reformer who advocated for Swaraj as a fundamental right of Indians.

• Tilak was also a prolific writer and edited newspapers such as Kesari (Marathi) and The Mahratta (English), which became platforms for expressing nationalist sentiments.

• Home Rule Movement:

• Started in 1916, the Home Rule Movement was led by Bal Gangadhar Tilak and Annie Besant to demand self-governance for India.

• Tilak's leadership and his slogan energized the masses, making the movement a significant step towards India's independence.

• Other Contributions of Tilak:

• Tilak popularized the celebration of Ganesh Chaturthi and Shivaji Jayanti to promote unity among Indians.

• He authored books like "Gita Rahasya," which reflected his interpretation of the Bhagavad Gita as a call for action.

• Other Key Leaders and Their Contributions:

• Mahatma Gandhi: Known for his philosophy of non-violence and movements like Civil Disobedience and Quit India.

• Subhas Chandra Bose: Advocated armed struggle for independence and founded the Indian National Army (INA).

• Dadabhai Naoroji: Known as the "Grand Old Man of India," he highlighted economic exploitation under British rule through the Drain Theory.

Q8. Answer: (b) Primary products

The correct answer is Primary products.

Key Points

• During the period from 1950 to 1990, India’s economy was primarily agrarian and relied heavily on the export of primary products, which include raw materials like agricultural goods, minerals, and other unprocessed commodities.

• Primary products such as tea, jute, cotton, iron ore, and sugar were the main components of India's export basket, reflecting the country's focus on its natural resource base.

• India’s industrial sector was in its infancy during this period, and most manufactured goods were consumed domestically, leaving primary products as the main export category.

• The export of primary goods helped the country earn foreign exchange, which was critical for its economic development and for meeting its imports of machinery and technology.

• The emphasis on exporting primary products gradually shifted in later decades as India started diversifying its exports to include manufactured and service-based products.

Additional Information

• Primary Products:

• Primary products are raw materials or natural resources that are extracted directly from the earth, such as agricultural goods (wheat, rice, tea, etc.), minerals (coal, iron ore, etc.), and unprocessed items.

• They are often exported by developing countries with agrarian economies, like India during the mid-20th century, due to limited industrial capabilities.

• Examples of primary products exported by India during 1950–1990 include jute, tea, spices, and raw cotton.

• Capital Goods:

• Capital goods are physical assets used by industries to produce goods and services, such as machinery, tools, and buildings.

• India did not export capital goods during 1950–1990 due to the lack of industrial development and technological advancements in that era.

• Automobiles:

• The automobile industry in India was largely underdeveloped during 1950–1990, with limited production catering to domestic needs only.

• Exports of automobiles were negligible during this period as the focus was on meeting local demand.

• Crude Oil:

• India was not a major producer of crude oil during the 1950–1990 period.

• Instead, crude oil imports were significant during this time to meet domestic energy demands.

• Important Points

• The export of primary products was a common trait of developing economies like India during the mid-20th century.

• India’s export strategy gradually evolved post-1990s, focusing on manufactured goods, IT services, and refined petroleum products.

• The 1991 economic reforms played a pivotal role in shifting India’s export basket towards higher-value goods and services.

Q9. Answer: (a) Pallichchhandam

The correct answer is Pallichchhandam.

Key Points

• Pallichchhandam refers to land donated specifically to Jaina institutions during the Chola rule.

• The term "Pallichchhandam" is derived from Palli, meaning Jain temples or institutions, and Chhandam, meaning donation or grant.

• Such donations were made for the maintenance of Jain religious establishments, including temples, educational centers, and monasteries.

• The Chola kings were known for their patronage of various religious traditions, including Jainism, and grants like Pallichchhandam reflect their support for religious diversity.

• These land grants were often accompanied by inscriptions that detailed the purpose of the donation and its beneficiaries, contributing to the preservation of Jain heritage in South India.

Additional Information

• Tirunamattukkani:

• This term refers to land donated to temples or other religious institutions under the Chola administration.

• The purpose of such grants was to support the daily rituals, festivals, and maintenance of temples.

• Such donations were typically recorded in inscriptions and were used to sustain temple economies and religious practices.

• Shalabhoga:

• Shalabhoga refers to land allocated for the maintenance of temple staff, including priests, cooks, and other workers.

• It was an essential part of the temple economy and helped ensure the smooth functioning of religious activities.

• Vellanvagai:

• Vellanvagai was land granted to farmers or agricultural workers for cultivation.

• Under the Chola administration, such land grants were often made to incentivize agricultural development and ensure food security.

• This type of grant was not specifically tied to religious institutions but was aimed at boosting economic productivity.

• Jainism under Chola Rule:

• Although the Cholas were primarily patrons of Hinduism, they also extended support to Jainism and Buddhism.

• Jain institutions flourished in South India during the early medieval period, with significant contributions to literature, art, and architecture.

• Land grants like Pallichchhandam were instrumental in ensuring the survival of Jain communities and their religious practices.

Important Points

• Chola Dynasty:

• The Chola dynasty was one of the longest-ruling dynasties in South India, known for its administrative efficiency, temple architecture, and naval strength.

• They ruled from the 9th century CE to the 13th century CE and were prominent patrons of art, culture, and religion.

• Religious Grants:

• The Cholas made land grants to various religious groups, including Shaivites, Vaishnavites, Buddhists, and Jains, promoting religious pluralism.

• Such grants were instrumental in maintaining the socio-economic structure of religious institutions and enhancing cultural development.

• South Indian Inscriptions:

• Inscriptions found in temples and public buildings provide crucial details about the land grants, administration, and societal norms during the Chola period.

• They serve as primary sources for understanding the economic and religious policies of the Chola rulers.

Q10. Answer: (b) Infant mortality rate

The correct answer is Infant mortality rate.

Key Points

• The Human Development Index (HDI) is a composite index used to measure and rank countries' levels of social and economic development. It focuses on three core dimensions: health, education, and standard of living.

• The health dimension is assessed by life expectancy at birth, which serves as a proxy for the overall health and longevity of a population.

• The education dimension is calculated using two indicators: mean years of schooling (average number of years of education received by people aged 25 and older) and expected years of schooling (years of schooling a child is expected to receive).

• The standard of living dimension is evaluated through Gross National Income (GNI) per capita, adjusted for purchasing power parity (PPP).

• Infant mortality rate, while an important health indicator, is not directly included in the calculation of HDI. Instead, it is indirectly reflected through its impact on life expectancy at birth.

Additional Information

• Life Expectancy at Birth:

• It represents the average number of years a newborn is expected to live if current mortality rates continue to apply.

• It is a key indicator of a country's health system and overall well-being of its citizens.

• In the HDI calculation, higher life expectancy correlates with better health outcomes and higher scores.

• Mean Years of Schooling:

• This indicator reflects the average number of years of education received by individuals aged 25 years and older.

• A higher value indicates better access to and quality of education in a country.

• It demonstrates the long-term investment in human capital development.

• Gross National Income (GNI) per Capita:

• GNI is the total income earned by a country's residents and businesses, including any income from abroad.

• It is adjusted for purchasing power parity (PPP) to account for differences in cost of living between countries.

• GNI per capita measures the average income and is a key indicator of economic well-being.

• Infant Mortality Rate:

• It is the number of infant deaths (under 1 year of age) per 1,000 live births in a given year.

• Though not directly included in HDI, it is a critical measure of a country's health system and socio-economic conditions.

• Countries with lower infant mortality rates often have higher life expectancy and better health outcomes.

Important Points

• Human Development Index (HDI):

• Introduced by the United Nations Development Programme (UNDP) in its 1990 Human Development Report.

• It aims to shift the focus of development economics from national income accounting to people-centered policies.

• The HDI ranks countries on a scale of 0 to 1, with higher values indicating better human development outcomes.

• Other Indicators Related to HDI:

• Besides HDI, the UNDP also calculates indices like the Inequality-adjusted HDI (IHDI), Gender Development Index (GDI), and Multidimensional Poverty Index (MPI) to provide a more detailed understanding of development.

• The IHDI accounts for inequality in distribution of each dimension.

• The GDI compares male and female HDI values to highlight gender disparities.

Q11. Answer: (c) Advanced optical communication

The correct answer is Advanced optical communication.

Key Points

• In April 2025, the Department of Telecommunications (DoT) announced funding for two specialized national testbeds focused on 6G Research and Development (R&D).

• One of these testbeds is dedicated to THz (terahertz) communication, which is a crucial technology for ultra-high-speed data transmission and forms a core aspect of 6G development.

• The second testbed focuses on Advanced optical communication, a vital area for modern telecommunication systems, enhancing data transmission capabilities over long distances with minimal loss. Hence, this is the correct answer.

• Advanced optical communication involves the use of light for transmitting data through optical fibers, which is essential for achieving the ultra-low latency and high bandwidth requirements of 6G technology.

• The government is investing in such testbeds to ensure India remains competitive in next-generation telecommunications technology and to support academic and industrial research in these fields.

Additional Information

• Advanced optical communication:

• This technology uses optical fibers to transmit data at high speeds by converting electrical signals into light signals.

• It is characterized by low latency, high bandwidth, and high data integrity, making it essential for applications like 6G, autonomous vehicles, and IoT (Internet of Things).

• It supports key technologies like Wavelength Division Multiplexing (WDM), which enhances data transmission by using multiple wavelengths of light.

• Research in advanced optical communication is paving the way for innovations like quantum communication and ultra-secure networks.

• THz communication:

• Terahertz (THz) communication operates in the 0.1–10 THz frequency range and is a promising technology for ultra-high-speed wireless communication.

• It enables data rates of several terabits per second, which is a necessity for 6G networks and beyond.

• THz communication is expected to play a role in applications like holographic communication, real-time AI processing, and immersive virtual reality (VR).

• Visible-light communication (VLC):

• VLC uses visible light as a medium for wireless communication, often through LEDs.

• It is suitable for environments where radio frequency (RF) communication faces interference, such as in hospitals or aircraft cabins.

• While VLC has its advantages, it is not the focus of the testbed discussed in the question.

• Quantum key distribution (QKD):

• QKD is a secure communication method that uses the principles of quantum mechanics to encrypt and transmit data.

• It is considered to be unbreakable and is being actively researched for applications in cybersecurity.

• However, QKD is not the focus of the 6G testbed mentioned in the context of the question.

• Satellite backhaul:

• Satellite backhaul involves using satellites to connect remote areas to the core telecommunication network, providing internet

and cellular services.

• It is especially useful for rural and geographically challenging locations but is not directly related to the testbed for advanced optical communication.

Q12. Answer: (b) Growth and repair of tissues

The correct answer is Growth and repair of tissues.

Key Points

• Proteins are essential macromolecules required for the growth, repair, and maintenance of body tissues. They play a crucial role in cell regeneration and healing wounds.

• Proteins are made up of amino acids, which are the building blocks necessary for the formation of muscles, skin, and internal organs.

• Unlike carbohydrates, proteins are primarily responsible for structural and functional roles in the body rather than being a quick energy source.

• Proteins also contribute to the production of enzymes, hormones, and antibodies, all of which are vital for maintaining body functions and immunity.

• In the absence of adequate protein intake, individuals may suffer from conditions like muscle wasting, weakened immune response, and delayed wound healing.

Additional Information

• Functions of Proteins:

• Structural Function: Proteins like collagen and keratin provide strength and support to tissues such as skin, hair, and nails.

• Enzymatic Function: Enzymes are proteins that catalyze biochemical reactions in the body, aiding in digestion, metabolism, and other vital processes.

• Transport Function: Proteins such as hemoglobin transport oxygen in the blood, while others assist in moving nutrients across cell membranes.

• Immune Function: Antibodies, composed of proteins, are crucial for fighting infections and ensuring immunity.

• Hormonal Function: Some hormones like insulin are protein-based and regulate various body functions, including blood sugar levels.

• Sources of Proteins:

• Animal Sources: Eggs, milk, meat, fish, and poultry are rich in high-quality proteins containing all essential amino acids.

• Plant Sources: Legumes, beans, nuts, seeds, and soy products provide protein for vegetarians and vegans.

• Dairy Products: Cheese, yogurt, and whey are excellent sources of proteins, especially for muscle repair.

• Protein Deficiency:

• Protein deficiency can lead to conditions such as kwashiorkor, characterized by swelling, fatigue, and poor growth.

• Individuals with inadequate protein intake may experience weakened immune systems and increased susceptibility to infections.

• Quick Energy Sources:

• Carbohydrates: These are the primary source of quick energy for the body, stored as glycogen and metabolized for immediate energy.

• Proteins are not typically used as a primary energy source unless the body is in a state of starvation or prolonged physical exertion.

• Improving Digestion:

• Proteins such as digestive enzymes (e.g., pepsin, trypsin) play a role in breaking down food into absorbable nutrients.

• However, proteins themselves are not directly responsible for enhancing digestion as a primary function.

Important Points

• Daily Protein Requirements:

• The recommended daily protein intake varies based on age, gender, and physical activity. For an average adult, it is approximately 0.8 grams per kilogram of body weight.

• Athletes and bodybuilders may require higher amounts to support muscle growth and repair.

• Protein Quality:

• Proteins are classified based on their amino acid content. Complete proteins (e.g., from animal sources) contain all essential amino acids.

• Incomplete proteins (e.g., from plant sources) may lack one or more essential amino acids but can be complemented by combining different food sources.

• Proteins vs. Other Nutrients:

• Carbohydrates: Primarily provide energy through glucose metabolism.

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• Fats: Serve as long-term energy storage and support cell structure and hormone production.

• Proteins: Focus on structural, enzymatic, and functional roles rather than immediate energy provision.

Q13. Answer: (a) Visakhapatnam

The correct answer is Visakhapatnam.

Key Points

• SLINEX is a bilateral naval exercise conducted between India and Sri Lanka to enhance mutual cooperation and interoperability between the navies of the two countries.

• The SLINEX 24 naval exercise was conducted in Visakhapatnam, a major port city in the state of Andhra Pradesh, India, in December 2024.

• Visakhapatnam, also known as Vizag, serves as the headquarters of the Eastern Naval Command of the Indian Navy, making it a strategic location for such exercises.

• This exercise involves complex naval drills, maritime operations, and joint tactical exercises, which help in strengthening defense cooperation between India and Sri Lanka.

• The series of SLINEX exercises aims to increase maritime security in the Indian Ocean Region (IOR), a strategically important area for both nations.

Additional Information

• Visakhapatnam:

• Located on the eastern coast of India, Visakhapatnam is one of the oldest port cities and is popularly known as the “City of Destiny.”

• It houses the headquarters of the Eastern Naval Command of the Indian Navy, making it a key location for naval operations and exercises.

• The city has a natural harbor and is a hub for various maritime activities, including shipbuilding and naval training.

• SLINEX Exercises:

• The acronym SLINEX stands for Sri Lanka–India Naval Exercise.

• These exercises started in 2005 and have been conducted regularly to enhance maritime cooperation and security.

• They include activities such as anti-piracy operations, search and rescue drills, and communication exercises, showcasing the operational capabilities of the navies.

• Importance of India-Sri Lanka Maritime Relations:

• The Indian Ocean Region (IOR) is geopolitically significant, with both nations relying heavily on its waters for trade and security.

• India and Sri Lanka share a maritime boundary, and their cooperation is essential for addressing challenges like piracy, smuggling, and illegal fishing.

• SLINEX exercises contribute to building trust and enhancing mutual understanding between the two nations.

• Other Naval Exercises by India:

• Malabar Exercise: A quadrilateral naval exercise involving the United States, Japan, and Australia.

• VARUNA: A bilateral exercise between India and France.

• INDRA: A joint military exercise between India and Russia.

Q14. Answer: (d) The flat land and perennial rivers support canal networks

The correct answer is The flat land and perennial rivers support canal networks.

Key Points

• The northern plains of India are characterized by extensive flat lands, making them ideal for the construction of canal networks. The flat terrain allows canals to be easily dug and maintained, ensuring smooth water flow for irrigation purposes.

• The region is drained by numerous perennial rivers, such as the Ganga, Yamuna, Brahmaputra, and their tributaries. These rivers provide a consistent and reliable source of water throughout the year, essential for canal irrigation.

• The availability of alluvial soil in the northern plains further supports canal irrigation as this soil type retains water efficiently, making it suitable for agriculture. This facilitates the cultivation of water-intensive crops like rice, sugarcane, and wheat.

• The presence of a dense population in the northern plains increases the demand for irrigation to sustain agricultural activities, making canal irrigation a preferred choice for meeting the water needs of farmers.

• The historical development of extensive canal systems, such as the Upper Ganga Canal, has contributed to the region's agricultural productivity, making it one of the most fertile areas in India.

Additional Information

• Features of the Northern Plains:

• They are formed by the deposition of alluvium brought by the Indus, Ganga, and Brahmaputra river systems.

• The plains extend over an area of approximately 7 lakh square kilometers, covering parts of Punjab, Haryana, Uttar Pradesh,

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Bihar, and West Bengal.
• These plains are known for their fertility and are often referred to as the "Granary of India."
• Advantages of Canal Irrigation:
• Canal irrigation ensures water availability even during dry seasons, supporting year-round agriculture.
• It helps in controlling floods by diverting excess water into canals during periods of heavy rainfall.
• Canals often recharge the groundwater table, contributing to the sustainability of water resources.
• Challenges of Canal Irrigation:
• Canals require substantial initial investment for construction and maintenance, making them expensive.
• Waterlogging and soil salinity issues can arise in areas with poor drainage facilities.
• The equitable distribution of water can be a challenge, often leading to conflicts between upstream and downstream users.
• Other Methods of Irrigation in India:
• Tube Wells: Widely used in areas with abundant groundwater, particularly in Punjab, Haryana, and Uttar Pradesh.
• Drip Irrigation: A modern method used mainly for water-scarce regions, ensuring water efficiency.
• Sprinkler Irrigation: Used for areas with uneven terrain or sandy soils, commonly seen in Rajasthan and parts of Gujarat.
• Perennial River Systems:
• Perennial rivers like the Ganga and Brahmaputra are fed by glaciers and monsoons, ensuring a continuous supply of water.
• These rivers form a dense drainage network in the northern plains, making the region highly suitable for canal irrigation.

Q15. Answer: (b) Sulphur dioxide and nitrogen oxides

The correct answer is Sulphur dioxide and nitrogen oxides.

Key Points

• Acid rain is primarily caused by the emission of sulphur dioxide (SO2) and nitrogen oxides (NO_x) into the atmosphere.
• These gases react with water vapor, oxygen, and other chemicals in the atmosphere to form sulphuric acid (H2SO4) and nitric acid (HNO3), which then mix with rainwater, making it acidic.
• Sulphur dioxide is mainly released from the burning of fossil fuels such as coal and oil in power plants and industrial facilities.
• Nitrogen oxides are emitted primarily from vehicle exhausts and industrial processes that involve combustion at high temperatures.
• This phenomenon leads to environmental damage, including the acidification of lakes and rivers, damage to forests, and deterioration of buildings and infrastructure. Hence, the correct option is Sulphur dioxide and nitrogen oxides.

Additional Information

• Formation of Acid Rain:
• Acid rain is caused when sulphur dioxide (SO2) and nitrogen oxides (NO_x) combine with water vapor in the atmosphere to form acids.
• The chemical reactions involve the formation of sulphuric acid (H2SO4) and nitric acid (HNO3), which dissolve in rainwater.
• The pH of acid rain is usually less than 5.6, making it harmful to natural and man-made environments.
• Effects of Acid Rain:
• Acid rain can cause the acidification of lakes, rivers, and streams, severely affecting aquatic life.
• It leads to the leaching of essential nutrients from the soil, adversely impacting plant growth and forest ecosystems.
• It accelerates the corrosion of buildings, monuments, and infrastructure, especially those made of limestone and marble.
• Acid rain can have indirect effects on human health by contaminating water sources and food chains.
• Sources of Sulphur Dioxide and Nitrogen Oxides:
• Sulphur dioxide (SO2): The primary sources are coal-fired power plants, oil refineries, and industrial processes.
• Nitrogen oxides (NO_x): These gases are mainly emitted by vehicles, industrial facilities, and power generation plants.
• Prevention and Control of Acid Rain:
• Reducing the use of fossil fuels by transitioning to renewable energy sources like solar and wind power.
• Implementing technologies such as flue gas desulfurization (FGD) to remove sulphur dioxide from exhaust emissions.
• Using catalytic converters in vehicles to minimize nitrogen oxide emissions.
• Promoting energy efficiency and enforcing stricter environmental regulations to limit industrial emissions.
• Important Points:
• Acid rain was first identified as a serious environmental issue in the mid-20th century, particularly in industrialized regions.
• International agreements such as the Convention on Long-Range Transboundary Air Pollution (CLRTAP) have been instrumental in reducing acid rain by controlling emissions of SO2 and NO_x.
• The Clean Air Act in the United States was amended in 1990 to establish programs to reduce acid rain.

Q16. Answer: (b) National Games

The correct answer is National Games.

Key Points

• The National Games of India is the biggest multi-sport national competition held in the country.

• The event is organized by the Indian Olympic Association (IOA) and features athletes from all Indian states and union territories competing in various sports disciplines.

• The first edition of the National Games was held in Lahore in 1924, originally called the "Indian Olympic Games."

• It is conducted every few years and serves as a platform for athletes to showcase their talent and potentially qualify for international-level competitions, including the Olympics and Asian Games.

• The National Games fosters sports culture in the country and helps in identifying and nurturing talented athletes.

Additional Information

• National Games:

• The National Games were initially organized as the "Indian Olympic Games" to promote sports and physical fitness in the country.

• The event now includes numerous sports such as athletics, swimming, gymnastics, wrestling, badminton, hockey, football, and many more.

• The latest edition was held in 2022 in Gujarat, marking the 36th National Games.

• The event also promotes infrastructure development in host states, as dedicated facilities are built for the competition.

• Khelo India Youth Games:

• Launched in 2018, Khelo India Youth Games is an initiative by the Government of India to revive sports culture at the grassroots level.

• It is primarily focused on students and youth aged between 10 and 18 years.

• The event aims to provide a platform for young athletes to showcase their skills and receive financial assistance for training.

• Pro Kabaddi League (PKL):

• Started in 2014, it is a professional Kabaddi league in India.

• PKL is a franchise-based league involving players from both India and other countries.

• It has significantly contributed to the popularity of Kabaddi, but it is not a national multi-sport event.

• Indian Premier League (IPL):

• IPL is a professional cricket league in India, launched in 2008 by the Board of Control for Cricket in India (BCCI).

• It is considered one of the most lucrative and popular cricket tournaments globally but is not a multi-sport national event.

Q17. Answer: (d) Sorbic acid

The correct answer is Sorbic acid.

Key Points

• Sorbic acid and its salts, such as potassium sorbate, are widely used as food preservatives to prevent the growth of mould, yeast, and fungi.

• Sorbic acid is a naturally occurring compound first isolated from the berries of the rowan tree (Sorbus aucuparia) in 1859.

• It is effective in low concentrations and is commonly used in processed foods, beverages, and bakery products to maintain quality and safety.

• Sorbic acid has antifungal properties and inhibits microbial growth by interfering with the metabolic processes of fungi and yeast.

• Due to its low toxicity and safety for human consumption, sorbic acid is approved by food safety authorities worldwide, including the US FDA and the European Food Safety Authority (EFSA).

Additional Information

• Perchloric Acid:

• Perchloric acid is a strong mineral acid primarily used in industrial and laboratory applications.

• It is not used as a food preservative due to its corrosive and highly reactive properties.

• Applications include oxidation reactions and the preparation of perchlorate salts.

• Boric Acid:

• Boric acid is a weak acid with applications in antiseptics, insecticides, and industrial products.

• It is not a primary food preservative due to concerns about its toxicity when ingested in large amounts.

• Boric acid is used in small amounts as a pH buffer in some industrial food preparation processes.

• Malic Acid:

• Malic acid is a naturally occurring organic acid found in fruits such as apples and cherries.

• It is primarily used in the food and beverage industry as a flavor enhancer and acidulant.
• While it contributes to the tangy taste of foods, it does not have antimicrobial properties like sorbic acid.
• Sorbic Acid:
• Sorbic acid is widely used in foods such as cheese, wine, dried fruits, and soft drinks.
• Potassium sorbate, a salt of sorbic acid, is highly soluble and often preferred for use in liquid products.
• It is effective in acidic environments, making it suitable for preserving acidic foods like fruit juices.
• Applications of Sorbic Acid:
• Used in pharmaceuticals to prevent microbial contamination of medicines.
• Commonly used in cosmetics to extend the shelf life of products by preventing microbial growth.
• Acts as an antifungal agent in food packaging materials.

Q18. Answer: (a) Li Chenggang

The correct answer is Li Chenggang.

Key Points

• Li Chenggang was appointed as the International Trade Negotiator by China in April 2025. He is a prominent figure in China's trade and economic policies.
• His appointment is seen as a strategic move by China to strengthen its position in global trade negotiations, especially amidst changing geopolitical and economic dynamics.
• Li Chenggang has significant experience in trade policies and has been involved in multiple international trade negotiations, representing China's interests effectively.
• He has previously held critical positions in China's Ministry of Commerce, contributing to the nation's trade strategies and economic agreements.
• His role as the International Trade Negotiator is pivotal in addressing trade disputes, enhancing bilateral and multilateral trade relations, and ensuring China's economic interests are well-represented on the global stage.

Additional Information

• International Trade Negotiator:
• An International Trade Negotiator is responsible for representing a country's trade interests during negotiations with other nations or international organizations.
• The role requires a deep understanding of global trade laws, regulations, and economic policies.
• They work to resolve disputes, negotiate trade agreements, and ensure that the nation’s economic and strategic interests are safeguarded.
• China's Trade Policies:
• China is one of the world's largest trading nations, with a focus on enhancing exports and securing essential imports.
• It actively participates in organizations like the World Trade Organization (WTO) and engages in bilateral and multilateral trade agreements.
• Recent policies emphasize innovation, technology exports, and reducing dependency on certain imports.
• Li Chenggang's Background:
• Li Chenggang has an extensive background in international trade and economic policies.
• He has served in various roles within the Ministry of Commerce of China, contributing to key trade agreements and policies.
• His expertise is recognized globally, making him a significant figure in shaping China's trade strategies.
• China's Global Trade Influence:
• China is a major player in global trade, contributing to over 15% of the world’s total trade volume.
• It has strong trade relations with countries across the globe, including the United States, European Union, and ASEAN nations.
• China's Belt and Road Initiative (BRI) is a significant project aimed at enhancing global trade connectivity.

Q19. Answer: (c) Amlan Borgohain

The correct answer is Amlan Borgohain.

Key Points

• Amlan Borgohain, an Indian sprinter, set a new national record in the 200m sprint event at the 2025 Asian Athletics Championships.
• He clocked an impressive timing of 20.36 seconds, breaking the previous national record in this category.
• Amlan Borgohain is known for his exceptional performance in short-distance track events, particularly in the 100m and 200m sprints.
• He hails from the state of Assam, India, and has been a prominent name in Indian athletics in recent years.

• His achievement at the 2025 Asian Athletics Championships is a significant milestone, further solidifying his reputation as one of India's top sprinters.

Additional Information

• Amlan Borgohain:

• Amlan Borgohain specializes in short-distance sprinting events, particularly the 100m and 200m.

• He previously broke the national record in the 200m sprint during the 2022 Federation Cup with a timing of 20.52 seconds.

• He represents India in various international athletic events and is considered one of the fastest sprinters in the country.

• His consistent performances have made him a key contender in Asian and global championships.

• Asian Athletics Championships:

• The Asian Athletics Championships is a biennial athletics event organized by the Asian Athletics Association.

• It is a prestigious competition where top athletes from across Asia compete in various track and field events.

• India has consistently performed well in these championships, with several athletes earning medals in past editions.

• Amlan's achievement in the 2025 edition adds to India's legacy in this event.

• Other Indian Sprinters:

• Animesh Kujur is another emerging sprinter but has not yet achieved significant international records.

• Gurindervir Singh is a promising athlete specializing in the 100m sprint, but he has not set any national records in the 200m event.

• Amiya Mallick held the national record in the 100m sprint previously but does not specialize in the 200m category.

• Importance of Sprinting in Athletics:

• Sprinting events are high-intensity races that focus on speed and agility over short distances, such as 100m, 200m, and 400m.

• These events require a combination of explosive power, technique, and endurance to achieve optimal performance.

• Indian athletes like Milkha Singh, Hima Das, and Amlan Borgohain have contributed significantly to the nation's reputation in track and field.

Important Points

• Training and Facilities:

• Indian sprinters like Amlan Borgohain undergo rigorous training under expert coaches and utilize advanced facilities provided by organizations like the Sports Authority of India (SAI).

• Support programs under initiatives like Target Olympic Podium Scheme (TOPS) play a crucial role in nurturing athletic talent in India.

• Records and Achievements:

• Amlan's record-breaking performance in the 2025 Asian Athletics Championships is among the fastest in Asia, showcasing India's growing prowess in athletics.

• Such achievements inspire upcoming athletes and contribute to the development of sports culture in the country.

Q20. Answer: (c) It opens the application or file.

The correct answer is It opens the application or file..

Key Points

• Double-clicking an icon on the desktop is a standard action in most graphical user interface (GUI) operating systems like Windows, macOS, and Linux, which opens the associated application or file.

• This action is typically used to launch programs or open files and folders that are represented by icons on the desktop. Hence, this statement is correct.

• When you double-click an icon, the operating system reads the file association and executes the related program or opens the file in the default program associated with its type.

• For example, if you double-click a Word document icon, the system opens the file in Microsoft Word or another text editor configured to handle .docx files.

• Double-click is also an essential feature for improving user accessibility, allowing quick execution of tasks without navigating menus or command lines.

Additional Information

• Functionality of Double-Click:

• In GUI environments, the double-click action is used for user interaction with files, folders, and shortcuts.

• It is part of basic mouse operations, which include single-click, right-click, and drag-and-drop.

• Double-click speed can be adjusted in the mouse settings of the operating system to suit user preferences.

• Operating systems like Windows 11 and macOS Ventura allow users to adjust double-click speed or even replace double-click functionality with single-click actions for accessibility purposes.

• File Associations:
• File associations determine which program opens a file when it is double-clicked.
• For example, a .jpg file opens in an image viewer like Photos or Adobe Photoshop, depending on the user's default settings.
• Users can change file associations in operating systems like Windows by navigating to Settings > Apps > Default Apps.
• File associations are critical for seamless operation and user convenience.
• Other Desktop Actions:
• Single-click is used for selecting icons or highlighting files without opening them.
• Right-click opens a context menu to allow additional options like rename, delete, or properties.
• Dragging an icon allows users to move files or shortcuts to other locations like folders or drives.
• Operating System Variations:
• In macOS, double-clicking an application icon launches the app, similar to Windows.
• In Linux environments, desktops like GNOME or KDE also use double-click functionality for similar purposes.
• Some systems allow users to replace double-click actions with single-click for accessibility.

Important Points

• Incorrect Options:
• Option 1: It gets deleted – Double-clicking does not delete an icon or file. Deletion usually requires right-clicking and selecting "Delete" or using the keyboard shortcut Delete key.
• Option 2: It goes to the Taskbar – Double-clicking an icon does not move it to the taskbar. Pinning to the taskbar is a separate action performed manually by the user.
• Option 4: It minimizes the window – Double-clicking does not minimize windows; this is achieved by clicking the minimize button or using keyboard shortcuts.

Q21. Answer: (d) Gopal Krishna Gokhale

The correct answer is Gopal Krishna Gokhale.

Key Points

• Gopal Krishna Gokhale founded the Servants of India Society in 1905 in Pune, Maharashtra.
• The society was established with the aim to train Indians for national service and create political awareness among the masses during the British colonial rule.
• Gopal Krishna Gokhale was a prominent Indian political leader and a social reformer who was a senior leader of the Indian National Congress.
• The society emphasized the values of self-sacrifice, dedication, and service to the nation.
• It worked on promoting education, healthcare, and social reforms in India, focusing on improving the lives of the underprivileged.

Additional Information

• Gopal Krishna Gokhale:
• Born on 9 May 1866, in Maharashtra, Gokhale was a moderate leader within the Indian National Congress who believed in non-violence and constitutional reforms.
• He was a mentor to Mahatma Gandhi, who later referred to him as his political guru.
• Gokhale's efforts were focused on reforming the education system, addressing caste inequalities, and promoting economic development.
• Servants of India Society:
• The society's motto was to "train men prepared to devote their lives to the cause of the country."
• It encouraged educated Indians to become servants of the nation and work in areas like public health, education, and rural development.
• Among its notable members was Srinivasa Shastri, a distinguished follower of Gokhale.
• Other Notable Leaders:
• Bal Gangadhar Tilak: A contemporary of Gokhale, he was a prominent extremist leader in the Indian National Congress and advocated for Swaraj (self-rule).
• Motilal Nehru: A senior Congress leader and the father of Jawaharlal Nehru, he focused on political independence and constitutional reforms.
• BR Ambedkar: A key figure in drafting the Indian Constitution, he worked extensively for social justice and the upliftment of Dalits in India.
• Impact of the Society:
• The Servants of India Society laid the foundation for several social reform movements and was instrumental in spreading political consciousness in pre-Independence India.

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• Its emphasis on education and social service inspired many leaders and organizations in India's freedom struggle.

Q22. Answer: (d) East Coast of India

The correct answer is East Coast of India.

Key Points

• Chilika Lake is located in the state of Odisha on the East Coast of India. It is Asia's largest brackish water lagoon and supports a rich variety of flora and fauna.

• Pulicat Lake is situated on the border of Andhra Pradesh and Tamil Nadu, also on the East Coast of India. It is the second-largest brackish water lake in India.

• Both lakes are located on the eastern coastline, which is characterized by deltas formed by major rivers such as the Mahanadi, Godavari, Krishna, and Cauvery.

• Chilika Lake is a recognized Ramsar Wetland Site and provides critical habitat for migratory birds, while Pulicat Lake is known for its ecological importance and bird sanctuary.

• The East Coast of India, where both lakes are located, is influenced by the Bay of Bengal and features unique ecosystems essential for biodiversity and livelihood.

Additional Information

• Chilika Lake:

• Located in Odisha, it spans an area of about 1,100 square kilometers.

• The lake is a significant habitat for irrawaddy dolphins and is home to over 160 species of birds during the migratory season.

• It is fed by rivers such as the Daya River and is connected to the Bay of Bengal through a narrow channel.

• Chilika Lake is famous for its eco-tourism and sustains local communities through fishing and agriculture.

• Pulicat Lake:

• It is located on the border of Tamil Nadu and Andhra Pradesh, spanning an area of about 759 square kilometers.

• The lake is separated from the Bay of Bengal by the Sriharikota Island, which houses the Indian Space Research Organisation (ISRO).

• It is a vital habitat for flamingos and other migratory birds, making it a prominent bird sanctuary.

• Pulicat Lake is primarily fed by rivers like the Swarnamukhi and is known for its brackish water ecosystem.

• East Coast of India:

• The eastern coastline of India runs along the Bay of Bengal and stretches from the Ganges-Brahmaputra delta in the north to Tamil Nadu in the south.

• It is characterized by fertile plains, deltas, and lagoons, making it a crucial region for agriculture and biodiversity.

• Major rivers forming deltas along the East Coast include the Mahanadi, Godavari, Krishna, and Cauvery.

• It features several important ecosystems, including mangroves, lagoons, and estuaries.

• Important Lakes of India:

• Other notable lakes in India include Wular Lake in Jammu and Kashmir, Vembanad Lake in Kerala, and Loktak Lake in Manipur.

• India has a rich diversity of lakes, including freshwater, brackish, and saline lakes, which play a crucial role in the ecosystem and livelihood of the people.

Q23. Answer: (a) Warehousing

The correct answer is Warehousing.

Key Points

• Warehousing has been classified as part of the infrastructure sector by the Government of India. This classification aims to improve access to financing for the sector.

• The inclusion of warehousing in the infrastructure category helps attract increased investments, both domestic and foreign, to modernize and expand storage and logistics facilities.

• Infrastructure status provides the sector with several benefits such as easier access to credit, longer repayment tenures, and reduced borrowing costs.

• This move is crucial for strengthening India's supply chain and logistics network, which plays a key role in supporting the agriculture and manufacturing sectors.

• Warehousing is critical for reducing post-harvest losses in agriculture and ensuring the efficient storage and movement of goods.

Additional Information

• Infrastructure Classification in India:

• Infrastructure sectors in India include areas like transportation, energy, water supply, communication, and now warehousing.

• Recognizing sectors as infrastructure allows them to access priority lending and other financial support mechanisms.

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• Importance of Warehousing:

• Warehousing is an essential part of the logistics and supply chain network, ensuring the proper storage of goods before distribution.

• It reduces transportation costs by enabling bulk storage and delivery.

• Modern warehouses include cold storage facilities, which are vital for preserving perishable goods like fruits, vegetables, and dairy products.

• Government Initiatives in Warehousing:

• The Government of India has introduced schemes like the Warehousing Development and Regulatory Authority (WDRA) to promote storage infrastructure.

• Fiscal incentives such as tax benefits and capital subsidies are provided for the development of warehousing facilities.

• Comparison of Other Options:

• Education: Although critical, it is not classified as an infrastructure sector. It falls under social infrastructure aimed at human resource development.

• Apparel: This belongs to the manufacturing sector and is a major contributor to exports but lacks infrastructure status.

• Retail: Retail is part of the trading sector and is not considered infrastructure despite its economic significance.

Q24. Answer: (d) Nishchay

The correct answer is Nishchay.

Key Points

• Nishchay threw a remarkable distance of 19.59 m in the Shot Put event at the Asian U-18 Athletics Championship held in April 2025.

• His performance earned him the prestigious Silver Medal, showcasing his exceptional skill and dedication in the sport.

• The Asian U-18 Athletics Championship is a significant event that features young athletes from across Asia competing in various athletic disciplines.

• Shot Put is a track and field event where participants attempt to throw a heavy spherical object known as the "shot" as far as possible.

• Other notable participants in the competition included Anuragh G, VS Anupriya, and Vidhi, but Nishchay's record-breaking throw stood out as the second-best performance.

Additional Information

• Asian U-18 Athletics Championship:

• The championship is an international event organized by the Asian Athletics Association, focusing on athletes under the age of 18.

• It provides a platform for young athletes to showcase their talent and compete at a continental level.

• The competition includes a variety of track and field events such as running, jumping, and throwing disciplines.

• Shot Put Event:

• Shot Put is a field event in athletics where athletes throw a heavy spherical object called the "shot."

• The objective is to throw the shot as far as possible within the designated sector.

• It requires a combination of strength, technique, and precision, making it one of the most challenging throwing events.

• Important Achievements in Indian Athletics:

• India has consistently produced talented athletes in various track and field events, earning medals at international championships.

• Recent achievements include medals in events like javelin throw, long jump, and relay races.

• Prominent athletes such as Neeraj Chopra and Anju Bobby George have contributed to India's global recognition in athletics.

• Training and Support for Young Athletes:

• Young athletes like Nishchay benefit from specialized training programs and support provided by organizations such as the Sports Authority of India (SAI).

• State-of-the-art facilities and experienced coaches help athletes excel in their respective sports.

• Government initiatives such as Khelo India aim to identify and nurture sporting talent at the grassroots level.

Q25. Answer: (a) Faizabad

The correct answer is Faizabad.

Key Points

• Faizabad was established as the capital of the Awadh (Oudh) region in 1722 by Saadat Khan Burhan-ul-Mulk, the first Nawab of Awadh.

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• Saadat Khan served as the governor of the region under the Mughal Empire and laid the foundation of Faizabad as the administrative and political center of Awadh.

• Faizabad remained the capital of Awadh until it was shifted to Lucknow by Nawab Asaf-ud-Daula in 1775.

• The city is located in present-day Uttar Pradesh and played an important role in the history of Mughal-era provincial governance.

• Faizabad is historically significant for being a cultural and political hub during the time of the Nawabs of Awadh.

Additional Information

• Awadh Region:

• Awadh, also known as Oudh, was a prominent province in northern India, primarily located in the present-day state of Uttar Pradesh.

• The region was known for its fertile lands, making it an agricultural hub and a wealthy province during the Mughal and British periods.

• Awadh was renowned for its rich culture, art, and architecture, which flourished under the patronage of the Nawabs.

• Saadat Khan Burhan-ul-Mulk:

• He was the first Nawab of Awadh, appointed by the Mughal Emperor Mohammad Shah in 1722.

• Saadat Khan established Faizabad as his capital and worked to strengthen the administration and economy of the province.

• He is credited with laying the foundation of the autonomous rule of the Nawabs in Awadh.

• Shift of Capital to Lucknow:

• In 1775, Nawab Asaf-ud-Daula, the fourth Nawab of Awadh, shifted the capital from Faizabad to Lucknow.

• Lucknow became a center of art, culture, music, and poetry during the Nawabi era.

• The shift was influenced by Lucknow's strategic location and its potential for further development.

• Other Options:

• Bareilly: Bareilly is a city in Uttar Pradesh but was never the capital of Awadh. It is historically significant for its role in the Indian Rebellion of 1857.

• Gorakhpur: Gorakhpur is another city in Uttar Pradesh, known for its religious significance and as the headquarters of the Gorakhnath Math. It was not associated with the governance of Awadh.

• Fatehpur: Fatehpur is a district in Uttar Pradesh but holds no historical connection to the capital of Awadh.

• Important Points:

• The Nawabs of Awadh played a crucial role in shaping the political and cultural identity of northern India during the 18th century.

• Faizabad, as the initial capital, served as the administrative and cultural hub of Awadh for more than five decades before the shift to Lucknow.

• The period of Nawabi rule in Awadh is often referred to as a golden era for its contributions to art, music, and cuisine.

Q26. Answer: (b) Chloroplast

The correct answer is Chloroplast.

Key Points

• Chloroplasts are the organelles responsible for photosynthesis in plants, enabling them to convert sunlight into chemical energy stored as glucose.

• They contain the pigment chlorophyll, which absorbs light energy primarily from the blue and red wavelengths of sunlight, facilitating the photosynthetic process.

• Photosynthesis occurs in two main phases: the light-dependent reactions (in the thylakoid membranes) and the Calvin cycle (in the stroma).

• The chloroplast structure includes the thylakoid membranes, stroma, and grana, which are essential for trapping light energy and synthesizing sugars.

• Chloroplasts are unique to plants and algae, and their ability to perform photosynthesis is critical for the survival of most life forms on Earth.

Additional Information

• Mitochondria:

• Known as the powerhouse of the cell, mitochondria are responsible for generating ATP (adenosine triphosphate) through cellular respiration.

• They do not participate in photosynthesis but play a crucial role in energy production within plant and animal cells.

• Mitochondria have a double membrane structure and their own DNA, enabling them to replicate independently of the cell.

• Leucoplasts:

• Leucoplasts are colorless plastids found in non-photosynthetic tissues of plants, such as roots and seeds.

• Their primary function is to store starch, oils, or proteins, but they do not contribute to photosynthesis.

• Examples include amyloplasts (store starch) and elaioplasts (store lipids).
• Chromoplasts:
• Chromoplasts are responsible for the synthesis and storage of pigments, giving fruits, flowers, and roots their distinctive colors (yellow, orange, red).
• They do not perform photosynthesis but play a role in attracting pollinators and seed dispersers.
• Importance of Photosynthesis:
• Photosynthesis is a fundamental process for life on Earth, providing the primary energy source for all living organisms.
• It helps maintain atmospheric oxygen levels and utilizes carbon dioxide, making it vital for balancing Earth's ecosystem.

Important Points

• Discovery of Chloroplasts:
• The concept of chloroplasts was first introduced by Julius von Sachs, a German botanist, in the 19th century.
• He discovered the role of chloroplasts in photosynthesis and their ability to store starch.
• Chlorophyll Types:
• Plants primarily use chlorophyll a and chlorophyll b for photosynthesis.
• These pigments absorb light effectively in the blue and red regions of the spectrum.
• Global Significance:
• Through photosynthesis, plants contribute to the carbon cycle, which is essential for climate regulation.
• Approximately 100 billion tons of carbon dioxide are fixed annually through photosynthesis.

Q27. Answer: (c) To provide basic rules for coordination and assurance

The correct answer is To provide basic rules for coordination and assurance.

Key Points

• Diverse societies consist of people from different backgrounds, religions, cultures, and ideologies. A constitution provides a framework to ensure coordination and harmony among such diverse groups.
• The constitution establishes basic rules and principles that help people coexist peacefully and work towards common goals, avoiding conflicts based on differences.
• It ensures assurance of equal rights, justice, and protection for all citizens, regardless of their social, economic, or cultural differences.
• The constitution acts as a guiding document for governance, helping leaders and institutions manage societal diversity effectively without discrimination or domination.
• In societies with multiple groups, the constitution prevents chaos by creating a legal and institutional framework to balance conflicting interests. This helps maintain stability and promote democratic values.

Additional Information

• Characteristics of Option 1 (To impose religious uniformity):
• This option is incorrect as imposing religious uniformity contradicts the principles of a democratic and diverse society. It leads to suppression of minority rights.
• Religious uniformity is against the ideals of secularism upheld in democratic constitutions like that of India, which guarantees religious freedom under Article 25.
• Characteristics of Option 2 (To eliminate all differences):
• Eliminating all differences is neither practical nor desirable in a diverse society. Diversity is a strength that fosters innovation and cultural richness.
• Constitutions aim to celebrate diversity while ensuring equality and justice, not to erase differences.
• Features of Option 3 (Correct Answer - To provide basic rules for coordination and assurance):
• Constitutions provide a legal framework that guides governance and ensures the rights and duties of all citizens.
• It helps prevent conflicts by establishing common principles and laws that apply equally to everyone.
• Examples include India's Preamble, which promises justice, liberty, and equality, and the Fundamental Rights under Articles 12-35.
• Characteristics of Option 4 (To allow rulers to dominate others):
• This option is incorrect as it contradicts the purpose of constitutions. Constitutions aim to limit the power of rulers and ensure accountability.
• For example, democratic constitutions establish checks and balances to prevent misuse of power by rulers.

Important Points

• Constitution of India:
• The Indian Constitution is the world's largest written constitution and provides a robust framework for governing a diverse

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society.

• It includes provisions like Article 14 (Equality before law), Article 15 (Prohibition of discrimination), and Article 19 (Freedom of speech and expression) to ensure coordination and assurance.

• Importance of Diversity:

• Diversity enriches societies by fostering different perspectives and ideas.

• Examples include countries like India, Canada, and South Africa that embrace multiculturalism.

Q28. Answer: (b) Ministry of Electronics and Information Technology (MeitY)

The correct answer is Ministry of Electronics and Information Technology (MeitY).

Key Points

• Software Technology Parks of India (STPI) is an autonomous society under the Ministry of Electronics and Information Technology (MeitY).

• STPI was established in 1991 with the objective of promoting software exports from India.

• The organization provides state-of-the-art infrastructure and support services, including high-speed data communication facilities to IT and IT-enabled services (ITES) companies.

• STPI works towards enhancing India's position as a preferred IT destination globally, contributing significantly to the country's software export growth.

• It has a network of 62 centers across India, catering to the needs of software exporters and startups in the IT and ITES sectors.

Additional Information

• Ministry of Electronics and Information Technology (MeitY):

• MeitY is responsible for policy formulation, development, and implementation in the field of electronics, IT, and e-governance.

• It plays a pivotal role in promoting Digital India initiatives, fostering innovation, and driving the growth of the electronics and IT industry.

• The ministry oversees several key programs, including Digital India, National AI Strategy, and Startup India.

• MeitY also facilitates the establishment of Software Technology Parks and other IT infrastructure to support India's burgeoning IT sector.

• Software Technology Parks of India (STPI):

• The primary focus of STPI is to encourage, promote, and boost software exports from India.

• It provides services such as IT incubation, high-speed internet connectivity, and financial assistance.

• STPI has significantly contributed to transforming India into a global IT hub, playing a critical role in the growth of IT exports.

• As of 2023, STPI assists in nurturing startups and providing incubation facilities through its CoE (Centres of Excellence) initiative.

• Other Ministries Mentioned:

• Ministry of Home Affairs: Deals with internal security, border management, and disaster management. It does not oversee STPI.

• Ministry of Communications: Oversees telecommunications policies and programs in India, unrelated to STPI.

• Ministry of Science and Technology: Focuses on scientific research and development, unrelated to STPI's IT and software export objectives.

Important Points

• STPI’s Contribution:

• Since its inception, STPI has helped India achieve significant milestones in software exports, which have grown exponentially over the years.

• It plays a crucial role in supporting startup ecosystems and encouraging innovation in IT and ITES sectors.

• Significance of MeitY:

• MeitY is instrumental in implementing the Digital India campaign to transform India into a digitally empowered economy.

• The ministry supports initiatives such as Cybersecurity, Artificial Intelligence (AI), IoT, and Blockchain to drive technological advancements.

Q29. Answer: (b) 1820

The correct answer is 1820.

Key Points

• Ishwar Chandra Vidyasagar was born on 26 September 1820 in Birsingha village, located in the Midnapore district of West Bengal, India.

• He is remembered for his significant contributions to social reform in India, particularly in the areas of widow remarriage and the abolition of polygamy in Hindu society.

• He played a pivotal role in the passing of the Hindu Widows' Remarriage Act of 1856, which legalized the remarriage of Hindu

widows.

• Vidyasagar was a staunch advocate of education, particularly for women, and worked tirelessly to establish schools and promote literacy among women.

• In addition to his social reforms, Vidyasagar was a renowned scholar and academic who simplified and modernized the Bengali alphabet and prose, making it easier to learn and use.

Additional Information

• Hindu Widows' Remarriage Act, 1856:

• This act was a landmark reform initiated by Ishwar Chandra Vidyasagar to provide legal recognition to the remarriage of widows in Hindu society.

• It was passed under the governance of Lord Dalhousie and later implemented during the tenure of Lord Canning.

• The act aimed to reduce the social stigma and exploitation faced by Hindu widows, who were often ostracized by society.

• Educational Contributions:

• Vidyasagar established several schools, including the Metropolitan Institution in Kolkata, which later became Vidyasagar College.

• He was a strong proponent of women's education and helped set up numerous schools for girls.

• He also served as the Principal of Sanskrit College in Kolkata, where he implemented progressive reforms to modernize the curriculum.

• Reforms in the Bengali Language:

• Vidyasagar simplified the Bengali alphabet, removing redundant characters and making the language more accessible.

• He authored several textbooks in Bengali to promote education and literacy.

• Other Social Reforms:

• In addition to advocating for widow remarriage, Vidyasagar opposed child marriage and polygamy, which were prevalent in Hindu society during his time.

• He worked tirelessly to uplift the status of women and other marginalized groups in society.

• Legacy:

• Ishwar Chandra Vidyasagar is regarded as one of the greatest social reformers and educationists in Indian history.

• His work in the fields of education, women's rights, and social reform continues to inspire generations of Indians.

• Several institutions, roads, and public places across India have been named after him to honor his contributions.

Q30. Answer: (c) Both, Supreme Court and High Courts can strike down unconstitutional laws.

The correct answer is Both, Supreme Court and High Courts can strike down unconstitutional laws..

Key Points

• Judicial Review is the power of the judiciary to review and determine the constitutionality of legislative and executive actions. It is a vital component of India's democracy.

• Both the Supreme Court and the High Courts in India have the authority to perform judicial review under Articles 32 and 226 of the Constitution, respectively. Hence, this statement is correct.

• Article 13 explicitly mentions that laws inconsistent with or in derogation of the Fundamental Rights shall be void. This forms the foundation of judicial review in India. Hence, this statement is correct.

• The judiciary does not need prior approval from the Parliament to review laws. It can independently assess laws based on petitions or suo moto actions. Thus, this statement is incorrect.

• The Supreme Court is the final interpreter of the Constitution, while High Courts exercise judicial review for matters within their territorial jurisdiction.

Additional Information

• Judicial Review in India:

• Judicial review is a part of the basic structure of the Constitution as established by the Keshavananda Bharati Case (1973).

• It ensures that the legislative and executive actions remain within the limits set by the Constitution.

• This mechanism protects the Fundamental Rights of citizens and maintains the supremacy of the Constitution.

• Role of the Supreme Court:

• The Supreme Court has original jurisdiction under Article 32 to enforce Fundamental Rights and strike down unconstitutional laws.

• It has appellate jurisdiction to review decisions of lower courts and tribunals.

• Judicial review by the Supreme Court applies to the entire country.

• Role of High Courts:

• High Courts exercise judicial review under Article 226, which empowers them to issue writs for the enforcement of Fundamental

Rights and other legal rights.

• Judicial review by High Courts is limited to their territorial jurisdiction.

• Important Cases related to Judicial Review:

• Marbury v. Madison (1803): This US case established the concept of judicial review, which influenced its adoption in India.

• A. K. Gopalan v. State of Madras (1950): This case was one of the earliest instances of judicial review in India.

• Maneka Gandhi v. Union of India (1978): This case expanded the scope of judicial review to include due process in administrative actions.

Important Points

• Constitutional Provisions:

• Article 13: Declares laws inconsistent with Fundamental Rights void, forming the backbone of judicial review.

• Article 32: Empowers the Supreme Court to issue writs for the enforcement of Fundamental Rights.

• Article 226: Grants High Courts the power to issue writs for the enforcement of Fundamental Rights and other legal rights.

• Limitations of Judicial Review:

• Judicial review cannot extend to political questions or policy decisions unless they violate the Constitution.

• It does not grant the judiciary legislative or executive powers; it only ensures constitutional compliance.

• Significance:

• Judicial review acts as a check on arbitrary legislative and executive actions.

• It upholds the principle of separation of powers and ensures the rule of law in a democracy.

Q31. Answer: (d) Courts must report cash transactions over Rs. 2 lakh to the Income Tax Department.

The correct answer is Courts must report cash transactions over Rs. 2 lakh to the Income Tax Department..

Key Points

• The Rajasthan High Court, on May 27, 2025, issued a directive concerning cash transactions and their reporting to the Income Tax Department.

• As per the directive, courts are required to report cash transactions exceeding Rs. 2 lakh under specific circumstances to ensure compliance with taxation laws.

• This mandate aligns with existing regulations under the Income Tax Act, 1961, which prohibit cash transactions above Rs. 2 lakh for certain transactions to curb black money and promote transparency.

• The court's decision emphasizes the role of judicial and administrative bodies in ensuring compliance with financial regulations and preventing tax evasion.

• Such directives are aimed at improving accountability and strengthening the overall financial regulatory framework in India.

Additional Information

• Income Tax Act, 1961:

• The Income Tax Act prohibits cash transactions of more than Rs. 2 lakh under Section 269ST, introduced in the Finance Act, 2017.

• Violations of Section 269ST can lead to a penalty equivalent to the amount received in cash.

• This provision was introduced to curb the circulation of black money and promote the use of digital transactions.

• Black Money (Undisclosed Foreign Income and Assets) and Imposition of Tax Act, 2015:

• This act aims to curb tax evasion related to undisclosed foreign income and assets.

• It imposes penalties and prosecutes individuals or entities involved in hiding income or conducting unreported financial transactions.

• Digital Payment Initiatives in India:

• The government promotes the use of digital payments through schemes such as the Digital India Programme.

• Initiatives like Unified Payments Interface (UPI), Bharat QR, and RuPay cards aim to reduce dependency on cash transactions.

• Judicial Role in Financial Regulations:

• Courts play a crucial role in ensuring adherence to financial laws and regulations.

• They often act as a bridge between law enforcement agencies and the government in implementing measures to prevent financial fraud and tax evasion.

Important Points

• Penalty for Cash Transactions:

• Under Section 271DA of the Income Tax Act, accepting cash transactions above Rs. 2 lakh attracts a penalty equal to the transaction amount.

• Businesses and individuals are encouraged to use banking channels or digital modes for high-value transactions.

• Cash Transaction Limit:

• The Rs. 2 lakh limit applies to single transactions or aggregate transactions in a single day from one person.

• Exceptions include transactions with the government, banks, post offices, and other notified entities.

• Role of Reporting Entities:

• Entities such as banks, financial institutions, and courts are required to report certain transactions under the Prevention of Money Laundering Act (PMLA) and other laws.

• Such reporting ensures transparency and reduces financial crimes.

Q32. Answer: (a) Article 9

The correct answer is Article 9.

Key Points

• Article 9 of the Indian Constitution states that a person who has voluntarily acquired the citizenship of any foreign country shall not be considered a citizen of India at the commencement of the Constitution.

• This provision ensures that individuals who have deliberately chosen to acquire foreign citizenship are excluded from Indian citizenship, despite Articles 5, 6, or 8.

• Articles 5, 6, and 8 of the Constitution deal with citizenship at the commencement of the Constitution. However, Article 9 specifically overrides these provisions for individuals who have voluntarily acquired foreign citizenship.

• Article 9 establishes the principle of exclusivity in citizenship, disallowing dual citizenship under the Indian legal framework.

• The provision reflects the framers' intention to maintain a single allegiance to India, ensuring that citizenship is not divided between India and a foreign state.

Additional Information

• Article 5:

• Article 5 defines the citizenship of people who were domiciled in India at the commencement of the Constitution (January 26, 1950).

• It states that anyone born in the territory of India, or whose parents were born in India, or who has been an ordinary resident for five years immediately preceding the commencement of the Constitution, is deemed a citizen of India.

• Article 6:

• Article 6 addresses the rights of certain persons who migrated to India from Pakistan before July 19, 1948, granting them Indian citizenship under specific conditions.

• Article 8:

• Article 8 provides citizenship rights to individuals of Indian origin residing outside India at the commencement of the Constitution, provided their father or grandfather was born in India.

• Such individuals must register with an Indian diplomatic or consular representative to be recognized as Indian citizens.

• Citizenship Act, 1955:

• The Citizenship Act, 1955, governs the acquisition, termination, and supplementary provisions of Indian citizenship.

• It lays down five modes of acquiring Indian citizenship: by birth, descent, registration, naturalization, and incorporation of territory.

• Concept of Single Citizenship:

• The Indian Constitution provides for single citizenship, meaning that all Indians, regardless of the state or territory they belong to, are citizens of India.

• This is in contrast to countries like the United States, which follow a dual citizenship model (federal and state citizenship).

Q33. Answer: (c) Chandigarh

The correct answer is Chandigarh.

Key Points

• Chandigarh, the Union Territory and joint capital of Punjab and Haryana, has been known for its focus on infrastructure and public facilities, including sports amenities.

• In 2025, Chandigarh inaugurated modern sports facilities, including specialized centers such as chess centers and a snooker hall, aimed at promoting indoor sports and nurturing talent in these fields.

• The initiative aligns with Chandigarh's reputation as a hub for education and sports, showcasing its commitment to providing world-class facilities to its residents.

• Such developments are part of broader efforts to enhance the Union Territory's infrastructure and encourage youth participation in sports, contributing to the overall development of the region.

• The inauguration of these facilities also reflects the growing importance of indoor sports in India and the government's efforts to create opportunities for athletes in lesser-known sports disciplines.

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Additional Information

• Chandigarh:

• Chandigarh is a Union Territory in India and serves as the capital of both Punjab and Haryana.

• It is known for its modern urban planning, designed by the renowned architect Le Corbusier.

• The city is a hub for education, sports, and cultural activities, with numerous facilities for public welfare.

• Importance of Modern Sports Facilities:

• Modern sports facilities help nurture young talent and promote a culture of fitness and competition.

• Indoor sports like chess and snooker require specialized infrastructure to enhance skill development and host professional events.

• Such facilities can also serve as venues for national and international tournaments, boosting tourism and local economy.

• Other Sports Initiatives in India:

• Khelo India Programme: A government initiative aimed at identifying and nurturing sports talent from grassroots levels.

• National Sports Development Fund (NSDF): Established to mobilize resources for the development of sports infrastructure and training programs.

• Target Olympic Podium Scheme (TOPS): Aims to support athletes with potential to win medals at the Olympics.

• Importance of Indoor Sports:

• Indoor sports are less affected by weather conditions and provide year-round opportunities for athletes to train and compete.

• They help in developing focus, strategy, and critical thinking skills, particularly in games like chess.

• India has been making strides in indoor sports, with players achieving global recognition in games like chess and snooker.

Q34. Answer: (c) Anglo-Indian Reservation

The correct answer is Anglo-Indian Reservation.

Key Points

• The 104th Constitutional Amendment Act, 2020, abolished the provision for the nomination of two Anglo-Indian members in the Lok Sabha and Legislative Assemblies of states.

• Prior to this amendment, Article 331 of the Constitution of India provided for the reservation of two seats in the Lok Sabha for the Anglo-Indian community, which was a nominated category.

• The provision for the nomination of Anglo-Indians was originally introduced to safeguard the political representation of a minority community that had unique cultural and historical significance in India.

• The government justified the abolition of this provision by asserting that the Anglo-Indian population had significantly reduced, and the community was now well-integrated into Indian society.

• This amendment does not affect the reservation for Scheduled Castes (SC), Scheduled Tribes (ST), or Other Backward Classes (OBC), which continues as per other provisions of the Constitution.

Additional Information

• Anglo-Indian Community:

• The Anglo-Indian community is a small minority in India, primarily consisting of people of mixed Indian and European ancestry.

• During British rule, Anglo-Indians were often employed in administrative roles, railways, and other government institutions.

• This community has contributed significantly to India in various fields, including education, sports, and culture.

• With the abolition of the reserved seats, Anglo-Indians can still participate in elections and represent their community without special provisions.

• Provisions of the 104th Constitutional Amendment Act:

• The 104th Amendment Act extended the reservation of seats for Scheduled Castes (SC) and Scheduled Tribes (ST) in the Lok Sabha and state assemblies for another 10 years, i.e., until January 25, 2030.

• However, it ended the provision for the nomination of two Anglo-Indian members in the Lok Sabha and Legislative Assemblies of states.

• Other Reservation Provisions in India:

• The Indian Constitution provides reservation for Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC) in legislatures, educational institutions, and government jobs.

• These provisions aim to ensure social justice and equality for disadvantaged and underrepresented communities.

• Women's reservation in legislatures is also being discussed but has not been implemented at the national level yet.

• Historical Context:

• Special representation for Anglo-Indians was introduced in the Constitution based on the recommendations of the Constituent Assembly.

• The inclusion aimed to acknowledge and safeguard the political rights of a small, distinct community during the transition to

independence and nation-building.

• Over time, this provision was considered redundant as the community became well-assimilated within Indian society.

Q35. Answer: (c) Indian Air Force

The correct answer is Indian Air Force.

Key Points

• The Ashwini radar system is a state-of-the-art 4D radar system designed for advanced air surveillance and tracking.

• In March 2025, under a Rs. 2,906-crore deal, the Indian Air Force is set to procure this radar system to enhance its operational capabilities.

• The Ashwini radar system is equipped with active electronically scanned array (AESA) technology, offering superior range, resolution, and reliability for aerial threat detection and tracking.

• The primary purpose of these radars is to bolster the air defense capabilities of the Indian Air Force by detecting and tracking incoming enemy aircraft, drones, and missiles.

• The procurement of the Ashwini radar system aligns with India's Make in India initiative, as the system is indigenously developed by the Defence Research and Development Organisation (DRDO).

Additional Information

• Indian Air Force:

• The Indian Air Force (IAF) is the air arm of the Indian Armed Forces, established on 8 October 1932.

• Its primary mission is to secure Indian airspace and conduct aerial warfare during armed conflicts.

• The IAF is one of the world’s largest and most technologically advanced air forces, constantly upgrading its equipment and technology.

• The Ashwini radar system will strengthen the IAF's air defense network, providing early warning and enhancing situational awareness.

• Ashwini Radar System:

• The Ashwini radar is a 4D AESA radar, which means it can measure azimuth, elevation, range, and velocity of targets.

• This radar system is designed to detect and track high-speed aerial targets, including fighter aircraft and ballistic missiles.

• It is highly mobile and can be deployed quickly, making it suitable for both static and dynamic operational scenarios.

• DRDO:

• The Defence Research and Development Organisation (DRDO) is India's premier agency responsible for the development of defense technologies.

• DRDO has been at the forefront of developing indigenous defense systems like Ashwini radar, Akash missiles, and Tejas fighter jets.

• The Ashwini radar is one of the several indigenous systems developed under the Atmanirbhar Bharat (self-reliant India) initiative.

• Other Indian Armed Forces:

• The Indian Navy is responsible for safeguarding India's maritime borders, while the Indian Army secures the nation's land borders.

• Although the Ashwini radar system will be utilized by the Indian Air Force, other branches of the armed forces also employ radar systems for surveillance and defense.

• The Indian Coast Guard uses radar systems primarily for maritime surveillance and search-and-rescue operations.

Important Points

• The Ashwini radar system is part of India's ongoing efforts to modernize its defense infrastructure and reduce dependency on foreign imports.

• The radar system is expected to significantly improve the Indian Air Force's ability to detect low-flying and high-speed enemy aircraft.

• India's defense modernization plans include a focus on indigenization, with DRDO playing a key role in designing and manufacturing cutting-edge technologies.

Q36. Answer: (b) Right to Life under Article 21

The correct answer is Right to Life under Article 21.

Key Points

• In the K. Umadevi v. Government of Tamil Nadu case (2022), the Supreme Court of India granted maternity benefits for the third child under the Maternity Benefit (Amendment) Act, 2017. The decision emphasized that these benefits are a constitutional right.

• The Court linked these benefits to the Right to Life under Article 21 of the Indian Constitution, which guarantees the protection of life and personal liberty.

• Article 21 includes within its ambit the right to live with dignity and the right to health, which encompasses maternal health and

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well-being.

• By extending maternity benefits to the third child, the Court underlined the importance of ensuring a dignified life for mothers and children, aligning with the broader interpretation of the Right to Life under Article 21.

• The judgment reinforced the idea that maternity benefits are not merely statutory entitlements but are rooted in fundamental rights, ensuring social and economic justice.

Additional Information

• Maternity Benefit (Amendment) Act, 2017:

• This Act is an amendment to the original Maternity Benefit Act, 1961, which aims to protect the employment of women during maternity and entitles them to maternity benefits.

• The amendment increased the maternity leave from 12 weeks to 26 weeks for women employees.

• It applies to establishments employing ten or more persons and includes provisions for crèche facilities and work-from-home options.

• Right to Life under Article 21:

• Article 21 states, "No person shall be deprived of his life or personal liberty except according to procedure established by law."

• The scope of Article 21 has been significantly expanded through judicial interpretation to include the right to health, education, housing, and other aspects essential for leading a dignified life.

• It is a cornerstone for various welfare provisions ensuring social justice and human rights.

• Other Relevant Rights:

• Right to Equality under Article 14: Ensures equal treatment before the law and equal protection of laws, addressing gender discrimination in policies like maternity benefits.

• Right to Education under Article 21A: Provides free and compulsory education to children aged 6–14 years, indirectly supporting family welfare and maternal health.

• Right against Exploitation under Article 23: Protects individuals from forced labor and exploitation, ensuring fair treatment of women in workplaces.

• Significance of Maternity Benefits:

• Promotes the health and well-being of mothers and infants, ensuring better maternal care and reducing infant mortality rates.

• Contributes to gender equality by enabling women to balance professional and personal responsibilities during motherhood.

• Strengthens workplace policies to accommodate women employees, fostering inclusive work environments.

Important Points

• Judicial Precedents:

• The Supreme Court has repeatedly emphasized that maternity benefits are essential for maintaining the dignity of women and ensuring their health and well-being.

• Earlier judgments have expanded the interpretation of Article 21 to include reproductive rights and maternal health.

• Global Context:

• The International Labour Organization (ILO) recommends a minimum of 14 weeks of maternity leave, highlighting the importance of maternity benefits worldwide.

• Countries like Sweden, Canada, and Norway have extensive maternity and parental leave policies to support working parents.

Q37. Answer: (b) Indigo

The correct answer is Indigo.

Key Points

• The colonial policies during British rule in India led to the commercialisation of agriculture, where farmers were forced to focus on producing cash crops for export rather than food crops for domestic consumption.

• Indigo, a plant used for producing blue dye, was one of the most significant crops encouraged for export by the British due to its high demand in the European textile industry. Hence, this is the correct option.

• The British established indigo plantations and compelled Indian farmers to grow indigo under exploitative systems like the nij system and the ryoti system.

• Farmers were often paid very low prices for indigo, leading to significant economic hardship and causing revolts such as the Indigo Rebellion of 1859–1860 in Bengal.

• Other crops encouraged by the British for export included cotton, tea, and opium, but indigo played a particularly pivotal role in the colonial economy.

Additional Information

• Commercialisation of Agriculture:

• The British introduced commercialisation of agriculture in India to serve the needs of the Industrial Revolution in Britain.

• Farmers were forced to cultivate cash crops such as indigo, cotton, and opium, which were exported to Europe.

• This shift disrupted traditional agricultural practices, leading to food shortages, famines, and poverty among Indian peasants.

• Indigo Cultivation in India:

• Indigo dye was in high demand in Europe during the 18th and 19th centuries, especially in the textile industry.

• The British imposed the ryoti system, under which farmers were forced to grow indigo on their land and sell it at extremely low prices to British planters.

• The exploitation of Indian farmers led to the Indigo Rebellion in Bengal, where peasants protested against the oppressive practices of British indigo planters.

• Impact of Indigo Cultivation:

• Indigo cultivation depleted soil fertility, leaving land unsuitable for growing food crops, causing severe economic distress.

• The profits from indigo exports benefited the British economy, while Indian farmers suffered debt and poverty.

• The Indigo Commission of 1860 was set up to address the grievances of indigo farmers, but its impact was limited.

• Comparison of Other Crops:

• Maize: A staple food crop, not primarily grown for export during British rule.

• Barley: Another food crop with limited export significance under colonial policies.

• Pulses: Essential for domestic consumption, not encouraged for export by the British.

Important Points

• Indigo Rebellion:

• The Indigo Rebellion of 1859-60 was a significant peasant uprising in Bengal against the exploitative practices of British indigo planters.

• It highlighted the plight of farmers under colonial policies and inspired later movements for agricultural reforms.

• Economic Exploitation:

• The British policies of forced cultivation of cash crops like indigo were part of a broader system of economic exploitation in colonial India.

• These policies contributed to widespread poverty and food insecurity among Indian farmers.

Q38. Answer: (a) Tamasha

The correct answer is Tamasha.

Key Points

• Tamasha is a traditional folk theatre form that originated and is widely practiced in the state of Maharashtra.

• This art form incorporates elements of music, dance, and drama to narrate stories, often with a mix of humor and social commentary.

• Tamasha is known for its lavani performances, which are energetic and rhythmic musical expressions, showcasing the rich cultural heritage of Maharashtra.

• The performances are often conducted in open spaces, with actors using improvised dialogues to interact with the audience, making it a dynamic and interactive theatre form.

• Historically, Tamasha was associated with the entertainment of rural communities, but it has gained popularity across urban areas as well, becoming an integral part of Maharashtra's cultural identity.

Additional Information

• Other Traditional Folk Theatre Forms in India:

• Yakshagana: Originating in Karnataka, Yakshagana is a dance-drama form characterized by elaborate costumes, makeup, and storytelling, often inspired by Hindu mythology.

• Nautanki: Popular in Uttar Pradesh and northern India, Nautanki is a folk theatre form that combines singing, acting, and dancing to narrate stories, often with moral or social messages.

• Bhavai: A folk theatre form from Gujarat, Bhavai integrates humor and satire to comment on social issues, with performers often using masks and symbolic props.

• Important Characteristics of Tamasha:

• Lavani: Lavani is a central feature of Tamasha, showcasing graceful movements, expressive gestures, and vibrant music.

• Historical Roots: Tamasha traces its origins back to the 16th century, evolving as a form of entertainment during the reign of the Maratha Empire.

• Performers: Traditionally, Tamasha performers include a mix of trained artists and local individuals, known for their improvisational skills.

• Social Relevance: Tamasha serves as a mirror to society, often addressing issues like caste, gender inequality, and politics through satire and storytelling.

• Lavani Dance:

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• Origin: Lavani is an integral part of Tamasha and is thought to have originated during the Peshwa era in Maharashtra.

• Musical Themes: The songs in Lavani often depict themes of love, devotion, and social challenges, combining boldness with emotional depth.

• Costumes: Lavani dancers wear traditional Nauvari saris (nine-yard saris) and ornaments, adding to the visual appeal.

Important Points

• Evolution of Tamasha:

• Initially performed in village fairs and festivals, Tamasha became an organized theatre form with professional troupes emerging during the 18th century.

• Modern Tamasha performances have adapted to urban audiences, incorporating new themes while retaining traditional elements.

• Influence on Other Art Forms:

• Tamasha has influenced Marathi cinema and music, with several filmmakers integrating its themes and styles into their works.

• The folk art form continues to inspire contemporary artists, preserving the cultural legacy of Maharashtra.

Q39. Answer: (c) South America

The correct answer is South America.

Key Points

• Peru and Chile are located in South America, which is one of the seven continents on Earth.

• South America is situated entirely in the Western Hemisphere and mostly in the Southern Hemisphere. It is bordered by the Pacific Ocean to the west and the Atlantic Ocean to the east.

• Both Peru and Chile are coastal countries in South America, sharing a long coastline along the Pacific Ocean.

• Peru is known for its rich cultural heritage, including the famous Machu Picchu, and its diverse geography ranging from the Andes Mountains to the Amazon rainforest.

• Chile is a narrow country stretching along the western edge of South America, famous for its Atacama Desert, one of the driest places on Earth, and the Andes Mountains.

Additional Information

• South America:

• South America is the fourth-largest continent in terms of area and the fifth-largest in terms of population.

• It is home to 12 independent countries, including Brazil, Argentina, Colombia, Peru, and Chile.

• The continent is known for its diverse geography, including the Amazon rainforest, the Andes Mountains, and the Pampas grasslands.

• Major rivers such as the Amazon River, the world's largest river by discharge, flow through South America.

• South America has a rich cultural history influenced by indigenous civilizations like the Incas and European colonization by countries like Spain and Portugal.

• Peru:

• Capital: Lima.

• Official Language: Spanish.

• Peru is famous for its archaeological sites, such as Machu Picchu, a UNESCO World Heritage Site.

• It has a varied landscape, including the Andes Mountains, the Amazon Basin, and the coastal desert.

• Peru is one of the world's leading producers of silver, copper, and gold.

• Chile:

• Capital: Santiago.

• Official Language: Spanish.

• Chile has a diverse climate, ranging from the Atacama Desert in the north to the glaciers of Patagonia in the south.

• Chile is a major producer of copper and is the world's largest exporter of this resource.

• The country is known for its wine industry and stunning landscapes, including its long coastline and the Andes Mountains.

• Important Points:

• Peru and Chile are neighbors in South America, sharing a border and geographical proximity.

• South America has a population of over 430 million, with Brazil being the largest country by area and population.

• The continent is culturally diverse, with influences from indigenous tribes, African slaves, and European settlers.

Q40. Answer: (a) Nikshay Mitras

The correct answer is Nikshay Mitras.

Key Points

• Nikshay Mitras is a volunteer initiative under the Pradhan Mantri TB Mukt Bharat Abhiyaan launched to combat Tuberculosis (TB) in India.

• Under the Nikshay Mitra program, volunteers adopt TB patients and assist them with nutritional support, treatment adherence, and regular follow-ups.

• During the review of National Tuberculosis Elimination Program (NTEP) in May 2025, PM Narendra Modi emphasized the use of Artificial Intelligence (AI) tools to enhance patient follow-up and monitoring.

• The National Tuberculosis Elimination Program (NTEP) aims to eliminate TB by 2025, five years ahead of the global target set by the World Health Organization (WHO).

• Volunteers, termed Nikshay Mitras, play a crucial role in achieving the target by ensuring personalized care and reducing the burden of TB patients.

Additional Information

• National Tuberculosis Elimination Program (NTEP):

• NTEP was previously known as the Revised National Tuberculosis Control Program (RNTCP).

• It focuses on active case finding, treatment adherence, and preventive measures to eliminate TB by 2025.

• The program aligns with the Sustainable Development Goals (SDGs) and aims to reduce TB incidence and mortality significantly.

• India is the highest TB burden country globally, accounting for nearly 26% of the global TB cases.

• NTEP incorporates advanced technologies such as AI tools for monitoring and addressing patient needs.

• Pradhan Mantri TB Mukt Bharat Abhiyaan:

• Launched on September 9, 2022, this initiative seeks community participation in TB elimination efforts.

• Nikshay Mitras adopt TB patients and provide nutritional and psychological support.

• Volunteers register through the Nikshay 2.0 portal, a digital platform for TB patient management.

• Support packages include monthly food baskets and assistance in accessing healthcare facilities.

• Role of Artificial Intelligence in TB Management:

• AI tools are used for predictive analytics to identify high-risk patients and ensure targeted interventions.

• AI helps in improving diagnostic accuracy, especially in resource-constrained areas.

• Patient follow-ups and medication adherence are enhanced through AI-based monitoring systems.

• The integration of AI in NTEP aligns with India's commitment to using technology for public health improvement.

• Global TB Elimination Efforts:

• The World Health Organization (WHO) aims to eliminate TB globally by 2030 under its End TB Strategy.

• India's goal of eliminating TB by 2025 demonstrates a proactive approach and commitment to public health.

• International collaboration and funding are crucial for achieving the set targets.

Important Points

• Key Facts about TB:

• Tuberculosis is a bacterial infection caused by Mycobacterium tuberculosis, primarily affecting the lungs.

• It spreads through airborne transmission when an infected person coughs or sneezes.

• India accounts for the highest number of TB cases globally, making it a public health priority.

• The disease is preventable and curable with early diagnosis and complete treatment adherence.

• Nikshay Portal:

• The Nikshay Portal is a digital tool used for TB patient registration, monitoring, and support.

• It facilitates real-time tracking of patient outcomes and treatment adherence.

• The portal plays a vital role in integrating technology with healthcare delivery systems.

Q41. Answer: (a) 1,62,661

Shortcut Trick

Difference between the largest and smallest ratio parts = 14 − 3 = 11 units.

Value of 11 units = Rs. 61,699 => 1 unit = 61,699 ÷ 11 = Rs. 5,609.

Total profit ratio = 12 + 3 + 14 = 29 units.

Total profit = 29 × 5,609 = Rs. 1,62,661.

Therefore The correct answer is Rs. 1,62,661.

Alternate Method

Given:

Profit distribution ratio among three partners = 12 : 3 : 14

Difference between largest and smallest shares = Rs. 61,699

Partner A

12 units

Partner B

3 units (Smallest)

Partner C

14 units (Largest)

Difference = 11 units = Rs. 61,699

Calculations:

=> Let the profit shares of the three partners be 12x, 3x, and 14x respectively.

=> The largest share among the partners = 14x

=> The smallest share among the partners = 3x

=> Difference between the largest and smallest shares = 14x − 3x = 11x

=> According to the given data: 11x = 61,699

=> x = 61,699 ÷ 11

=> x = 5,609

=> Total profit of the company = 12x + 3x + 14x = 29x

=> Total profit = 29 × 5,609

=> Total profit = 1,62,661

Therefore The correct answer is Rs. 1,62,661.

Additional Information

Partnership Profit Ratio

When the time periods of investment for all partners are equal or unspecified, the profit is distributed exactly in the ratio of their original capital investments.

Working with Ratios Directly

Instead of calculating individual values step-by-step, you can equate the given real value directly to its corresponding ratio unit (such as the difference or sum in parts) to quickly find the multiplying factor.

Compound Partnership Formula

When both investments and time periods differ, the overall Profit Ratio is given by = (Capital1 × Time1) : (Capital2 × Time2) : (Capital3 × Time3).

Q42. Answer: (d) Rs. 11,928

Shortcut Trick

For pA = qB = rC, the ratio A : B : C is given by (LCM/p) : (LCM/q) : (LCM/r).

LCM of 2, 4, 7 is 28.

Ratio of A : B : C = (28 ÷ 2) : (28 ÷ 4) : (28 ÷ 7) = 14 : 7 : 4.

Total parts = 14 + 7 + 4 = 25 parts.

A's share = (14 ÷ 25) × 21300 = 14 × 852 = Rs. 11,928.

Therefore The correct answer is Rs. 11,928.

Alternate Method

Given:

Total Amount = Rs. 21,300

2 × A = 4 × B = 7 × C

Total Amount = Rs. 21,300 (25 parts)

14x

A's Share

7x

B's Share

4x

C's Share

A : B : C = 14 : 7 : 4

Calculations:

=> Let 2A = 4B = 7C = k

=> A = k/2, B = k/4, C = k/7

=> Ratio of A : B : C = 1/2 : 1/4 : 1/7

=> To simplify, multiply the ratio by the LCM of 2, 4, and 7 (which is 28):

=> A : B : C = (1/2 × 28) : (1/4 × 28) : (1/7 × 28)

=> A : B : C = 14 : 7 : 4

=> Total ratio parts = 14 + 7 + 4 = 25 parts

=> 25 parts = Rs. 21,300

=> 1 part = 21300 ÷ 25 = Rs. 852

=> Share of A = 14 parts = 14 × 852 = Rs. 11,928

Therefore The correct answer is Rs. 11,928.

Additional Information

Equating Multiple Ratios

If pA = qB = rC, then the ratio A : B : C is quickly found by writing 1/p : 1/q : 1/r, then multiplying the terms by the LCM of p, q, and r.

Inverse Ratio

If two quantities are in the ratio a : b, then their inverse ratio is 1/a : 1/b, which structurally simplifies to b : a.

Compound Ratio

The compound ratio of two or more ratios is obtained by multiplying their antecedent (first terms) together and their consequent (second terms) together. For a : b and c : d, it evaluates to ac : bd.

Q43. Answer: (d) 2275

Shortcut Trick

Fraction value of 60% = 3/5.

This means an increase of 3 units over a base of 5 units.

New value = 5 + 3 = 8 units.

8 units = 3640 => 1 unit = 3640 ÷ 8 = 455.

Original number = 5 units = 5 × 455 = 2275.

Therefore The correct answer is 2275.

Alternate Method

Given:

A number when increased by 60% becomes 3640.

Formula Used:

Final Value = Original Value × (100 + Increase %)/100

Original Number (100%)

+60% Increase

Total = 160% = 3640

? (Value = 2275)

Calculations:

=> Let the original number be x.

=> x + (60/100) × x = 3640

=> x × (160/100) = 3640

=> 1.6 × x = 3640

=> x = 3640 ÷ 1.6

=> x = 36400 ÷ 16 = 2275

Therefore The correct answer is 2275.

Additional Information

Percentage Increase Formula

When a value is increased by R%, the new value is calculated as: New Value = Original Value × (1 + R ÷ 100).

Successive Percentage Change

If a number undergoes two successive changes of A% and B%, the net percentage change is given by (A + B + AB ÷ 100)%.

Percentage to Fraction Conversion

Converting percentages to fractions (e.g., 60% = 3/5) significantly simplifies calculations involving percentage increases or decreases.

Q44. Answer: (c) (iv)

Shortcut Trick

Discount % = [Free Items ÷ (Paid Items + Free Items)] × 100

(i) Discount = (3 ÷ 8) × 100 = 37.5%

(ii) Discount = (3 ÷ 9) × 100 = 33.33%

(iii) Discount = (5 ÷ 25) × 100 = 20%

(iv) Discount = (6 ÷ 14) × 100 = 42.85%

Therefore The correct answer is Scheme (iv).

Alternate Method

Given:

Four discount schemes offered by a shopkeeper:

(i) Buy 5 and get 3 free

(ii) Buy 6 and get 3 free

(iii) Buy 20 and get 5 free

(iv) Buy 8 and get 6 free

Formula Used:

Discount % = (Number of Free Articles ÷ Total Number of Articles) × 100

Total Number of Articles = Paid Articles + Free Articles

Discount Percentage Comparison

Scheme (i)

37.5%

Scheme (ii)

33.33%

Scheme (iii)

20%

Scheme (iv)

42.85%

Most beneficial scheme offers the maximum discount

Calculations:

=> For Scheme (i): Total items = 5 + 3 = 8. Discount % = (3 ÷ 8) × 100 = 37.5%

=> For Scheme (ii): Total items = 6 + 3 = 9. Discount % = (3 ÷ 9) × 100 = 33.33%

=> For Scheme (iii): Total items = 20 + 5 = 25. Discount % = (5 ÷ 25) × 100 = 20%

=> For Scheme (iv): Total items = 8 + 6 = 14. Discount % = (6 ÷ 14) × 100 ≈ 42.85%

=> Comparing the calculated discount percentages: 42.85% > 37.5% > 33.33% > 20%

=> Scheme (iv) provides the maximum discount, hence it is the most beneficial to the customer.

Therefore The correct answer is Scheme (iv).

Additional Information

Successive Discounts

When two discounts of a% and b% are given successively, the equivalent single discount is [a + b − (a × b ÷ 100)]%.

Marked Price & Selling Price

Discount is always calculated on the Marked Price (MP). The standard relationship is Selling Price (SP) = MP − Discount.

Buy X Get Y Free Mechanism

In any such scheme, the customer pays for X items but actually receives (X + Y) items. Therefore, the equivalent discount percent is essentially Y items free out of a total marked price of (X + Y) items.

Q45. Answer: (b) 30

Shortcut Trick

Let the consecutive even numbers be symmetrically represented as (n − 1) and (n + 1).

Sum of their squares = $(n - 1)^2 + (n + 1)^2 = 2(n^2 + 1)$

=> $2(n^2 + 1) = 452$

=> $n^2 + 1 = 226$ => $n^2 = 225$ => $n = 15$

The required sum of the two numbers is $(n - 1) + (n + 1) = 2n = 2 \times 15 = 30$.

Therefore The correct answer is 30.

Alternate Method

Given:

The sum of the squares of two consecutive even natural numbers is 452.

Formula Used:

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

Calculations:

=> Let the two consecutive even natural numbers be x and (x + 2).

=> $x^2 + (x + 2)^2 = 452$

=> $x^2 + x^2 + 4x + 4 = 452$

=> $2x^2 + 4x - 448 = 0$

=> $x^2 + 2x - 224 = 0$

=> $x^2 + 16x - 14x - 224 = 0$

=> $x(x + 16) - 14(x + 16) = 0$

=> $(x - 14)(x + 16) = 0$

=> $x = 14$ or $x = -16$

=> Since the numbers are natural numbers, we take the positive value $x = 14$.

=> The consecutive even numbers are 14 and 16.

=> Sum of the numbers = 14 + 16 = 30.

Therefore The correct answer is 30.

Additional Information

Consecutive Even/Odd Numbers

Consecutive even or odd numbers always differ by 2. They can be generally represented as 2n and 2n+2 for even numbers, and 2n+1 and 2n+3 for odd numbers.

Symmetric Assumption Trick

When dealing with squares or sums of two consecutive even/odd numbers, assuming them as (n−1) and (n+1) simplifies the equation by completely cancelling out the middle term.

Quadratic Roots Nature

For any quadratic equation $ax^2+bx+c=0$, the sum of roots is $-b/a$ and the product of roots is c/a. Real roots exist when the discriminant ($D = b^2-4ac$) ≥ 0.

Q46. Answer: (b) -32

Shortcut Trick

Apply the BODMAS rule directly to the expression.

Division: $(-60) \div (-12) = 5$

Multiplication: $(-2) \times 9 = -18$

Addition & Subtraction: $-9 - 5 - 18 = -32$

Therefore The correct answer is −32.

Alternate Method

Given:

$(-9) - (-60) \div (-12) + (-2) \times 9$

Formula Used:

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

Calculation:

=> $(-9) - [(-60) \div (-12)] + (-2) \times 9$

=> $(-9) - 5 + (-2) \times 9$

=> $(-9) - 5 + [(-2) \times 9]$

=> $-9 - 5 - 18$

=> $-14 - 18$

=> -32

Therefore The correct answer is −32.

Additional Information

BODMAS Rule

It dictates the correct order of operations to be followed while solving a mathematical expression: Brackets, Orders, Division, Multiplication, Addition, and Subtraction.

Sign Convention for Division & Multiplication

Negative × Negative = Positive | Negative × Positive = Negative | Negative ÷ Negative = Positive.

Addition of Negative Numbers

When adding multiple negative numbers, sum their absolute values and attach a negative sign to the result.

Q47. Answer: (c) 25.8

Shortcut Trick

To find the LCM of decimals, first make the number of decimal places equal: 8.60 and 0.12.

Treat them as integers by temporarily removing the decimal: 860 and 12.

Find the LCM of these integers: LCM(860, 12) = 2580.

Place the decimal point back by putting two decimal places (dividing by 100).

LCM = 2580 ÷ 100 = 25.8

Therefore The correct answer is 25.8.

Alternate Method

Given:

Numbers: 8.6 and 0.12

Formula Used:

LCM of fractions = LCM of Numerators ÷ HCF of Denominators

Calculations:

=> First, convert the decimals into fractions and reduce them to their simplest form.

=> 8.6 = 86 ÷ 10 = 43/5

=> 0.12 = 12 ÷ 100 = 3/25

=> Now, apply the formula to find the LCM of (43/5) and (3/25).

=> LCM of Numerators (43, 3) = 43 × 3 = 129

=> HCF of Denominators (5, 25) = 5

=> LCM of the given numbers = 129 ÷ 5 = 25.8

Therefore The correct answer is 25.8.

Additional Information

HCF of Fractions

The HCF of two or more fractions is calculated as: HCF of Numerators ÷ LCM of Denominators. It is crucial to ensure that fractions are in their simplest form before finding the LCM or HCF.

LCM of Decimals Rule

Before converting decimal numbers to integers for calculating LCM or HCF, always ensure the number of decimal places is identical for all terms by appending zeros at the end.

Product of Two Numbers

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

Q48. Answer: (c) 10,400

Shortcut Trick

When Simple Interest is equal for the same time period, principal amounts are inversely proportional to their respective interest rates.

Ratio of investments = P1 : P2 = R2 : R1 = 13 : 12

Total ratio parts = 13 + 12 = 25 parts

Value of 25 parts = Rs. 20,000 => 1 part = Rs. 800

Sum invested at 12% (P1) = 13 parts × 800 = Rs. 10,400

Therefore The correct answer is Rs. 10,400.

Alternate Method

Given:

Total Principal (P) = Rs. 20,000

Rate 1 (R1) = 12%, Rate 2 (R2) = 13%

Time (T) = 7 years

Formula Used:

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

Total: Rs. 20,000

P1 @ 12%

P2 @ 13%

SI from P1 = SI from P2

Time = 7 years

Calculation:

Let the sum invested at 12% be P1 and at 13% be (20000 − P1).

=> Interest from first part = (P1 × 12 × 7) ÷ 100

=> Interest from second part = ((20000 − P1) × 13 × 7) ÷ 100

Since the interests earned from both investments are equal:

=> (P1 × 12 × 7) ÷ 100 = ((20000 − P1) × 13 × 7) ÷ 100

=> 12P1 = 13 × (20000 − P1)

=> 12P1 = 260000 − 13P1

=> 12P1 + 13P1 = 260000

=> 25P1 = 260000

=> P1 = 260000 ÷ 25

=> P1 = 10400

Therefore The correct answer is Rs. 10,400.

Additional Information

Equal Simple Interest Rule

When a given sum is divided into multiple parts such that the simple interest earned from each part is identical, the invested parts are in the ratio P1 : P2 : P3 = (1 ÷ R1T1) : (1 ÷ R2T2) : (1 ÷ R3T3).

Equal Amount Rule

If a sum is divided such that the final amount (Principal + Interest) obtained from each part is equal, the ratio of investments is P1 : P2 = 1 ÷ (100 + R1T1) : 1 ÷ (100 + R2T2).

Simple Interest Key Concept

Unlike Compound Interest, Simple Interest remains strictly constant for every succeeding year because it is always calculated entirely on the original principal value.

Q49. Answer: (b) 288π cm³

Shortcut Trick

Radius of sphere (r) = Diameter ÷ 2 = 12 ÷ 2 = 6 cm

Volume = (4/3) × π × r³

Volume = (4/3) × π × 6³ = (4/3) × 216π = 288π cm³

Therefore The correct answer is 288π cm³.

Alternate Method

Given:

Diameter of the sphere (d) = 12 cm

Formula Used:

Radius (r) = d ÷ 2

Volume of a sphere = (4 ÷ 3) × π × r³

r = 6 cm

Diameter = 12 cm

Calculations:

=> Radius (r) = 12 ÷ 2 = 6 cm

=> Volume = (4 ÷ 3) × π × (6)³

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=> Volume = (4 ÷ 3) × π × 216

=> Volume = 4 × π × 72

=> Volume = 288π cm^3

Therefore The correct answer is 288π cm^3.

Additional Information

Surface Area of a Sphere

The total curved surface area of a complete sphere is given by the formula: SA = 4 × π × r^2.

Volume of a Hemisphere

A hemisphere is exactly half of a sphere. Its volume formula is: V = (2 ÷ 3) × π × r^3.

Total Surface Area of a Hemisphere

The total surface area includes the curved exterior surface plus the flat circular base: TSA = 3 × π × r^2.

Q50. Answer: (c) −98x + 111

Shortcut Trick

Solve part by part mentally and combine the coefficients of like terms directly.

x^2 terms: [2 × (7/2)x^2] − [7 × x^2] = 7x^2 − 7x^2 = 0

x terms: [2 × (−28x)] − [7 × 6x] = −56x − 42x = −98x

Constant terms: [2 × 17] − [7 × (−11)] = 34 + 77 = 111

Combining them together gives: −98x + 111

Therefore The correct answer is −98x + 111.

Alternate Method

Given:

Expression: 2((7/2)x^2 − 28x + 17) − 7(x^2 + 6x − 11)

Method Used:

Expand the brackets using the distributive property a(b + c) = ab + ac and then combine the similar terms.

Calculations:

=> Expand the first part by multiplying 2 inside the bracket:

=> 2 × (7/2)x^2 − 2 × 28x + 2 × 17

=> 7x^2 − 56x + 34

=> Expand the second part by multiplying −7 inside the bracket:

=> −7 × x^2 − 7 × 6x − 7 × (−11)

=> −7x^2 − 42x + 77

=> Now, combine both expanded expressions together:

=> (7x^2 − 56x + 34) + (−7x^2 − 42x + 77)

=> Group the like terms (x^2, x, and constant terms):

=> (7 − 7)x^2 + (−56 − 42)x + (34 + 77)

=> 0x^2 − 98x + 111

=> −98x + 111

Therefore The correct answer is −98x + 111.

Additional Information

Distributive Property

This rule states that multiplying a sum by a number gives the same result as multiplying each addend by the number and then adding the products together: a(b + c) = ab + ac.

Combining Like Terms

In algebra, like terms are terms that have the exact same variables and exponents. You can simplify algebraic expressions directly by adding or subtracting the coefficients of like terms.

BODMAS Rule

BODMAS stands for Brackets, Orders, Division, Multiplication, Addition, and Subtraction. It strictly dictates the correct order of operations to be performed in any mathematical simplification.

Q51. Answer: (d) 60%

Shortcut Trick

Ratio of Actual CP to SP = (100 − Less Weight %) : (100 + Claimed Profit %)

Actual CP = 100 − 10 = 90 units

Selling Price (SP) = 100 + 44 = 144 units

Profit = 144 − 90 = 54 units

Profit % = (54 ÷ 90) × 100 = 60%

Therefore The correct answer is 60%.

Alternate Method

Given:

Claimed profit percentage = 44%

Weight reduced by the trader = 10%

Formula Used:

Profit % = (Profit ÷ Cost Price) × 100

Profit = Selling Price − Cost Price

Actual CP

900 units

Selling Price

1440 units

Profit: 540

60% Profit

Profit % = (540 ÷ 900) × 100 = 60%

Calculations:

=> Let the Cost Price (CP) of 1000 units of weight be 1000.

=> The trader claims a profit of 44%.

=> Selling Price (SP) of 1000 units = 1000 + (44 ÷ 100) × 1000 = 1440.

=> However, the trader uses 10% less weight, providing only 900 units.

=> Actual weight given = 1000 − (10 ÷ 100) × 1000 = 900 units.

=> Actual Cost Price (CP) incurred by the trader for the 900 units = 900.

=> Actual Profit earned = SP − Actual CP = 1440 − 900 = 540.

=> Total Profit % = (Actual Profit ÷ Actual CP) × 100

=> Total Profit % = (540 ÷ 900) × 100 = 60%

Therefore The correct answer is 60%.

Additional Information

Dishonest Dealer Concept

When a dealer sells goods by claiming a specific margin but uses false weights, the profit is made on the difference between the actual given weight and the selling price equivalent. It is always calculated on the actual weight delivered.

Multiple Profit Adjustments

If a dealer marks up the price by a% and also manipulates weight by b%, calculating the direct ratio of effective Cost Price to total Selling Price yields the overall net profit percentage seamlessly.

Marked Price vs Actual Value

Marked Price (MP) is the list price assigned by the seller. However, in dishonest weight situations, the claimed price reflects the equivalent value of the normal weight rather than the reduced weight provided.

Q52. Answer: (d) 900

Shortcut Trick

By Alligation, compare individual profit/loss percentages with the net overall percentage.

Loss on 1st = −9%, Gain on 2nd = +27%, Net = 0%.

Ratio of Cost Prices = (27 − 0) : (0 − (−9)) = 27 : 9 = 3 : 1.

Total CP parts = 3 + 1 = 4 parts → Rs. 1200.

CP of the 1st bicycle = (3 ÷ 4) × 1200 = Rs. 900.

Therefore The correct answer is Rs. 900.

Alternate Method

Given:

Total Cost Price of two bicycles = Rs. 1200

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Loss on 1st bicycle = 9%

Gain on 2nd bicycle = 27%

Overall net profit or loss = 0%

−9%

1st Bicycle

+27%

2nd Bicycle

0%

27 − 0 = 27

0 − (−9) = 9

Ratio = 27 : 9 = 3 : 1

Calculations:

=> Let CP of 1st bicycle = x and CP of 2nd bicycle = y

=> Since net profit/loss is 0, Loss amount on 1st = Profit amount on 2nd

=> 9% of x = 27% of y

=> 0.09 × x = 0.27 × y

=> x ÷ y = 27 ÷ 9 = 3 ÷ 1

=> Ratio of CP (x : y) = 3 : 1

=> Total parts = 3 + 1 = 4 parts

=> 4 parts = Rs. 1200

=> 1 part = 1200 ÷ 4 = Rs. 300

=> CP of 1st bicycle (x) = 3 × 300 = Rs. 900

Therefore The correct answer is Rs. 900.

Additional Information

Overall No Profit No Loss

When a transaction results in neither a profit nor a loss, the absolute profit earned on one item is exactly equal to the absolute loss incurred on the other: Profit % × CP1 = Loss % × CP2.

Alligation in Profit & Loss

Alligation gives the direct ratio of Cost Prices when the profit/loss percentages of individual parts and the overall profit/loss percentage are combined.

Q53. Answer: (d) Rs. 5,744.26

Shortcut Trick

The multiplying factor for two successive discounts of 12% and 9% is calculated as: (1 − 0.12) × (1 − 0.09) = 0.88 × 0.91 = 0.8008.

Marked Price × 0.8008 = Selling Price

Marked Price = 4600 ÷ 0.8008 ≈ 5744.2557...

Rounding up to two decimal places gives Rs. 5,744.26.

Therefore The correct answer is Rs. 5,744.26.

Alternate Method

Given:

Selling Price (SP) = Rs. 4,600

Successive discounts = 12% and 9%

Formula Used:

Selling Price (SP) = Marked Price (MP) × (1 − D1/100) × (1 − D2/100)

MP = ?

−12%

Price 1

−9%

SP = Rs. 4600

Calculation:

=> 4600 = MP × (100 − 12)/100 × (100 − 9)/100

=> 4600 = MP × 88/100 × 91/100

=> 4600 = MP × 0.88 × 0.91

=> 4600 = MP × 0.8008

=> MP = 4600 ÷ 0.8008

=> MP = 5744.2557...

=> MP ≈ Rs. 5,744.26

Therefore The correct answer is Rs. 5,744.26.

Additional Information

Effective Single Discount

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

Selling Price Formula

Selling Price (SP) = Marked Price (MP) × (100 − Discount%) ÷ 100.

Multiple Successive Discounts

If multiple successive discounts D1, D2, D3... are applied on an item, then the final Selling Price is SP = MP × (1 − D1/100) × (1 − D2/100) × ...

Q54. Answer: (d) 16

Shortcut Trick

Sum of interior angles of a polygon = (n − 2) × 2 right angles.

Given, the sum of interior angles = 28 right angles.

=> (n − 2) × 2 = 28

=> n − 2 = 14 => n = 16

Therefore The correct answer is 16 sides.

Alternate Method

Given:

Sum of all interior angles = 28 right angles = 28 × 90°

Formula Used:

Sum of interior angles of an n-sided regular polygon = (n − 2) × 180°

Interior Angle

Regular Polygon Property:

Sum of Interior Angles = (n − 2) × 180°

1 Right Angle = 90°

Given: Sum = 28 × 90°

Calculations:

=> (n − 2) × 180° = 28 × 90°

=> (n − 2) × 180° = 2520°

=> n − 2 = 2520° ÷ 180°

=> n − 2 = 14

=> n = 14 + 2

=> n = 16

Therefore The correct answer is 16 sides.

Additional Information

Interior Angles of a Regular Polygon

Each interior angle of an n-sided regular polygon is given by [(n − 2) × 180°] ÷ n.

Exterior Angles of a Polygon

The sum of all exterior angles of any simple convex polygon is always 360°, regardless of the number of sides. Each exterior angle = 360° ÷ n.

Number of Diagonals

The total number of diagonals in an n-sided polygon can be calculated using the formula: [n × (n − 3)] ÷ 2.

Q55. Answer: (d) 32 years

Shortcut Trick

In Compound Interest, if a sum becomes n times in t years, it becomes n^m times in m × t years.

Given: The sum becomes 3^1 times in 16 years.

We need to find the time for it to become 9 times, which is 3^2 times.

Here, the base multiplier n = 3, the power m = 2, and the time t = 16 years.

Required time = 2 × 16 = 32 years.

Therefore The correct answer is 32 years.

Alternate Method

Given:

A sum of money triples itself at a certain rate of compound interest in 16 years.

Formula Used:

A = P(1 + R/100)^T

Where A = Amount, P = Principal, R = Rate of interest, and T = Time period.

× 3

× 3

16 years

16 years

P

3P

9P

Total Time = 16 + 16 = 32 years

Calculations:

=> According to the given condition, the sum becomes 3 times in 16 years.

=> 3P = P(1 + R/100)^(16)

=> 3 = (1 + R/100)^(16) --- (Equation 1)

=> We need to find the time T when the sum amounts to 9 times itself:

=> 9P = P(1 + R/100)^T

=> 9 = (1 + R/100)^T

=> 3^2 = (1 + R/100)^T

=> Substituting the value of 3 from Equation 1 into the above expression:

=> [(1 + R/100)^(16)]^2 = (1 + R/100)^T

=> $(1 + R/100)^{32}$ = (1 + R/100)^T

=> Comparing the exponents on both sides since the bases are equal:

=> T = 32 years

Therefore The correct answer is 32 years.

Additional Information

Compound Interest Multiplication Rule

If a sum of money becomes x times of itself in T years at compound interest, it will become x^n times of itself in n × T years.

Simple Interest Multiplication Rule

If a sum of money becomes x times in T years at simple interest, the time taken to become y times is calculated using the formula: [(y − 1) ÷ (x − 1)] × T years.

Difference Between SI and CI

Simple interest is calculated only on the principal amount, whereas compound interest is calculated on both the principal and the accumulated interest of previous periods. For the first compounding cycle, SI and CI are identical.

Q56. Answer: (b) 18

Shortcut Trick

Relative speed of Train 1 with respect to the man = Distance ÷ Time = 150 ÷ 36 = 25/6 m/s.

In km/hr, relative speed = (25/6) × (18/5) = 15 km/hr.

Since they move in the same direction, speed of Train 1 = Relative speed + Man's speed = 15 + 9 = 24 km/hr.

Relative speed of Train 1 and Train 2 (opposite direction) = 24 + 43 = 67 km/hr = 67 × (5/18) m/s.

Time to cross = Total Length ÷ Relative Speed = (150 + 185) ÷ [67 × (5/18)] = 335 ÷ (335/18) = 18 seconds.

Therefore The correct answer is 18 seconds.

Alternate Method

Given:

Length of Train 1 = 150 m

Speed of the man = 9 km/hr (moving in the same direction)

Time taken to cross the man = 36 seconds

Length of Train 2 = 185 m

Speed of Train 2 = 43 km/hr (moving in the opposite direction)

Case 1: Train overtaking man

Train 1 (150 m)

v km/hr

Man

9 km/hr

Case 2: Train crossing another train

Train 1 (150 m)

24 km/hr

Train 2 (185 m)

43 km/hr

Total Distance = 150 + 185 = 335 m

Formula Used:

Relative Speed (Same Direction) = S1 − S2

Relative Speed (Opposite Direction) = S1 + S2

Speed in m/s = Speed in km/hr × (5/18)

Time = Distance ÷ Speed

Calculations:

Let the speed of the first train be v km/hr.

=> Relative speed with respect to the man = (v − 9) km/hr = (v − 9) × 5/18 m/s

=> Time taken to cross the man = Length of Train 1 ÷ Relative speed

=> 36 = 150 ÷ [(v − 9) × 5/18]

=> v − 9 = (150 × 18) ÷ (36 × 5)

=> v − 9 = 2700 ÷ 180

=> v − 9 = 15

=> v = 24 km/hr

Now, Train 1 crosses Train 2 moving in the opposite direction.

=> Total Distance to be covered = Length of Train 1 + Length of Train 2 = 150 + 185 = 335 m

=> Relative speed = Speed of Train 1 + Speed of Train 2

=> Relative speed = 24 + 43 = 67 km/hr

=> Relative speed in m/s = 67 × 5/18 = 335/18 m/s

=> Time taken = Total Distance ÷ Relative speed

=> Time taken = 335 ÷ (335/18)

=> Time taken = (335 × 18) ÷ 335 = 18 seconds.

Therefore The correct answer is 18 seconds.

Additional Information

Concept of Relative Speed

When two bodies move in the same direction, their relative speed is the difference of their individual speeds (S1 − S2). When they move in opposite directions, it is the sum of their speeds (S1 + S2).

Total Distance in Crossing

When a train crosses a stationary or moving point object (like a man or pole), the total distance covered is merely the length of the train. However, when it crosses another train or platform, the total distance is the sum of the lengths of both objects (L1 + L2).

Unit Conversions

To convert km/hr to m/s, multiply the value by 5/18. Conversely, to convert m/s to km/hr, multiply by 18/5. This conversion is derived from 1 km = 1000 m and 1 hour = 3600 seconds.

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Q57. Answer: (d) 11

Shortcut Trick

The mode is simply the value that appears most frequently in the given dataset.

By quick observation, 11 appears 3 times, 12 appears 2 times, and all other numbers appear 1 time.

Since 11 has the highest frequency, it is the mode.

Therefore The correct answer is 11 marks.

Alternate Method

Given:

Marks scored by 10 students: 11, 11, 14, 12, 20, 19, 16, 18, 11, 12

Concept Used:

Mode is the specific observation that occurs the maximum number of times in a given data set.

0

1

2

3

11

Max

12

14

16

18

19

20

Marks

Frequency

Calculations:

=> Arranging the given data in ascending order:

=> 11, 11, 11, 12, 12, 14, 16, 18, 19, 20

=> Frequency of 11 = 3

=> Frequency of 12 = 2

=> Frequency of 14, 16, 18, 19, 20 = 1 each

=> The mark 11 occurs the maximum number of times (3 times).

Therefore The correct answer is 11 marks.

Additional Information

Mean

The arithmetic average of all data points. Mean = Sum of all observations ÷ Total number of observations.

Median

The middle value of a sorted data set. For an odd number of terms (n), it is the ((n+1)÷2)^(th) term. For an even n, it is the average of the (n÷2)^(th) and ((n÷2)+1)^(th) terms.

Empirical Formula

For a moderately skewed distribution, the relationship between mean, median, and mode is given by: Mode ≈ 3 × Median − 2 × Mean.

Q58. Answer: (a) 13

Shortcut Trick

From the first condition: M = 3D + 9

From the second condition: M = 4D + 7

Equating both equations: 3D + 9 = 4D + 7 => D = 2 years

Substitute D = 2 into either equation: M = 4(2) + 7 = 15 years

Difference in ages = 15 − 2 = 13 years

Therefore The correct answer is 13 years.

Alternate Method

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Given:

Let Mary's present age be M and Diya's present age be D.

3 times Mary's age is 27 years more than 9 times Diya's age.

4 times Diya's age is 7 years less than Mary's age.

Mary's Age

Diya's Age

15 years

2

Difference = 13 years

Age Difference: 15 − 2 = 13 years

Calculations:

=> 3M = 9D + 27

Dividing the entire equation by 3:

=> M = 3D + 9 --- (Equation 1)

For the second condition:

=> 4D = M − 7

=> M = 4D + 7 --- (Equation 2)

From Equation 1 and Equation 2:

=> 3D + 9 = 4D + 7

=> 4D − 3D = 9 − 7

=> D = 2

Substitute D = 2 into Equation 1:

=> M = 3(2) + 9

=> M = 6 + 9 = 15

Difference between their ages = M − D

=> 15 − 2 = 13 years

Therefore The correct answer is 13 years.

Additional Information

Linear Equations in Two Variables

A mathematical model with two equations and two unknown variables. These can be easily solved using substitution, elimination, or by equating isolated expressions.

Problems on Ages

Age problems generally require defining present ages as variables (x, y). Conditions for past ages are expressed as (x − n) and future ages are expressed as (x + n).

Age Ratio Method

If the present ages are given in the ratio a:b, the actual ages can be assumed directly as ax and bx. This reduces the problem into solving for a single common multiplier.

Q59. Answer: (c) 1

Shortcut Trick

Put θ = 45° in the given expression to solve it quickly.

We know that sec 45° = √2, sin 45° = 1 / √2, and tan 45° = 1.

=> Expression = √2 × (1 + 1 / √2) × (√2 − 1)

=> Expression = (√2 + 1) × (√2 − 1)

=> Expression = $(\sqrt{2})^2 - 1^2 = 2 - 1 = 1$

Therefore The correct answer is 1.

Alternate Method

Given:

secθ (1 + sinθ) (secθ − tanθ)

Formula Used:

secθ = 1 / cosθ

tanθ = sinθ / cosθ

$1 - \sin^2\theta = \cos^2\theta$

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

Calculations:

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

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

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

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

=> $\cos^2\theta / \cos^2\theta$

=> 1

Therefore The correct answer is 1.

Additional Information

Pythagorean Identities

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

Value Substitution Trick

For simplifying complex trigonometric expressions, assume a standard angle like 30°, 45°, or 60° to quickly evaluate the expression, ensuring no term becomes undefined (like division by zero).

Basic Trigonometric Conversions

Always remember that $\tan\theta = \sin\theta / \cos\theta$ and $\cot\theta = \cos\theta / \sin\theta$. Also, $\sec\theta$ and $\text{cosec}\theta$ are the reciprocals of $\cos\theta$ and $\sin\theta$ respectively.

Q60. Answer: (b) 24

Shortcut Trick

When the same distance is covered at two different speeds S1 and S2, the average speed is given by the direct formula:

Average speed = $(2 \times S1 \times S2) \div (S1 + S2)$

=> Average speed = $(2 \times 18 \times 36) \div (18 + 36)$

=> Average speed = $(2 \times 18 \times 36) \div 54 = 24$ km/hr

Therefore The correct answer is 24 km/hr.

Alternate Method

Kanpur

Lucknow

Speed = 18 km/hr

Speed = 36 km/hr

Same Distance (d)

Given:

Speed from Kanpur to Lucknow (S1) = 18 km/hr

Speed from Lucknow to Kanpur (S2) = 36 km/hr

Let the distance between Kanpur and Lucknow be d km.

Formula Used:

Average Speed = Total Distance ÷ Total Time

Time = Distance ÷ Speed

Calculations:

=> Total Distance for the entire journey = d + d = 2d

=> Time taken to reach Lucknow (T1) = d ÷ 18 hours

=> Time taken to return to Kanpur (T2) = d ÷ 36 hours

=> Total Time = (d ÷ 18) + (d ÷ 36)

=> Total Time = (2d + d) ÷ 36 = 3d ÷ 36 = d ÷ 12 hours

=> Average Speed = Total Distance ÷ Total Time

=> Average Speed = 2d ÷ (d ÷ 12)

=> Average Speed = 2d × 12 ÷ d = 24 km/hr

Therefore The correct answer is 24 km/hr.

Additional Information

Average Speed for 3 Equal Distances

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If a person covers three equal distances at speeds x, y, and z respectively, the direct formula is: Average Speed = (3xyz) ÷ (xy + yz + zx).

Relative Speed

When two bodies are moving in the same direction, relative speed is the difference of their speeds (V1 − V2). When moving in opposite directions, it is the sum of their speeds (V1 + V2).

General Average Speed Rule

If the distances traveled at different speeds are unequal, strictly use the fundamental formula (Total Distance ÷ Total Time). Never simply calculate the arithmetic mean of the given speeds.

Q61. Answer: (a) 165

Shortcut Trick

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

Here, the total number of terms, n = 164.

Average = 164 + 1 = 165

Therefore The correct answer is 165.

Alternate Method

Given:

The sequence consists of the first 164 even numbers.

Formula Used:

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

1st Term

2

Average

165

164th Term

328

4

326

(2 + 328) ÷ 2 = 165

Calculations:

=> The first even number (a) = 2

=> The 164th even number (l) = 164 × 2 = 328

=> Average = (a + l) ÷ 2

=> Average = (2 + 328) ÷ 2

=> Average = 330 ÷ 2

=> Average = 165

Therefore The correct answer is 165.

Additional Information

Average of first 'n' natural numbers

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

Average of first 'n' odd numbers

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

Sum of first 'n' even numbers

The sum of the first n even numbers can be calculated using the formula n × (n + 1).

Average of Consecutive Numbers

For any arithmetic progression or uniformly spaced sequence, the average is simply (First term + Last term) ÷ 2.

Q62. Answer: (c) 36 hours

Shortcut Trick

Time for P to fill tank = 30 × (6/5) = 36 hours, Q = 27 × (4/3) = 36 hours.

Let total capacity = LCM(36, 36) = 36 units → Efficiency of P = 1, Efficiency of Q = 1.

In 2 hours, P and Q fill 2 × (1 + 1) = 4 units.

Pipe R empties these 4 units in 4 hours → Efficiency of R = −1 unit/hr.

Net efficiency (P + Q + R) = 1 + 1 − 1 = 1 unit/hr → Total time = 36 ÷ 1 = 36 hours.

Therefore The correct answer is 36 hours.

Alternate Method

Given:

P can fill 5/6 part of the tank in 30 hours.

Q can fill 3/4 part of the tank in 27 hours.

Formula Used:

Total Work = Efficiency × Time

Net Efficiency = Sum of individual efficiencies

Calculations:

=> Time for P to fill tank = 30 × (6/5) = 36 hours

=> Time for Q to fill tank = 27 × (4/3) = 36 hours

=> Let total capacity = LCM(36, 36) = 36 units

Pipe	Hours	Total Work	Efficiency
P	36	36	1
Q	36	1	

=> Work done by P and Q in 2 hours = 2 × (1 + 1) = 4 units

=> Pipe R empties these 4 units in 4 hours

=> Efficiency of R = −4 ÷ 4 = −1 unit/hr

=> Net efficiency (P + Q + R) = 1 + 1 − 1 = 1 unit/hr

=> Total time taken together = Total Work ÷ Net Efficiency = 36 ÷ 1 = 36 hours

Therefore The correct answer is 36 hours.

Additional Information

Pipes & Cisterns Rule

If an inlet pipe fills a tank in x hours, its efficiency is positive (1/x). If an outlet pipe empties it in y hours, its efficiency is negative (−1/y).

Net Rate of Filling

When multiple pipes operate together, the net rate of work is the algebraic sum of their individual rates.

Fractional Work

If a pipe fills a/b part of a tank in T hours, the total time required to fill the complete tank is T × (b/a) hours.

Q63. Answer: (d) 200: 119

Shortcut Trick

Given, 51% of First Number = 6/7 of Second Number

=> First / Second = (6/7) × (100/51)

=> First / Second = 600 / 357

=> First / Second = 200 / 119

Therefore The correct answer is 200: 119.

Alternate Method

51% of 1st

=

6/7 of 2nd

Ratio = 200 : 119

Given:

51% of the first number is equal to six-sevenths of the second number.

Calculations:

Let the first number be x and the second number be y.

=> 51% of x = (6/7) × y

=> (51/100) × x = (6/7) × y

Rearranging the variables to find the ratio of x to y:

=> x / y = (6/7) ÷ (51/100)

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=> x / y = (6/7) × (100/51)

=> x / y = (6 × 100) / (7 × 51)

Dividing numerator and denominator by 3 (since both 6 and 51 are divisible by 3):

=> x / y = (2 × 100) / (7 × 17)

=> x / y = 200 / 119

Therefore The correct answer is 200: 119.

Additional Information

Percentage to Fraction Conversion

To convert any percentage value into a fraction, divide the value by 100 and simplify it to the lowest terms. For example, x% = x/100.

Proportion Property

If two ratios are strictly equal (a/b = c/d), then the product of extremes is equal to the product of means, which can be written as a × d = b × c.

Compound Ratio

When two or more ratios are multiplied together, it forms a compound ratio. For two given ratios a:b and c:d, their compound ratio is written as (a × c):(b × d).

Q64. Answer: (b) 2120/149 days

Shortcut Trick

Total Work = LCM of 19, 11, and 2 = 418 units.

A's efficiency = 418 ÷ 19 = 22 units/day.

B's efficiency = 418 ÷ 11 = 38 units/day.

(A + B + C)'s efficiency = 418 ÷ 2 = 209 units/day.

C's efficiency = 209 − (22 + 38) = 149 units/day.

Therefore The correct answer is 2 ^(120)⁄149 days.

Alternate Method

Given:

=> Time taken by A = 19 days

=> Time taken by B = 11 days

=> Time taken by A, B, and C together = 2 days

Formula Used:

=> Efficiency = Total Work ÷ Time Taken

Person	Days	Total Work	Efficiency
A	19	418	22
B	11	38	
A + B + C	2	209	

Calculations:

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

=> Efficiency of C = 209 − (22 + 38)

=> Efficiency of C = 209 − 60 = 149 units/day

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

=> Time taken by C alone = 418 ÷ 149 = 2 ^(120)⁄149 days

Therefore The correct answer is 2 ^(120)⁄149 days.

Additional Information

Total Work Concept

Total work is usually considered as the Least Common Multiple (LCM) of all the given time periods. This makes efficiency calculations easier and avoids complex fractions.

Efficiency and Time Relationship

Efficiency is inversely proportional to time taken. Work done = Efficiency × Time. Combined efficiency of a working group is the exact sum of their individual unit-day efficiencies.

Work & Wages

Whenever individuals work together for the complete duration, their total wage distribution happens exactly in the ratio of their daily efficiency rather than the number of days they worked.

Pipes and Cisterns Concept

Conceptually identical to Time & Work problems. Inlet pipes have positive efficiency (filling) while outlet pipes or leaks have negative efficiency (emptying the tank).

Q65. Answer: (c) 800

Shortcut Trick

Let the total monthly salary be 100%.

Remaining salary after 25% debt repayment = 100% − 25% = 75%.

Savings % = (100% − 52%) of 75% = 48% of 75% = 36%.

Given that 36% of total salary = Rs. 288.

Total salary (100%) = 288 ÷ 36 × 100 = 8 × 100 = 800.

Therefore The correct answer is Rs. 800.

Alternate Method

Given:

Debt repayment = 25% of monthly salary

Amount spent from remaining salary = 52%

Total amount saved = Rs. 288

Formula Used:

Savings = Total Salary × (Remaining % after debt) × (Remaining % after spending)

Salary = 100%

Debt = 25%

Remaining = 75%

Spend = 39%

Save = 36%

36% = Rs. 288

Calculations:

=> Let the total monthly salary be x.

=> After paying 25% towards debt, remaining salary = x × (100 − 25) ÷ 100 = 0.75x

=> He spends 52% of the remaining salary, so he saves (100 − 52) = 48% of the remaining amount.

=> Savings = 48% of 0.75x

=> Savings = (48 ÷ 100) × 0.75x = 0.36x

=> Given that his savings = Rs. 288

=> 0.36x = 288

=> x = 288 ÷ 0.36

=> x = 28800 ÷ 36

=> x = 800

Therefore The correct answer is Rs. 800.

Additional Information

Successive Percentage Application

When a percentage is applied to a remaining amount, the current balance acts as a new 100% base. The formula is Final Value = Initial Value × (1 − p1/100) × (1 − p2/100).

Fraction Conversion Method

Converting percentages to fractions speeds up calculations. 25% = 1/4 (leaving 3/4 remaining) and 48% = 12/25. Thus, Savings = Total × 3/4 × 12/25 = Total × 9/25.

Tree Diagram Approach

Visualizing total values as branches (e.g., 100 splitting into 25 and 75, then 75 splitting into 39 and 36) helps prevent errors when consecutive percentages are calculated on remaining parts rather than the initial total.

Q66. Answer: (d) 11

Shortcut Trick

To check divisibility by 11, find the difference between the sum of digits at odd and even positions.

Sum of digits at odd positions = 7 + 7 + 7 + 7 + 3 = 31

Sum of digits at even positions = 4 + 5 + 9 + 2 = 20

Difference = 31 − 20 = 11, which is exactly divisible by 11.

Therefore The correct answer is 11.

Alternate Method

Given:

Number = 747579723

Checking the given options sequentially:

1) Divisibility by 8:

=> The last 3 digits of the number are 723.

=> 723 ÷ 8 = 90 with a remainder of 3. (Not divisible)

2) Divisibility by 9:

=> Sum of all digits = 7 + 4 + 7 + 5 + 7 + 9 + 7 + 2 + 3 = 51.

=> 51 ÷ 9 = 5 with a remainder of 6. (Not divisible)

3) Divisibility by 13:

=> Split the number into groups of three from the right: 747, 579, 723.

=> Alternating sum = (747 + 723) − 579 = 1470 − 579 = 891.

=> 891 ÷ 13 = 68 with a remainder of 7. (Not divisible)

4) Divisibility by 11:

=> Sum of digits at odd positions = 7 + 7 + 7 + 7 + 3 = 31

=> Sum of digits at even positions = 4 + 5 + 9 + 2 = 20

=> Difference = 31 − 20 = 11

=> Since 11 is exactly divisible by 11, the entire number is divisible by 11.

Therefore The correct answer is 11.

Additional Information

Divisibility Rule of 8

A number is divisible by 8 if its last three digits form a number that is perfectly divisible by 8.

Divisibility Rule of 9

A number is divisible by 9 if the sum of all its digits is a multiple of 9.

Divisibility Rule of 11

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

Divisibility Rule of 13

Split the number into blocks of 3 digits from right to left. If the alternating sum or difference of these blocks is divisible by 13, the original number is also divisible by 13.

Q67. Answer: (d) M - N = -5

Shortcut Trick

Sum of digits at odd places = N + 2 + 4 = N + 6

Sum of digits at even places = 4 + M + 7 = M + 11

Difference = (M + 11) − (N + 6) = M − N + 5

For divisibility by 11, this difference must be 0 or a multiple of 11.

If the difference is 0, M − N + 5 = 0 => M − N = -5.

Therefore The correct answer is M − N = -5.

Alternate Method

Given:

The 6-digit number N42M47 is divisible by 11.

Concept Used:

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

Calculation:

=> Sum of digits at odd places (1st, 3rd, and 5th from left) = N + 2 + 4 = N + 6

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=> Sum of digits at even places (2nd, 4th, and 6th from left) = 4 + M + 7 = M + 11

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

=> Difference = (M + 11) − (N + 6)

=> Difference = M − N + 5

=> For divisibility by 11, equate the difference to 0 or 11:

=> Case 1: M − N + 5 = 0 => M − N = -5

=> Case 2: M − N + 5 = 11 => M − N = 6

=> Matching with the given options, we find M − N = -5.

Therefore The correct answer is M − N = -5.

Additional Information

Divisibility Rule of 3

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

Divisibility Rule of 9

A number is divisible by 9 if the sum of all its digits is a multiple of 9.

Divisibility Rule of 8

A number is divisible by 8 if the number formed by its last three digits is a multiple of 8.

Q68. Answer: (b) 20

Shortcut Trick

Apply BODMAS directly by resolving the innermost bracket first:

=> 960 ÷ {28 + 5 × (7 − 3)}

=> 960 ÷ {28 + 5 × 4}

=> 960 ÷ 48

Therefore The correct answer is 20.

Alternate Method

Given:

Expression: [960 ÷ {28 + 5 × (7 − 3)}]

Concept Used:

BODMAS Rule: Brackets → Orders → Division → Multiplication → Addition → Subtraction.

Calculations:

=> 960 ÷ {28 + 5 × (7 − 3)}

First, resolve the circular bracket ():

=> 960 ÷ {28 + 5 × 4}

Next, perform multiplication inside the curly bracket { }:

=> 960 ÷ {28 + 20}

Then, perform addition inside the curly bracket { }:

=> 960 ÷ 48

Finally, perform the division operation:

=> 20

Therefore The correct answer is 20.

Additional Information

BODMAS Rule

BODMAS sets the hierarchy for mathematical operations: Brackets, Orders (powers/roots), Division, Multiplication, Addition, and Subtraction.

Bracket Precedence

When multiple brackets are present, resolve them sequentially from innermost to outermost: first Bar (Vinculum), then Circular (), next Curly { }, and finally Square [].

Same Priority Operations

Division and Multiplication share the exact same priority level. When they appear consecutively without brackets, always resolve them sequentially from left to right.

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Q69. Answer: (d) 43200

Shortcut Trick

Side of each cube, a = $\sqrt[3]{216000}$ = 60 cm.

When 'n' cubes are joined end-to-end, the Lateral Surface Area (LSA) of the resulting cuboid = $2a^2(n + 1)$.

Here, number of cubes (n) = 5 and side (a) = 60 cm.

LSA = $2 \times 60^2 \times (5 + 1) = 2 \times 3600 \times 6 = 43200$ cm².

Therefore The correct answer is 43200 cm².

Alternate Method

Given:

Volume of each solid cube = 216000 cm³

Number of cubes joined (n) = 5

Formula Used:

Side of a cube (a) = $\sqrt[3]{\text{Volume}}$

Lateral Surface Area (LSA) of a cuboid = 2H(L + B)

Length = 300 cm

H = 60

B = 60

Cuboid Formed by 5 Cubes

Calculations:

=> $a^3 = 216000$

=> a = 60 cm

=> Length of the resulting cuboid (L) = $5 \times a = 5 \times 60 = 300$ cm

=> Breadth of the cuboid (B) = a = 60 cm

=> Height of the cuboid (H) = a = 60 cm

=> LSA = $2 \times H \times (L + B)$

=> LSA = $2 \times 60 \times (300 + 60)$

=> LSA = $120 \times 360 = 43200$ cm²

Therefore The correct answer is 43200 cm².

Additional Information

Properties of Joined Cubes

When 'n' cubes of edge 'a' are joined end to end, the resulting cuboid has Length = na, Breadth = a, and Height = a.

Lateral Surface Area (LSA) of a Cuboid

The LSA represents the area of the 4 vertical faces excluding the top and bottom faces. Formula: LSA = 2H(L + B).

Total Surface Area (TSA) of a Cuboid

The TSA includes the area of all 6 faces of the cuboid. Formula: TSA = 2(LB + BH + HL).

Q70. Answer: (c) 16, 50

Shortcut Trick

For such questions, the fastest method is to verify the given options directly.

Condition 1: Sum of the two numbers must be 66.

Condition 2: LCM of the two numbers must be 400.

Checking the correct option: 16 and 50 → Sum = 16 + 50 = 66.

LCM of 16 and 50 = 400. Both conditions are perfectly satisfied.

Therefore The correct answer is 16, 50.

Alternate Method

Given:

Sum of two numbers = 66

LCM of the numbers = 400

Formula Used:

Let the HCF of the numbers be h. The numbers can be written as ha and hb, where a and b are co-prime.

Sum = h(a + b) and LCM = hab

Calculation:

=> Sum = h(a + b) = 66

=> LCM = hab = 400

=> The HCF (h) must perfectly divide both the sum (66) and the LCM (400).

=> Common factors of 66 and 400 are 1 and 2. Thus, the highest common factor h = 2.

=> Substituting h = 2 in the sum equation: 2(a + b) = 66 => a + b = 33

=> Substituting h = 2 in the LCM equation: 2ab = 400 => ab = 200

=> We need two numbers a and b such that a + b = 33 and ab = 200.

=> Using the quadratic identity: $(a - b)^2 = (a + b)^2 - 4ab$

=> $(a - b)^2 = (33)^2 - 4 \times 200$

=> $(a - b)^2 = 1089 - 800 = 289$

=> $a - b = \sqrt{289} = 17$

=> Adding equations (a + b = 33) and (a − b = 17): 2a = 50 => a = 25

=> Substituting a = 25 in a + b = 33: b = 8

=> The required numbers are ha = 2 × 25 = 50 and hb = 2 × 8 = 16.

Therefore The correct answer is 16, 50.

Additional Information

Product of Numbers Rule

For any two numbers, the product of the numbers is strictly equal to the product of their HCF and LCM. Formula: N1 × N2 = HCF × LCM.

Co-prime Factors

When two numbers are expressed as ha and hb (where h is the HCF), the parts a and b must always be co-prime to each other (i.e., their HCF is exactly 1).

Quadratic Identity Application

To find the difference between two unknown variables when their sum and product are already known, apply the standard identity: $(a - b)^2 = (a + b)^2 - 4ab$.

Q71. Answer: (b) 111

The logic follows here,

Hence, the correct answer is "Option 2"

Q72. Answer: (c) Mother's brother's daughter

Preparing the family tree using the following symbols:

According to the given information,

Hence, the correct answer is "Option 3"

Q73. Answer: (a) UWS

The logic followed here is:

Hence, the correct answer is "Option 1"

Q74. Answer: (a) 4 km to the east

• Pranay starts from Point A and drives 7 km towards the south.

• He then takes a left turn and drives 6 km, then turns left and drives 12 km.

• He then takes a left turn and drives 10 km.

• He takes a final left turn, drives 5 km and stops at Point P.

The Final Arrangement is,

Hence, the correct answer is "Option 1"

Q75. Answer: (a) XUWV

The logic followed here is:

Hence, the correct answer is "Option 1"

Q76. Answer: (c) AVO

The logic followed here is:

Hence, the correct answer is "Option 3"

Q77. Answer: (c) SWCI

The logic followed here is:

Hence, the correct answer is "Option 3"

Q78. Answer: (a) Three

Seven boxes, N, O, T, F, A, R and M, are kept one over the other but not necessarily in the same order.

• M is kept immediately above A.

• N is kept immediately above O.

• Only T is kept above F.

• Only two boxes are kept above M.

• N is not kept at third position from the bottom.

The Final Arrangement is,

T
F
M
A
R
N
O

Hence, the correct answer is "Option 1"

Q79. Answer: (d) 8

Given the number 7856413

1 is added to each odd digit and 2 is subtracted from each even digit in the number

Sum of the digits that are third from the left and third from the right in the new number thus formed.

= 6 + 2

= 8

Hence, the correct answer is "Option 4"

Q80. Answer: (d) 140

The logic follows here,

Hence, the correct answer is "Option 4"

Q81. Answer: (a) 1st

Total students = 22

• They are all facing north (so left-to-right order is natural).

• Mayank is 15th from the left end.

• So, his position from the left = 15.

• Payal is 7th to the right of Mayank.

• That means Payal's position from the left = 15 + 7 = 22.

• Total students = 22.

• Position from the right = Total – Position from left + 1

• = 22 – 22 + 1

• = 1.

Hence, the correct answer is "Option 1"

Q82. Answer: (c) Three

Given : (Left) / 8 5 2 1 1 4 < $ 2 & 8 # 7 5 & 3 + 1 6 ^ (Right)

Required Conditions: Symbol - Numbers - Another Number.

(Left) / 8 5 2 1 1 4 < $ 2 & 8 # 7 5 & 3 + 1 6 ^ (Right)

Hence, the correct answer is "Option 3"

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Q83. Answer: (c) One

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

Required conditions: Number - Symbol - Another Number

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

Hence, the correct answer is "Option 3"

Q84. Answer: (d) ITU

The logic followed here is:

Hence, the correct answer is "Option 4"

Q85. Answer: (c) 862

The logic follows here,

Hence, the correct answer is "Option 3"

Q86. Answer: (d) 6

'TEMP' is coded as '3129'

'ITEM' is coded as '139*6*'.

The code for I is 6.

Hence, the correct answer is "Option 4"

Q87. Answer: (d) Both conclusions (I) and (II) follow.

The least possible Venn diagram for the given statements is as follows:

Conclusions:

(I) Some soils are rocks. - True (All Rock are soil means some rock are soil and some soil ae rocks.)

(II) All magnets are soils.- True (All magnets are rocks.All Rock are soil.All magnets are soils is True)

Both conclusions (I) and (II) follow.

Hence, the correct answer is "Option 4"

Q88. Answer: (d) Neither conclusion (I) nor (II) follows.

The least possible Venn diagram for the given statements is as follows:

Conclusions:

I. Some Beetroots are Onions.

II. No Beetroots are Onions.

Q89. Answer: (d) PGB 20

The logic followed here is:

Hence, the correct answer is "Option 4"

Q90. Answer: (c) 16, 246

Logic : Second number = (First number)^2– 10

Similarly,

Hence, the correct answer is "Option 3"

Q91. Answer: (b) 111

Let's compute it step by step.

• Total people = 211

• Mr. Maxi is 9th from the left

• Mr. Han is 91st from the right

First convert Mr. Han's position to "from the left":

Han's position from left = 211 – 91 + 1 = 121

Now the number of people between Mr. Maxi (9th) and Mr. Han (121st):

121 – 9 - 1 = 111

Number of people between them = 111

Hence, the correct answer is "Option 2"

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Q92. Answer: (d) UEGU

Logic followed here is,

Hence, the correct answer is "Option 4"

Q93. Answer: (c) 61

Given : 26 × 4 ÷ 8 − 15 + 6 = ?

'+' and '−' are interchanged, and '×' and '÷' are interchanged.

BODMAS Table:

26 ÷ 4 × 8 + 15 - 6 = ?

6.5 × 8 + 15 - 6 = ?

52 + 15 - 6 = ?

61.

Hence, the correct answer is "Option 3"

Q94. Answer: (c) Six

Seven people A, B, C, D, E, F and G are sitting in a row, facing the north.

• Only one person sits to the right of B.

• E sits third from the left end of the row.

• G is the immediate neighbour of F and B.

• C sits to the immediate left of A.

The Final Arrangement is,

Q95. Answer: (a) North-west

• Satheesh starts from his home and drives 5 km towards north.

• He then takes a left turn, drives 6 km, turns left, and drives 4 km.

• He then takes a right turn and drives 5 km and turns right, then drives 3 km to reach his office.

The Final Diagram,

Hence, the correct answer is "Option 1"

Q96. Answer: (a) 1

• 'LIKE' is coded as '7029'

• 'KAIL' is coded as '1279'

The Code for A is 1.

Hence, the correct answer is "Option 1"

Q97. Answer: (a) Three

Five people, A, B, C, D and E are sitting in a straight line, facing North.

• B is sitting to the extreme left end.

• Only two people are sitting between D and B.

• E is seated second to the right of B.

• A is not an immediate neighbour of E

The Final Arrangement is,

Hence, the correct answer is "Option 1"

Q98. Answer: (a) GWZXM

The logic followed here is:

Hence, the correct answer is "Option 1"

Q99. Answer: (c) Three

Hence, the correct answer is "Option 3"

Q100. Answer: (a) 9

Given number 9 4 3 3 7 2 8 5 6

1 is added to each even digit and 3 is subtracted from each odd digit

The difference between the highest and lowest digits thus formed = 9 - 0.

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9.

Hence, the correct answer is "Option 1."

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