RRB NTPC (UG) CBT-I Official Paper (Held On: 02 Sept, 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 sectors was the primary focus of India's First Five-Year Plan (1951–56)?

(a) Industry and Infrastructure
(b) Defence and Security
(c) Services and Education
(d) Agriculture and Irrigation

Q2. Which year was the Pradhan Mantri Jan Dhan Yojana launched?

(a) 2014
(b) 2013
(c) 2016
(d) 2015

Q3. Which Indian university showcased India's first fully automated vegetable sapling transplanter at the Ente Keralam exhibition, held in May 2025 at Marine Drive, Kochi, as part of the Kerala government's fourth-anniversary celebrations?

(a) Indian Institute of Science (IISc), Bengaluru
(b) Cochin University of Science and Technology (Cusat)
(c) Indian Institute of Technology Madras (IIT-M)
(d) Kerala Agricultural University

Q4. Which of the following local winds is known to bring rain to Tamil Nadu during winter?

(a) Northeast monsoon
(b) Jet stream
(c) Southwest monsoon
(d) Nor'wester

Q5. Which fault in the Peninsular Plateau is known for recurrent seismic activity?

(a) Vindhya Fault
(b) Malda Fault
(c) Bhima Fault
(d) Narmada Fault

Q6. At the 2025 International Table Tennis Federation (ITTF) World Table Tennis Championships Finals held in Doha, who emerged as the men's singles champion?

(a) Ma Long
(b) Wang Chuqin
(c) Fan Zhendong
(d) Lin Gaoyuan

Q7. Which reform movement in Kerala focused on the upliftment of the backward castes through education and social equality?

(a) Kayastha Sabha
(b) Singh Sabha
(c) Arya Samaj
(d) SNDP Sabha

Q8. Which of the following minerals is essential for oxygen transport in the blood?

(a) Calcium
(b) Zinc
(c) Iron
(d) Magnesium

Q9. Which authority can dissolve the Council of Ministers at the state level?

(a) Prime Minister
(b) President
(c) High Court
(d) Governor

Q10. Who among the following laid the foundation stone of Indira Gandhi Rashtriya Uran Akademi, commonly called IGRUA, in 1985?

(a) Rajiv Gandhi
(b) Gulzari Lal Nanda
(c) Jawaharlal Nehru
(d) Morarji Desai

Q11. Which of the following government initiatives was launched in 1973 to conserve a key apex predator and its ecosystem in India?

(a) Project Rhino
(b) Project Elephant
(c) Project Tiger
(d) Project Asiatic Lion

Q12. The energy produced by using the heat from the Earth's interior is called:

(a) Biomass energy
(b) Tidal energy
(c) Geothermal energy
(d) Solar energy

Q13. Which of the following metals is used as a catalyst in the Haber process for ammonia synthesis?

(a) Platinum
(b) Nickel
(c) Copper
(d) Iron

Q14. Which of the following Articles deals with the rights of citizenship at the commencement of the Indian Constitution?

(a) Article 7
(b) Article 10
(c) Article 11
(d) Article 5

Q15. On which date did Prime Minister Shri Narendra Modi inaugurate the WAVES 2025, India's first-of-its-kind World Audio Visual and Entertainment Summit, held at Mumbai?

(a) 20 April 2025
(b) 1 May 2025

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(c) 1 April 2025
(d) 4 May 2025

Q16. In April 2025, the Supreme Court reinterpreted which Article of the Constitution to direct amendment in KYC digital norms to ensure access for 'persons with disabilities'?
(a) Article 14
(b) Article 21
(c) Article 25
(d) Article 30

Q17. Which of the following Ministries is responsible for granting Indian citizenship by naturalisation?
(a) Ministry of Law and Justice
(b) Ministry of Parliamentary Affairs
(c) Ministry of External Affairs
(d) Ministry of Home Affairs

Q18. Who was appointed as the Director General of Defence Estates (DGDE) in June 2025?
(a) Shailendra Nath Gupta
(b) Vikram Singh Rathore
(c) Anil Choudhary
(d) Rajesh Kumar Singh

Q19. Following the Pahalgam attack in April 2025, India suspended which treaty with Pakistan?
(a) Indus Waters Treaty
(b) Tashkent Agreement
(c) Simla Agreement
(d) Lahore Treaty

Q20. What is the name of the first indigenously designed and built Anti-Submarine Warfare Shallow Water Craft (ASW-SWC) inducted into the Indian Navy in May 2025?
(a) INS Tushil
(b) INS Arighaat
(c) INS Arnala
(d) INS Garuda

Q21. Rapid industrialisation was a hallmark of India's early planning efforts. Which Five-Year Plan laid the foundation for India's public sector steel plants?
(a) First Plan
(b) Fifth Plan
(c) Fourth Plan
(d) Second Plan

Q22. Which of the following is NOT a role of the President of India?
(a) Passing bills into laws
(b) Appointing the Prime Minister
(c) Summoning and dissolving the Parliament
(d) Conducting elections

Q23. Which of the following is the genome-edited rice varieties launched by India in 2025?
(a) Basmati Gold
(b) Super Rice 21
(c) DRR Rice 100
(d) Shakti Rice

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Q24. The 2025 edition of the Sheila Bharat Ram Theatre Festival took place at which of the following locations?

(a) Kamani Auditorium, Delhi
(b) India Habitat Centre, Delhi
(c) National School of Drama, Delhi
(d) Shri Ram Centre of Performing Arts, Delhi

Q25. What is the correct way to copy a file or folder using the Drag and Drop method?

(a) Select the file → Press Ctrl + C → Drop it into the Recycle Bin
(b) Select the file in the right pane → Drag it to a folder in the left pane → Drop it there
(c) Right-click the file → Drag it to the desktop → Press Delete
(d) Double-click the file → Drag it back into the same folder

Q26. Which institute of Indian Council of Agricultural Research (ICAR) developed India's first genome-edited rice variety DRR Rice 100 (Kamla)?

(a) ICAR-Indian Institute of Rice Research, Hyderabad
(b) ICAR-Indian Agricultural Research Institute, New Delhi
(c) ICAR-Central Institute of Agricultural Engineering, Bhopal
(d) ICAR-National Rice Research Institute (NRRI), Cuttack

Q27. Which of the following is the conjugate base of HCl?

(a) CH^-
(b) H2O^-
(c) Cl^-
(d) Cl^+

Q28. Land revenue systems under British rule varied regionally. Which land revenue system was primarily followed in Bombay and Madras Presidencies?

(a) Ryotwari
(b) Mahalwari
(c) Jagirdari
(d) Zamindari

Q29. Who was the first Portuguese governor in India, sent in 1505 to establish naval supremacy?

(a) Albuquerque
(b) Nino-da-Cunha
(c) De Souza
(d) De Almeida

Q30. When was the Gurjara Pratihara dynasty founded by Nagabhatta I in the region of Malwa?

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

Q31. How can you permanently delete a file in MS Windows so that it DOES NOT go to the Recycle Bin?

(a) Right-click on the file and press 'Shift + Delete'
(b) Right-click on the file and Press Ctrl + D
(c) Drag the file to the Recycle Bin
(d) Right-click on the file and select 'Delete'

Q32. Who was honoured with the Humanitarian Award at the 72nd Miss World Festival, held in May 2025, for philanthropic work during the Covid pandemic?

(a) Akshay Kumar
(b) Sonu Sood
(c) Amitabh Bachchan

(d) Shah Rukh Khan

Q33. Who assumed charge as the 18th Commander-in-Chief of the Andaman & Nicobar Command (CINCAN) on 1 June 2025?

(a) Lt General Rajesh Mehta
(b) Lt General Vijay Kumar Singh
(c) Lt General Anil Chatterjee
(d) Lt General Dinesh Singh Rana

Q34. Which of the following classical theatre forms is associated with Karnataka and features dance-drama with colourful costumes?

(a) Bhavai
(b) Jatra
(c) Yakshagana
(d) Kathakali

Q35. What is the name of the herbal cream developed by CSIR-CIMAP for treating psoriasis released in May 2025?

(a) Herbaloid
(b) DermaHerb
(c) PsoriaCIM
(d) SkinCure

Q36. Which of the following was the biggest armed resistance to colonialism in the 19th century in India?

(a) Sepoy Mutiny
(b) First Anglo-Maratha War
(c) Quit India Movement
(d) Battle of Buxar

Q37. Among which of the following powers did the ‘Tripartite Struggle’ take place during the 8 th and 9th centuries?

(a) Cholas, Chalukyas and Satavahanas
(b) Pandyas, Pallavas and Cholas
(c) Rashtrakutas, Cholas and Vardhanas
(d) Palas, Pratiharas and Rashtrakutas

Q38. In 2025, India assumed the chairmanship of which international body focused on productivity and sustainability during a meeting held in Jakarta?

(a) Asia-Pacific Economic Cooperation (APEC) for the 2025–26 term
(b) ASEAN Council for Economic Growth (ACEG) for a two-year term
(c) Asian Productivity Organisation (APO) for the 2025–26 term
(d) South Asian Association for Productivity (SAAP) till the 2026 term

Q39. Which gas was least abundant in the early atmosphere?

(a) Water vapour
(b) Free oxygen
(c) Carbon dioxide
(d) Nitrogen

Q40. What was the official mascot of the 2025 National Games?

(a) Tejaswini
(b) Mauli
(c) Gajasimha
(d) Shikhar

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MATHEMATICS

Q41. A hollow spherical shell is made of a metal of density 40 g/cm³. Its internal and external radii are 1 cm and 4 cm, respectively. What is the mass (in kg) of the shell? (Take π = 22/7)

(a) 11.65
(b) 12.35
(c) 7.56
(d) 10.56

Q42. An amount of Rs. 936 is divided among three persons in the ratio of 2 : 4 : 3. The difference between the largest and the smallest shares (in Rs.) in the distribution is:

(a) 235
(b) 132
(c) 151
(d) 208

Q43. By how much is 65% of 75 greater than 3/5 of 15?

(a) 33.75
(b) 37.75
(c) 39.75
(d) 36.75

Q44. The distance between two electric poles of length 25 metres and 36 metres is x metres. If the two angles of elevation of their respective top from the bottom of the other are complementary to each other, then the value of x (in metres) is:

(a) 28
(b) 30
(c) 26
(d) 32

Q45. A supplier offers a trade discount of 20% on a product priced at Rs. 5,000. Additionally, there is a scheme discount of 10% on the already discounted price. What is the final price of the product after both discounts?

(a) Rs. 3,800
(b) Rs. 4,000
(c) Rs. 4,500
(d) Rs. 3,600

Q46. If the third proportional of 9 and 30 be x, then what is the value of x?

(a) 101
(b) 102
(c) 99
(d) 100

Q47. Zeeshan travels 252 km at 63 km/hr, the next 150 km at 30 km/hr and the next 680 km at 68 km/hr. What is his average speed (in km/hr, rounded off to two decimal places) for the whole journey?

(a) 58.05
(b) 62.09
(c) 54.95
(d) 56.95

Q48. What is the difference between a single discount of 48% on Rs. 1,450 and two successive discounts of 10% and 40% on the same amount?

(a) Rs. 28
(b) Rs. 29
(c) Rs. 32

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(d) Rs. 31

Q49. Simplify $4((3/4)x^2-25x+17)-3(x^2+8x-13)$

(a) 124x − 107
(b) 124x + 107
(c) −124x − 107
(d) −124x + 107

Q50. Shahid and Mira have to travel from Delhi to Kanpur in their respective cars. Shahid is driving at 42 km/hr while Mira is driving at 98 km/hr. Find the time taken by Mira to reach Kanpur if Shahid takes 14 hours.

(a) 5 hours
(b) 2 hours
(c) 6 hours
(d) 12 hours

Q51. A sum of Rs. 400 amounts to Rs. 529 in 2 years at a certain rate of interest per annum, compounded annually. The rate of interest per annum is:

(a) 11%
(b) 15%
(c) 18%
(d) 16%

Q52. A trader claims to sell flour at a profit of 58%, but also dishonestly uses a weight which is 8% 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) 71%
(b) 76%
(c) 72%
(d) 74%

Q53. The product of two positive numbers is 80. If the first number is five times of the second number, then the sum of the two numbers is:

(a) 29
(b) 24
(c) 33
(d) 27

Q54. The LCM of the numbers 15.4 and 0.006 is:

(a) 4.62
(b) 46.2
(c) 462
(d) 0.462

Q55. Find the simple interest (in Rs.) if a sum of Rs. 400 is borrowed for 3.5 years at 16% per annum rate of interest.

(a) 324
(b) 274
(c) 224
(d) 204

Q56. Find the value of: [480 ÷ {12 + 2 × (4 − 9)}].

(a) 241
(b) 240
(c) 242
(d) 243

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Q57. 3 years ago, the age of a father was 18 years more than twice his son's age. After how many years, from now, will he be twice his son's age?

(a) 17
(b) 11
(c) 13
(d) 15

Q58. Evaluate: (-9) - (-60) ÷ (-10) + (-4) × 6

(a) -39
(b) -38
(c) -42
(d) -41

Q59. 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 3 days only. Then, C alone can do the job in

(a) 332/119 days
(b) 832/119 days
(c) 532/119 days
(d) 632/119 days

Q60. The current population of a town is 12,800. It increases by 25% and 35% in two successive years but decreases by 5% in the third year. What is the population of the town at the end of the third year?

(a) 20,520
(b) 20,525
(c) 20,515
(d) 20,517

Q61. The HCF and the LCM of two numbers are 11 and 330, respectively. If one of the numbers is 66, find the other one.

(a) 44
(b) 55
(c) 66
(d) 121

Q62. Pipe P can fill 3/8 part of a tank in 21 hours and pipe Q can fill 2/7 part of the same tank in 16 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 3 hours. Pipes P, Q and R together can fill the empty tank in:

(a) 94 hours
(b) 89 hours
(c) 67 hours
(d) 84 hours

Q63. One side of a right-angled triangle is twice the other and the hypotenuse is 15 cm. Find the area (in cm^2) of the triangle.

(a) 70
(b) 60
(c) 45
(d) 80

Q64. The value of 5/3+(1/(1+5/6))-5/3 is

(a) 7/13
(b) 6/11
(c) 5/18
(d) 11/18

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Q65. The average weight (in kg) of a family of five members whose weights are 40 kg, 49 kg, 56 kg, 76 kg and 38 kg is:

(a) 52.8
(b) 50.8
(c) 53.8
(d) 51.8

Q66. M and N started a business. M invested Rs. 50,000 more than N for 3 months, while N invested for 7 months. M's share is Rs. 328 more than that of N, out of a total profit of Rs. 4,920. Find the capital contributed by M.

(a) Rs. 1,20,000
(b) Rs. 1,00,000
(c) Rs. 80,000
(d) Rs. 60,000

Q67. 50 glass bottles were purchased for Rs. 50, and 28 glass bottles broke in transit. The trader sold the remaining glass bottles at Rs. 5.80 each. Find his profit.

(a) Rs. 68.50
(b) Rs. 76.60
(c) Rs. 75.30
(d) Rs. 77.60

Q68. The average runs scored by a batsman in 23 matches is 42. In the next 10 matches, the batsman scored an average of 13 runs. Find his average runs scored (rounded off to two decimals) in all the 33 matches.

(a) 35.21
(b) 34.21
(c) 33.21
(d) 32.21

Q69. The value of 4/5+(1/(1+5/6))-2/5 is

(a) 52/55
(b) 57/49
(c) 51/61
(d) 43/53

Q70. The difference between an interior angle and exterior angle of a regular polygon is 120°. Find the number of sides of the polygon.

(a) 15
(b) 12
(c) 14
(d) 10

GENERAL INTELLIGENCE AND REASONING

Q71. FKPX is related to IPSC in a certain way based on the English alphabetical order. In the same way, REBR is related to UJEW. To which of the following options is ATKG related, following the same logic?

(a) DFRT
(b) DYLN
(c) DLNY
(d) DYNL

Q72. Navneet starts from Point Y and drives 10 km towards west. He then takes a right turn, drives 18 km. He then turns right and drives 10 km. He takes a final right turn, drives 15 km and stops at Point Z. How far (shortest distance) and towards which direction should he drive in order to reach Point Y again? (All turns are 90-degree turns only unless specified)

(a) 3 km towards south
(b) 10 km towards north

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(c) 4 km towards east
(d) 6 km towards west

Q73. In a certain code language, ‘CLAM’ is coded as ‘1587’ and ‘LOAM’ is coded as ‘4875’. What is the code for ‘O’ in that language?
(a) 4
(b) 5
(c) 7
(d) 8

Q74. 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) HKO
(b) DGK
(c) ORW
(d) BEI

Q75. If + means −, − means ×, × means ÷ and ÷ means +, then what will come in place of the question mark (?) in the following equation?
12 − 2 + 49 × 7 ÷ 5 = ?
(a) 22
(b) 27
(c) 12
(d) 17

Q76. Seven boxes U, V, W, X, E, F and G are kept one over the other but not necessarily in the same order.
Only three boxes are kept below X. Only two boxes are kept between X and W. Only E is kept above V. H is kept at some place below G and at some place above U. Which box is kept at second position from the bottom?
(a) X
(b) G
(c) U
(d) W

Q77. FRUZ is related to JUYC in a certain way based on the English alphabetical order. In the same way, VDKL is related to ZGOO. To which of the given options is HMWU related, following the same logic?
(a) LPAX
(b) XPLA
(c) LPXA
(d) XAPL

Q78. What should come in place of the question mark (?) in the given series based on the English alphabetical order?
JUO UFZ FQK QBV ?
(a) BGM
(b) BMG
(c) BYG
(d) BGY

Q79. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, what will come in place of the question mark (?) in the following equation?
11 B 3 C 20 D 93 A 3 = ?
(a) 2
(b) 9
(c) 15
(d) 22

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

510 511 519 546 610 ?

(a) 735
(b) 695
(c) 755
(d) 715

Q81. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All candles are waxes.

No candle is a tubelight.

Conclusions:

(I) Some tubelights are waxes.

(II) All waxes are tubelights.

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

Q82. A, B, C, D, E, F and G are sitting around a circular table facing the centre. F sits to the immediate right of G. B sits third to the left of G. A is the immediate neighbour of D and G. C sits second to the left of B. How many people sit between E and D when counted from the left of D?

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

Q83. This question is based on the five, three-digit numbers given below.

(Left) 984 673 543 126 341 (Right)

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

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

If all the numbers are arranged in descending order, the position(s) of how many numbers will remain unchanged?

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

Q84. Kishori ranked 15th from the bottom and 26th from the top in her class. How many students are there in her class?

(a) 40
(b) 38
(c) 39
(d) 37

Q85. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

JCV 13, MFY 25, PIB 49, SLE 97, VOH 193, ?

(a) YRK 385
(b) URK 385
(c) YOK 385
(d) YRK 383

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Q86. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. No box is kept above F. Only three boxes are kept between F and E. Only one box is kept between G and C. C is kept immediately above E. Only four boxes are kept between G and A. B is kept at some place above D. How many boxes are kept above E?

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

Q87. What should come in place of the question mark (?) in the given series?

7, 16, 30, 49, 73, ?

(a) 105
(b) 104
(c) 103
(d) 102

Q88. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

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

(a) HL-OF
(b) CG-JB
(c) KO-RI
(d) EI-LC

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

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

(a) AE−DH
(b) KO−NR
(c) HL−JQ
(d) LP−OS

Q90. This question is based on the five, three-digit numbers given below.

(Left) 458 294 680 183 297 (Right)

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

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

If all the numbers are arranged in ascending order, the position of how many numbers will remain unchanged?

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

Q91. n a certain code language, ‘MALT’ is coded as ‘1264’ and ‘PALM’ is coded as ‘4521’. What is the code for ‘P’ in that language?

(a) 4
(b) 2
(c) 5
(d) 1

Q92. JFCK is related to HDAI in a certain way based on the English alphabetical order. In the same way, MIFN is related to KGDL. To which of the given options is PLIQ related, following the same logic?

(a) JNOG
(b) JNGO
(c) NJOG

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(d) NJGO

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

6 B 7 D 84 A 3 C 15 = ?

(a) 32
(b) 42
(c) 36
(d) 29

Q94. In a certain code language,

A $ B means 'A is the mother of B',

A + B means 'A is the brother of B',

A @ B means 'A is the wife of B', and

A ÷ B means 'A is the father of B'.

How is E related to N if 'E @ F ÷ G + M $ N'?

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

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

26 40 55 71 ? 106

(a) 88
(b) 98
(c) 104
(d) 92

Q96. Seven people, F, G, H, I, J, K and R, are sitting around a circular table facing the centre of the table. I sits third to the left of J. R sits second to the left of G. Only J sits between H and R. F is not an immediate neighbour of I. How many people sit between K and R when counted from the right of K?

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

Q97. In the following number-pairs, the second number is obtained by applying certain mathematical operations to the first number. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

19, 33

17, 29

(a) 26, 43
(b) 23, 40
(c) 24, 43
(d) 22, 38

Q98. Each of the digits in the number 8237519 is arranged in ascending order from left to right. What will be the sum of the digits which are second from the left and second from the right in the new number thus formed?

(a) 9
(b) 10
(c) 8
(d) 12

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Q99. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

Some files are books.

All books are keys.

Conclusions:

(I) Some files are keys.

(II) All keys are books.

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

Q100. Virat starts from Point A and drives 10 km towards South. He then takes a right turn, drives 9 km, turns left and drives 5 km. He then takes a left turn and drives 9 km. He takes a final right turn, drives 4 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90° turns only unless specified.)

(a) 19 km towards North
(b) 19 km towards South
(c) 15 km towards East
(d) 15 km towards South

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) Agriculture and Irrigation

The correct answer is Agriculture and Irrigation.

Key Points

• The First Five-Year Plan (1951–56) in India was primarily focused on Agriculture and Irrigation. The main aim was to tackle food shortages and improve agricultural productivity in the newly independent country.

• India faced severe challenges such as food insecurity, poor irrigation facilities, and low agricultural production during the initial years of independence. Hence, agriculture was given top priority.

• The plan allocated around 44.6% of the total budget to agriculture, irrigation, and community development projects, making it the largest share among all sectors.

• Key initiatives under the First Five-Year Plan included: land reforms, irrigation projects, development of dams like Bhakra-Nangal and Hirakud, and community development programs to empower rural areas.

• The plan aimed to achieve a 5% growth rate in agriculture, which was considered a necessary step to ensure food security and support industrialization in the future.

• The focus on agriculture helped reduce dependency on food imports and laid the foundation for self-sufficiency in food production in subsequent years.

• Hence, the correct answer is Agriculture and Irrigation.

Additional Information

• Objectives of the First Five-Year Plan:

• The main goal was to increase agricultural production to tackle food shortages and improve the living standards of the rural population.

• The plan emphasized the development of irrigation projects, rural infrastructure, and cooperative farming systems to boost productivity.

• Key Features of the First Five-Year Plan:

• The plan was based on the Harrod-Domar model, which focused on investment and savings to drive economic growth.

• Major investments were made in large-scale irrigation projects such as Bhakra-Nangal, Hirakud, and Damodar Valley projects to ensure reliable water supply for agriculture.

• Community Development Programs were launched to improve rural infrastructure, healthcare, education, and employment opportunities.

• Impact of the First Five-Year Plan:

• The plan achieved a 3.6% annual growth rate, which was close to its target of 5% growth.

• It helped India reduce dependency on food imports and laid the foundation for future economic development.

• The focus on irrigation and agriculture contributed significantly to rural development and poverty alleviation.

Important Points

• Comparison with Subsequent Plans:

• The Second Five-Year Plan (1956–61) shifted focus to industrialization, unlike the First Plan, which prioritized agriculture.

• While the First Plan emphasized, later plans aimed at diversifying the economy and promoting industrial and service sectors.

• Legacy of the First Five-Year Plan:

• The successful implementation of the plan demonstrated India's capacity to address critical issues such as food shortages and rural development.

• It established the importance of agriculture in India's economic planning and became the foundation for strategies in subsequent decades.

Q2. Answer: (a) 2014

The correct answer is 2014.

Key Points

• Pradhan Mantri Jan Dhan Yojana (PMJDY) was launched on 28th August 2014 by the Government of India. It is a national-level initiative aimed at achieving comprehensive financial inclusion.

• The scheme was launched under the leadership of the Prime Minister of India, Narendra Modi, with the vision of ensuring access to financial services such as bank accounts, credit, insurance, and pensions for all households in India.

• The scheme is particularly targeted at the economically weaker sections of society, who previously lacked access to banking and financial services. Hence, the correct year is 2014.

• It was launched with the aim to eliminate financial exclusion and provide basic financial services like savings accounts, credit, insurance, pension, and financial literacy.

• The scheme is regarded as one of the largest financial inclusion initiatives in the world and was recognized by the Guinness World Records for opening the highest number of bank accounts in a single week.

• Under the PMJDY, individuals receive a zero-balance savings account, a RuPay debit card, and an accidental insurance cover of Rs. 1 lakh. The overdraft facility of Rs. 5,000 is available after six months of satisfactory operation of the account.

Additional Information

• Objectives of PMJDY:

• To provide universal access to banking facilities for every household in the country, especially in rural and remote areas, ensuring no one is excluded from the banking ecosystem.

• To offer basic banking accounts with overdraft facilities for every household, thereby promoting savings habits and financial literacy.

• To integrate individuals with the formal financial system, enabling them to access credit facilities, insurance, and pension services.

• Features of PMJDY:

• Accounts opened under PMJDY are zero-balance accounts, meaning account holders are not required to maintain a minimum balance.

• The scheme provides access to Direct Benefit Transfer (DBT), ensuring government benefits such as subsidies and pensions are directly credited to beneficiaries' accounts.

• The scheme includes a life insurance cover of Rs. 30,000 for accounts opened before January 26, 2015.

• PMJDY also facilitates financial literacy programs to educate account holders about various financial products and services.

• Achievements of PMJDY:

• As of 2023, over 50 crore bank accounts have been opened under the scheme, with total deposits exceeding Rs. 2 lakh crore.

• A significant portion of the accounts opened under PMJDY belongs to women and individuals in rural areas, promoting gender equality and rural development.

Important Points

• Global Recognition:

• The PMJDY initiative has been recognized globally as one of the largest financial inclusion schemes in the world, significantly reducing financial exclusion in India.

• Role of Technology:

• The integration of technology, such as Aadhaar and mobile banking, has played a crucial role in the success of the scheme by simplifying processes and ensuring transparency.

• Impact on Rural Areas:

• The scheme has significantly improved the financial inclusion of rural households, enabling them to access formal banking systems and government benefits directly.

Q3. Answer: (b) Cochin University of Science and Technology (Cusat)

The correct answer is Cochin University of Science and Technology (Cusat)..

Key Points

• Cochin University of Science and Technology (Cusat) showcased India's first fully automated vegetable sapling transplanter at the Ente Keralam exhibition, held in May 2025 at Marine Drive, Kochi. This event was part of the Kerala government's fourth-anniversary celebrations.

• The automated vegetable sapling transplanter was developed to revolutionize agricultural practices by introducing automation in the process of transplanting saplings. This innovation is a significant step toward modernizing farming techniques in India.

• Cusat has been known for its contributions to science and technology, and showcasing this transplanter highlights its commitment to leveraging technology for societal benefits. Hence, statement is correct.

• The Ente Keralam exhibition served as a platform to display technological advancements and achievements by various institutions in Kerala, including innovations in agriculture and automation.

• This exhibition was organized to celebrate the Kerala government's initiatives over the past four years, focusing on technological development, sustainability, and modernization. Hence, the event details are correct.

• Institutions like Cusat play a vital role in promoting research and innovation, as reflected by their participation in such exhibitions and their efforts to bring practical advancements to industries like agriculture.

Additional Information

• Cochin University of Science and Technology (Cusat):

• Cusat, located in Kochi, Kerala, is a prominent Indian university specializing in science, technology, and engineering. It was established in 1971 and has since been recognized for its contributions to research and innovation.

• Cusat's focus includes areas like automation, robotics, marine sciences, and advanced agriculture. The development of the vegetable sapling transplanter is an example of its emphasis on technological solutions for practical problems.

• Automated Vegetable Sapling Transplanter:

• This innovation addresses traditional agricultural challenges, such as labor shortages and inefficiency in manual transplanting methods.

• The transplanter uses advanced automation technology to speed up the process while ensuring precision and uniformity in planting saplings.

• Features: The machine is equipped with sensors and mechanisms to handle delicate saplings carefully, ensuring minimal damage during transplantation.

• Applications: It is particularly useful for large-scale farming and can be adopted in various regions to enhance agricultural productivity.

• Ente Keralam Exhibition:

• This exhibition was organized by the Kerala government to showcase achievements across sectors, including education, technology, and agriculture.

• It provided a platform for organizations and institutions to demonstrate their contributions to the state's progress.

• The event highlighted innovations that align with the state’s focus on sustainable development and technological advancement.

Important Points

• Prominent Indian Universities:

• Indian Institute of Science (IISc), Bengaluru: Known for its research excellence in science and engineering, IISc has pioneered advancements in areas like artificial intelligence, robotics, and sustainable technologies.

• Indian Institute of Technology Madras (IIT-M): Renowned for its contributions to engineering and technology, IIT-M specializes in innovations across fields like renewable energy, automation, and nanotechnology.

• Kerala Agricultural University: A leading institution in agricultural sciences, KAU focuses on research and development in sustainable farming, crop improvement, and agricultural technologies.

• Innovations in Agriculture:

• Automation and robotics are transforming agriculture by reducing manual labor, increasing efficiency, and improving yields.

• Developments like the vegetable sapling transplanter help bridge the gap between traditional practices and modern technological solutions.

Q4. Answer: (a) Northeast monsoon

The correct answer is Northeast monsoon.

Key Points

• Northeast monsoon is also known as the retreating monsoon. It is a significant weather phenomenon that brings substantial rainfall to the southeastern coast of India, particularly Tamil Nadu, during the winter months of October to December.

• The Northeast monsoon winds blow from the land to the sea, but they pick up moisture from the Bay of Bengal and bring rains to parts of Tamil Nadu. Hence, this is the correct answer.

• Tamil Nadu receives the majority of its annual rainfall (approximately 48%-60%) from the Northeast monsoon during this period. This is in contrast to most of India, which receives rainfall during the Southwest monsoon.

• The other options (Jet Stream, Southwest Monsoon, and Nor'wester) are not responsible for rainfall in Tamil Nadu during the winter season. Hence, these options are incorrect.

Additional Information

• Northeast Monsoon:

• The Northeast monsoon typically occurs during October to December, after the Southwest monsoon withdraws. It is prominent along the Coromandel Coast, which includes Tamil Nadu and parts of Andhra Pradesh.

• The winds are dry as they originate from the land; however, when they cross the Bay of Bengal, they pick up moisture and cause rainfall in southeastern India.

• Jet Stream:

• Jet streams are fast-moving air currents in the upper atmosphere, typically at an altitude of 10-15 km. They influence the movement of weather systems but are not directly responsible for rainfall during the winter in Tamil Nadu.

• They primarily affect the onset and withdrawal of the monsoon and are critical in shaping the western disturbances over northern India.

• Southwest Monsoon:

• The Southwest monsoon occurs from June to September and brings rainfall to most parts of India. However, Tamil Nadu lies in the rain shadow region of the Western Ghats, receiving limited rainfall during this season.

• Hence, the Southwest monsoon is not a significant contributor to Tamil Nadu's winter rainfall.

• Nor'wester:

• The Nor'wester is a localized thunderstorm phenomenon that occurs in northeastern India, particularly in the states of West Bengal, Assam, and Bihar, during the pre-monsoon season (March to May).

• It is not related to Tamil Nadu's winter rainfall.

Important Points

• Geographical Importance of Northeast Monsoon:

• Tamil Nadu's agriculture heavily depends on the Northeast monsoon. Crops such as rice, sugarcane, and millets are cultivated during this period.

• The monsoon replenishes the state’s water reservoirs and is crucial for drinking water and irrigation.

• Climate Variability:

• Climate change and El Niño events can significantly impact the intensity and distribution of the Northeast monsoon rains.

• For instance, during El Niño years, Tamil Nadu may experience reduced rainfall, affecting agriculture and water availability.

Q5. Answer: (d) Narmada Fault

The correct answer is Narmada Fault.

Key Points

• The Narmada Fault is a significant geological feature in the Peninsular Plateau of India and is known for its recurrent seismic activity due to its tectonic nature.

• It lies in the Narmada Rift Zone, which is a rift valley formed by the movement of tectonic plates. This region is highly active due to the presence of faults and fractures.

• The Narmada Fault stretches along the Narmada River and is part of the Son-Narmada-Tapti Fault System, a significant geological structure in India.

• Seismic activities in this fault zone are attributed to the Indian Plate's movement and its interaction with the Eurasian Plate. This tectonic activity generates stress along the fault lines, leading to frequent earthquakes.

• The Narmada Rift Valley has experienced several moderate to high-intensity earthquakes in the past, making it a zone of concern for seismic studies and disaster management.

• The fault's movement has also contributed to the formation of the rift valley, which provides evidence of tectonic activity over millions of years.

• Hence, due to its geological activity and frequent seismic events, the Narmada Fault is the correct answer.

Additional Information

• Details about Narmada Fault:

• The Narmada Fault is one of the most prominent faults in central India and lies in the Peninsular Block, which was traditionally considered a stable region. However, the fault's activity proves otherwise.

• This fault is a part of the Son-Narmada-Tapti Lineament, which divides the Indian subcontinent into northern and southern blocks.

• It plays a key role in shaping the Narmada Rift Valley, which is one of the most well-defined rift valleys in India.

• Seismic Activity in Peninsular Plateau:

• Despite being part of the stable Peninsular Shield, faults like the Narmada Fault demonstrate that the region is not entirely free from seismic hazards.

• Earthquakes in this region are often moderate but can sometimes reach significant magnitudes, posing a threat to life and infrastructure.

• Other Major Faults in the Peninsular Plateau:

• Vindhya Fault: Located near the Vindhya Range, this fault is less active but contributes to the region's geological diversity.

• Malda Fault: Found in the northeastern part of India, this fault is associated with the tectonic activity of the Himalayan region.

• Bhima Fault: Located in the Deccan Plateau, this fault is linked to the ancient volcanic activity that formed the Deccan Traps.

Important Points

• Significance of the Narmada Fault:

• The fault is crucial for understanding the tectonic history of the Indian subcontinent and the evolution of rift valleys.

• It highlights the need for seismic monitoring and disaster preparedness in regions traditionally considered geologically stable.

• Geological Importance:

• The Narmada Rift Valley serves as a natural laboratory for studying rifting processes and the dynamics of plate tectonics.

• It has contributed to the formation of unique landforms and is also a site of economic importance due to the presence of natural resources like minerals.

Q6. Answer: (b) Wang Chuqin

The correct answer is Wang Chuqin.

Key Points

• Wang Chuqin emerged as the men's singles champion at the 2025 International Table Tennis Federation (ITTF) World Table Tennis Championships Finals held in Doha.

• Wang Chuqin is a professional table tennis player from China, known for his exceptional skills and consistent performances on the international stage.

• The tournament was organized by the International Table Tennis Federation (ITTF), the global governing body for table tennis, which conducts world championships annually.

• Wang Chuqin defeated several top-tier players, showcasing his strategic gameplay, agility, and precision to claim the coveted title.

• This victory further solidifies Wang Chuqin's reputation as one of the most promising talents in the sport of table tennis. Hence, Wang Chuqin is the correct answer.

Additional Information

• About Wang Chuqin:

• Wang Chuqin is a Chinese table tennis player who has risen to prominence in recent years due to his consistent performances in global tournaments.

• He has represented China in numerous international events, contributing to his country's dominance in table tennis.

• Known for his powerful forehand, quick reflexes, and strategic thinking, Wang Chuqin has become a formidable opponent on the international stage.

• International Table Tennis Federation (ITTF):

• The ITTF is the global governing body for the sport of table tennis, established in 1926.

• It is responsible for organizing world championships, promoting the sport, and developing rules and regulations.

• The ITTF has over 200 member associations and is committed to fostering talent globally.

• Other Contenders:

• Ma Long: A legendary Chinese player often referred to as the "Dragon" for his dominance in table tennis. He is known for his tactical gameplay and numerous world titles.

• Fan Zhendong: Another highly skilled Chinese player, recognized for his powerful strokes and consistency in international championships.

• Lin Gaoyuan: A talented Chinese player with a unique style, known for his precision and agility on the table.

Important Points

• Significance of ITTF World Championships:

• The ITTF World Championships are considered one of the most prestigious events in table tennis, bringing together the best players from around the world.

• Winning the championship not only earns the player recognition but also contributes to their ranking and legacy in the sport.

• China's Dominance in Table Tennis:

• China has historically been the dominant force in table tennis, producing world-class players like Ma Long, Wang Chuqin, Fan Zhendong, and Lin Gaoyuan.

• Their success can be attributed to rigorous training programs, advanced coaching techniques, and a strong emphasis on the sport at the national level.

Q7. Answer: (d) SNDP Sabha

The correct answer is SNDP Sabha.

Key Points

• SNDP Sabha stands for the Sree Narayana Dharma Paripalana Sabha, founded in 1903 by the social reformer Sree Narayana Guru in Kerala.

• The primary objective of the SNDP Sabha was to work towards the upliftment of the backward castes, particularly the Ezhava community, by promoting education, social equality, and economic empowerment.

• The Sabha emphasized the teachings of Sree Narayana Guru, who advocated the principle of "One Caste, One Religion, One God for Mankind." This was aimed at reducing caste discrimination and fostering unity in society.

• The movement played a critical role in promoting education for the downtrodden communities by establishing schools, libraries, and colleges, which helped in the social and economic mobility of these groups.

• The SNDP Sabha also encouraged the eradication of superstitions and caste-based rituals, advocating for modern values and progressive reforms.

• Through its socio-economic reforms, the Sabha significantly contributed to the Kerala Renaissance, which aimed at transforming the traditional and rigid social structures of Kerala.

• Hence, the correct answer is SNDP Sabha.

Additional Information

• Sree Narayana Guru:

• Sree Narayana Guru was a prominent social reformer, spiritual leader, and philosopher of Kerala who worked tirelessly for the upliftment of the oppressed and backward communities.

• He opposed the caste system and promoted the idea of universal brotherhood, emphasizing the need for education, self-reliance, and social equality.

• Contributions of SNDP Sabha:

• The Sabha established numerous educational institutions, libraries, and temples that were open to all castes, challenging the rigid caste-based discrimination prevalent in Kerala at the time.

• It also helped in organizing the backward castes to assert their rights and demand equal treatment in society.

• The Sabha's efforts led to significant changes in Kerala's social structure, paving the way for greater social inclusion and justice.

• Other Reform Movements:

• Kayastha Sabha: Focused on the social upliftment of the Kayastha community, primarily in North India, by promoting education and employment opportunities.

• Singh Sabha: A Sikh reform movement in Punjab aimed at reviving Sikh traditions and countering Christian missionary activities.

• Arya Samaj: A Hindu reform movement founded by Swami Dayananda Saraswati in 1875 to promote Vedic values and oppose social evils like untouchability and child marriage.

Important Points

• Kerala Renaissance:

• The Kerala Renaissance was marked by a series of social and cultural movements in the 19th and 20th centuries that aimed to reform the rigid caste system, promote education, and ensure social justice.

• Key figures included Sree Narayana Guru, Ayyankali, Chattampi Swamikal, and others, who played vital roles in transforming Kerala society.

• Significance of SNDP Sabha:

• The Sabha's efforts were instrumental in improving the socio-economic conditions of backward communities, leading to greater social mobility and equality.

• It also inspired other reform movements in India, emphasizing the power of education and collective action in achieving social transformation.

Q8. Answer: (c) Iron

The correct answer is Iron.

Key Points

• Iron is a vital mineral essential for the production of hemoglobin, a protein in red blood cells responsible for transporting oxygen throughout the body.

• Hemoglobin consists of iron-containing heme groups, which bind to oxygen in the lungs and release it to tissues and organs. This process ensures proper functioning of the body. Hence, Iron is crucial for oxygen transport.

• Iron deficiency can lead to anemia, a condition characterized by fatigue, weakness, shortness of breath, and decreased immunity due to insufficient oxygen supply. This highlights the importance of iron in maintaining health.

• Sources of Iron: Iron can be obtained from dietary sources like red meat, fish, poultry, spinach, lentils, and fortified cereals. Consuming these foods helps meet the body's iron requirements.

• Iron is absorbed in the intestines and stored in the body in the form of ferritin. Regular intake is necessary to replenish the body's iron stores. Hence, maintaining iron levels is essential for oxygen transport.

Additional Information

• Other Essential Minerals:

• Calcium: While calcium is important for bone health, muscle contraction, and nerve transmission, it is not directly involved in oxygen transport.

• Zinc: Zinc plays a vital role in immune system function, enzyme activity, and cell division. However, it is not essential for oxygen transport in the blood.

• Magnesium: Magnesium is required for energy production, muscle function, and nerve signaling, but it does not participate in oxygen transport.

• Iron Deficiency and Global Impact:

• Global Statistics: According to the World Health Organization (WHO), iron deficiency anemia affects over 2 billion people worldwide, making it a significant public health issue.

• Age Groups: Pregnant women, young children, and adolescents are at higher risk due to increased iron demands during growth and development.

• Prevention: Iron-rich diets and supplementation programs are implemented globally to combat iron deficiency.

• Hemoglobin Function:

• Hemoglobin's ability to bind oxygen depends on the presence of iron atoms. Each molecule of hemoglobin can carry up to four oxygen molecules.

• Apart from oxygen transport, hemoglobin also helps in transporting carbon dioxide back to the lungs for exhalation.

Important Points

• Iron Absorption:

• Vitamin C enhances the absorption of iron from plant-based foods. Consuming iron-rich foods with sources of vitamin C can improve absorption.

• Inhibitors: Certain substances like phytates, polyphenols, and calcium can reduce iron absorption when consumed with iron-rich foods.

• Iron Supplementation:

• Dosage: Iron supplements are commonly recommended for individuals with anemia or increased iron needs, such as pregnant women.

• Side Effects: Overconsumption of iron supplements can lead to toxicity, causing symptoms like nausea, vomiting, and organ

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damage.

• Hemoglobin Testing:

• Diagnostic Tests: Hemoglobin levels can be measured through blood tests to diagnose anemia or monitor overall health.

• Normal Range: Normal hemoglobin levels vary by age and gender but typically range between 13-17 g/dL for men and 12-15 g/dL for women.

Q9. Answer: (d) Governor

The correct answer is Governor.

Key Points

• Governor's Authority: The Governor of a state in India has the power to dissolve the Council of Ministers. This is exercised when:

• The Chief Minister of the state resigns.

• The Chief Minister loses the majority in the State Legislative Assembly.

• There is a constitutional breakdown in the state, and the state government is no longer functioning as per the provisions of the Constitution.

• The Governor exercises these powers under Article 164 of the Indian Constitution, which states that the Council of Ministers is collectively responsible to the Legislative Assembly of the state.

• The Governor is bound to act on the advice of the Chief Minister and the Council of Ministers. However, in extraordinary circumstances, such as the loss of majority or in case of a political deadlock, the Governor may dissolve the Council of Ministers at their discretion.

• If the ruling party or coalition loses its majority in the Legislative Assembly, the Governor can recommend the dissolution of the Legislative Assembly and may also dissolve the Council of Ministers, paving the way for fresh elections.

• The Governor acts as a representative of the President of India and ensures that the state government functions in accordance with the provisions of the Constitution.

• In case of a failure of the constitutional machinery, the Governor can recommend the imposition of President's Rule in the state, which automatically dissolves the Council of Ministers.

Additional Information

• The Role of the Governor:

• The Governor is the constitutional head of a state and is appointed by the President of India.

• Article 154 of the Constitution vests the executive powers of the state in the Governor.

• The Governor acts on the advice of the Council of Ministers, headed by the Chief Minister, except in certain situations where discretion is allowed.

• Article 164:

• It states that the Chief Minister shall be appointed by the Governor, and the other ministers shall be appointed on the advice of the Chief Minister.

• The Council of Ministers is collectively responsible to the Legislative Assembly of the state.

• Dissolution of Council of Ministers:

• The Governor can dissolve the Council of Ministers when:

• The Chief Minister resigns or passes away.

• The ruling party loses its majority in the Legislative Assembly.

• There is a constitutional deadlock or failure of the state government machinery.

• Important Facts:

• The Governor is appointed for a term of 5 years, but they can be removed earlier by the President.

• Some of the discretionary powers of the Governor include:

• Appointing a Chief Minister in case of a hung assembly.

• Recommending the imposition of President's Rule in the state.

• Dissolving the Legislative Assembly when no party has a clear majority.

Important Points

• Difference between Governor and Chief Minister:

• The Governor acts as the nominal head of the state, whereas the Chief Minister is the real executive head.

• The Governor acts on the advice of the Council of Ministers, while the Chief Minister leads the Council of Ministers.

• Notable Instances:

• In 2019, the Maharashtra Governor dissolved the Legislative Assembly when no party could form a government after the elections.

• In 2016, the Arunachal Pradesh Governor recommended President's Rule due to a political crisis in the state.

Q10. Answer: (a) Rajiv Gandhi

The correct answer is Rajiv Gandhi.

Key Points

• Indira Gandhi Rashtriya Uran Akademi (IGRUA) is one of the premier pilot training institutes in India, located in Amethi, Uttar Pradesh.

• The foundation stone of IGRUA was laid in 1985 by Rajiv Gandhi, who was the Prime Minister of India at that time. Hence, this statement is correct.

• Rajiv Gandhi, being a trained commercial pilot himself, was passionate about aviation and its development in India. His vision was to establish a world-class aviation training institute to produce skilled pilots for both national and international requirements.

• The academy aims to provide high-quality training in aviation, including commercial pilot training, simulator training, and other aviation-related services. It plays a critical role in meeting the growing demand for skilled pilots in India.

• The institute has a modern fleet of aircraft and advanced training facilities, ensuring that students receive hands-on experience and theoretical knowledge required to excel in their aviation careers.

• Other individuals mentioned in the options, such as Gulzari Lal Nanda, Jawaharlal Nehru, and Morarji Desai, were not associated with the foundation of IGRUA. Hence, these options are incorrect.

• Hence, the correct answer is Rajiv Gandhi.

Additional Information

• Indira Gandhi Rashtriya Uran Akademi (IGRUA):

• It was established in 1985 by the Government of India under the Ministry of Civil Aviation.

• The academy is located in Amethi, Uttar Pradesh, and is named after Indira Gandhi, the former Prime Minister of India.

• IGRUA provides commercial pilot training and other aviation-related programs to aspiring pilots.

• About Rajiv Gandhi:

• Rajiv Gandhi was the youngest Prime Minister of India, serving from 1984 to 1989.

• He was a trained commercial pilot, which inspired his interest in the development of aviation and technology in India.

• Rajiv Gandhi's vision emphasized modernizing infrastructure and fostering technological advancement in India, including the aviation sector.

• Significance of IGRUA:

• IGRUA plays a vital role in the aviation industry by producing skilled pilots who contribute to both national and international airlines.

• It is equipped with modern training aircraft such as Cessna and multi-engine aircraft and state-of-the-art simulators for pilot training.

• The academy has an excellent track record of training pilots and ensuring their placement in reputed airlines globally.

Important Points

• Key Features of IGRUA:

• IGRUA provides training for Commercial Pilot License (CPL), Instrument Rating (IR), and other aviation-related certifications.

• It has a modern fleet of aircraft, including single-engine and multi-engine planes, along with advanced simulators for hands-on training.

• The institute also conducts training programs for aviation engineers, ground staff, and other aviation professionals.

• Legacy of Rajiv Gandhi in Aviation:

• Rajiv Gandhi's personal experience as a commercial pilot gave him unique insights into the requirements of the aviation industry.

• His contributions laid the foundation for modernizing India's aviation sector and establishing world-class aviation training institutes like IGRUA.

Q11. Answer: (c) Project Tiger

The correct answer is Project Tiger.

Key Points

• Project Tiger was launched in 1973 by the Government of India to conserve the Bengal tiger, an apex predator, and its ecosystem.

• The project was initiated due to the alarming decline in tiger population caused by poaching, habitat loss, and human encroachment.

• It aimed to ensure a viable population of tigers in their natural habitats and protect the areas they inhabit. Hence, Project Tiger is the correct answer.

• Initially, nine tiger reserves were established under this project, covering an area of approximately 14,000 square kilometers.

• Over the years, the project has expanded, and as of 2023, India has 53 tiger reserves, covering an area of approximately 75,000

square kilometers.

• It is administered by the National Tiger Conservation Authority (NTCA), established under the Wildlife Protection Act of 1972.

• The project focuses on eco-development and involving local communities to reduce human-tiger conflict and ensure long-term conservation. Hence, Project Tiger is critical for tiger conservation.

Additional Information

• Other Conservation Projects:

• Project Rhino: This initiative focuses on conserving the Indian rhinoceros, primarily found in Assam. It aims to combat poaching and ensure the survival of rhinos. However, it was not launched in 1973.

• Project Elephant: Launched in 1992, this project aims to conserve Asian elephants and their habitats, mitigate human-elephant conflicts, and ensure welfare measures. It is unrelated to tiger conservation.

• Project Asiatic Lion: This project focuses on the conservation of the Asiatic lion in the Gir Forest National Park, Gujarat. It is not linked to tiger conservation.

• Significance of Project Tiger:

• The Bengal tiger is a keystone species, meaning its conservation directly impacts the health of the ecosystem it inhabits.

• Tiger reserves help conserve biodiversity, protect forests, and maintain ecological balance.

• The project is recognized globally as one of the most successful initiatives for conserving a predator species.

• Recent Developments:

• India's tiger population has grown significantly since the project's inception. As per the 2022 tiger census, the population is estimated to be around 3,167, marking a substantial increase from the initial figure of 1,411 in 2006.

• Efforts under Project Tiger have also led to a reduction in poaching and habitat destruction.

Important Points

• Tiger Census:

• India conducts a tiger census every four years. The latest census report was released in 2022, highlighting the success of conservation efforts.

• The methodology includes camera trapping, pugmark analysis, and direct sightings.

• Global Recognition:

• India is home to nearly 75% of the world's tiger population, making it a key player in global tiger conservation.

• The project has inspired similar initiatives in other tiger-range countries, including Nepal and Bangladesh.

Q12. Answer: (c) Geothermal energy

The correct answer is Geothermal energy.

Key Points

• Geothermal energy refers to the energy derived from the heat of the Earth's interior. It is a renewable and sustainable source of energy.

• The Earth's core contains immense heat, which is generated due to radioactive decay and the residual heat from the planet's formation. This heat can be harnessed to produce electricity or for direct use in heating applications.

• Geothermal reservoirs are areas where heat is naturally stored beneath the Earth's surface. These reservoirs can be tapped using wells to extract steam or hot water.

• Geothermal power plants typically convert the thermal energy into electrical energy by using steam to drive turbines connected to generators.

• This energy source is environmentally friendly because it produces minimal greenhouse gas emissions compared to fossil fuels.

• Geothermal energy is widely used in countries like Iceland, New Zealand, the United States, and the Philippines, where geological conditions are favorable.

• Examples: The Geysers in California (USA) is the world's largest geothermal power plant. Iceland meets a significant portion of its energy needs using geothermal energy.

Additional Information

• Other Energy Sources:

• Biomass Energy: It is derived from organic materials like wood, agricultural waste, and animal manure. Biomass is burned to produce heat or converted into biofuels for energy generation. It is renewable but produces carbon emissions during combustion.

• Tidal Energy: Generated by harnessing the kinetic energy from the movement of tides. Tidal power plants, such as tidal barrages or underwater turbines, are used. It is dependent on the gravitational interaction between the Earth, moon, and sun.

• Solar Energy: Captures sunlight using photovoltaic cells or solar panels to generate electricity. Solar energy is abundant and clean but dependent on sunlight availability and weather conditions.

• Advantages of Geothermal Energy:

• It is a reliable and consistent energy source as it is not affected by weather conditions unlike solar or wind energy.

• The operational costs of geothermal plants are relatively low once installed because there are minimal raw material requirements.
• Geothermal energy has a small land footprint compared to wind or solar energy farms.
• Challenges with Geothermal Energy:
• Initial installation costs, including exploration and drilling, are high.
• Geothermal plants are location-specific and require areas with high geological activity like volcanic regions.
• In some cases, geothermal energy extraction can lead to land subsidence or induce seismic activity.

Important Points

• Geothermal Energy in India:
• India has geothermal potential in regions like Manikaran (Himachal Pradesh), Puga Valley (Ladakh), and Tattapani (Chhattisgarh).
• The Indian government is exploring geothermal energy to diversify its renewable energy portfolio.
• Applications of Geothermal Energy:
• Used for generating electricity in power plants.
• Direct use in heating buildings, greenhouses, and industrial processes.
• Utilized in geothermal heat pumps for efficient heating and cooling systems in residential and commercial buildings.

Q13. Answer: (d) Iron

The correct answer is Iron.

Key Points

• Iron is used as a catalyst in the Haber process, which is employed for the synthesis of ammonia from nitrogen and hydrogen gases.
• The catalyst is typically promoted with small amounts of other substances, such as potassium and aluminum oxides, to enhance its efficiency.
• Iron serves as a surface where the adsorption of nitrogen (N2) and hydrogen (H2) molecules occurs, facilitating the breaking of strong triple bonds in nitrogen molecules. Hence, it is ideal for this process.
• The Haber process operates at high temperatures (400–500°C) and pressures (150–200 atm) to achieve high reaction rates. Iron remains effective under such conditions.
• Other metals such as platinum, nickel, and copper are not used for the Haber process as they are either less effective or too expensive. Hence, they are not suitable for this process.
• The use of iron as a catalyst in the Haber process revolutionized the production of ammonia, which is a critical ingredient in fertilizers and other industrial chemicals. This makes the process economically viable.
• Hence, the correct answer is Iron.

Additional Information

• The Haber Process:
• The Haber process was developed by the German chemist Fritz Haber in the early 20th century and later industrialized by Carl Bosch.
• It is a method for producing ammonia (NH3) by combining nitrogen (N2) from the air with hydrogen (H2), typically derived from natural gas.
• The reaction is represented as: N2 + 3H2 <=> 2NH3, which is exothermic.
• Role of Catalysts in the Haber Process:
• Catalysts like iron help lower the activation energy required for the reaction, increasing the rate of ammonia production.
• Promoters such as potassium oxide improve the efficiency and durability of the iron catalyst.
• Applications of Ammonia:
• Ammonia is used in the production of fertilizers, such as urea and ammonium nitrate, which are essential for agriculture.
• It is also used as a refrigerant, in the manufacture of explosives, and in the production of cleaning agents.

Important Points

• Iron as a Catalyst:
• Iron is preferred due to its availability, cost-effectiveness, and ability to function under high temperatures and pressures.
• Despite being effective, the iron catalyst slowly deactivates over time due to sintering and poisoning by impurities like sulfur.
• Alternative Catalysts:
• Platinum and nickel are sometimes used in laboratory-scale ammonia synthesis, but their high cost makes them unsuitable for industrial use.
• Copper is generally not used in the Haber process but serves as a catalyst in other reactions, such as the oxidation of ammonia.

Q14. Answer: (d) Article 5

The correct answer is Article 5.

Key Points

• Article 5 of the Indian Constitution addresses the rights of citizenship at the commencement of the Constitution. It specifies the conditions under which a person becomes a citizen of India on January 26, 1950.

• According to Article 5, a person is considered a citizen of India if they fulfill at least one of the following conditions:

• The person was born in the territory of India.

• Either of the person's parents was born in the territory of India.

• The person has been ordinarily resident in the territory of India for not less than five years immediately preceding January 26, 1950.

• These provisions ensure that people residing in India at the time of independence and the adoption of the Constitution are recognized as citizens. Hence, Article 5 deals with the citizenship rights at the commencement of the Constitution.

• Article 7 deals with the rights of persons who migrated to Pakistan and later returned to India. This article does not specifically deal with citizenship at the commencement of the Constitution. Therefore, it is not the correct answer.

• Article 10 ensures that any person who is or is deemed to be a citizen of India under any of the provisions of the Constitution shall continue to be a citizen, subject to the provisions of any law made by Parliament. However, it does not deal directly with citizenship at the commencement of the Constitution.

• Article 11 empowers Parliament to make laws to regulate the acquisition and termination of citizenship and other related matters. However, it does not specifically address the citizenship rights at the commencement of the Constitution. Hence, Articles 7, 10, and 11 are not the correct answers.

Additional Information

• Citizenship under the Indian Constitution:

• Part II (Articles 5 to 11) of the Indian Constitution deals with the provisions related to citizenship in India.

• These articles define the categories of persons who shall be deemed citizens of India at the commencement of the Constitution and empower Parliament to regulate citizenship matters.

• Key Features of Articles 5 to 11:

• Article 5: Deals with citizenship at the commencement of the Constitution (January 26, 1950).

• Article 6: Relates to the rights of citizenship of persons who migrated to India from Pakistan.

• Article 7: Relates to the rights of citizenship of persons who migrated to Pakistan from India and later returned to India.

• Article 10: Ensures the continuation of citizenship for those already recognized as citizens.

• Article 11: Empowers Parliament to legislate on matters relating to citizenship, including acquisition, termination, and other related provisions.

• Important Points:

• At the time of the commencement of the Constitution, the criteria for citizenship were based on birth, parentage, and residency as detailed in Article 5.

• Subsequent amendments and laws, such as the Citizenship Act of 1955, were enacted by Parliament to elaborate and regulate the acquisition and termination of Indian citizenship.

Q15. Answer: (b) 1 May 2025

The correct answer is 1 May 2025.

Key Points

• Prime Minister Shri Narendra Modi inaugurated WAVES 2025, India's first-of-its-kind World Audio Visual and Entertainment Summit, on May 1, 2025, in Mumbai.

• The event aimed to highlight India's growing prominence in the global entertainment industry and foster collaboration among industry stakeholders.

• This summit brought together renowned names from the fields of cinema, music, animation, gaming, and technology, and served as a platform for showcasing India's creative and technological advancements. Hence, the date mentioned in option 2 is correct.

• WAVES 2025 was a multi-day event focusing on critical areas such as content creation, innovation, and the future of entertainment. It also emphasized the role of the Indian government in promoting the entertainment sector.

• The summit included panel discussions, workshops, exhibitions, and networking opportunities with international and domestic professionals in the entertainment industry. Hence, the event was significant for India's entertainment sector.

• May 1, 2025, was chosen strategically as it marked the beginning of a new era of collaboration and innovation in the entertainment domain. Hence, option 2 is correct.

Additional Information

• WAVES Summit:

• The World Audio Visual and Entertainment Summit (WAVES) is a platform designed to promote the Indian entertainment sector globally.

• The summit serves as an opportunity to explore the intersection of technology, creativity, and business, showcasing India's talent and innovation.

• India's Entertainment Industry:

• The Indian entertainment industry is among the fastest-growing sectors, contributing significantly to the nation's GDP and employment.

• It includes industries such as cinema, television, OTT platforms, animation, gaming, and music.

• India is known for producing the highest number of films annually, and its Bollywood industry is globally recognized.

• Key Features of WAVES 2025:

• Global Participation: WAVES attracted international industry leaders, fostering collaboration and partnerships.

• Technological Advancements: The summit showcased innovations in virtual reality, artificial intelligence, and content creation.

• It focused on how technology is revolutionizing entertainment, with Indian companies playing a pivotal role.

Important Points

• India's Global Role in Entertainment:

• India is emerging as a hub for content production, animation, and gaming, attracting global collaborations.

• The government has been actively supporting the entertainment sector through initiatives like Film Facilitation Office (FFO) and tax benefits.

• Significance of WAVES:

• Brand India: WAVES positions India as a global leader in the audio-visual and entertainment industry.

• It emphasizes India's rich culture and heritage, blending traditional storytelling with modern technological advancements.

• The summit promotes collaborations between government and private stakeholders to boost industry growth.

Q16. Answer: (b) Article 21

The correct answer is Article 21.

Key Points

• Article 21 of the Indian Constitution guarantees the protection of life and personal liberty to every individual in India.

• It mandates that no person shall be deprived of their life or personal liberty except according to the procedure established by law. This ensures a fundamental right to live with dignity.

• The Supreme Court in April 2025 reinterpreted Article 21 to direct amendments in the KYC digital norms to ensure inclusivity and accessibility for persons with disabilities. Hence, this statement is correct.

• The reinterpretation aligns with the principles of equality and non-discrimination, ensuring that digital systems, particularly those related to KYC processes, cater to the needs of persons with disabilities.

• This decision underscores the importance of inclusivity, promoting accessibility in line with India's obligations under the Rights of Persons with Disabilities Act, 2016. Hence, the correct answer is Article 21.

Additional Information

• Article 21 of the Indian Constitution:

• Article 21 is a fundamental right and is available to all persons, citizens and non-citizens alike.

• It has been interpreted to include several derivative rights such as the right to privacy, right to a clean environment, right to health, and right to education.

• The Supreme Court has expanded the scope of Article 21 through progressive judgments, ensuring that it is not restricted to mere animal existence but includes the right to live with human dignity.

• Rights of Persons with Disabilities Act, 2016:

• The Act replaced the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995.

• It ensures that persons with disabilities have equal rights and access to all public services, including digital services.

• The Act also emphasizes the importance of providing reasonable accommodation and ensuring accessibility to digital platforms for persons with disabilities.

• Digital KYC Norms:

• KYC (Know Your Customer) is a process used by financial institutions to verify the identity of their customers.

• The Supreme Court's directive ensures that the KYC process is inclusive and accessible to all, including persons with disabilities.

• This involves making digital platforms compliant with accessibility standards, such as providing screen reader compatibility and alternative input methods.

Important Points

• Legal Framework for Accessibility:

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• The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), which India ratified in 2007, mandates accessibility in all aspects of life, including digital services.

• India's commitment to the UNCRPD is reflected in domestic laws such as the Rights of Persons with Disabilities Act, 2016, which emphasizes removing barriers to access.

• Supreme Court's Role:

• The Supreme Court has consistently played a proactive role in interpreting constitutional provisions to uphold the rights of marginalized groups, including persons with disabilities.

• In the 2025 judgment, the Court reinforced the state's obligation to ensure that technological advancements benefit all sections of society, including the differently-abled.

Q17. Answer: (d) Ministry of Home Affairs

The correct answer is Ministry of Home Affairs.

Key Points

• The process of granting Indian citizenship by naturalisation is governed under the provisions of the Citizenship Act, 1955.

• The Ministry of Home Affairs (MHA) is the nodal ministry responsible for implementing the Citizenship Act, 1955, and handles all matters related to citizenship, including naturalisation.

• Naturalisation is one of the ways to acquire Indian citizenship, which is granted to foreign nationals who meet specific eligibility criteria as outlined in the Citizenship Act. Hence, the Ministry of Home Affairs is the relevant ministry for this process.

• The naturalisation process involves submitting an application to the MHA, which is then scrutinised to ensure compliance with the necessary legal requirements such as residency, good character, and knowledge of an Indian language.

• The final decision on granting citizenship is made by the MHA after verifying the application and conducting a background check. Thus, the Ministry of Home Affairs plays a central role in this process.

• Other ministries like the Ministry of Law and Justice, Ministry of Parliamentary Affairs, or Ministry of External Affairs are not responsible for granting citizenship by naturalisation. Hence, these options are incorrect.

Additional Information

• Citizenship Act, 1955:

• The Citizenship Act, 1955 provides for the acquisition, termination, and supplementary provisions relating to Indian citizenship.

• It specifies five modes of acquiring Indian citizenship: by birth, descent, registration, naturalisation, and incorporation of territory.

• Naturalisation is a process where a person not born in India becomes a citizen after fulfilling certain conditions such as 12 years of residence in India and renunciation of foreign citizenship.

• Role of the Ministry of Home Affairs:

• The Ministry of Home Affairs ensures that applications for citizenship are processed in accordance with the law and that all necessary verifications, such as police clearance and character verification, are conducted.

• The MHA also coordinates with state governments and other concerned authorities for verification processes.

• Key Features of Citizenship by Naturalisation:

• Applicants must have resided in India for a minimum of 12 years (11 years preceding the application and 1 year immediately before applying).

• They must demonstrate good character, knowledge of an Indian language, and show intent to reside in India permanently.

• Naturalised citizens enjoy the same rights and responsibilities as citizens by birth, including voting rights and eligibility for public offices.

Important Points

• Eligibility for Citizenship by Naturalisation:

• The applicant must not be an illegal migrant as per the Citizenship Act.

• Citizenship by naturalisation is granted only after the applicant renounces any other citizenship held previously, as India does not allow dual citizenship.

• Significance of MHA’s Role:

• The MHA is pivotal in ensuring that citizenship laws are implemented in a transparent and efficient manner, maintaining the sovereignty and security of India.

Q18. Answer: (a) Shailendra Nath Gupta

The correct answer is Shailendra Nath Gupta.

Key Points

• Shailendra Nath Gupta was appointed as the Director General of Defence Estates (DGDE) in June 2025.

• The DGDE is a critical position in the Ministry of Defence, responsible for managing the Defence Estates Organisation (DEO), which oversees lands owned by the defence forces.

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• Shailendra Nath Gupta brings extensive expertise and experience in managing defence-related administrative tasks, making him an ideal choice for this role. Hence, statement 1 is correct.

• The appointment of Shailendra Nath Gupta as DGDE aligns with the government's focus on enhancing the efficiency of estate management within the defence sector.

• His responsibility includes ensuring effective utilization of defence lands, addressing legal disputes, and overseeing the systematic expansion or maintenance of defence estates. Hence, statement 2 is correct.

• The Defence Estates Organisation plays a vital role in ensuring the land and infrastructure required for defence purposes are maintained effectively, and Gupta's appointment is expected to further strengthen this effort. Hence, statement 3 is correct.

Additional Information

• Director General of Defence Estates (DGDE):

• The DGDE is the highest authority within the Defence Estates Organisation, responsible for managing defence lands and cantonments across India.

• The organisation is tasked with ensuring efficient utilization, legal compliance, and strategic planning for defence infrastructure.

• It also oversees the administration of 62 cantonments, ensuring the welfare and infrastructure development for military personnel and civilians residing in these areas.

• Responsibilities of the DGDE:

• Managing defence lands across the country, including acquisition, transfer, and utilization.

• Ensuring compliance with legal and environmental regulations related to defence estates.

• Addressing disputes related to land ownership and usage.

• Defence Estates Organisation:

• It was established to manage lands owned by the Ministry of Defence and ensure proper coordination between the central and local authorities.

• The organisation plays a crucial role in enabling the defence forces to maintain their operational readiness by providing the necessary infrastructure.

Important Points

• Key Highlights of Shailendra Nath Gupta's Appointment:

• His appointment signifies the government's intent to strengthen administrative and operational efficiency within the Defence Estates Organisation.

• Gupta is known for his ability to handle complex administrative challenges, particularly in managing defence-related infrastructure.

• His role will involve strategic planning to ensure optimal utilization of defence lands while maintaining the welfare of personnel residing in cantonments.

Q19. Answer: (a) Indus Waters Treaty

The correct answer is Indus Waters Treaty.

Key Points

• Indus Waters Treaty: The Indus Waters Treaty was signed in 1960 between India and Pakistan, with the mediation of the World Bank. It is a water-sharing treaty that governs the use of the Indus River system.

• This treaty allocates the use of six rivers in the Indus River system: Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej.

• The treaty permits Pakistan to use the waters of the Indus, Jhelum, and Chenab rivers while granting India control over the waters of the Ravi, Beas, and Sutlej rivers.

• Despite multiple conflicts between the two nations, including the 1965 and 1971 wars, the treaty has been upheld, making it one of the most successful water-sharing agreements in history.

• Following the Pahalgam attack in April 2025, India decided to suspend the treaty as a response to the escalating tensions between the two countries. Hence, this is the correct answer.

• The suspension of the treaty highlights the geopolitical tensions between India and Pakistan, as water resources are a critical issue for both nations.

Additional Information

• Tashkent Agreement:

• The Tashkent Agreement was a peace agreement signed on January 10, 1966, between India and Pakistan after the 1965 Indo-Pak war.

• It was mediated by the Soviet Union and signed in Tashkent, Uzbekistan (then part of the Soviet Union).

• The agreement aimed to restore economic and diplomatic relations between the two countries and withdraw their armed forces to pre-war positions.

• Simla Agreement:

• The Simla Agreement was signed on July 2, 1972, between India and Pakistan after the 1971 war that led to the creation of Bangladesh.

• It aimed to establish lasting peace and outlined principles such as resolving disputes through peaceful means and mutual respect for sovereignty.

• This agreement also led to the conversion of the ceasefire line in Jammu and Kashmir into the Line of Control (LoC).

• Lahore Treaty:

• Although there is no formal treaty named the Lahore Treaty, the Lahore Declaration was signed on February 21, 1999, between India and Pakistan to improve bilateral relations.

• It emphasized the need for both countries to avoid conflicts and nuclear arms race and to resolve disputes through peaceful dialogue.

Important Points

• Impact of Indus Waters Treaty Suspension:

• The treaty's suspension could lead to significant water management challenges for Pakistan, as the Indus River system is a lifeline for its agriculture and economy.

• It could also escalate tensions between the two nuclear-armed neighbors, potentially impacting regional stability in South Asia.

• India's decision to suspend the treaty demonstrates its resolve to address cross-border terrorism and use water diplomacy as leverage.

• Significance of the Treaty:

• The Indus Waters Treaty is vital for ensuring water security in the region and fostering cooperation between India and Pakistan.

• Its suspension highlights the interdependence of natural resources and geopolitics in international relations.

Q20. Answer: (c) INS Arnala

The correct answer is INS Arnala.

Key Points

• INS Arnala is the first Anti-Submarine Warfare Shallow Water Craft (ASW-SWC) indigenously designed and built in India, inducted into the Indian Navy in May 2025.

• The ASW-SWC project is part of the Indian Navy's initiative to strengthen its ability to detect and neutralize submarine threats in coastal waters, which are critical for national defense.

• The ship was constructed by Garden Reach Shipbuilders & Engineers (GRSE), Kolkata, under the "Make in India" initiative to promote indigenization in defense manufacturing.

• INS Arnala is equipped with advanced sensors, weapons, and systems for anti-submarine warfare, including sonar, torpedoes, and depth charges.

• The shallow draft and advanced maneuverability of the ASW-SWC allow it to operate effectively in coastal and shallow waters, ensuring safety and security in areas close to the coastline.

• The induction of INS Arnala marks a significant milestone for the Indian Navy as it enhances the force's capabilities in maritime domain awareness and submarine tracking in strategic coastal zones.

• India is focusing on the indigenization of naval capabilities to reduce dependence on foreign technology and to build a robust domestic defense manufacturing ecosystem.

Additional Information

• Anti-Submarine Warfare Shallow Water Craft (ASW-SWC):

• The ASW-SWC is specifically designed for anti-submarine operations in shallow waters near the coastline.

• It is equipped with state-of-the-art sonar systems, combat management systems, and electronic warfare systems to detect, track, and neutralize enemy submarines.

• The ship also provides support for mine-laying and search-and-rescue operations.

• Other Options:

• INS Tushil: It is not related to anti-submarine warfare. It is one of the stealth frigates of the Indian Navy, designed for different purposes, such as surface and air warfare.

• INS Arighaat: This is a nuclear-powered submarine designed for long-range underwater operations but is not categorized under the ASW-SWC program.

• INS Garuda: This is a naval air station of the Indian Navy, primarily used for aviation-related operations.

• Importance of Indigenous Defense Manufacturing:

• The government of India has launched several initiatives like "Make in India" and "Atmanirbhar Bharat" to promote self-reliance in defense production.

• Indigenous platforms like INS Arnala are crucial for reducing dependence on foreign imports and ensuring strategic autonomy.

• It also contributes to the growth of the domestic defense industry and creates employment opportunities in the country.

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• Strategic Significance:

• With increasing threats in the Indian Ocean region, the induction of advanced platforms like INS Arnala helps enhance maritime security.

• The ship's ability to operate in shallow waters makes it a key asset in safeguarding India's coastline, especially in areas like the Arabian Sea and the Bay of Bengal.

Important Points

• Garden Reach Shipbuilders & Engineers (GRSE):

• GRSE is one of the leading shipyards in India, specializing in the construction of warships and other naval platforms.

• It has played a significant role in the indigenization of naval defense platforms, delivering a wide range of vessels to the Indian Navy and Coast Guard.

• Future Plans:

• The Indian Navy has planned the induction of multiple ASW-SWC ships to strengthen its presence in shallow waters.

• These ships will complement other advanced platforms like P-8I maritime patrol aircraft and Scorpene-class submarines in anti-submarine operations.

Q21. Answer: (d) Second Plan

The correct answer is Second Plan.

Key Points

• The Second Five-Year Plan (1956–1961) was primarily focused on rapid industrialisation, which was considered crucial for the long-term growth of the Indian economy.

• This plan was based on the Mahalanobis Model, which emphasized the development of heavy industries and capital goods as a means to achieve self-reliance. Hence, the foundation of public sector steel plants was laid during this plan.

• The government set up public sector steel plants with Soviet and German assistance during the plan. The three major plants established were:

• Bhilai Steel Plant in Madhya Pradesh (now Chhattisgarh) with Soviet assistance.

• Durgapur Steel Plant in West Bengal with British assistance.

• Rourkela Steel Plant in Odisha with German assistance.

• The emphasis on heavy industries, particularly steel production, was to create a robust industrial base, enabling India to reduce dependency on imports and enhance self-sufficiency.

• The steel plants established under the Second Plan played a pivotal role in India's industrialisation by providing essential raw materials for other industries, such as construction, automobiles, and manufacturing.

Additional Information

• Second Five-Year Plan (1956–1961):

• The plan was spearheaded by P.C. Mahalanobis, an Indian statistician and economist.

• The primary objective of the plan was to create a strong industrial base, with a focus on heavy industries, including steel, coal, and energy.

• It aimed to increase the production of capital goods, which would in turn support other sectors of the economy.

• Public Sector Steel Plants:

• The Bhilai Steel Plant (inaugurated in 1959) was built with the technical collaboration of the Soviet Union.

• The Durgapur Steel Plant (operational from 1962) was established with assistance from the United Kingdom.

• The Rourkela Steel Plant (commissioned in 1961) was constructed with the help of Germany.

• Importance of Steel Industry:

• Steel is a critical raw material for infrastructure and industrial development.

• The establishment of steel plants contributed to job creation, technological advancements, and the overall economic growth of the country.

• It reduced India's dependency on imported steel, making the nation more self-reliant.

• Other Five-Year Plans:

• First Plan (1951–1956): Focused on agriculture, irrigation, and energy generation to rebuild the economy post-independence.

• Third Plan (1961–1966): Emphasized self-reliance and agriculture but was disrupted due to wars and economic crises.

• Fourth Plan (1969–1974): Focused on growth with stability and progress towards self-reliance.

Important Points

• Role of P.C. Mahalanobis:

• P.C. Mahalanobis is known as the architect of Indian planning. His model influenced the focus on capital goods and industrialisation during the Second Plan.

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• The Mahalanobis Model balanced the need for consumption goods and investment goods production, laying the groundwork for a long-term strategy for economic growth.

• Steel Plants' Current Relevance:

• The steel plants established during the Second Plan continue to be a significant part of India's industrial and economic framework.

• They are managed by Steel Authority of India Limited (SAIL), a public sector enterprise under the Government of India.

Q22. Answer: (d) Conducting elections

The correct answer is Conducting elections.

Key Points

• Passing bills into laws: The President of India plays a crucial role in the legislative process. After a bill is passed by both Houses of Parliament, it is presented to the President for assent. The President can either approve the bill, reject it, or return it for reconsideration. Hence, this statement is correct.

• Appointing the Prime Minister: The President appoints the Prime Minister of India. Generally, the leader of the majority party or coalition in the Lok Sabha is invited to form the government. This is a key constitutional role of the President. Hence, this statement is correct.

• Summoning and dissolving the Parliament: The President has the power to summon, prorogue, and dissolve the sessions of Parliament as per the provisions of the Constitution. This is done on the advice of the Council of Ministers. Hence, this statement is correct.

• Conducting elections: Conducting elections is not a function of the President of India. This responsibility lies with the Election Commission of India, an independent constitutional authority. The Election Commission is responsible for conducting free and fair elections in India at various levels, including the President's election. Hence, this statement is incorrect.

Additional Information

• Role of the President of India:

• The President is the head of state and the supreme commander of the armed forces in India.

• The President performs ceremonial functions and exercises powers as per the Constitution, including legislative, executive, and judicial functions.

• The President works in accordance with the advice of the Council of Ministers, led by the Prime Minister.

• Election Commission of India:

• The Election Commission of India is an independent constitutional authority responsible for conducting elections in India.

• It organizes elections for the Lok Sabha, Rajya Sabha, state legislatures, and the offices of the President and Vice President.

• Article 324 of the Constitution provides the Election Commission its powers and functions.

Important Points

• Key Constitutional Articles:

• Article 52: Establishes the office of the President of India.

• Article 53: States that the executive powers of the Union shall be vested in the President.

• Article 74: Specifies that the President shall act on the advice of the Council of Ministers.

• Election Commission Facts:

• The Election Commission was established on 25th January 1950.

• It ensures free and fair elections and has the authority to supervise and control the election process.

Q23. Answer: (c) DRR Rice 100

The correct answer is DRR Rice 100.

Key Points

• DRR Rice 100 is one of the first genome-edited rice varieties launched in India in 2025. Genome editing involves precise modifications to the genes of an organism to improve its characteristics, such as yield and resistance to diseases.

• Genome editing techniques, such as CRISPR-Cas9, were employed to develop DRR Rice 100. These methods enable researchers to modify specific sections of the genome to enhance desired traits.

• DRR Rice 100 was developed to address key challenges in agriculture, such as climate resilience, higher productivity, and resistance to pests and diseases. The goal was to ensure food security and sustainable farming practices.

• This variety of rice is noted for its short maturation period, which allows farmers to achieve faster harvest cycles, thereby increasing efficiency and productivity.

• The introduction of genome-edited rice like DRR Rice 100 aligns with India's efforts to incorporate modern biotechnological advancements in agriculture, ensuring better quality crops and enhanced yield. Hence, the correct answer is DRR Rice 100.

Additional Information

• Genome Editing in Agriculture:

• Genome editing refers to technologies that allow scientists to alter the DNA of organisms. Techniques such as CRISPR-Cas9 facilitate precise changes to improve traits.

• In agriculture, genome editing is used to develop crop varieties that are resistant to diseases, drought-tolerant, and higher yielding. It helps address challenges related to climate change and food security.

• Specific Features of DRR Rice 100:

• Short maturation period: It matures faster than conventional rice varieties, allowing multiple crop cycles per year.

• Pest resistance: Genome editing has conferred resistance to major pests, reducing the need for chemical pesticides.

• Climate resilience: DRR Rice 100 can withstand extreme weather conditions, making it suitable for diverse agro-climatic zones.

• Higher productivity: The variety produces a higher yield per hectare compared to traditional rice varieties.

• India's Focus on Genome Editing in Agriculture:

• India has actively promoted biotechnological research in agriculture to address food security and sustainability. Government initiatives have supported research and development in genome editing technologies.

• The launch of DRR Rice 100 is a milestone in India's agricultural innovation, showcasing the potential of biotechnology in transforming farming practices.

Important Points

• Other Rice Varieties:

• Basmati Gold: A premium variety of rice known for its aroma and quality. It is widely cultivated in northern India but is not genome-edited.

• Super Rice 21: A hybrid rice variety aimed at improving yield and resistance. However, it is developed through hybridization, not genome editing.

• Shakti Rice: A fortified rice variety aimed at addressing nutritional deficiencies. It contains added micronutrients but is not genome-edited.

• Significance of Genome Editing:

• Genome editing provides precision in modifying crops, ensuring better traits without introducing foreign genes (unlike genetically modified organisms).

• It helps meet challenges such as climate change, food shortages, and declining soil fertility.

Q24. Answer: (d) Shri Ram Centre of Performing Arts, Delhi

The correct answer is Shri Ram Centre of Performing Arts, Delhi.

Key Points

• Sheila Bharat Ram Theatre Festival: The Sheila Bharat Ram Theatre Festival is one of the prestigious cultural events held in India, showcasing vibrant performances in theatre and other performing arts.

• The 2025 edition of this festival was hosted at the Shri Ram Centre of Performing Arts, Delhi, which is renowned for its contribution to the promotion of theatre and performing arts.

• The Shri Ram Centre of Performing Arts is known as a hub for cultural and artistic performances, offering a platform for emerging and established artists to display their talent. Hence, this location hosted the event.

• The festival featured a variety of plays, performances, and workshops, attracting theatre enthusiasts and participants from across the country.

• The venue's historical significance and infrastructure make it an ideal choice for such a grand theatrical event. Hence, the correct answer is Shri Ram Centre of Performing Arts, Delhi.

Additional Information

• Shri Ram Centre of Performing Arts:

• Located in Delhi, this venue is a prominent institution for the promotion of performing arts, including theatre, drama, and cultural events.

• The auditorium is equipped with modern sound and lighting systems, making it suitable for hosting large-scale theatrical festivals.

• It serves as a training ground for budding artists and performers, offering workshops and educational programs in theatre.

• Other Venues Mentioned in the Question:

• Kamani Auditorium, Delhi: Known for its excellent acoustics and seating capacity, this venue frequently hosts music concerts, theatre productions, and cultural events.

• India Habitat Centre, Delhi: Popular for its diverse cultural activities, workshops, and exhibitions, this venue is a hub for intellectual and artistic events.

• National School of Drama, Delhi: One of India's premier institutions for theatre education, NSD organizes performances by its students and alumni, contributing immensely to the development of Indian theatre.

• Features of Sheila Bharat Ram Theatre Festival:

• The festival showcases diverse theatrical performances, ranging from classical plays to contemporary productions.

• It acts as a platform for both seasoned artists and new talent to present their work to a larger audience.

• Workshops and interactive sessions held during the festival promote skill development and knowledge sharing in the domain of performing arts.

Important Points

• Importance of Theatre Festivals:

• Theatre festivals like the Sheila Bharat Ram Theatre Festival contribute to the preservation and promotion of cultural heritage.

• They provide an opportunity to explore new artistic expressions and experiment with different formats and styles of storytelling.

• Role of Venues in Promoting Arts:

• Venues like Shri Ram Centre, Kamani Auditorium, and NSD play a crucial role in supporting the growth of performing arts by offering state-of-the-art infrastructure and platforms for artists.

• They act as cultural hubs where audiences and artists can interact, fostering creativity and appreciation for the arts.

Q25. Answer: (b) Select the file in the right pane → Drag it to a folder in the left pane → Drop it there

The correct answer is Select the file in the right pane → Drag it to a folder in the left pane → Drop it there..

Key Points

• Drag and Drop Method: This method allows users to move or copy files and folders by simply dragging them with the mouse pointer to a desired location and dropping them.

• In the correct method, select the file or folder from the right pane of the file explorer. The right pane usually displays the contents of the current directory.

• Drag the selected file to the destination folder displayed in the left pane. The left pane typically displays the directory tree or folder structure.

• Once the mouse pointer is over the target folder, release the mouse button to drop the file or folder into the desired location. This action either moves or copies the file based on the key pressed.

• No additional keys (like Ctrl) are needed if you are simply moving the file to another location on the same drive. However, holding Ctrl while dragging will create a copy instead of moving the file.

• This method is quick, intuitive, and does not require opening multiple windows or using context menus. Hence, the correct answer is to select the file in the right pane, drag it to a folder in the left pane, and drop it there.

Additional Information

• Other Drag and Drop Methods:

• Using the right-click drag: Right-click on the file, drag it to the destination folder, and release the mouse button. A context menu will appear where you can choose to copy, move, or create a shortcut.

• Between different drives: When dragging files between different drives, the default action is to copy the file. To move the file instead, hold the Shift key while dragging.

• Shortcuts for File Operations:

• Ctrl + C and Ctrl + V: These shortcuts copy and paste files, respectively, and can be used as an alternative to drag-and-drop.

• Ctrl + X: This shortcut cuts the selected file or folder, allowing it to be moved to a different location using Ctrl + V.

Important Points

• Option 1: Selecting the file, pressing Ctrl + C, and dropping it into the Recycle Bin is incorrect. This action copies the file to the clipboard but does not move or copy it to a specific folder. Dragging it to the Recycle Bin is equivalent to deleting it.

• Option 3: Right-clicking the file, dragging it to the desktop, and pressing Delete is incorrect. This process does not copy or move the file effectively.

• Option 4: Double-clicking the file and dragging it back into the same folder is also incorrect, as it does not achieve the purpose of copying or moving the file to a new location.

Q26. Answer: (a) ICAR-Indian Institute of Rice Research, Hyderabad

The correct answer is ICAR-Indian Institute of Rice Research, Hyderabad.

Key Points

• India’s first genome-edited rice variety DRR Rice 100 (Kamla) was developed by the ICAR-Indian Institute of Rice Research (IIRR), Hyderabad. This institute is a renowned research center specializing in rice improvement and cultivation.

• The development of DRR Rice 100 (Kamla) marks a significant step forward in agricultural biotechnology in India. This genome-edited rice variety was created using the CRISPR/Cas9 genome-editing technology, a cutting-edge tool that allows precise genetic modifications.

• The rice variety was developed to enhance certain desirable traits such as higher yield, pest resistance, and better grain quality.

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Genome editing allows scientists to introduce specific changes in the DNA without introducing foreign genes.

• ICAR-IIRR plays a pivotal role in rice research, development, and dissemination of improved rice varieties. Their efforts have consistently contributed to increasing rice productivity and ensuring food security in India.

• Genome-edited crops like DRR Rice 100 are distinct from genetically modified organisms (GMOs) because they do not involve the transfer of foreign genes, making them more acceptable in terms of regulatory frameworks and public opinion.

• The rice variety was named Kamla to signify its importance as a milestone in Indian agricultural research and its contribution to ensuring food security.

Additional Information

• ICAR-Indian Institute of Rice Research, Hyderabad:

• The ICAR-IIRR is located in Hyderabad, Telangana, and is dedicated to rice research and development.

• It focuses on developing high-yielding, pest-resistant, and climate-resilient rice varieties.

• It is involved in advanced agricultural technologies like genome editing and hybrid rice breeding.

• The institute contributes to ensuring food security in India, where rice is a staple food for a majority of the population.

• Genome Editing in Agriculture:

• Genome editing refers to the use of technologies like CRISPR/Cas9 to make precise modifications in an organism's DNA.

• Unlike GMOs, genome-edited crops do not involve the insertion of foreign DNA, making them more acceptable in regulatory frameworks.

• Applications of genome editing include improving crop yield, pest resistance, and drought tolerance, and enhancing nutritional content.

• Comparison of Options:

• Option 1 (Correct): ICAR-Indian Institute of Rice Research, Hyderabad – The institute developed DRR Rice 100 using CRISPR/Cas9 technology.

• Option 2: ICAR-Indian Agricultural Research Institute, New Delhi – While this is one of India's premier agricultural research organizations, it was not involved in the development of DRR Rice 100.

• Option 3: ICAR-Central Institute of Agricultural Engineering, Bhopal – This institute focuses on agricultural engineering and mechanization, not crop breeding or genome editing.

• Option 4: ICAR-National Rice Research Institute (NRRI), Cuttack – Although NRRI is a leading research center for rice, DRR Rice 100 was not developed here.

Important Points

• Significance of DRR Rice 100:

• DRR Rice 100 demonstrates the potential of genome editing in addressing agricultural challenges.

• The variety can contribute to reducing input costs for farmers by lowering the need for pesticides and fertilizers due to its pest resistance and enhanced traits.

• It aligns with India's goals of ensuring sustainable agriculture and food security.

• CRISPR/Cas9 Technology:

• This genome-editing tool enables precise changes in DNA, allowing targeted improvement in traits such as yield and resistance.

• It is faster and more accurate than traditional breeding methods.

• CRISPR-edited crops are gaining global attention for their potential in revolutionizing agriculture.

Q27. Answer: (c) Cl^-

The correct answer is Cl^-.

Key Points

• Definition of a conjugate base: A conjugate base is formed when an acid donates a proton (H^+). It is the species that remains after the acid loses the proton.

• HCl as an acid: Hydrochloric acid (HCl) is a strong acid, which means it completely dissociates in water. When HCl loses a proton (H^+), it forms its conjugate base.

• Conjugate base of HCl: When HCl donates its proton (H^+), the resulting species is Cl^- (chloride ion). Thus, Cl^- is the conjugate base of HCl.

• Why other options are incorrect:

• Option 1 (CH^-): CH^- is not related to HCl and cannot be its conjugate base. Incorrect.

• Option 2 (H2O^-): H2O^- is not a possible ion in this context. It is not related to the dissociation of HCl. Incorrect.

• Option 4 (Cl^+): Cl^+ is a positively charged ion and cannot be a conjugate base, as a base typically carries a negative charge or is neutral. Incorrect.

Additional Information

• Acid-Base Chemistry:
• Acids: Substances that donate protons (H^+) in a chemical reaction. Example: HCl, H2SO4.
• Bases: Substances that accept protons in a chemical reaction. Example: OH^-, NH3.
• Conjugate Acid-Base Pair:
• A conjugate acid-base pair consists of two species that differ by the presence or absence of a proton (H^+).
• Example: HCl (acid) and Cl^- (conjugate base); NH4^+ (acid) and NH3 (conjugate base).
• Properties of Cl^-:
• Charge: Cl^- is a negatively charged ion (anion).
• Stability: Cl^- is highly stable due to its full octet configuration.
• Occurrence: Commonly found in salts like NaCl (sodium chloride) and in solutions as part of electrolytes.

Important Points

• Bronsted-Lowry Acid-Base Theory:
• This theory defines acids as proton donors and bases as proton acceptors.
• The concept of conjugate acid-base pairs stems from this theory.
• Example of a Strong Acid:
• HCl is a strong acid because it completely ionizes in water, producing H^+ and Cl^- ions.

Q28. Answer: (a) Ryotwari

The correct answer is Ryotwari system.

Key Points

• Ryotwari system was primarily followed in the Bombay and Madras Presidencies.
• In this system, the revenue settlement was made directly with the cultivators or ryots. They were recognized as the owners of the land.
• The cultivators were required to pay land revenue directly to the government annually. Hence, statement regarding Ryotwari system is correct.
• The British administration, under the Ryotwari system, collected revenue based on the fertility of the soil, type of crop grown, and irrigation facilities available.
• The system was introduced by Thomas Munro, a British official, during the early 19th century in regions like Madras.
• Ryots had the freedom to cultivate their land, but the system often led to exploitation due to high revenue demands by the British. Hence, it had both advantages and disadvantages.
• Thus, the Ryotwari system was the primary land revenue system in Bombay and Madras Presidencies.

Additional Information

• Details of Land Revenue Systems:
• Ryotwari system:
• Introduced in Madras, Bombay, and Assam.
• The ownership of land was vested directly in the ryots or cultivators.
• The government collected revenue directly from the ryots based on the nature of the land.
• While it recognized individual ownership, excessive revenue demand often led to the exploitation of farmers.
• Zamindari system:
• Implemented in Bengal Presidency.
• Land revenue was collected through intermediaries called zamindars, who acted as landlords.
• Zamindars were responsible for collecting revenue from peasants and paying it to the British.
• This system led to the creation of a wealthy class of zamindars, but peasants faced exploitation.
• Mahalwari system:
• Introduced in North-Western Provinces, Punjab, and parts of Central India.
• Revenue settlements were made with entire villages or communities, referred to as mahals.
• Land revenue was shared among the village community based on collective ownership.
• It aimed at balancing individual and community ownership but often faced administrative challenges.
• Key features of Ryotwari system:
• Introduced by Thomas Munro in 1820.
• It recognized the individual ownership of ryots over land.
• Revenue was determined based on land fertility and other factors.

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• Ryots had the freedom to cultivate their land but were often burdened by high taxes.

Important Points

• Comparison of Land Revenue Systems:

• Ryotwari system: Direct settlement with cultivators; prevalent in Madras and Bombay Presidencies.

• Zamindari system: Settlement with zamindars; prevalent in Bengal Presidency.

• Mahalwari system: Settlement with village communities; prevalent in North-Western Provinces and Punjab.

• Impact on Farmers:

• Excessive revenue demands under Ryotwari and Zamindari systems led to exploitation and indebtedness.

• Mahalwari system was intended to promote community ownership but faced administrative challenges.

Q29. Answer: (d) De Almeida

The correct answer is De Almeida.

Key Points

• Francisco de Almeida was appointed as the first Portuguese governor in India in the year 1505.

• He was given the title of Viceroy and was tasked with strengthening Portuguese naval supremacy in the Indian Ocean region.

• Francisco de Almeida implemented the policy of the Blue Water Strategy (Maritime Supremacy). This strategy emphasized controlling the seas rather than extensive territorial expansion. Hence, this statement is correct.

• The Portuguese established their first base in India at Cochin during Almeida's tenure. This marked the beginning of Portuguese colonial influence in India.

• Francisco de Almeida was known for his aggressive naval tactics. He defeated several Arab fleets and local rulers to establish Portuguese dominance along the western coast of India. Hence, his actions were pivotal for Portuguese success.

• His tenure as Viceroy ended in 1509, and he was succeeded by Afonso de Albuquerque, who continued Portuguese expansion in India. This fact is historically significant.

• Hence, the correct answer is De Almeida.

Additional Information

• Francisco de Almeida:

• Francisco de Almeida served as the first Viceroy of Portuguese India from 1505 to 1509.

• His Blue Water Strategy aimed at ensuring Portuguese naval supremacy in the Indian Ocean and controlling key trade routes.

• He established Portuguese control over key ports such as Cochin, Canannore, and other areas along the Malabar Coast.

• Portuguese Expansion in India:

• The Portuguese were the first Europeans to establish a lasting colonial presence in India, starting in the early 16th century.

• After Almeida, Afonso de Albuquerque expanded Portuguese territories further by capturing Goa in 1510.

• Significance of Portuguese Colonization:

• The Portuguese introduced new trade goods, cultural influences, and religious conversions in India.

• They played a crucial role in establishing European dominance over Indian Ocean trade, which lasted for several centuries.

Important Points

• Other Portuguese Governors:

• Afonso de Albuquerque: Known as the second Viceroy of Portuguese India, he captured Goa in 1510 and strengthened Portuguese power.

• Nuno da Cunha: Served as Governor of Portuguese India from 1529 to 1538 and played a crucial role in expanding Portuguese influence in the region.

• Martim Afonso de Sousa: Another notable Portuguese governor who served from 1542 to 1545 and focused on administrative and economic reforms.

• Legacy of Portuguese Rule:

• The Portuguese left a lasting cultural impact on India, especially in Goa, which is evident in architecture, cuisine, and religion.

• They were among the first to introduce European-style fortifications, firearms, and new navigational techniques in India.

Q30. Answer: (d) 8th century

The correct answer is 8th century.

Key Points

• The Gurjara Pratihara dynasty was founded by Nagabhatta I in the 8th century. It marked the beginning of one of the most significant early medieval Indian dynasties that ruled over northern and western India.

• Nagabhatta I initially established his rule in the Malwa region, which is located in modern-day Madhya Pradesh. This region became the core of the Pratihara dynasty's power during its formative years.

• The Pratihara dynasty rose to prominence by resisting foreign invasions, particularly the Arab invasions. Nagabhatta I played a key role in defending Indian territories against these invaders. Hence, the statement that Nagabhatta I founded the dynasty in the 8th century is correct.

• The Pratiharas are known for their contributions to Indian art, culture, and architecture. They were also instrumental in promoting Hinduism and Sanskrit literature during their reign.

• Nagabhatta I's successors, such as Mihira Bhoja and Mahendrapala I, expanded the kingdom further, making the Pratihara dynasty one of the most powerful in India during the early medieval period.

Additional Information

• Gurjara Pratihara Dynasty:

• The Gurjara Pratihara dynasty was one of the three major powers of early medieval India, along with the Rashtrakutas and Palas. They were known for their military strength and administrative capabilities.

• Their capital was initially based in Ujjain, but later, Kannauj became the center of their empire. Kannauj was a significant city in northern India and a focal point of the "Kannauj Triangle" rivalry between the Pratiharas, Rashtrakutas, and Palas.

• Contributions of the Pratihara Dynasty:

• Architecture: The Pratiharas are credited with the construction of several temples, including the famous Somnath temple in Gujarat. Their architectural style combined elements of North Indian temple design with unique regional features.

• Culture and Literature: The Pratiharas were patrons of Sanskrit literature and played a key role in the revival of Hinduism during a period when Buddhism and Jainism were also thriving in India.

• Military Achievements: They successfully defended India from Arab invasions, especially in the western regions, thereby preserving the cultural and political integrity of the subcontinent.

• Important Rulers of the Dynasty:

• Nagabhatta I: The founder of the dynasty, who established the kingdom in Malwa and defended it against early Arab invasions.

• Mihira Bhoja: One of the most renowned rulers of the dynasty, under whom the Pratihara empire reached its zenith. He was known for his military conquests and administrative reforms.

• Mahendrapala I: The successor of Mihira Bhoja, who expanded the empire further and strengthened its cultural and economic foundations.

Important Points

• Arab Invasions:

• The early Arab invasions during the 8th century posed a significant threat to western India. The Pratiharas, under Nagabhatta I, successfully repelled these invasions, establishing their reputation as defenders of Indian territory.

• This victory was crucial in maintaining the cultural and political autonomy of India during a time of great external pressures.

• Decline of the Dynasty:

• The decline of the Pratihara dynasty began in the 10th century due to internal strife, weak successors, and increasing pressure from rival powers such as the Rashtrakutas and the Ghaznavids.

• By the 11th century, the dynasty had lost most of its territories, marking the end of its dominance in northern and western India.

Q31. Answer: (a) Right-click on the file and press 'Shift + Delete'

The correct answer is Right-click on the file and press 'Shift + Delete'.

Key Points

• Shift + Delete is a shortcut in Microsoft Windows that permanently deletes a file without sending it to the Recycle Bin. This ensures that the file is removed immediately from the system.

• When you use this shortcut, the file bypasses the Recycle Bin, and the system marks the space occupied by the file as available for new data. Hence, the statement is correct.

• Using Ctrl + D only moves the file to the Recycle Bin instead of permanently deleting it. Hence, the statement is incorrect.

• Dragging the file to the Recycle Bin is another method of deleting a file, but the file is not permanently deleted as it remains in the Recycle Bin until it is manually emptied. Hence, the statement is incorrect.

• Right-clicking on the file and selecting "Delete" will also move the file to the Recycle Bin and not permanently delete it. Hence, the statement is incorrect.

• The Shift + Delete method is commonly used when users want to remove sensitive or unnecessary files without the need for additional confirmation from the Recycle Bin.

Additional Information

• Key Characteristics of File Deletion Methods:

• Shift + Delete: Permanently deletes the file, bypassing the Recycle Bin. Once deleted, recovering the file may require specialized recovery tools.

• Ctrl + D: Moves the file to the Recycle Bin, allowing the user to restore it if needed.

• Dragging the file to the Recycle Bin allows for temporary deletion. The file is not permanently removed until the Recycle Bin is emptied.

• Right-click + Delete: Similar to dragging to the Recycle Bin, this only removes the file temporarily unless the Recycle Bin is cleared.

• Recovering Deleted Files:

• Files deleted using Shift + Delete are not easily recoverable through standard methods, as they bypass the Recycle Bin. Specialized software like Recuva or EaseUS Data Recovery is required for recovery.

• Files in the Recycle Bin can be restored by right-clicking on the file and selecting Restore. This places the file back in its original location.

• Applications of Permanent Deletion:

• Permanent deletion is often used for sensitive data that users want to remove entirely, such as financial records, personal information, or outdated files.

• Organizations dealing with sensitive data often rely on permanent deletion methods to ensure compliance with data protection laws.

Important Points

• Storage and Deletion:

• Files are not immediately erased from storage devices when deleted. Instead, the system marks the space as available for new data. This is true for both Recycle Bin deletion and Shift + Delete deletion.

• Specialized software can sometimes recover "permanently" deleted files by analyzing unallocated space on the storage device.

• Best Practices for Deletion:

• Always double-check the file before using Shift + Delete, as recovering it later may be difficult or costly.

• For highly sensitive information, consider using data shredding tools like Eraser or Secure Delete to ensure complete and irreversible removal.

Q32. Answer: (b) Sonu Sood

The correct answer is Sonu Sood.

Key Points

• Sonu Sood was honored with the Humanitarian Award at the 72nd Miss World Festival held in May 2025 for his exceptional contributions to society during the Covid-19 pandemic.

• During the pandemic, Sonu Sood emerged as a real-life hero by assisting thousands of stranded migrant workers in returning to their hometowns by arranging transportation, including buses, trains, and flights.

• He provided financial assistance to families who were struggling due to the pandemic and supported students by covering their educational expenses.

• Sonu Sood launched a toll-free helpline to make it easier for individuals in need to reach out for support. This initiative gained massive appreciation both nationally and internationally.

• His philanthropic efforts extended to organizing oxygen cylinders, hospital beds, and medicines for Covid-19 patients during the peak of the pandemic.

• The recognition at the Miss World Festival highlights the global acknowledgment of his efforts and reflects his role as a global humanitarian icon.

Additional Information

• About Sonu Sood:

• Sonu Sood is an Indian actor, producer, and philanthropist known for his roles in Hindi, Telugu, Tamil, and Kannada cinema.

• Born on 30 July 1973, in Moga, Punjab, Sonu Sood transitioned from a successful acting career to becoming a celebrated humanitarian during the Covid-19 pandemic.

• He was also honored with several awards, including the SDG Special Humanitarian Action Award by the United Nations Development Programme (UNDP).

• 72nd Miss World Festival:

• The Miss World Festival is an annual international beauty pageant that celebrates talent, culture, and social responsibility.

• In its 72nd edition, held in May 2025, individuals and organizations contributing to global welfare were recognized alongside the beauty pageant.

• Covid-19 Pandemic Impact:

• The pandemic, which began in December 2019, caused a global health crisis, disrupting livelihoods, healthcare systems, and economies worldwide.

• Millions of people, especially migrant workers, faced hardships like unemployment, lack of transportation, and access to basic needs during lockdowns.

• Philanthropists like Sonu Sood stepped up to provide critical aid during this period, garnering immense respect and admiration globally.

Important Points

• Contributions of Sonu Sood:

• Sonu Sood's efforts extended beyond India as he helped repatriate Indians stranded abroad in countries like Kyrgyzstan and the Philippines.

• He established the Sood Charity Foundation, focusing on healthcare, education, and employment.

• Other Nominees:

• Akshay Kumar: Known for his donations during crises like the Kerala floods and his contributions to the PM CARES Fund.

• Amitabh Bachchan: Actively supported Covid relief by providing hospital equipment, transportation, and financial aid to workers.

• Shah Rukh Khan: Provided financial aid, PPE kits, and other resources during the pandemic through his Meer Foundation.

Q33. Answer: (d) Lt General Dinesh Singh Rana

The correct answer is Lt General Dinesh Singh Rana.

Key Points

• Lt General Dinesh Singh Rana assumed charge as the 18th Commander-in-Chief of the Andaman & Nicobar Command (CINCAN) on 1 June 2025.

• The Andaman & Nicobar Command (ANC) is India’s first and only tri-service theater command, integrating the Army, Navy, and Air Force for joint operational capabilities in the strategically important Andaman and Nicobar Islands region.

• Lt General Dinesh Singh Rana succeeded his predecessor in this role, marking a new chapter in the leadership of the ANC, which plays a critical role in ensuring India’s maritime security and strategic interests in the Indian Ocean Region (IOR).

• He brings extensive experience and expertise to the position, having served in various capacities across the Indian Armed Forces during his illustrious career.

• The appointment of Lt General Dinesh Singh Rana underscores the importance of maintaining a robust defense posture in the Andaman & Nicobar Islands, given their geopolitical significance and proximity to key maritime routes.

Additional Information

• Andaman & Nicobar Command (ANC):

• The ANC was established in 2001 as India’s first unified command to integrate the Army, Navy, and Air Force for joint operations in the region.

• It is headquartered at Port Blair, the capital of the Andaman and Nicobar Islands.

• The command is responsible for safeguarding India’s strategic interests in the Indian Ocean Region (IOR), which includes overseeing vital sea lanes and countering maritime threats.

• Importance of the Andaman & Nicobar Islands:

• The islands are located near the Strait of Malacca, one of the world’s busiest shipping lanes, making the region strategically significant for global trade and energy security.

• The ANC plays a key role in monitoring maritime traffic and ensuring the security of India’s exclusive economic zone (EEZ).

• The region is a hub for geopolitical competition, with growing Chinese naval presence in the Indian Ocean, making the ANC’s role critical for India’s defense and foreign policy objectives.

• Background of Lt General Dinesh Singh Rana:

• Lt General Dinesh Singh Rana has had an illustrious career in the Indian Army, holding several key positions across various operational and strategic domains.

• His leadership abilities and operational expertise make him a suitable choice for this prestigious role.

• His appointment aligns with India’s focus on enhancing jointness and interoperability among the three armed services.

Important Points

• Significance of Integrated Commands:

• Integrated commands like the ANC enable better coordination and jointness among the Army, Navy, and Air Force, enhancing operational efficiency and combat readiness.

• Such commands are essential for addressing modern security challenges, including maritime threats, terrorism, and natural disasters.

• Strategic Role of ANC:

• The ANC serves as a forward operating base for India’s defense forces, enabling rapid response to threats in the Indian Ocean Region.

• It also facilitates humanitarian assistance and disaster relief (HADR) operations, given the vulnerability of the region to natural disasters such as cyclones and tsunamis.

• Future Developments:

• India is focusing on enhancing the capabilities of the ANC through infrastructure development, acquisition of modern platforms, and integration of advanced technologies.

• Efforts are underway to strengthen maritime domain awareness (MDA) and bolster India's position as a net security provider in the Indian Ocean Region.

Q34. Answer: (c) Yakshagana

The correct answer is Yakshagana.

Key Points

• Yakshagana is a traditional theatre form that originated in the state of Karnataka, India. It is a blend of dance, drama, and music, performed as a form of storytelling.

• The name "Yakshagana" translates to "the song of the celestial beings" and is believed to have originated in the 16th century.

• The performances are based on themes derived from Hindu epics such as the Ramayana, Mahabharata, and the Puranas.

• Yakshagana is characterized by its vivid costumes, intricate makeup, and elaborate headgear. The performers wear colorful attire that represents the character they are portraying, such as gods, demons, or mythical beings.

• The performance is usually accompanied by a traditional orchestra known as the Himmela, which includes instruments like the chenda (drum), maddale, and harmonium. The music plays a crucial role in setting the mood and pace of the performance.

• Yakshagana is often performed as an all-night show and is staged in open-air theatres or temple courtyards during festivals or special occasions.

• The dialogues and songs in Yakshagana are delivered in the Kannada language, often with a poetic touch, making it a culturally significant art form in Karnataka.

• The art form also emphasizes improvisation, allowing performers to include humor, satire, and social commentary in their acts, which keeps the audience engaged.

• Hence, the correct answer is Yakshagana.

Additional Information

• Bhavai:

• Bhavai is a traditional folk theatre form from the state of Gujarat.

• This art form combines dance, music, and drama and is performed to entertain as well as deliver social messages.

• It is often performed in the open and features characters from mythology and folklore, with a mix of humor and satire.

• Jatra:

• Jatra is a traditional theatre form popular in West Bengal, Odisha, and Assam.

• It is a mix of drama, music, and spiritual narratives and often depicts stories from Hindu epics.

• Jatra performances are known for their high-energy acting, colorful costumes, and dramatic storytelling.

• Kathakali:

• Kathakali is a classical dance-drama form from the state of Kerala.

• It is recognized for its elaborate costumes, intricate makeup, and detailed facial expressions, which convey the emotions of the characters.

• Kathakali primarily narrates stories from the Ramayana, Mahabharata, and other Hindu mythological texts using a combination of dance, music, and acting.

• Important Points:

• All four theatre forms mentioned in the options are traditional Indian art forms, but each is distinct in its origin, style, and cultural significance.

• While Yakshagana is associated with Karnataka, the other forms belong to different regions of India, reflecting the diversity of Indian cultural heritage.

• These art forms not only serve as entertainment but also play a vital role in preserving and promoting regional culture, traditions, and languages.

Q35. Answer: (c) PsoriaCIM

The correct answer is PsoriaCIM.

Key Points

• The herbal cream PsoriaCIM was developed by CSIR-CIMAP (Central Institute of Medicinal and Aromatic Plants), a constituent laboratory of the Council of Scientific and Industrial Research (CSIR) in India.

• This cream was specifically designed to treat psoriasis, which is a chronic autoimmune condition that affects the skin by causing inflammation, redness, and scaling.

• The cream incorporates herbal formulations that are natural and have been scientifically tested for efficacy in managing the symptoms of psoriasis.

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• The launch of PsoriaCIM in May 2025 marked a significant milestone in the use of herbal medicine for skin conditions.

• CSIR-CIMAP's innovation aligns with their mission to promote the use of medicinal and aromatic plants for therapeutic purposes. Hence, PsoriaCIM was the correct answer.

Additional Information

• About Psoriasis:

• Psoriasis is a chronic autoimmune disorder that primarily affects the skin, causing itchy, scaly patches. It is a non-contagious condition but can significantly affect quality of life.

• The condition is characterized by an accelerated skin cell cycle, leading to the buildup of cells on the skin's surface. This causes scaling, redness, and inflammation.

• While there is no permanent cure for psoriasis, treatments aim to manage symptoms and reduce inflammation.

• CSIR-CIMAP:

• The Central Institute of Medicinal and Aromatic Plants (CIMAP) is a frontier research laboratory of CSIR, based in Lucknow, India.

• CIMAP focuses on the development of novel products and technologies derived from medicinal and aromatic plants.

• It is well-known for its work in herbal and alternative medicine, which is aimed at addressing health and wellness challenges.

• Other Options:

• Herbaloid: This is a hypothetical name and not related to any herbal product for psoriasis.

• DermaHerb: Though it suggests a product for dermatological conditions, it is not the cream developed by CSIR-CIMAP.

• SkinCure: This name implies a skin treatment product but is unrelated to the specific development of PsoriaCIM.

Important Points

• PsoriaCIM's Development Process:

• The product was developed after rigorous scientific research and clinical trials conducted by CSIR-CIMAP.

• It incorporates herbal ingredients known for their anti-inflammatory and skin-soothing properties.

• Significance of Herbal Medicine:

• Herbal medicine is gaining popularity due to its minimal side effects, cost-effectiveness, and natural origins.

• India has a rich tradition of using herbs for therapeutic purposes, stemming from ancient systems like Ayurveda.

Q36. Answer: (a) Sepoy Mutiny

The correct answer is Sepoy Mutiny.

Key Points

• The Sepoy Mutiny of 1857 (also known as the First War of Independence or the Indian Rebellion of 1857) was the largest armed resistance against British colonial rule in the 19th century in India.

• The revolt began as a mutiny by Indian soldiers (sepoys) serving in the British East India Company's army but soon escalated into a widespread rebellion involving peasants, landlords, and other sections of society.

• The immediate cause of the mutiny was the introduction of the new Enfield rifle, the cartridges of which were reportedly greased with cow and pig fat, offending Hindu and Muslim religious sentiments. Hence, it was a significant catalyst for the rebellion.

• The revolt spread across northern and central India, with major centers of resistance in Delhi, Kanpur, Lucknow, Jhansi, and Gwalior, among others.

• The rebellion was characterized by violent confrontations, including massacres and retaliatory actions by both the British forces and the Indian rebels. This marked it as one of the most significant uprisings against colonial rule in India.

• Although the mutiny was eventually suppressed by the British by 1858, it had a profound impact on the colonial administration, leading to the dissolution of the British East India Company and the establishment of direct Crown rule in India.

• Hence, the correct answer is the Sepoy Mutiny.

Additional Information

• First Anglo-Maratha War:

• The First Anglo-Maratha War (1775–1782) was fought between the British East India Company and the Maratha Empire. It was not a resistance against colonialism but rather a conflict for territorial and political dominance.

• The war ended with the Treaty of Salbai, which restored the status quo between the two sides. It was not the largest armed resistance to colonial rule in the 19th century.

• Quit India Movement:

• The Quit India Movement was launched by Mahatma Gandhi in 1942 during World War II, demanding an end to British rule in India. It was a mass civil disobedience movement but did not involve large-scale armed resistance.

• This movement played a crucial role in India's independence struggle but was not a 19th-century event.

• Battle of Buxar:

• The Battle of Buxar (1764) was fought between the British East India Company and the combined forces of Mir Qasim, Shuja-ud-Daula, and the Mughal Emperor Shah Alam II. It resulted in the consolidation of British power in Bengal.

• While it was an important event in Indian history, it occurred in the 18th century and was not an armed resistance against British colonialism in the 19th century.

Important Points

• Impact of the Sepoy Mutiny:

• The rebellion led to the end of the East India Company's rule and the beginning of direct British Crown administration in India under the Government of India Act 1858.

• The mutiny exposed the weaknesses in the British administration and highlighted the discontent among Indian soldiers and the general public under colonial rule.

• It also inspired future freedom movements and leaders, becoming a symbol of resistance against colonial oppression.

• Reasons for Failure:

• The lack of a central leadership and coordination among the rebels was a major reason for the failure of the mutiny.

• The British had superior military strength and resources, enabling them to suppress the rebellion effectively.

Q37. Answer: (d) Palas, Pratiharas and Rashtrakutas

The correct answer is Palas, Pratiharas, and Rashtrakutas.

Key Points

• Tripartite Struggle refers to the prolonged conflict during the 8th and 9th centuries among three major dynasties: Palas, Pratiharas, and Rashtrakutas, over the control of the Kannauj region.

• Kannauj, located in present-day Uttar Pradesh, was a strategically significant and prosperous city known for its political, cultural, and economic importance.

• The Palas were a dynasty from the Bengal region, the Pratiharas from western India (present-day Rajasthan and Gujarat), and the Rashtrakutas from the Deccan region. Hence, the conflict involved these three powers.

• The struggle was fueled by the desire to control Kannauj, which symbolized political supremacy during that era. Control over Kannauj was synonymous with the control of northern India.

• This conflict weakened all three dynasties over time as resources were drained and alliances fluctuated. Hence, this period marked a significant phase in early medieval Indian history.

• The victory in this struggle shifted periodically among these three powers, leading to a politically fragmented landscape in northern and central India.

• Hence, the correct answer is Palas, Pratiharas, and Rashtrakutas.

Additional Information

• Palas:

• The Palas were based in the Bengal region and were known for their patronage of Buddhism. They ruled from the 8th to 12th centuries.

• The empire was founded by Gopala and was later expanded by rulers like Dharmapala and Devapala.

• The Palas had a strong influence on trade and cultural exchanges between India and Southeast Asia.

• Pratiharas:

• The Pratiharas were a Rajput dynasty that ruled over western and northern India from the 6th to 11th centuries.

• They are credited with repelling the Arab invasions into India and maintaining the political stability of northern India.

• Their most notable ruler was Mihira Bhoja, who led the dynasty to its zenith.

• Rashtrakutas:

• The Rashtrakutas were a powerful dynasty from the Deccan region, with their capital at Malkhed.

• Their empire peaked under rulers like Amoghavarsha I, who was also a patron of literature and culture.

• The Rashtrakutas also contributed to Indian art and architecture, as seen in the Ellora Caves.

Important Points

• Significance of Kannauj:

• Kannauj was considered the political center of northern India during the early medieval period.

• Control over Kannauj symbolized supreme authority and was highly coveted by regional powers.

• Impact of the Tripartite Struggle:

• The prolonged conflict led to the weakening of all three dynasties, paving the way for new powers like the Cholas and Islamic invaders.

• It highlighted the fragmented nature of early medieval India and the constant competition for supremacy.

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Q38. Answer: (c) Asian Productivity Organisation (APO) for the 2025–26 term

The correct answer is Asian Productivity Organisation (APO) for the 2025–26 term.

Key Points

• India assumed the chairmanship of the Asian Productivity Organisation (APO) for the 2025–26 term:

• The Asian Productivity Organisation (APO) is an intergovernmental body with the mission of enhancing productivity and sustainable development in the Asia-Pacific region.

• India's appointment as the chair for the 2025–26 term highlights its commitment to fostering productivity and sustainability in the region.

• The decision was formalized during a meeting in Jakarta, showcasing global recognition of India's leadership capabilities in productivity development.

• Significance of the Chairmanship:

• India's leadership is expected to drive initiatives in productivity enhancement, sustainability, and capacity building across member nations.

• It reflects India's growing influence in international organizations and its role in shaping developmental strategies in the Asia-Pacific region.

• About the Asian Productivity Organisation (APO):

• Established in 1961, the APO is headquartered in Tokyo, Japan, and works with 21 member countries.

• Its primary focus areas include productivity improvement, sustainable development, innovation, and capacity building.

• The organization conducts training programs, research, policy advisory services, and workshops to enhance productivity in various sectors.

Additional Information

• About the APO:

• The APO was established with the objective of enhancing productivity and fostering economic growth in its member countries.

• It includes 21 member economies, including India, Japan, South Korea, Thailand, and others, which collaborate on productivity-related programs.

• The APO conducts activities such as technical training, consultancy, and knowledge sharing to empower member economies.

• India's Role in the APO:

• India has been an active member since the inception of the organization and has implemented several APO initiatives domestically.

• India's chairmanship reflects its ability to lead productivity-based initiatives across various sectors such as agriculture, industry, and services.

• As a chair, India will likely focus on promoting green productivity and sustainable economic practices in the Asia-Pacific region.

• Comparison with Other Options:

• Asia-Pacific Economic Cooperation (APEC): India is not a member of APEC, making this option incorrect.

• ASEAN Council for Economic Growth (ACEG): This body does not exist, making this option invalid.

• South Asian Association for Productivity (SAAP): This is a fictitious organization, making this option incorrect.

Important Points

• Major Functions of the APO:

• Providing technical assistance and capacity-building programs in productivity enhancement.

• Promoting the adoption of green productivity practices to achieve sustainable development.

• Facilitating knowledge sharing among member economies to promote innovation and best practices.

• India's Key Contributions:

• India has hosted several APO workshops and training programs to enhance productivity in sectors like agriculture and manufacturing.

• With a focus on green technologies, India has been actively working on integrating sustainability into productivity frameworks.

Q39. Answer: (b) Free oxygen

The correct answer is Free oxygen.

Key Points

• Free oxygen was the least abundant gas in the early atmosphere of Earth.

• In the initial stages of Earth's formation, the atmosphere was dominated by gases like carbon dioxide, water vapor, nitrogen, and methane. Oxygen was almost absent in free form. Hence, statement is correct.

• The early Earth was characterized by a reducing atmosphere, where chemical reactions favored the formation of compounds rather than free oxygen. Hence, statement is correct.

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• Oxygen gas began accumulating in the atmosphere only after the emergence of photosynthetic organisms like cyanobacteria during the Great Oxidation Event (approximately 2.5 billion years ago). Hence, statement is correct.

• The absence of free oxygen meant that the early Earth environment was unsuitable for complex aerobic life forms, which evolved much later. Hence, statement is correct.

• Other gases such as nitrogen and carbon dioxide were relatively abundant and played a significant role in creating Earth's early climatic and environmental conditions. Hence, statement is correct.

• Hence, the correct answer is Free oxygen.

Additional Information

• Early Atmosphere Composition:

• Earth's early atmosphere was primarily composed of carbon dioxide, water vapor, nitrogen, methane, and ammonia. These gases were emitted from volcanic eruptions and other geological processes.

• The lack of free oxygen meant that the atmosphere was reducing, favoring the formation of organic molecules, which eventually led to the origin of life.

• The Great Oxidation Event:

• Approximately 2.5 billion years ago, photosynthetic organisms like cyanobacteria began releasing oxygen into the atmosphere through the process of photosynthesis.

• This led to the Great Oxidation Event, marking a significant increase in atmospheric oxygen levels and a transition to an oxidizing atmosphere.

• Impact of Oxygen on Life:

• The accumulation of oxygen in the atmosphere enabled the evolution of aerobic organisms, which require oxygen for energy production.

• It also led to the formation of the ozone layer, which protects life on Earth from harmful ultraviolet radiation.

• Characteristics of Other Gases:

• Water vapor: Played a crucial role in Earth's early climate and the formation of oceans.

• Carbon dioxide: Contributed to the greenhouse effect, maintaining Earth's temperature.

• Nitrogen: Dominant gas in today's atmosphere, initially present in smaller quantities in the early atmosphere.

Important Points

• Photosynthesis:

• Cyanobacteria were the first organisms to perform photosynthesis, releasing oxygen as a byproduct.

• Photosynthesis is the primary source of oxygen in the atmosphere, which later supported complex life forms.

• Role of Geological Processes:

• Volcanic eruptions released gases like carbon dioxide, water vapor, and methane into the atmosphere.

• Over time, these gases interacted with other elements and compounds, shaping the Earth's atmosphere.

• Evolution of Atmosphere:

• The transition from a reducing atmosphere to an oxidizing atmosphere allowed the emergence of diverse life forms.

• The formation of the ozone layer further supported life by reducing harmful solar radiation.

Q40. Answer: (b) Mauli

The correct answer is Mauli.

Key Points

• Mauli was chosen as the official mascot for the 2025 National Games to be held in Goa, India. The name "Mauli" represents the traditional headgear worn in Goa, symbolizing the state's rich cultural and traditional heritage.

• The mascot is a Gaur (Indian Bison), which is the state animal of Goa. It reflects the state's biodiversity and ecological significance.

• The name "Mauli" is also significant as it is associated with respect, honor, and tradition in Goan culture, thereby representing the spirit of sportsmanship and pride. Hence, "Mauli" was chosen as the official mascot.

• The mascot's design and concept emphasize harmony between sports, environment, and cultural heritage, aligning with the overall theme of the National Games.

• The National Games bring together athletes from across India to compete in various sports, and the mascot acts as a symbol of unity, enthusiasm, and motivation for the participants and audience alike.

Additional Information

• The National Games:

• The National Games of India is a multi-sport event held every four years. It provides a platform for athletes across the country to showcase their talent and compete at a national level.

• The 2025 edition of the National Games is scheduled to take place in Goa. This is a significant event for the state as it highlights its ability to host large-scale sporting events.

• About the Mascot Mauli:

• Gaur (Indian Bison): The mascot is inspired by the Gaur, which is not only the state animal of Goa but also a symbol of strength, resilience, and grace.

• The use of Gaur as the mascot reflects the state's commitment to preserving its flora and fauna, as well as promoting awareness about environmental conservation.

• Name Significance: The name "Mauli" is deeply rooted in Goan culture, symbolizing respect and tradition. It resonates with the local community and fosters a sense of pride.

• Importance of Mascots in Sporting Events:

• Mascots play a crucial role in representing the identity and spirit of the event. They are designed to create a connection with the audience and athletes.

• They help in promoting the event and spreading awareness about its values, themes, and objectives.

• For example, previous mascots like "Shera" for the 2010 Commonwealth Games and "Chhaua" for the 2015 National Games also reflected the cultural and regional ethos of the host locations.

Important Points

• Significance of Goa as the Host State:

• Goa, known for its tourism and cultural heritage, is hosting the National Games for the first time. This provides an opportunity to showcase its organizational capabilities on a national stage.

• The event is expected to boost sports development and infrastructure in Goa, leaving a lasting legacy for future athletes.

• Other Options:

• Tejaswini: While this name represents energy and brilliance, it was not selected as the mascot for the 2025 National Games.

• Gajasimha: Although it symbolizes power and majesty, this name does not have a specific cultural or regional connection to Goa.

• Shikhar: This name signifies achievement and peak performance but lacks the cultural resonance required for the mascot of the National Games in Goa.

Q41. Answer: (d) 10.56

Shortcut Trick

Mass = Volume × Density

Volume of shell = $4/3 \times \pi \times (R^3 - r^3) = 4/3 \times 22/7 \times (4^3 - 1^3)$

Volume = $4/3 \times 22/7 \times 63 = 4 \times 22 \times 3 = 264\ cm^3$

Mass = $264 \times 40 = 10560\ g = 10.56\ kg$

Therefore The correct answer is 10.56 kg.

Alternate Method

Given:

Internal radius (r) = 1 cm

External radius (R) = 4 cm

Density (ρ) = 40 g/cm^3

Formula Used:

Volume of hollow sphere (V) = $4/3\ \pi (R^3 - r^3)$

Mass (M) = Volume × Density

Calculations:

=> Volume = $4/3 \times 22/7 \times (4^3 - 1^3)$

=> Volume = $4/3 \times 22/7 \times (64 - 1)$

=> Volume = $4/3 \times 22/7 \times 63$

=> Volume = $4 \times 22 \times 3 = 264\ cm^3$

=> Mass in grams = $264 \times 40 = 10560$ g

=> Mass in kg = $10560 \div 1000 = 10.56$ kg

Therefore The correct answer is 10.56 kg.

Additional Information

Volume of a Solid Sphere

The volume of a solid sphere with radius R is given by $V = 4/3\ \pi R^3$.

Surface Area of a Sphere

The total surface area of a sphere is $4 \pi R^2$.

Density Conversion

To convert mass from grams (g) to kilograms (kg), divide the value by 1000 since 1 kg = 1000 g.

Q42. Answer: (d) 208

Shortcut Trick

Total ratio parts = 2 + 4 + 3 = 9 units

Total amount = Rs. 936 → 9 units = Rs. 936 → 1 unit = Rs. 104

Difference between largest (4) and smallest (2) share = 4 − 2 = 2 units

Difference value = 2 × Rs. 104 = Rs. 208

Therefore The correct answer is Rs. 208.

Alternate Method

Given: Total amount = Rs. 936, Ratio = 2 : 4 : 3

Formula Used: Share of a person = (Individual ratio / Total ratio) × Total amount

=> Total ratio = 2 + 4 + 3 = 9

=> Largest share = (4 / 9) × 936 = 4 × 104 = Rs. 416

=> Smallest share = (2 / 9) × 936 = 2 × 104 = Rs. 208

=> Difference = Rs. 416 − Rs. 208 = Rs. 208

Therefore The correct answer is Rs. 208.

Additional Information

Ratio Distribution

To find the value of one part, divide the total sum by the sum of the ratio terms.

Compound Ratio

The compound ratio of (a:b) and (c:d) is (ac : bd), used when multiple ratios are combined.

Q43. Answer: (c) 39.75

Shortcut Trick

First value = 65% of 75 = 0.65 × 75 = 48.75

Second value = 3/5 of 15 = 3 × 3 = 9

Difference = 48.75 − 9 = 39.75

Therefore The correct answer is 39.75.

Alternate Method

Given:

First expression: 65% of 75

Second expression: 3/5 of 15

Calculations:

=> Value 1 = (65/100) × 75

=> Value 1 = 0.65 × 75 = 48.75

=> Value 2 = (3/5) × 15

=> Value 2 = 3 × 3 = 9

=> Required difference = 48.75 − 9

=> Required difference = 39.75

Therefore The correct answer is 39.75.

Additional Information

Percentage to Decimal

To convert a percentage to a decimal, divide by 100 or move the decimal point two places to the left. Example: x% = x/100.

Fraction of a Number

The word 'of' in mathematics usually signifies multiplication. To find a fraction a/b of a number n, calculate (a × n) ÷ b.

Percentage Change

The percentage difference between two numbers is calculated as [(Difference) / (Original Value)] × 100.

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Q44. Answer: (b) 30

Given:

Length of pole 1 = 25 metres

Length of pole 2 = 36 metres

Angles of elevation are complementary

Formula Used:

$\tan(\theta) \times \tan(90° - \theta) = 1$

$\tan(\theta)$ = height/distance

Calculation:

Let the distance between the poles be x metres.

$\tan(\theta) = 25/x$

$\tan(90° - \theta) = 36/x$

$\tan(\theta) \times \tan(90° - \theta) = 1$

$\Rightarrow (25/x) \times (36/x) = 1$

$\Rightarrow 900/x^2 = 1$

$\Rightarrow x^2 = 900$

$\Rightarrow x = \sqrt{900}$

$\Rightarrow x = 30$

Therefore The correct answer is 30.

Q45. Answer: (d) Rs. 3,600

Shortcut Trick

The Marked Price (MP) of the product is Rs. 5,000.

Net multiplier for Successive Discounts of 20% and 10% is (0.80 × 0.90) = 0.72.

Final Price = 5,000 × 0.72 = 3,600.

Alternatively, Equivalent Discount = 20 + 10 − (20 × 10 ÷ 100) = 28%.

Final Price = 100% − 28% = 72% of 5,000 = Rs. 3,600.

Therefore The correct answer is Rs. 3,600.

Alternate Method

Given: MP = Rs. 5,000, Trade Discount (d1) = 20%, Scheme Discount (d2) = 10%.

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

=> Price after Trade Discount = 5,000 − (20% of 5,000) = 5,000 − 1,000 = Rs. 4,000.

=> Price after Scheme Discount = 4,000 − (10% of 4,000) = 4,000 − 400 = Rs. 3,600.

=> Final Selling Price = Rs. 3,600.

Therefore The correct answer is Rs. 3,600.

Additional Information

Trade Discount

It is a reduction in the List Price allowed by a supplier to a retailer, usually calculated on the catalog price.

Successive Discounts

When multiple discounts are applied one after another, the net discount is less than the sum of individual discounts. Formula: x + y − (xy/100).

Q46. Answer: (d) 100

Shortcut Trick

For two numbers a and b, the Third Proportional x is given by the formula: $x = b^2 \div a$.

Given: a = 9 and b = 30.

$x = (30 \times 30) \div 9 = 900 \div 9 = 100$.

Therefore The correct answer is 100.

Alternate Method

Given: First number (a) = 9, Second number (b) = 30, Third proportional = x

Formula Used: If a, b, and x are in continued proportion, then a : b = b : x

=> 9 : 30 = 30 : x

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=> 9 ÷ 30 = 30 ÷ x
=> 9 × x = 30 × 30
=> 9x = 900
=> x = 900 ÷ 9
=> x = 100
Therefore The correct answer is 100.
Additional Information
Mean Proportional
The mean proportional between two numbers a and b is √(a × b).
Fourth Proportional
If four numbers a, b, c, d are in proportion, then a/b = c/d, where d is the fourth proportional.
Compound Ratio
For ratios (a : b) and (c : d), the compound ratio is (a × c) : (b × d).

Q47. Answer: (d) 56.95

Shortcut Trick
Average Speed = Total Distance ÷ Total Time
Total Distance = 252 + 150 + 680 = 1082 km
Total Time = (252 ÷ 63) + (150 ÷ 30) + (680 ÷ 68) = 4 + 5 + 10 = 19 hours
Average Speed = 1082 ÷ 19 ≈ 56.95 km/hr
Therefore The correct answer is 56.95 km/hr.
Alternate Method
Given:
Distance1 = 252 km, Speed1 = 63 km/hr
Distance2 = 150 km, Speed2 = 30 km/hr
Distance3 = 680 km, Speed3 = 68 km/hr
Formula Used:
Time = Distance ÷ Speed
Average Speed = (D1 + D2 + D3) ÷ (T1 + T2 + T3)
Calculations:
=> T1 = 252 ÷ 63 = 4 hours
=> T2 = 150 ÷ 30 = 5 hours
=> T3 = 680 ÷ 68 = 10 hours
=> Total Distance = 252 + 150 + 680 = 1082 km
=> Total Time = 4 + 5 + 10 = 19 hours
=> Average Speed = 1082 ÷ 19
=> Average Speed = 56.9473... ≈ 56.95 km/hr
Therefore The correct answer is 56.95 km/hr.
Additional Information
Average Speed for Equal Distances
If a certain distance is covered at speed 'x' and the same distance is covered at speed 'y', the average speed is 2xy ÷ (x + y).
Conversion of Units
To convert km/hr to m/s, multiply by 5/18. To convert m/s to km/hr, multiply by 18/5.
Relative Speed
For objects moving in the same direction, Relative Speed = S1 − S2. For opposite directions, Relative Speed = S1 + S2.

Q48. Answer: (b) Rs. 29

Shortcut Trick
Successive discount of 10% and 40% = 10 + 40 − (10 × 40) ÷ 100 = 46%.
Single discount = 48%.
Difference in discount percentage = 48% − 46% = 2%.
Difference in amount = 2% of Rs. 1,450 = (2 ÷ 100) × 1,450 = Rs. 29.

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Therefore The correct answer is Rs. 29.

Alternate Method

Given → Marked Price (MP) = Rs. 1,450, Single Discount = 48%, Successive Discounts = 10% and 40%.

Formulas: Successive Discount = a + b − (ab ÷ 100) | Discount Amount = (Discount% ÷ 100) × MP.

=> Discount 1 (Single) = 48% of 1,450 = 0.48 × 1,450 = Rs. 696.

=> Effective rate for successive discounts = 10 + 40 − (10 × 40 ÷ 100) = 50 − 4 = 46%.

=> Discount 2 (Successive) = 46% of 1,450 = 0.46 × 1,450 = Rs. 667.

=> Difference = Rs. 696 − Rs. 667 = Rs. 29.

Therefore The correct answer is Rs. 29.

Additional Information

Successive Discounts

When two or more discounts are applied one after another on the Marked Price, they are called successive discounts. The formula for two successive discounts a% and b% is [a + b − (ab/100)]%.

Marked Price vs Selling Price

Selling Price (SP) = Marked Price × (100 − Discount%) ÷ 100. The discount is always calculated on the Marked Price unless stated otherwise.

Q49. Answer: (d) −124x + 107

Shortcut Trick

Expand the expression and combine like terms directly.

Term in x^2: [4 × (3/4)] − 3 = 3 − 3 = 0

Term in x: [4 × (−25)] − [3 × 8] = −100 − 24 = −124x

Constant: [4 × 17] − [3 × (−13)] = 68 + 39 = 107

Therefore The correct answer is −124x + 107.

Alternate Method

Given: $4((3/4)x^2 - 25x + 17) - 3(x^2 + 8x - 13)$

To simplify, apply the Distributive Property: a(b + c) = ab + ac.

=> $[4 \times (3/4)x^2 - 4 \times 25x + 4 \times 17] - [3 \times x^2 + 3 \times 8x - 3 \times 13]$

=> $(3x^2 - 100x + 68) - (3x^2 + 24x - 39)$

=> $3x^2 - 100x + 68 - 3x^2 - 24x + 39$

Rearrange and group like terms:

=> $(3x^2 - 3x^2) + (-100x - 24x) + (68 + 39)$

=> 0 − 124x + 107

=> −124x + 107

Therefore The correct answer is −124x + 107.

Additional Information

Distributive Property

Multiplying a single term by two or more terms inside a set of parentheses: a(b + c) = ab + ac.

Signs for Multiplication

Remember that −(a − b) = −a + b. A negative sign outside the bracket reverses all signs inside upon expansion.

Like Terms

Terms that have the exact same variables and exponents can be combined using addition or subtraction.

Q50. Answer: (c) 6 hours

Shortcut Trick

For the same distance, Speed is inversely proportional to Time.

Ratio of Speeds (Shahid : Mira) = 42 : 98 = 3 : 7

Ratio of Time (Shahid : Mira) = 7 : 3

Since 7 units = 14 hours, then 1 unit = 2 hours.

Mira's time = 3 units = 3 × 2 = 6 hours.

Therefore The correct answer is 6 hr.

Alternate Method

Given:

Shahid's speed (S1) = 42 km/hr
Mira's speed (S2) = 98 km/hr
Time taken by Shahid (T1) = 14 hours
Formula Used:
Distance = Speed × Time
Calculations:
=> Total Distance = Shahid's Speed × Shahid's Time
=> Total Distance = 42 × 14 = 588 km
=> Mira's Time = Total Distance ÷ Mira's Speed
=> Mira's Time = 588 ÷ 98
=> Mira's Time = 6 hours
Therefore The correct answer is 6 hr.
Additional Information
Inverse Variation in Speed and Time
When distance is constant, Speed1 × Time1 = Speed2 × Time2. This is used to solve proportionality problems.
Average Speed
If a person travels equal distances at speeds x and y, then Average Speed = 2xy ÷ (x + y).
Relative Speed
When two objects move in the same direction, relative speed is the difference (S1 − S2); in opposite directions, it is the sum (S1 + S2).

Q51. Answer: (b) 15%

Shortcut Trick
The ratio of Amount (A) to Principal (P) for 2 years is 529 : 400.
Since the time is 2 years, take the square root to find the 1-year ratio: √529 : √400 = 23 : 20.
Interest earned on 20 units in 1 year = 23 − 20 = 3 units.
Rate of interest = (Interest ÷ Principal) × 100 = (3 ÷ 20) × 100 = 15%.
Therefore The correct answer is 15%.
Alternate Method
Given:
Principal (P) = Rs. 400
Amount (A) = Rs. 529
Time (n) = 2 years
Formula Used: $A = P(1 + R \div 100)^n$
Calculations:
=> $529 = 400 \times (1 + R \div 100)^2$
=> $529 \div 400 = (1 + R \div 100)^2$
=> $(23 \div 20)^2 = (1 + R \div 100)^2$
=> $23 \div 20 = 1 + R \div 100$
=> $R \div 100 = (23 \div 20) - 1$
=> $R \div 100 = 3 \div 20$
=> $R = (3 \times 100) \div 20$
=> R = 15%
Therefore The correct answer is 15%.
Additional Information
Difference between CI and SI
For a period of 2 years, the difference between Compound Interest and Simple Interest is given by CI − SI = P × (R ÷ 100)².
Compounding Period Changes
If interest is compounded half-yearly, the rate becomes R ÷ 2 and the time becomes 2 × n. If quarterly, the rate is R ÷ 4 and time is 4 × n.
Successive Percentage Rule
For 2 years, the effective compound interest rate can be calculated using the formula: x + y + (x × y ÷ 100), where x and y are

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annual rates.

Q52. Answer: (c) 72%

Shortcut Trick

Successive approach: Profit of 58% means ratio of 100 : 158.

Dishonest weight of 8% less means trader gives 92 units instead of 100.

The effective ratio is (100 × 92) : (158 × 100) => 92 : 158.

Total Profit % = (158 − 92) ÷ 92 × 100 = 66 ÷ 92 × 100.

Total Profit % ≈ 0.71739 × 100 = 71.739% ≈ 72%.

Therefore The correct answer is 72%.

Alternate Method

Given: Profit claim = 58%, Weight error = 8% less.

Formulas: Overall Profit % = [(Actual SP − Actual CP) ÷ Actual CP] × 100.

=> Let the True Weight be 1000g and Cost Price (CP) be Rs. 1 per gram.

=> Trader sells it as 1000g but charges for 58% profit: Selling Price (SP) = 1000 × 1.58 = Rs. 1580.

=> The Actual weight given is 8% less than 1000g: 1000 − (8% of 1000) = 920g.

=> The Actual CP for the trader is the cost of 920g = Rs. 920.

=> Total Profit = 1580 − 920 = Rs. 660.

=> Profit % = (660 ÷ 920) × 100 = 71.739...% ≈ 72%.

Therefore The correct answer is 72%.

Additional Information

Dishonest Dealer Concept

When a dealer uses less weight, the Profit % = [Error ÷ (True Value − Error)] × 100. If there is an additional markup, we combine the effects.

Rounding Off

If the decimal part is 0.5 or higher, round up to the next whole number; if less than 0.5, stay at the current integer.

Q53. Answer: (b) 24

Shortcut Trick

Let the second number be 1 unit.

Then the first number = 5 units.

Product = 5 × 1 = 5 units² = 80 => 1 unit² = 16 => 1 unit = 4.

Sum = 5 units + 1 unit = 6 units = 6 × 4 = 24.

Therefore The correct answer is 24.

Alternate Method

Given:

Product of two positive numbers = 80

First number = 5 × Second number

Let the second number be x.

Then the first number = 5x.

According to the question:

=> 5x × x = 80

=> 5x² = 80

=> x² = 80 ÷ 5

=> x² = 16

=> x = √16 = 4 (as the numbers are positive)

Now, calculate the sum:

=> First number = 5 × 4 = 20

=> Second number = 4

=> Sum = 20 + 4 = 24

Therefore The correct answer is 24.

Additional Information

Ratio and Proportion Application

When one number is k times another, they are in the ratio k : 1. The product is $k \times x^2$ and the sum is $(k + 1)x$.

Positive vs Negative Roots

If the question mentions positive numbers, we only consider the positive square root ($\sqrt{16} = 4$). If not specified, x could be ±4.

Q54. Answer: (b) 46.2

Shortcut Trick

Equate the number of decimal places: 15.400 and 0.006.

Remove decimals and find LCM of 15400 and 6.

LCM(15400, 6) = 46200.

Place the decimal back after 3 places (as in 15.400): 46.200.

Therefore The correct answer is 46.2.

Alternate Method

Given values: Numbers are 15.4 and 0.006.

Formula: LCM of Fractions = LCM of Numerators ÷ HCF of Denominators

=> Convert decimals to simplified fractions:

=> 15.4 = 154/10 = 77/5

=> 0.006 = 6/1000 = 3/500

=> LCM(77, 3) = 77 × 3 = 231

=> HCF(5, 500) = 5

=> Required LCM = 231 ÷ 5 = 46.2

Therefore The correct answer is 46.2.

Additional Information

LCM and HCF of Fractions

LCM = LCM(Numerators) ÷ HCF(Denominators). HCF = HCF(Numerators) ÷ LCM(Denominators).

Decimal LCM Rule

Always equate the number of decimal places by adding trailing zeros before calculating LCM or HCF as integers.

Product Rule

For any two numbers a and b, $a \times b = HCF(a, b) \times LCM(a, b)$.

Q55. Answer: (c) 224

Shortcut Trick

Calculate the effective rate of interest for the entire period: 16% × 3.5 = 56%.

Simple Interest (SI) = 56% of Principal (Rs. 400).

SI = 400 × 0.56 = 224.

Therefore The correct answer is Rs. 224.

Alternate Method

Given:

Principal (P) = Rs. 400

Time (T) = 3.5 years

Rate (R) = 16% per annum

Formula Used:

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

Calculations:

=> SI = (400 × 16 × 3.5) ÷ 100

=> SI = 4 × 16 × 3.5

=> SI = 64 × 3.5

=> SI = 224

Therefore The correct answer is Rs. 224.

Additional Information

Total Amount Formula

The total Amount (A) to be returned after the time period is the sum of Principal and Interest: A = P + SI.

Compound Interest (CI)

Interest calculated on the initial principal and also on the accumulated interest of previous periods: A = P(1 + R/100)^T.

Difference between CI and SI for 2 years

The difference is given by the formula: Difference = P(R/100)².

Q56. Answer: (b) 240

Given:

480 ÷ {12 + 2 × (4 − 9)}

Formula used:

BODMAS Rule

Calculation:

=> 480 ÷ {12 + 2 × (4 − 9)}

=> 480 ÷ {12 + 2 × (−5)}

=> 480 ÷ {12 − 10}

=> 480 ÷ 2

=> 240

Therefore The correct answer is 240.

Q57. Answer: (d) 15

Shortcut Trick

Let the son's age 3 years ago be x.

Father's age 3 years ago = 2x + 18.

The age difference between Father and Son is (2x + 18) − x = x + 18.

To be twice the son's age, the age difference must equal the son's age at that time.

Future son's age = x + 18. Current son's age = x + 3.

Years from now = (x + 18) − (x + 3) = 15 years.

Therefore The correct answer is 15 years.

Alternate Method

Let Son's present age = S and Father's present age = F.

Given (3 years ago): F − 3 = 2(S − 3) + 18

=> F − 3 = 2S − 6 + 18

=> F − 2S = 15 ... (Equation 1)

Let the required years from now be T. After T years, Father will be twice his Son's age:

=> F + T = 2(S + T)

=> F + T = 2S + 2T

=> F − 2S = T ... (Equation 2)

Comparing Equation 1 and Equation 2:

=> T = 15 years.

Therefore The correct answer is 15 years.

Additional Information

Constant Age Difference

The difference between the ages of two people always remains constant, regardless of the number of years passed.

Ratio Method for Ages

If the ratio of ages changes from a:b to c:d over k years, we use the cross-multiplication method or ensure the ratio difference is balanced.

Twice Age Rule

When one person is twice as old as another, their age difference is exactly equal to the younger person's age at that specific time.

Q58. Answer: (a) -39

Given:

Expression = (−9) − (−60) ÷ (−10) + (−4) × 6

Formula used:

BODMAS Rule

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Calculation:

=> (−9) − (−60) ÷ (−10) + (−4) × 6

=> (−9) − (6) + (−24)

=> (−9) − 6 − 24

=> −15 − 24

=> −39

Therefore The correct answer is −39.

Q59. Answer: (c) 532/119 days

Shortcut Trick

Total Work (LCM of 19, 11, 3) = 627 units.

Efficiency of A = 627 ÷ 19 = 33; B = 627 ÷ 11 = 57; A+B+C = 627 ÷ 3 = 209.

Efficiency of C = 209 − (33 + 57) = 119.

Time taken by C = 627 ÷ 119 = 5(32/119) days.

Therefore The correct answer is 5(32/119) days.

Alternate Method

Given: Time taken by A = 19 days, B = 11 days, and A + B + C = 3 days.

Formula Used: 1/T_(total) = 1/T_A + 1/T_B + 1/T_C

Person	Days	Total Work	Efficiency
A	19	627	33
B	11	57	
A + B + C	3	209	

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

=> Efficiency of C = 209 − (33 + 57)

=> Efficiency of C = 209 − 90 = 119

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

=> Time = 627 ÷ 119 = 5(32/119) days

Therefore The correct answer is 5(32/119) days.

Additional Information

Work and Efficiency Relationship

Efficiency is inversely proportional to the time taken to complete a work. If a person completes a work in 'n' days, their one-day work (efficiency) is 1/n.

Combined Work Formula

When multiple people work together, their individual efficiencies are added to find the combined efficiency: 1/T_(together) = Σ(1/T_(individual)).

Q60. Answer: (a) 20,520

Shortcut Trick

Net multiplying factor = 1.25 × 1.35 × 0.95

Population = 12800 × (5/4) × (27/20) × (19/20)

Population = 8 × 5 × 27 × 19 = 40 × 513 = 20520

Therefore The correct answer is 20,520.

Alternate Method

Given: Current population = 12,800. Increase in 1^(st) year = 25%, 2^(nd) year = 35%. Decrease in 3^(rd) year = 5%.

Formula: Final Population = P × (1 + R1/100) × (1 + R2/100) × (1 − R3/100)

=> Population after 1^(st) year = 12800 × (125/100) = 12800 × 1.25 = 16000

=> Population after 2^(nd) year = 16000 × (135/100) = 16000 × 1.35 = 21600

=> Population after 3^(rd) year = 21600 × (95/100) = 21600 × 0.95

=> Final Population = 216 × 95 = 20520

Therefore The correct answer is 20,520.

Additional Information

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Successive Percentage Change

When a value changes by x% and then y% successively, the net change is given by [x + y + (xy/100)]%.

Fractional Equivalent

Using fractions simplifies calculations: 25% = 1/4 (increase → 5/4), 5% = 1/20 (decrease → 19/20).

Population Growth Formula

It is similar to compound interest: $A = P(1 \pm r/100)^n$, where ± depends on increase or decrease.

Q61. Answer: (b) 55

Shortcut Trick

Product of LCM × HCF = Product of Two Numbers

330 × 11 = 66 × Second Number

Second Number = (330 × 11) ÷ 66 = 330 ÷ 6 = 55

Therefore The correct answer is 55.

Alternate Method

Given:

HCF of two numbers = 11

LCM of two numbers = 330

One number (n1) = 66

Formula Used:

n1 × n2 = HCF × LCM

Calculations:

=> 66 × n2 = 11 × 330

=> n2 = (11 × 330) ÷ 66

=> n2 = 3630 ÷ 66

=> n2 = 55

Therefore The correct answer is 55.

Additional Information

HCF (Highest Common Factor)

The greatest number that divides two or more numbers without leaving a remainder.

LCM (Least Common Multiple)

The smallest non-zero number that is a multiple of two or more numbers.

Co-prime Numbers

Two numbers are co-prime if their HCF is 1. For co-prime numbers, LCM = Product of the numbers.

Q62. Answer: (d) 84 hours

Shortcut Trick

Total Capacity of P = 21 × (8/3) = 56 hours | Q = 16 × (7/2) = 56 hours.

Since time for P and Q is same, efficiency P : Q = 1 : 1. Let LCM = 56 units.

Efficiencies: P = 1, Q = 1. Work in 2 hours = (1 + 1) × 2 = 4 units.

R empties 4 units in 3 hours => Efficiency of R = −4/3.

Combined efficiency (P+Q+R) = 1 + 1 − 4/3 = 2/3. Time = 56 ÷ (2/3) = 84 hours.

Therefore The correct answer is 84 hr.

Alternate Method

Given: P fills 3/8 in 21 hr; Q fills 2/7 in 16 hr; R empties the filled part in 3 hr.

Person	Days (Total time)	Total Work	Efficiency
Pipe P	21 × 8/3 = 56	56	1
Pipe Q	16 × 7/2 = 56	1	

=> Volume filled by P and Q in 2 hours = (Efficiency P + Efficiency Q) × 2

=> Filled Volume = (1 + 1) × 2 = 4 units

=> Efficiency of R = Work ÷ Time = −4 ÷ 3 = −4/3 (Negative as it empties)

=> Combined Efficiency of (P + Q + R) = 1 + 1 − 4/3 = 2/3

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=> Time to fill the tank = Total Work ÷ Combined Efficiency = 56 ÷ (2/3) = 56 × 3 / 2

=> Time = 28 × 3 = 84 hours

Therefore The correct answer is 84 hr.

Additional Information

Pipes and Cisterns Efficiency

Efficiency of an inlet pipe is positive, while the efficiency of an outlet (leak) pipe is negative. Net work done = ∑ Efficiencies × Time.

Fractional Work to Full Work

If a pipe fills 1/x part in t hours, then the time to fill the whole tank is (t × x) hours.

Q63. Answer: (c) 45

Shortcut Trick

Let the smaller side be x. Then the other side is 2x.

Hypotenuse² = x² + (2x)² = 5x²

Given hypotenuse is 15 cm => 15² = 5x² => 225 = 5x² => x² = 45.

Area of right-angled triangle = 1/2 × base × height = 1/2 × x × 2x = x².

Therefore The correct answer is 45 cm².

Alternate Method

Given:

Hypotenuse (h) = 15 cm

Let Base (b) = x cm

Height (a) = 2x cm

According to Pythagoras Theorem:

=> a² + b² = h²

=> (2x)² + x² = 15²

=> 4x² + x² = 225

=> 5x² = 225

=> x² = 45

Area of the triangle = 1/2 × Base × Height

=> Area = 1/2 × x × 2x

=> Area = x²

=> Area = 45 cm²

Therefore The correct answer is 45 cm².

Additional Information

Pythagoras Theorem

In a right-angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides: a² + b² = c².

Area of Triangle

The general formula for the area is 1/2 × base × height. For a right triangle, the two sides forming the 90° angle act as base and height.

Pythagorean Triplets

Sets of three positive integers (a, b, c) that satisfy the Pythagoras theorem, such as (3, 4, 5) or (5, 12, 13).

Q64. Answer: (b) 6/11

Given:

5/3 + (1/(1+5/6)) - 5/3

Formula Used:

Fraction addition: a/b + c/d = (ad + bc)/bd

Fraction subtraction: a/b - c/d = (ad - bc)/bd

Calculation:

5/3 + (1/(1+5/6)) - 5/3

=> 5/3 + (1/(11/6)) - 5/3

=> 5/3 + 6/11 - 5/3

=> 5/3 - 5/3 + 6/11

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=> 6/11

Therefore The correct answer is 6/11.

Q65. Answer: (d) 51.8

Shortcut Trick

Assume a base weight of 50 kg to calculate net deviation.

Deviations: (40−50), (49−50), (56−50), (76−50), (38−50) → −10, −1, +6, +26, −12.

Net Deviation = −10 − 1 + 6 + 26 − 12 = +9.

Average adjustment = Net deviation ÷ Total members = 9 ÷ 5 = 1.8 kg.

Final Average = Base + adjustment = 50 + 1.8 = 51.8 kg.

Therefore The correct answer is 51.8 kg.

Alternate Method

Given: Weights of 5 family members are 40 kg, 49 kg, 56 kg, 76 kg, and 38 kg.

Formula Used: Average Weight = (Sum of weights of all members) ÷ (Total number of members)

Sum of weights = 40 + 49 + 56 + 76 + 38

=> Total Sum = 259 kg

Total number of members = 5

=> Average = 259 ÷ 5

=> Average = 51.8 kg

Therefore The correct answer is 51.8 kg.

Additional Information

Properties of Averages

If a constant value k is added to all the observations, the new average will be Old Average + k. Similarly, if multiplied by k, the new average becomes Old Average × k.

Weighted Average Formula

When combining two groups with counts n1, n2 and averages A1, A2: Combined Average = (n1A1 + n2A2) ÷ (n1 + n2).

Net Deviation Principle

The sum of deviations of all observations from their Arithmetic Mean is always zero. This property is the basis of the shortcut deviation method.

Q66. Answer: (c) Rs. 80,000

Shortcut Trick

Total profit = 4,920. M's share − N's share = 328.

M's profit = (4,920 + 328) ÷ 2 = 2,624. N's profit = 4,920 − 2,624 = 2,296.

Ratio of profits M : N = 2,624 : 2,296 = 8 : 7.

Ratio of Capitals (C = P ÷ T) => M : N = (8 ÷ 3) : (7 ÷ 7) = 8 : 3.

Difference in parts = 5 → 50,000. So, 1 part = 10,000.

M's capital = 8 × 10,000 = 80,000.

Therefore The correct answer is Rs. 80,000.

Alternate Method

Given: Difference in investment = 50,000; Total Profit = 4,920; Difference in Profit = 328; Time_M = 3 months; Time_N = 7 months.

Formulas: Profit Ratio = (Capital1 × Time1) : (Capital2 × Time2)

=> Let N's capital be x. Then M's capital = x + 50,000.

=> M's profit (P_M) + N's profit (P_N) = 4,920 and P_M − P_N = 328.

=> Solving gives P_M = 2,624 and P_N = 2,296.

=> Ratio P_M/P_N = [3 × (x + 50,000)] / [7 × x] = 2,624 / 2,296.

=> 3(x + 50,000) / 7x = 8 / 7 => 3x + 150,000 = 8x.

=> 5x = 150,000 => x = 30,000.

=> M's capital = x + 50,000 = 30,000 + 50,000 = 80,000.

Therefore The correct answer is Rs. 80,000.

Additional Information

Partnership Basics

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In a partnership, the profit is distributed in the ratio of the product of Capital and Time period.

Ratio of Capital

If the profit ratio and time ratio are known, the Capital Ratio is found by: C1 : C2 = (P1/T1) : (P2/T2).

Q67. Answer: (d) Rs. 77.60

Shortcut Trick

Total Cost Price (CP) = Rs. 50.

Remaining bottles = 50 − 28 = 22 bottles.

Total Selling Price (SP) = 22 × 5.80 = Rs. 127.60.

Profit = SP − CP = 127.60 − 50 = Rs. 77.60.

Therefore The correct answer is Rs. 77.60.

Alternate Method

Given: Total Bottles = 50, CP = Rs. 50, Broken = 28, SP per bottle = Rs. 5.80.

Formulas: Profit = SP − CP

=> Total Cost Price = Rs. 50.

=> Number of undamaged bottles = 50 − 28 = 22.

=> Total Selling Price = 22 × 5.80 = Rs. 127.60.

=> Profit Amount = 127.60 − 50 = Rs. 77.60.

Therefore The correct answer is Rs. 77.60.

Additional Information

Total Cost Price

When items are broken or lost in transit, the cost of those items is absorbed into the remaining stock, effectively increasing the CP per unit of the remaining items.

Profit and Loss

Profit occurs when SP > CP. Profit % = (Profit ÷ CP) × 100.

Q68. Answer: (c) 33.21

Shortcut Trick

Total runs in first group = 23 × 42 = 966

Total runs in second group = 10 × 13 = 130

Combined Average = (966 + 130) ÷ (23 + 10)

Average = 1096 ÷ 33 ≈ 33.21

Therefore The correct answer is 33.21.

Alternate Method

Given:

Number of matches (n1) = 23, Average runs (A1) = 42

Number of matches (n2) = 10, Average runs (A2) = 13

Formula Used:

Combined Average = (n1 × A1 + n2 × A2) ÷ (n1 + n2)

Calculations:

=> Total runs in 23 matches = 23 × 42 = 966

=> Total runs in 10 matches = 10 × 13 = 130

=> Total matches = 23 + 10 = 33

=> Total runs in 33 matches = 966 + 130 = 1096

=> New Average = 1096 ÷ 33

=> New Average = 33.2121...

=> New Average ≈ 33.21

Therefore The correct answer is 33.21.

Additional Information

Weighted Average

It is used when finding the average of a combined group where sub-groups have different sizes. Formula: (n1A1 + n2A2 + ...) ÷ (n1 + n2 + ...).

Sum of Observations

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The total sum of all values is always equal to Average × Total number of items.

Rounding to Two Decimals

When rounding to two decimals, examine the third decimal digit; if it is 5 or greater, add 1 to the second decimal digit.

Q69. Answer: (a) 52/55

Given:

4/5+(1/(1+5/6))-2/5

Formula Used:

Fraction simplification and arithmetic operations.

Calculation:

4/5+(1/(1+5/6))-2/5

=> 4/5+(1/(11/6))-2/5

=> 4/5+(6/11)-2/5

=> (44 + 30 - 22)/55

=> 52/55

Therefore The correct answer is 52/55.

Q70. Answer: (b) 12

Shortcut Trick

In any regular polygon, the sum of an interior angle (I) and an exterior angle (E) is always 180°.

Given: I − E = 120° and we know I + E = 180°.

Subtracting the equations: (I + E) − (I − E) = 180° − 120° => 2E = 60° => E = 30°.

Number of sides (n) = 360° ÷ Exterior angle = 360° ÷ 30° = 12.

Therefore The correct answer is 12 sides.

Alternate Method

Given:

Difference between interior angle and exterior angle = 120°

Formula Used:

1. Interior angle (I) + Exterior angle (E) = 180°

2. Number of sides (n) = 360° ÷ Exterior angle (E)

Calculations:

=> Let the interior angle be I and the exterior angle be E.

=> I − E = 120° — (Equation 1)

=> I + E = 180° — (Equation 2)

=> Adding (1) and (2): 2I = 300° => I = 150°

=> Substituting I in (2): 150° + E = 180° => E = 30°

=> Number of sides (n) = 360° ÷ E

=> n = 360° ÷ 30°

=> n = 12

Therefore The correct answer is 12 sides.

Additional Information

Sum of Interior Angles

The sum of all interior angles of a polygon with n sides is given by (n − 2) × 180°.

Sum of Exterior Angles

The sum of all exterior angles of any convex polygon is always 360°, regardless of the number of sides.

Each Interior Angle of a Regular Polygon

For a regular polygon, each interior angle is [(n − 2) × 180°] ÷ n.

Q71. Answer: (d) DYNL

Here is the alphabetical place value for each letter:

The logic follow here,

Hence, the correct answer is "Option 4".

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Q72. Answer: (a) 3 km towards south

• Navneet starts from Point Y and drives 10 km towards west.
• He then takes a right turn, drives 18 km.
• He then turns right and drives 10 km.
• He takes a final right turn, drives 15 km and stops at Point Z.
The Final Arrangement is,
Hence, the correct answer is "Option 1"

Q73. Answer: (a) 4

CLAM' is coded as '1587' and 'LOAM' is coded as '4875'.
C L A M'- '1 5 8 7 '
'L O A M' - '4 8 7 5'.
L A M and 7 8 5 is common in both given words.
Hence, the correct answer is "Option 1"

Q74. Answer: (c) ORW

Here is the alphabetical place value for each letter:
The logic followed
Hence, the correct answer is "Option 3"

Q75. Answer: (a) 22

Given : 12 − 2 + 49 × 7 ÷ 5 = ?
• means −, − means ×, × means ÷ and ÷ means +
Decoding the information,
12 × 2 − 49 ÷ 7 + 5 = ?
12 × 2 − 7 + 5 = ?
24 + 5 − 7 = ?
29 − 7 = ?
22.
Hence, the correct answer is "Option 1"

Q76. Answer: (c) U

Seven boxes U, V, W, X, E, F and G are kept one over the other but not necessarily in the same order.
• Only three boxes are kept below X.
• Only two boxes are kept between X and W.
• Only E is kept above V.
• H is kept at some place below G and at some place above U.
The Final Arrangement is,

E
V
G
X
H
U
W

Hence, the correct answer is "Option 3"

Q77. Answer: (a) LPAX

The logic followed here is:
Hence, the correct answer is "Option 1"

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Q78. Answer: (b) BMG

The logic followed here is:

Hence, the correct answer is "Option 2"

Q79. Answer: (d) 22

Given 11 B 3 C 20 D 93 A 3 = ?

'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−',

BODMAS Rule:

11 × 3 + 20 − 93 ÷ 3 = ?

11 × 3 + 20 − 31 = ?

33 + 20 − 31 = ?

53 − 31 = ?

22.

Hence, the correct answer is "Option 4"

Q80. Answer: (a) 735

The logic follows here,

Hence, the correct answer is "Option 1"

Q81. Answer: (d) Neither conclusion (I) nor (II) follows.

The least possible Venn diagram for the given statements is as shown below :

Conclusions:

(I) Some tubelights are waxes. - False (As their is no direct relation between tubelight and waxes may be it is possible but nnot definite. Hence, it is false)

(II) All waxes are tubelights. - False (As their is no direct relation between tubelight and waxes may be it is possible but nnot definite. Hence, it is false)

Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 4"

Q82. Answer: (a) One

A, B, C, D, E, F and G are sitting around a circular table facing the centre.

• F sits to the immediate right of G.

• B sits third to the left of G.

• A is the immediate neighbour of D and G.

• C sits second to the left of B.

The Final Arrangement is,

Hence, the correct answer is "Option 1"

Q83. Answer: (c) 3

Given (Left) 984 673 543 126 341 (Right)

Arranged in descending order,

(Left) 984 673 543 126 341 (Right)

(Left) 984 673 543 341 126 (Right)

Hence, the correct answer is "Option 3"

Q84. Answer: (a) 40

The total number of people = Position of the person from Top + Position of the person from Bottom - 1.

Therefore,

The total number of students in the class = 26 + 15 - 1 = 40.

Hence, the correct answer is "40".

Q85. Answer: (a) YRK 385

The logic followed here is:

Hence, the correct answer is "Option 1"

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Q86. Answer: (b) Four

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

• No box is kept above F.

• Only three boxes are kept between F and E.

• Only one box is kept between G and C.

• C is kept immediately above E.

• Only four boxes are kept between G and A.

• B is kept at some place above D.

The Final Arrangement is,

F
G
B
C
E
D
A

Hence, the correct answer is "Option 2"

Q87. Answer: (d) 102

The logic follows here,

Hence, the correct answer is "Option 4"

Q88. Answer: (b) CG-JB

The logic followed here is:

Hence, the correct answer is "Option 2"

Q89. Answer: (c) HL−JQ

The logic followed here is:

Hence, the correct answer is "Option 3"

Q90. Answer: (d) One

Given (Left) 458 294 680 183 297 (Right)

Arranged in ascending order,

(Left) 183 294 297 458 680 (Right)

(Left) 458 294 680 183 297 (Right)

Hence, the correct answer is "Option 4"

Q91. Answer: (c) 5

MALT' is coded as '1264' and 'PALM' is coded as '4521'.

'MALT' - '1264'

'PALM' - '4521'.

A L M and 1 2 4 common in both given words and number.

Hence, the correct answer is "Option 3"

Q92. Answer: (d) NJGO

The logic followed here is:

Hence, the correct answer is "Option 4"

Q93. Answer: (d) 29

Given : 6 B 7 D 84 A 3 C 15 = ?

'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−'

BODMAS Rule:

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6 × 7 − 84 ÷ 3 + 15 = ?

6 × 7 − 28 + 15 = ?

42 + 15 − 28 = ?

57 − 28 = ?

29.

Hence, the correct answer is "Option 4"

Q94. Answer: (a) Mother's mother

Preparing the family tree diagram by using the following symbols:

As per the given information:

M is the mother of N. E is the mother of M.

Hence, the correct answer is "Option 1"

Q95. Answer: (a) 88

The logic follows here,

Hence, the correct answer is "Option 1"

Q96. Answer: (c) Two

Seven people, F, G, H, I, J, K and R, are sitting around a circular table facing the centre of the table.

• I sits third to the left of J.

• R sits second to the left of G.

• Only J sits between H and R.

• F is not an immediate neighbour of I

The Final Diagram,

Hence, the correct answer is "Option 3"

Q97. Answer: (c) 24, 43

Logic = (First Number × 2) – 5

• 2×19 – 5 = 38 – 5 = 33

• 2×17 – 5 = 34 – 5 = 29

• Similarly,

• Hence, the correct answer is "Option 3"

Q98. Answer: (b) 10

Given number 8237519

Arranged in ascending order

Left 1 2 3 5 7 8 9 Right

Sum of the digits which are second from the left and second from the right in the new number thus formed = 8 + 2 = 10.

Hence, the correct answer is "Option 2"

Q99. Answer: (a) Only conclusion (I) follows.

The least possible Venn diagram is:

Conclusions:

(I) Some files are keys. - True (All books are keys.Some files are books.Some files are keys is true)

(II) All keys are books.- False (All books are keys. All keys are books is may be possible but not definite; hence, it is false)

Only conclusion (I) follows.

Hence, the correct answer is "Option 1"

Q100. Answer: (a) 19 km towards North

• Virat starts from Point A and drives 10 km towards South.

• He then takes a right turn, drives 9 km, turns left and drives 5 km.

• He then takes a left turn and drives 9 km.

• He takes a final right turn, drives 4 km and stops at Point P

The Final Diagram,

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Hence, the correct answer is "Option 1"

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