RRB NTPC (UG) CBT-I Official Paper (Held On: 20 Aug, 2025 Shift 3) (Previous Year Paper)

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

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GENERAL AWARENESS

Q1. Which convention, ratified in 1998, seeks to protect the environment and human health by encouraging shared responsibility and cooperation in the global trade of pesticides and hazardous chemicals?

(a) Paris Agreement
(b) Basel Convention
(c) Rotterdam Convention
(d) Stockholm Convention

Q2. Which ISRO mission, successfully completed in January 2025, demonstrated autonomous docking between two satellites?

(a) SPADEX
(b) Gaganyaan
(c) Aditya-L1
(d) Chandrayaan-3

Q3. In a LAN setup, which of the following statements is true?

(a) LAN requires satellite communication.
(b) LANs are used to connect computers over a large geographical area.
(c) LAN cannot share printers or files between devices.
(d) LAN connects computers in a limited area, such as a home or office.

Q4. Which summit held in Kochi in February 2025 aimed at attracting investments in various sectors in Kerala?

(a) Kochi Investment Summit
(b) Kerala Investment Summit
(c) Kerala Development Conference
(d) Kerala Economic Forum

Q5. What is the primary objective of the AI-based BharatGen model launched by the Science and Technology Minister in June 2025?

(a) Replacing foreign AI tools used by Indian government agencies
(b) Providing cloud services for AI startups across India and Asia
(c) Advancing AI in Indian languages and cultural frameworks
(d) Developing quantum computing using only indigenous algorithms

Q6. What percentage of India's population lived mostly in villages during British colonial rule?

(a) Approximately 95%
(b) Approximately 65%
(c) Approximately 75%
(d) Approximately 85%

Q7. What is the distinctive feature of Warli painting?

(a) Geometric patterns and white pigment
(b) Depictions of royal courts
(c) Use of gold leaf
(d) Use of bright colors

Q8. In which case did the Supreme Court hold that judicial review is a basic feature of the Constitution?

(a) Shah Bano case
(b) Shankari Prasad case
(c) Kesavananda Bharati case
(d) Golaknath case

Q9. Which of the following best defines globalisation in the context of economic reforms in India, post 1991?

(a) Closure of multinational companies
(b) Integration of the Indian economy with the global economy
(c) Restrictions on foreign investment
(d) Promoting only domestic trade

Q10. During the colonial period, 70-75% of the people were engaged in ____.

(a) small scale industries
(b) transport sector
(c) mining activities
(d) agricultural activities

Q11. How many deep trenches are there in the Indian Ocean?

(a) Eight
(b) Nine
(c) Seven
(d) Six

Q12. Which Indian artist received the Asia Arts Pathbreaker Award at the 2025 Asia Arts Game Changer Awards for his innovative contribution to contemporary art?

(a) Jayeeta Chatterjee
(b) Shilpa Gupta
(c) Bharti Kher
(d) Anupam Sood

Q13. Which of the following is an example of a synthetic polymer used in industry?

(a) Starch
(b) Nylon-6,6
(c) Cellulose
(d) Rubber

Q14. Where was India's first Vande Bharat sleeper train unveiled in September 2024?

(a) BEML Complex, Bengaluru
(b) Rail Coach Factory, Kapurthala
(c) Metro Rail Depot, Mumbai
(d) ICF, Chennai

Q15. In Lassaigne's test, which element is indicated by the formation of a Prussian indigo precipitate when part of the solution is heated in the presence of iron (II) sulphate solution?

(a) Oxygen
(b) Carbon
(c) Hydrogen
(d) Nitrogen

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Q16. What is the primary function of infrastructure in an economy?

(a) Industrial and economic practices
(b) Political campaigns
(c) Recreation and tourism
(d) luxury consumption

Q17. India's renewable energy sector saw a record-breaking growth of 24.5 GW and 3.4 GW through which of the following in 2024, according to data from the Ministry of New and Renewable Energy?

(a) Biomass and tidal
(b) Hydroelectricity and geothermal
(c) Solar and wind
(d) Wind and nuclear

Q18. Which of the following diseases is caused by a virus?

(a) Measles
(b) Tuberculosis
(c) Malaria
(d) Cholera

Q19. Which of the following is a distinctive feature of a statutory corporation in India?

(a) It has no legal existence separate from the government.
(b) It is wholly owned by private shareholders and receives no government funding.
(c) It is created by a special Act, has independent legal status and can be sued.
(d) Its employees are considered government civil servants under normal rules.

Q20. Greece's women's team defeated which team to win the gold medal for the first time in the 2025 World Aquatics World Cup?

(a) Hungary
(b) Italy
(c) Spain
(d) Russia

Q21. What is the main feature of classical Indian drama?

(a) Only comedy scenes
(b) Not using makeup
(c) Only Dance
(d) Inclusion of sentiments

Q22. Which state announced plans to build India's first quantum computing village in 2025?

(a) Himachal Pradesh
(b) Punjab
(c) Andhra Pradesh
(d) Karnataka

Q23. Which of the following Indian brands has ranked second in the Future Brand Index, 2024?

(a) Larsen & Toubro
(b) Tata Consultancy Services
(c) Hindustan Unilever Limited
(d) Reliance Industries Limited

Q24. Which river valley project has been developed with the help of Tennessee Valley Authority (TVA)?

(a) Damodar Valley Project
(b) Nagarjuna Sagar Project
(c) Bhakra Nangal Project
(d) Tehri Project

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Q25. Which of the following is the correct way to create a new folder on the desktop in Windows?

(a) Drag an icon from the Start Menu to the desktop
(b) Open Task Manager and click on New Folder.
(c) Press Ctrl+S on the desktop
(d) Right-click on the desktop and go to New Folder

Q26. What is the main feature of the Waqf (Amendment) Act, 2025?

(a) Implementation of Uniform Civil Code Guidelines
(b) Inclusion of Muslim women and all sects on boards
(c) Nationalisation of all registered Waqf properties
(d) Abolition of all existing Waqf Boards

Q27. Which of the following rebellions was led by traditional land soldiers (foot soldiers) in Odisha?

(a) Ahom revolt
(b) Wahabi movement
(c) Paika rebellion
(d) Faraizi revolt

Q28. Which of the following is an non-statutory and non-constitutional body?

(a) Attorney General of India
(b) NITI Aayog
(c) Central Information Commission
(d) National Human Rights Commission

Q29. As a tribute to the 1857 hero Babu Kunwar Singh, the IAF Surya Kiran Air Show dazzled the skies of _____ in April 2025.

(a) Lucknow
(b) Meerut
(c) Patna
(d) Bhagalpur

Q30. Which of the following was a tribal rebellion led by Birsa, a leader from Ranchi, that began as a religious movement and later turned into a fight against colonial land settlement, moneylenders and forest contractors?

(a) Kuka rebellion
(b) Munda uprising
(c) Sannyasi revolt
(d) Wahabi movement

Q31. Which amendment abolished the privy purse and privileges of the former rulers of princely states?

(a) Thirty-first Amendment Act, 1972
(b) Twenty-Fourth Amendment Act, 1971
(c) Twenty-Sixth Amendment Act, 1971
(d) Twenty-fifth Amendment Act, 1971

Q32. Shri Pankaj R Patel, a Padma Bhushan awardee in 2025, was the Chairman of which of the following Indian pharmaceutical companies in April 2025?

(a) Zydus Lifesciences Limited
(b) Dr. Reddy's Laboratories
(c) Sun Pharmaceutical Industries
(d) Cipla

Q33. What is the low pressure belt near the equator commonly called?

(a) Polar Front
(b) Horse Latitudes
(c) Doldrums

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(d) Trade Wind Belt

Q34. The 'Connect India 2025' event organised by an Indian association called I AM in the United States was aimed at bringing together partner organisations from which sector?

(a) Minnesota
(b) California
(c) New York
(d) Texas

Q35. Which of the following states come under the Fifth Schedule of the Indian Constitution?

(a) Mizoram and Manipur
(b) Jharkhand and Chhattisgarh
(c) Nagaland and Meghalaya
(d) Assam and Tripura

Q36. Which of the following digital programmes aims to make the legislative proceedings of the State and Union Territory Legislatures in India completely paperless?

(a) e-Governance for Legislators (eGL)
(b) Digital India Mission
(c) e-Parliament
(d) National e-Vidhan Application (NeVA)

Q37. After the fall of the Mauryan Empire, which dynasty was founded by Pushyamitra Shunga, the general who killed the last Mauryan ruler?

(a) Kanva Dynasty
(b) Satavahana Dynasty
(c) Shunga Dynasty
(d) Gupta Dynasty

Q38. The Partition of Bengal (1905) was justified by the British on the basis of _____.

(a) Economic prosperity
(b) Religious harmony
(c) Administrative facility
(d) Spread of education

Q39. The Andaman and Nicobar Islands are separated by _____.

(a) 12° N parallel
(b) 10° N parallel
(c) 14° N parallel
(d) 16° N parallel

Q40. The famous Virupaksha Temple at Pattadakal was built in the 8th century by?

(a) Chalukyas
(b) Vardhan
(c) Vakataka
(d) Pallavas

MATHEMATICS

Q41. I bought two frocks for Rs. 1,200. I sold the first frock at a loss of 7% and the second at a profit of 23%. If I made neither a loss nor a profit overall, find the purchase price (in Rs.) of the first frock.

(a) 944
(b) 904
(c) 920
(d) 940

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Q42. Find the value of (cos ^6 θ + sin ^6 θ + 3 sin² θ cos² θ)/(csc θ sec θ ((sin θ + cos θ)² - 1)).

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

Q43. A train overtakes two people walking along a railway track. The first person is traveling at a speed of 9 km/hr. The second person is traveling at a speed of 12.6 km/hr. The train takes 13.5 and 15 seconds, respectively, to overtake them. If both men are walking in the same direction as the train, what is the train's speed?

(a) 35 km/hr
(b) 44 km/hr
(c) 45 km/hr
(d) 38 km/hr

Q44. The radius of a sphere is 16 cm. Find its surface area.

(a) 768π см²
(b) 341π cm²
(c) 512π cm²
(d) 1024π cm²

Q45. Which of the following numbers divides 747579723?

(a) 13
(b) 11
(c) 9
(d) 8

Q46. Find the value of 57 ^(- 8) ÷ 57 ^(17) × 57 ^(- 18).

(a) 57^(−36)
(b) 57^(−46)
(c) 57^(−45)
(d) 57^(−43)

Q47. The greatest common factor (HCF) of two numbers is 16 and their least common multiple (LCM) is 240. If one number is 48, find the other number.

(a) 64
(b) 72
(c) 80
(d) 70

Q48. The selling price of 40 books is equal to the cost price of 28. Find the loss or profit percentage.

(a) 30% loss
(b) 30% profit
(c) 100/12 % profit
(d) 100/12 % loss

Q49. Hema can complete a task in 30 days. Hema and Raji together can complete the same task in 22 days, and Hema, Raji, and Smita together can complete the same task in 15 days. In how many days can Hema and Smita together complete the same task?

(a) 62/3
(b) 55/3
(c) 51/5
(d) 45/4

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Q50. Sapna invested Rs. 21,900 at simple interest, partly at 14% per annum and partly at 10% per annum. If she receives the same interest on both investments after 2 years, find the amount (in Rs.) invested at 14% per annum.

(a) 9,123
(b) 9,128
(c) 9,124
(d) 9,125

Q51. Find the average of first 167 even numbers.

(a) 169
(b) 167.5
(c) 168.5
(d) 168

Q52. In triangle ABC, BD and AC intersect at D and angle DBC = 40°. E is a point on BC such that angle CAE = 37°. What is the measure of angle AEB?

(a) 99°
(b) 87°
(c) 83°
(d) 78°

Q53. 65% of 65 is how much more than 3/5 of 55.

(a) 9.25
(b) 3.25
(c) 7.25
(d) 6.25

Q54. In an election between two candidates, 92% of registered voters cast their ballots, and 20% were found invalid. The winning candidate received 75% of the valid votes and won the election by a margin of 322 votes. How many voters were registered in total?

(a) 875
(b) 3123
(c) 873
(d) 877

Q55. Find the total surface area of a cube of side 40 cm.

(a) 9632 cm^2
(b) 9628 cm^2
(c) 9600 cm^2
(d) 9564 cm^2

Q56. P, Q, and R started a business by investing Rs. 2,030, Rs. 1,700, and Rs. 1,010, respectively. If Q's share of the profit earned by them is Rs. 975, what is the difference (in Rs.) in the profits earned by P and R?

(a) Rs. 585
(b) Rs. 586
(c) Rs. 584
(d) Rs. 583

Q57. If the third proportional to 32 and 24 is x, then find the value of x.

(a) 17
(b) 20
(c) 16
(d) 18

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Q58. The cost of 7 pens and 8 pencils is Rs. 230. If the price of pens is reduced by Rs. 1 per pen and the price of pencils is increased by Rs. 7 per pencil, the cost of 14 pens and 4 pencils becomes Rs. 150. What is the original price of 8 pens and 8 pencils?

(a) Rs. 230
(b) Rs. 228
(c) Rs. 232
(d) Rs. 229

Q59. Find the number of prime numbers that lie between 389 and 403, including both numbers.

(a) 6
(b) 3
(c) 2
(d) 8

Q60. Rs. 28,000 is divided among A, B and C in such a way that 2 times A's share = 9 times B's share = 6 times C's share. Find A's share.

(a) Rs. 17,845
(b) Rs. 18,195
(c) Rs. 18,140
(d) Rs. 18,000

Q61. Simplify the following.

$3(5/3x^2 - 28x + 15) - 5(x^2 + 6x - 15)$

(a) $114x - 120$
(b) $114x + 120$
(c) $-114x - 120$
(d) $-114x + 120$

Q62. The average price of three items of furniture is Rs. 5,310. If their prices are in the ratio 3 : 5 : 7, find the price (in Rs.) of the cheapest item.

(a) 5,310
(b) 3,186
(c) 7,434
(d) 1,062

Q63. A can lay a railway track between two stations in 22 days, and B can complete the same task in 10 days. With C's help, they finish the job in just 2 days. In how many days can C complete the job alone?

(a) 1132/39 days
(b) 832/39 days
(c) 1232/39 days
(d) 232/39 days

Q64. An item marked at Rs. 38,800 is available at a single discount of 25% or at two successive discounts of 10% and 15%. What will be the difference between the selling prices under these discount schemes?

(a) Rs. 825
(b) Rs. 800
(c) Rs. 628
(d) Rs. 582

Q65. If 2 times the age of Ram is 25 years more than 9 times the age of Ramya, and 5 times the age of Ramya is 4 years less than the age of Ram, then find the difference (in years) between the ages of Ram and Ramya.

(a) 72
(b) 77
(c) 74
(d) 75

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Q66. A wholesaler offers a scheme discount of 10% on the marked price of Rs. 400. Find the selling price.

(a) Rs. 360
(b) Rs. 350
(c) Rs. 380
(d) Rs. 370

Q67. Find the simple interest (in Rs.) on an amount of Rs. 4,000 deposited on 21 February 2024 and withdrawn on 22 April 2024 at 6.75% per annum.

(a) Rs. 45
(b) Rs. 46
(c) Rs. 44
(d) Rs. 43

Q68. It is given that 7^(0.07) = x, 7 ^(0.07) = y and x ^z = y^3, then the value of z will be closest to _____.

(a) 3.41
(b) 3
(c) 5.42
(d) 1.23

Q69. A man driving a car at 79 km/hr crosses a bridge in 3.6 minutes. Find the length of the bridge.

(a) 4.01 km
(b) 4.88 km
(c) 4.74 km
(d) 4.21 km

Q70. The greatest common factor (HCF) and least common multiple (LCM) of two numbers are 5 and 495 respectively. If one of these numbers is 55, find the other number.

(a) 45
(b) 64
(c) 8
(d) 9

GENERAL INTELLIGENCE AND REASONING

Q71. Refer to the following number and symbol series and answer the question below. Counting should be done from left to right only.

(Left) $ \ % % # > ? > ^ # 6 5 > > 4 9 \ 6 ^ \ / (Right)

How many such numbers are there which are immediately preceded by a symbol and also immediately followed by a symbol?

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

Q72. Jhik starts driving from point A and drives 18 km towards the east. Then he turns left and drives 4 km, then he turns left and drives 21 km. Then he turns left and drives 9 km. He takes a final left turn and drives 3 km and stops at point P. How far (the shortest distance) and in which direction should he drive to reach back at point A? (Unless specified, all turns are 90° turns only.)

(a) 6 km towards north
(b) 5 km towards north
(c) 6 km towards east
(d) 5 km towards south

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Q73. Mr. Tony ranks 69th from the top and 13th from the bottom in his class. How many students are there in his class?

(a) 82
(b) 83
(c) 80
(d) 81

Q74. Seven boxes A, B, C, D, E, F and G are placed one above the other but not necessarily in the same order.

F is placed immediately above G. A is placed immediately above C. Only E is placed above B. Only two boxes are placed above F. A is not placed third from the bottom.

How many boxes are placed above C?

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

Q75. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and hence they form a group. Which letter-cluster pair does not belong to that group? (Note: The odd letter-cluster pair is not based on the number of consonants/vowels or their position.)

(a) TM-OO
(b) CP - XS
(c) IY-DA
(d) NH-IJ

Q76. Tina starts driving from point Y and drives 4 km north. Then, she turns left and drives 2 km, then turns left again and drives 6 km. She then turns left again and drives 4 km. Then, she turns right and drives 4 km. She then takes a final right turn and drives 2 km and stops at point 8. How far (minimum distance) and in which direction must he drive to reach point Y again? (Unless specified, all turns are 90-degree turns only.)

(a) 6 km towards north
(b) 4 km towards east
(c) 2 km towards south
(d) 2 km towards west

Q77. Three of the following four letter-clusters are alike in a certain way based on the English alphabetical order and hence they form a group. Which letter-cluster does not belong to that group? (Note: Anomalous letter-cluster is not based on the number of consonants/vowels in it or their position.)

(a) EYTQ
(b) FZVR
(c) AUPM
(d) BVQN

Q78. In a certain code language, 'this is lethal' is coded as 'po ko re' and 'she is happy' is coded as 're lo ao'. What will 'is' be coded as in the given language?

(a) ao
(b) re
(c) ko
(d) po

Q79. If 'x' and '+' are interchanged and '-' and '÷' are interchanged, what will come in place of the question mark (?) in the following equation?

32 ÷ 2 × 72 - 9 + 5 = ?

(a) 72
(b) 73
(c) 71
(d) 70

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Q80. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true even if it seems to be at variance from commonly known facts, Decide which of the given conclusions logically follows from the given statements.

Statement:

All fathers are brothers.

All brothers are sons.

Conclusion:

(I) All fathers are sons.

(II) All brothers are fathers.

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

Q81. What should come in place of question mark (?) in the given series?

3,-2,-12,-32, -72, ?

(a) −152
(b) −135
(c) −124
(d) −125

Q82. Refer to the following number and symbol series and answer the question below. All numbers are single-digit. Counting should be done from left to right only.

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

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

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

Q83. If 1 is added to each even digit of the number 36719542, then what will be the product of the digits which appear more than once in the new number thus formed?

(a) 105
(b) 35
(c) 21
(d) 15

Q84. If 1 is subtracted from each even digit of the number 97145286, then find the sum of the digits which appear more than once in the new number thus formed.

(a) 12
(b) 6
(c) 8
(d) 13

Q85. L, M, N, O, Q, R and S are seated around a round table facing the center. L sits fourth to the right of R. Only two people sit between Q and N when counted from the left of Q. M sits third to the left of O. S is an immediate neighbour of O and N. How many people sit between L and S when counted from the left of S?

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

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Q86. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true even if it seems to be at variance from commonly known facts, Decide which of the given conclusions logically follow(s) from the given statements.

Statements:

All hummingbirds are cranes. Some cranes are flamingos.

Conclusions:

I. Some hummingbirds are flamingos.

II. No flamingo is a hummingbird.

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

Q87. 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 whole numbers, without breaking the number into its component digits. For example, take 13. Operations on 13, such as addition/subtraction/multiplying by 13, etc., can be performed. Breaking 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(52, 100, 196)

(65, 126, 248)

(a) (72, 140, 256)
(b) (56, 108, 202)
(c) (68, 132, 260)
(d) (94, 184, 264)

Q88. Three of the following four letter-clusters are alike in a certain way based on the English alphabetical order and hence they form a group. Which letter-cluster does not belong to that group? (Note: Anomalous letter-cluster is not based on the number of consonants/vowels in it or their position.)

(a) NGO
(b) IBJ
(c) KDL
(d) PIR

Q89. In a certain code language, 'GIFT' is coded as '7529' and 'FITS' is coded as '2596'. What is the code for 'S' in the given code language?

(a) 5
(b) 6
(c) 9
(d) 2

Q90. In the following triplets, each group of letters is related to the next group following a certain logic. From the given alternatives, select the one that follows the same logic.

MICE - EMCI - MEIC

DEAR - RDAE - DREA

(a) AGES-SAGE - GESA
(b) GUST-TGSU - GTUS
(c) NUTS-UNTS - SUTN
(d) AXLE-EALX - AXEL

Q91. In the following triplets, each group of letters is related to the next group following a certain logic. From the given alternatives, select the one that follows the same logic.

TRIM-ITRM - MIRT

MIST - SMIT - TSIM

(a) CLUE-UCLE - EULC
(b) FOLD-FLOD - DLOF

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(c) WEST-EWST - TESW
(d) PLAY-APLY - LAYP

Q92. In a certain code language,
A + B means 'A is the husband of B',
A - B means 'A is the brother of B',
A x B means 'A is the sister of B' and
A ÷ B means 'A is the daughter of B'.
How is C related to T if 'C - E ÷ G + I x T'?
(a) Father's brother
(b) Mother's brother
(c) Sister's son
(d) Son

Q93. Which of the following letter-number cluster should replace the question mark (?) in order to make the given series logically complete?
GBD 14, KFH 17, OJL 20, SNP 23, ?
(a) WTS 26
(b) VRT 26
(c) WRT 26
(d) VTR 25

Q94. A, B, C, D, E, F, and G are seated around a round table facing the center. C sits to the immediate right of D. Only three people sit between C and G, when counted from the left of C. Only three people sit between D and B. A sits immediate right of F. How many people sit between C and A when counted from the right of C?
(a) 4
(b) 3
(c) 2
(d) 1

Q95. What should come in place of question mark (?) in the given series?
160 151 140 127 112?
(a) 93
(b) 91
(c) 95
(d) 84

Q96. Which of the following letter-number clusters when placed in place of the question mark (?) in the given series so that the series is logically complete.
KFU-15 IIQ-22 GLM-31 EOI-42?
(a) CRE-55
(b) RES-54
(c) RDG-55
(d) GTR-54

Q97. If '+' and '-' are interchanged and '×' and '÷' are interchanged, then what will come in place of the question mark (?) in the following equation?
65 × 5 - 19 ÷ 3 + 25 = ?
(a) 45
(b) 40
(c) 44
(d) 46

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Q98. Seven boxes V, W, X, Y, Z, Q, and R are placed one above the other, but not necessarily in the same order. Y is placed immediately above Q. W is placed immediately above Z. Only X is placed above V. Only two boxes are placed above Y. W is not placed third from the bottom. How many boxes are placed between R and X?

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

Q99. Select the pair that follows the same pattern as the pairs given below. Both pairs follow the same pattern.

VTM : ZQQ

DNU : HKY

(a) MHE : PCH
(b) YFH : CAL
(c) LHC : PEG
(d) KZQ : PWL

Q100. What will come in place of the question mark (?) in the series given below?

512 513 505 532 468?

(a) 587
(b) 597
(c) 583
(d) 593

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) Rotterdam Convention

The correct answer is Rotterdam Convention.

Key Points

• The Rotterdam Convention, officially named the "Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade," was adopted in 1998.

• The convention aims to promote shared responsibility and cooperative efforts among countries in managing the trade of hazardous chemicals and pesticides to protect human health and the environment.

• It establishes a legally binding framework for the international trade of certain hazardous chemicals, ensuring that countries have the necessary information to assess their risks and make informed decisions about their importation and use.

• The Rotterdam Convention operates through the Prior Informed Consent (PIC) Procedure, which allows countries to decide whether to allow or restrict the import of hazardous chemicals listed under the Convention.

• As of October 2023, the Rotterdam Convention has been ratified by 165 parties, including the European Union and several individual countries, demonstrating a global commitment to addressing the risks associated with hazardous chemicals and

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pesticides.

Additional Information

• Key Features of the Rotterdam Convention:

• Focuses on promoting shared responsibility in international trade of hazardous chemicals.

• Requires parties to provide prior informed consent before exporting certain chemicals to other nations.

• Facilitates the exchange of scientific, technical, economic, and legal information regarding these chemicals.

• Paris Agreement:

• Adopted in December 2015 and effective from November 2016.

• Its primary goal is to limit global warming to below 2 degrees Celsius above pre-industrial levels, aiming for a more ambitious target of 1.5 degrees Celsius.

• Focuses on reducing greenhouse gas emissions through nationally determined contributions (NDCs).

• Basel Convention:

• Adopted in 1989 and effective from 1992.

• Aims to control the transboundary movements of hazardous wastes and their disposal.

• Focuses on minimizing waste generation and ensuring environmentally sound management of hazardous wastes.

• Stockholm Convention:

• Adopted in 2001 and effective from 2004.

• Aims to eliminate or restrict the production and use of persistent organic pollutants (POPs).

• Focuses on protecting human health and the environment from harmful effects of POPs, which are toxic chemicals that persist in the environment.

Important Points

• Examples of Chemicals Covered by the Rotterdam Convention:

• Industrial chemicals: Asbestos, Polychlorinated biphenyls (PCBs).

• Pesticides: Aldrin, Dieldrin, DDT.

• Global Impact:

• Encourages cooperation between developed and developing nations to manage chemical risks.

• Plays a crucial role in reducing environmental pollution and protecting biodiversity.

Q2. Answer: (a) SPADEX

The correct answer is SPADEX.

Key Points

• SPADEX (Space Docking Experiment) is an ambitious project of the Indian Space Research Organisation (ISRO) aimed at demonstrating autonomous docking capabilities between two satellites.

• The experiment is crucial for future missions involving space stations, in-orbit servicing, and refueling spacecraft.

• SPADEX successfully completed its autonomous docking demonstration in January 2025, marking a significant milestone in India's space technology development.

• The docking process involves precise navigation, control systems, and sensors, enabling two spacecraft to connect in orbit without human intervention.

• This mission establishes India’s capability to conduct complex space operations and supports advancements in satellite repair and maintenance technologies.

Additional Information

• SPADEX (Space Docking Experiment):

• SPADEX is developed by ISRO to test autonomous docking technologies, a critical feature for future space stations and spacecraft servicing missions.

• This technology enables satellites to dock together in orbit for activities such as refueling, repairing, or even assembling larger structures.

• The experiment includes two spacecraft, one acting as a target and the other as a chaser, showcasing precision navigation and control.

• The success of SPADEX demonstrates India’s growing expertise in satellite and orbital technologies.

• Gaganyaan Mission:

• The Gaganyaan Mission is India’s first human spaceflight program, aiming to send astronauts into low Earth orbit.

• It is expected to launch by 2024, focusing on crew safety, space habitation, and life-support systems.

• While advanced technology is involved, Gaganyaan is not directly related to autonomous docking.

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• Aditya-L1:
• Aditya-L1 is India's first solar mission, launched to study the Sun’s corona, chromosphere, and solar wind.
• It focuses on scientific exploration rather than demonstrating autonomous docking.
• Chandrayaan-3:
• Chandrayaan-3 is a lunar exploration mission by ISRO, which successfully soft-landed on the Moon.
• This mission is unrelated to autonomous docking and focuses primarily on lunar surface studies.

Important Points

• Autonomous Docking:
• Autonomous docking is a complex space operation requiring advanced sensors, navigation systems, and control algorithms.
• It is essential for future space missions involving multi-satellite systems, space stations, and reusable spacecraft.
• ISRO's Achievements:
• ISRO continues to innovate with missions like SPADEX, Chandrayaan, and Gaganyaan, expanding India’s space capabilities.
• The success of SPADEX highlights India’s capability to develop cutting-edge space technologies for international collaboration and exploration.

Q3. Answer: (d) LAN connects computers in a limited area, such as a home or office.

The correct answer is LAN connects computers in a limited area, such as a home or office.

Key Points

• LAN (Local Area Network) is a network that interconnects computers within a limited geographical area such as a home, office, or campus.
• It is characterized by its high-speed data transfer capabilities, typically ranging from 10 Mbps to 10 Gbps, depending on the technology used.
• A LAN allows devices like computers, printers, and servers to share resources, such as files, applications, or printers, across the network.
• Unlike Wide Area Networks (WANs), LANs are confined to a smaller physical area and do not require satellite communication. Hence, statement 1 is incorrect.
• LANs are not used to connect computers over a large geographical area; that is the purpose of a WAN (Wide Area Network). Hence, statement 2 is incorrect.
• LANs are specifically designed to enable resource sharing, such as printers and file sharing, between connected devices. Hence, statement 3 is incorrect.
• The correct description of a LAN is that it connects computers within a limited area, such as a home, office, or school. Hence, statement 4 is correct.

Additional Information

• LAN Characteristics:
• LANs are generally confined to small areas such as homes, offices, or campuses, with a range of a few meters to a few kilometers.
• They use technologies such as Ethernet and Wi-Fi for connectivity.
• LANs typically have low latency and high speed due to their limited size.
• LAN Applications:
• File and printer sharing among connected devices.
• Shared access to software applications and databases.
• Facilitating communication through email, chat, or shared calendars within an organization.
• Types of Networks:
• WAN (Wide Area Network): Covers large geographical areas, such as cities or countries, and connects multiple LANs together using telecommunications networks.
• MAN (Metropolitan Area Network): Covers a larger area than a LAN but smaller than a WAN, typically a city or a large campus.
• LAN (Local Area Network): Covers a small geographic area and is used for high-speed communication between nearby devices.
• Advantages of LAN:
• High data transfer speeds.
• Cost-effective resource sharing.
• Improved collaboration and communication within the network.
• Enhanced security with centralized data management.

Important Points

• Key Technologies in LAN:

• Ethernet: The most common LAN technology, supporting speeds from 10 Mbps to 100 Gbps.
• Wi-Fi: Wireless LAN technology that enables wireless connectivity for devices within the network's range.
• Examples of LAN Usage:
• Office networks where employees share files, printers, and applications.
• Home networks connecting devices like laptops, printers, and smart home devices.
• Campus networks in educational institutions.
• LAN Components:
• Switches: Connect devices within the LAN and enable data transfer between them.
• Routers: Connect the LAN to other networks, such as the Internet.
• Access Points: Provide wireless connectivity within the LAN.

Q4. Answer: (b) Kerala Investment Summit

The correct answer is Kerala Investment Summit.

Key Points

• The Kerala Investment Summit is a flagship event organized to attract investments into various sectors of Kerala's economy.
• This summit held in Kochi in February 2025, focused on showcasing Kerala as an attractive investment destination across multiple sectors such as tourism, infrastructure, IT, agriculture, and renewable energy.
• It served as a platform for business leaders, policymakers, investors, and entrepreneurs to discuss opportunities and challenges in Kerala's business ecosystem.
• The summit aimed at facilitating business-to-government (B2G) and business-to-business (B2B) interactions to enable partnerships and collaborations.
• Special focus was given to promoting Kerala’s unique strengths, such as its strong human capital, cultural heritage, and existing infrastructure, to attract both domestic and international investments.

Additional Information

• Kerala Investment Summit Background:
• Kerala has previously hosted similar investment-focused events like the Ascend Kerala Global Investors Meet to boost its economy.
• Such summits aim to position Kerala as a preferred destination for investors by offering incentives like single-window clearance systems and investment-friendly policies.
• These events typically highlight Kerala’s strengths in sectors like tourism, which contributes significantly to the state’s economy, and IT/ITES industries, which are rapidly growing.
• Infrastructure and Economic Features of Kerala:
• Kerala boasts high literacy rates and skilled human resources, which make it an attractive hub for industries such as technology and healthcare.
• Its extensive network of ports, airports, and road connectivity supports logistics and trade.
• The state government also actively promotes renewable energy projects and sustainable practices, catering to global trends in green investments.
• Other Investment Events in India:
• Examples of other major investment events include the Vibrant Gujarat Summit, Invest Karnataka, and Make in Odisha Conclave, each aimed at attracting investments into their respective states.
• These summits are conducted to showcase state-specific opportunities while aligning with national goals like Make in India and Atmanirbhar Bharat.
• Key Sectors Promoted in Kerala Investment Summit:
• Tourism: Kerala is globally recognized for its backwaters, ayurvedic wellness tourism, and eco-tourism initiatives.
• IT and Technology: The state is home to prominent IT parks like Technopark in Trivandrum and Infopark in Kochi.
• Agriculture and Food Processing: Kerala’s agricultural outputs include spices, rubber, and coconut, which offer vast opportunities for export-oriented industries.

Important Points

• Economic Challenges in Kerala:
• The state faces challenges like high unemployment rates despite having an educated workforce.
• Efforts like the Kerala Investment Summit are geared towards addressing these challenges by creating job opportunities through investments.
• Kerala's dependence on remittances from its expatriate population highlights the need for diversified economic growth.
• Government Initiatives:

• Kerala has implemented policies promoting ease of doing business, such as online registration for businesses and tax incentives.

• Special economic zones (SEZs) and industrial corridors have been developed to attract investments in manufacturing and export-oriented industries.

Q5. Answer: (c) Advancing AI in Indian languages and cultural frameworks

The correct answer is Advancing AI in Indian languages and cultural frameworks.

Key Points

• The BharatGen model, launched in June 2025 by the Science and Technology Minister of India, is a pioneering Artificial Intelligence (AI) model aimed at improving technology in the context of India's diverse languages and cultural frameworks.

• The primary goal of BharatGen is to advance AI capabilities in handling and understanding India's numerous regional languages, which are often underrepresented in global AI systems.

• It emphasizes creating an inclusive AI ecosystem that aligns with India's cultural and linguistic diversity, ensuring that indigenous dialects and expressions are effectively integrated.

• BharatGen focuses on promoting the development of AI tools that cater specifically to India's unique socio-cultural needs, thereby fostering innovation within the country.

• This initiative supports the government's goal of positioning India as a global leader in AI by leveraging its vast linguistic and cultural heritage for the development of AI-driven solutions.

Additional Information

• Indian Languages and AI:

• India is home to 22 officially recognized languages and over 19,500 dialects.

• Many global AI tools are tailored to English and a few other widely spoken languages, leaving a significant gap in accessibility for non-English-speaking populations in India.

• BharatGen seeks to close this gap by developing AI models to understand, process, and generate text in multiple Indian languages effectively.

• Government's Push for AI:

• The Government of India has been actively promoting AI research and development through initiatives like National AI Portal and establishing Centres of Excellence.

• BharatGen aligns with the government's broader vision of leveraging AI to transform healthcare, agriculture, education, and governance sectors in India.

• It also supports the government's Digital India mission, which emphasizes technological empowerment and digital literacy.

• Other AI Initiatives in India:

• The National Strategy for AI, released by NITI Aayog, identifies AI as a transformative tool to boost economic growth and address social challenges in India.

• Projects like RAISE 2020 (Responsible AI for Social Empowerment) further emphasize the ethical and inclusive use of AI in India.

• Challenges in AI Development for Indian Languages:

• Many Indian languages lack sufficient digital resources, such as annotated datasets, which are essential for training AI systems.

• The complexity of Indian languages, including their syntax, grammar, and phonetics, poses additional challenges for AI developers.

Important Points

• Difference from Other Options:

• Replacing foreign AI tools: While BharatGen does aim to reduce dependence on foreign AI models, its primary focus is on promoting AI in Indian languages and cultural contexts. Hence, Option 1 is incorrect.

• Providing cloud services: BharatGen is not a cloud service platform for startups; rather, it focuses on AI development for linguistic and cultural diversity. Thus, Option 2 is incorrect.

• Quantum computing: BharatGen is unrelated to quantum computing and focuses on AI development in Indian languages and culture. Therefore, Option 4 is also incorrect.

• Potential Impact: BharatGen is expected to transform India's position in the global AI landscape by providing localized solutions and promoting inclusive technological advancements.

Q6. Answer: (d) Approximately 85%

The correct answer is Approximately 85%.

Key Points

• During British colonial rule, the majority of India's population lived in villages. Historical records and surveys conducted during that period indicate that nearly 85% of India's population lived in rural areas, primarily engaged in agriculture and allied activities.

• India’s economy was predominantly agrarian, with most people depending on farming as their primary source of income. Industrialization was minimal, and urban development was limited to a few cities.

• British policies, such as the Permanent Settlement of 1793, had a significant impact on rural communities. These policies focused on revenue collection from agricultural lands, further consolidating rural dependency on farming.

• The lack of infrastructure and resources for urbanization ensured that villages remained the backbone of India’s population during this era.

• Even though some cities like Calcutta (Kolkata), Bombay (Mumbai), and Madras (Chennai) were developed as administrative and trading hubs, the vast majority of the population resided in villages due to limited urban opportunities and transportation facilities.

Additional Information

• British Colonial Policies:

• The British adopted policies like the Permanent Settlement and the Ryotwari system, which heavily influenced rural India's socio-economic structure.

• These policies often resulted in exploitation of farmers, high taxes, and widespread poverty in villages.

• The colonial rulers primarily focused on revenue generation from agriculture rather than promoting industrialization or urbanization.

• Urbanization during British Rule:

• Urbanization was limited to major port cities and administrative centers like Kolkata, Mumbai, Chennai, and Delhi.

• These cities served as hubs for trade, transportation, and governance, but they accounted for only a small fraction of India’s population.

• Rural Life in India:

• Villages were largely self-sufficient, with communities relying on agriculture, handicrafts, and local markets for their livelihood.

• The social structure was influenced by caste systems, with specific roles assigned to different groups.

• Education and healthcare facilities were almost non-existent in rural areas, contributing to widespread illiteracy and poor living conditions.

• Impact of Industrial Revolution:

• The Industrial Revolution in Britain led to the decline of traditional Indian industries such as textiles, resulting in the further impoverishment of rural communities.

• Many artisans and craftsmen were forced to abandon their trades and rely on agriculture for survival.

• Population Distribution:

• Historical data from the Census of India conducted during British rule confirms that rural areas constituted the majority of the population, with estimates ranging from 80% to 90% in various regions.

• This trend persisted until India gained independence in 1947, after which urbanization began to accelerate.

Important Points

• Agrarian Economy:

• India’s agrarian economy was the backbone of its rural population during British rule, with land revenue accounting for a significant portion of British income.

• Traditional irrigation methods and farming practices were prevalent due to a lack of technological advancements.

• Rural Challenges:

• Villages faced challenges like poverty, exploitation by landlords, illiteracy, and poor healthcare facilities.

• Famines were frequent due to dependency on monsoon rains and lack of irrigation infrastructure.

• Post-Independence Developments:

• After independence, India focused on rural development through initiatives like land reforms, Green Revolution, and rural electrification.

• Urbanization increased significantly, but villages still play a crucial role in India’s socio-economic fabric.

Q7. Answer: (a) Geometric patterns and white pigment

The correct answer is Geometric patterns and white pigment.

Key Points

• Warli painting is a traditional art form originating from the Warli tribe of Maharashtra, India.

• The distinctive feature of Warli paintings is the use of geometric patterns such as circles, triangles, and lines, which are inspired by elements of nature like the sun, moon, and mountains.

• These paintings are created using a white pigment made from rice paste and water, applied on a background of red ochre or mud walls.

• The themes of Warli paintings revolve around daily life, social events, and nature, often depicting scenes of farming, hunting,

dancing, and festivals.

• Warli art is characterized by its simplicity and absence of intricate detailing, making it unique among Indian tribal art forms.

Additional Information

• Historical Background:

• Warli painting dates back to approximately 2500 BCE, making it one of the oldest forms of tribal art in India.

• The art is practiced primarily by the Warli tribe residing in the Thane district of Maharashtra.

• Geometric Patterns in Warli Art:

• The geometric shapes used in Warli art symbolize elements of nature and human activities. For example, circles represent the sun and moon, triangles symbolize mountains and trees, and lines depict movement and activity.

• The paintings often use human and animal figures drawn with basic shapes, emphasizing the harmonious relationship between humans and nature.

• Use of White Pigment:

• The white pigment used in Warli art is traditionally prepared by grinding rice into a paste and mixing it with water.

• This pigment is applied on walls painted with red ochre or mud, creating a stark contrast that enhances the visibility of the artwork.

• Modern Relevance:

• Warli art has gained international recognition and is often used in contemporary designs, including home décor, apparel, and packaging.

• Various organizations and initiatives have been undertaken to preserve and promote this tribal art form globally.

Important Points

• Option 2: Depictions of royal courts:

• This feature is associated with Mughal and Rajput miniature paintings rather than Warli art.

• Warli art focuses on tribal life and nature rather than royal themes.

• Option 3: Use of gold leaf:

• The use of gold leaf is a characteristic of traditional Indian miniature paintings, particularly those from the Mughal and Rajput era.

• Warli paintings do not incorporate gold leaf as they emphasize simplicity and natural elements.

• Option 4: Use of bright colors:

• Warli art is known for its monochromatic style, primarily using white pigment on earthy backgrounds.

• Bright colors are generally not used in Warli paintings, setting them apart from other tribal and folk art forms like Madhubani.

Q8. Answer: (c) Kesavananda Bharati case

The correct answer is Kesavananda Bharati case.

Key Points

• The Kesavananda Bharati case (1973) is a landmark judgment by the Supreme Court of India where it was held that judicial review is a basic feature of the Constitution. This implies that Parliament cannot amend the Constitution in a way that takes away or destroys its basic structure.

• The case arose when Swami Kesavananda Bharati, head of a mutt in Kerala, challenged the state government's attempt to impose restrictions on the management of the mutt's property under the Kerala Land Reforms Act, 1969.

• In this case, the Supreme Court developed the Basic Structure Doctrine, which asserts that certain fundamental features of the Constitution, such as the supremacy of the Constitution, rule of law, and judicial review, cannot be altered by the Parliament.

• The judgment, delivered by a 13-judge bench, was decided by a narrow margin of 7:6, showcasing the significance and complexity of the case.

• The ruling emphasized the importance of judicial review, which ensures that amendments or laws passed by the legislature do not violate the fundamental principles enshrined in the Constitution.

Additional Information

• Judicial Review in India:

• Judicial review refers to the power of the judiciary to examine the constitutional validity of legislative enactments and executive orders of both the central and state governments.

• This power is derived from Articles 13, 32, and 226 of the Indian Constitution.

• It ensures the supremacy of the Constitution and safeguards fundamental rights.

• The judiciary acts as a guardian of the Constitution and prevents any arbitrary use of power by the legislature or executive.

• Basic Structure Doctrine:

• The doctrine was established in the Kesavananda Bharati case and has been reaffirmed in several subsequent judgments, including the Minerva Mills case (1980).

• It ensures that certain core principles, such as secularism, federalism, and the separation of powers, remain intact.

• The doctrine acts as a check on the Parliament's power to amend the Constitution under Article 368.

• Other Important Cases Related to Judicial Review:

• Shankari Prasad case (1951): The Supreme Court upheld the Parliament's power to amend the Constitution, including fundamental rights, under Article 368.

• Golaknath case (1967): The Court ruled that Parliament cannot amend fundamental rights, emphasizing the importance of protecting individual liberties.

• Minerva Mills case (1980): Reaffirmed the Basic Structure Doctrine and restricted Parliament's power to amend the Constitution.

• Importance of Kesavananda Bharati Case:

• This case marked a turning point in Indian constitutional history by limiting the power of Parliament and ensuring the preservation of the Constitution's basic structure.

• It strengthened the role of the judiciary as the guardian of the Constitution, ensuring a balance between the three organs of the government.

Important Points

• Shah Bano case (1985): The Supreme Court ruled in favor of a Muslim woman's right to receive maintenance from her husband after divorce, based on Section 125 of the Criminal Procedure Code.

• Shankari Prasad case (1951): The Court upheld the validity of the First Amendment, affirming that the Parliament could amend fundamental rights.

• Kesavananda Bharati case (1973): Established the Basic Structure Doctrine and emphasized the importance of judicial review as a safeguard for constitutional principles.

• Golaknath case (1967): The Supreme Court declared that Parliament could not amend fundamental rights, which was later overturned in the Kesavananda Bharati case.

Q9. Answer: (b) Integration of the Indian economy with the global economy

The correct answer is Integration of the Indian economy with the global economy.

Key Points

• Globalisation refers to the process of integration and interaction between different economies, cultures, and populations worldwide, facilitated by advancements in trade, investment, and technology.

• In the context of economic reforms in India post-1991, globalisation primarily aimed at integrating the Indian economy with the global economy.

• The reforms encouraged foreign investment, reduced trade barriers, and promoted the opening up of Indian markets to international competition. This is a hallmark of globalisation.

• The Economic Reforms of 1991, often referred to as LPG reforms (Liberalisation, Privatisation, and Globalisation), marked a paradigm shift in India's economic policy by introducing policies that facilitated trade liberalisation, deregulation, and economic integration with the global market.

• Policies included reducing import tariffs, removing restrictions on foreign investments, and allowing multinational companies to operate in India, thereby increasing India's participation in the global trade and economy.

Additional Information

• Statement-wise Analysis:

• Statement 1: Closure of multinational companies – Incorrect. Globalisation promotes the entry and operation of multinational corporations (MNCs) in a country by facilitating ease of doing business and reducing trade barriers. It does not advocate the closure of MNCs.

• Statement 2: Integration of the Indian economy with the global economy – Correct. This is the fundamental principle of globalisation. It focuses on creating an interconnected global economy, fostering trade, investment, and exchange of resources between nations.

• Statement 3: Restrictions on foreign investment – Incorrect. Globalisation encourages foreign investment by reducing restrictions and creating a conducive environment for investors. The economic reforms of 1991 specifically aimed to attract foreign direct investment (FDI).

• Statement 4: Promoting only domestic trade – Incorrect. Globalisation does not limit trade to the domestic level but rather emphasises international trade and interaction with the global economy.

• Objectives of Globalisation in India:

• To increase economic growth by fostering foreign investment and trade.

• To integrate India into the global supply chain.

• To enhance the competitiveness of Indian industries on a global scale.

• To boost exports and improve the balance of payments.

• Impact of Globalisation on India:

• Introduction of FDI (Foreign Direct Investment) in sectors like telecommunications, insurance, and retail.
• Emergence of India as an IT hub and global outsourcing destination.
• Growth in the number of multinational companies operating in India.
• Increased competition, leading to improved product quality and services.
• Enhanced employment opportunities and technology transfer.
• Key Policies Introduced During 1991 Economic Reforms:
• Reduction of custom duties and tariffs on imports and exports.
• Dismantling of the Licence Raj, which reduced bureaucratic hurdles for businesses.
• Encouragement of private sector participation in industries previously reserved for the public sector.
• Introduction of the Foreign Exchange Management Act (FEMA) in 1999, replacing the Foreign Exchange Regulation Act (FERA), to facilitate international trade.

Important Points

• Role of the World Trade Organization (WTO):
• The WTO has played a crucial role in promoting globalisation by creating a framework for international trade and resolving trade disputes.
• India became a member of the WTO in 1995, which further facilitated its integration into the global economy.
• Challenges of Globalisation:
• Unequal distribution of benefits, leading to widening income inequality.
• Increased vulnerability to global economic crises, such as the 2008 financial crisis.
• Threat to traditional industries due to foreign competition.
• Notable Impacts of Globalisation in India:
• The entry of global automobile brands like Hyundai, Honda, and Toyota into the Indian market.
• Growth of the IT sector, with companies like Infosys and Wipro becoming globally recognised.
• Expansion of e-commerce giants like Amazon and Walmart in India.

Q10. Answer: (d) agricultural activities

The correct answer is agricultural activities.

Key Points

• During the colonial period in India, the majority of the population, approximately 70-75%, was engaged in agricultural activities, making it the backbone of the country's economy. This statement is correct.
• The Indian economy during the colonial era was primarily agrarian, with agriculture being the main source of livelihood for most of the population. It was the dominant sector contributing to the country's economy.
• The agricultural sector during the British period was characterized by subsistence farming and the production of cash crops like cotton, indigo, and tea to support the colonial rulers' trade and industries in Britain.
• The introduction of the Zamindari System and heavy taxation policies by the British led to widespread exploitation of farmers, causing a decline in agricultural productivity and creating economic hardships for the rural population.
• Other sectors like small-scale industries, transport, and mining existed during the colonial period, but they employed a significantly smaller portion of the population compared to agriculture, which was the primary occupation.

Additional Information

• Small-Scale Industries:
• During the colonial period, small-scale industries, such as handloom weaving and traditional crafts, existed but suffered due to the policies of the British, which favored British manufactured goods.
• The introduction of British manufactured goods, especially textiles, led to the decline of traditional Indian industries like handloom and handicrafts.
• Small-scale industries were not a major source of employment compared to agriculture.
• Transport Sector:
• The British introduced railways in India during the mid-19th century to facilitate the transport of raw materials to ports for export and import of British goods.
• While the transport sector grew due to the development of railways, it primarily catered to British economic interests and did not employ a large proportion of the population.
• The local population was majorly involved in manual labor, such as porters and construction workers, in the transport sector.
• Mining Activities:
• The colonial period saw the beginning of mining activities, particularly for coal, iron ore, and other minerals, to fuel the industries in Britain.

• However, mining activities were limited in scale during this period and employed only a small fraction of the labor force compared to agriculture.

• Changes in Agriculture During Colonial Rule:

• The British introduced commercialization of agriculture, focusing on cash crops like indigo, tea, cotton, and opium, which were exported to Britain.

• The policies, such as the Permanent Settlement (introduced in 1793) and other land revenue systems like the Ryotwari and Mahalwari, led to the exploitation of farmers.

• Frequent famines occurred during this period due to improper agricultural practices, inadequate irrigation, and exploitation, leading to widespread poverty and starvation.

Important Points

• The Agricultural Sector was the primary source of livelihood for the majority of Indians during the colonial period, but it faced significant challenges due to British policies.

• Heavy taxation, focus on cash crops for export, and lack of investment in irrigation and infrastructure led to stagnation and exploitation in agriculture.

• In contrast to agriculture, the industrial and mining sectors were underdeveloped during this period, and the transport sector was mainly utilized for colonial economic interests rather than benefiting the local population.

• The legacy of colonial policies in agriculture has had a long-lasting impact on the Indian economy, even post-independence.

Q11. Answer: (d) Six

The correct answer is Six.

Key Points

• The Indian Ocean is home to six major deep-sea trenches, which are prominent geological features formed by subduction zones where tectonic plates converge.

• The most notable trench in the Indian Ocean is the Java Trench, also known as the Sunda Trench, located near Indonesia. It is the deepest trench in the Indian Ocean and can reach depths of over 7,200 meters.

• Other significant trenches include the Central Indian Ocean Trench, Carlsberg Ridge Trench, and the Makran Trench, located along the coast of Iran and Pakistan.

• These trenches play a key role in geological processes such as earthquakes, volcanic activity, and the formation of tsunamis due to tectonic plate movements.

• Scientific studies in these trenches have also revealed unique ecosystems and deep-sea species that thrive in extreme conditions, enhancing our understanding of marine biodiversity.

Additional Information

• Java Trench:

• Located in the eastern Indian Ocean near Indonesia, it is the deepest trench in the Indian Ocean.

• The trench is associated with the subduction of the Indo-Australian Plate beneath the Eurasian Plate.

• It has a maximum depth of approximately 7,725 meters.

• Makran Trench:

• Located along the coasts of Iran and Pakistan, it is an active subduction zone.

• This trench has been identified as a source of major earthquakes and tsunamis in the region.

• The Makran Trench is significant for understanding seismic hazards and tectonic activity in the area.

• Central Indian Ocean Trench:

• Located in the central part of the Indian Ocean, this trench is associated with the Indian Plate's movement.

• It plays a role in the geodynamics of the ocean floor and is a site for underwater volcanic activity.

• Carlsberg Ridge Trench:

• It is part of the mid-ocean ridge system in the Indian Ocean.

• The ridge and associated trenches are crucial for understanding seafloor spreading and plate tectonics.

• Importance of Ocean Trenches:

• Trenches act as natural laboratories for studying geological and ecological processes.

• They contribute to the understanding of plate tectonics, earthquake generation, and tsunami formation.

• Trenches also host unique species adapted to extreme pressure and darkness, offering insights into deep-sea ecosystems.

Important Points

• Formation of Trenches: Trenches are formed at convergent boundaries where one tectonic plate subducts beneath another.

• Geological Activity: These regions are prone to volcanic eruptions, earthquakes, and tsunamis due to intense tectonic activity.

• Exploration: The exploration of ocean trenches provides critical data on earth’s crust, marine biodiversity, and climate change.

• Research Importance: These trenches are studied for their geophysical and ecological importance, contributing to advancements in earth sciences.

Q12. Answer: (b) Shilpa Gupta

The correct answer is Shilpa Gupta.

Key Points

• Shilpa Gupta is a renowned contemporary Indian artist known for her interdisciplinary work that spans mediums such as installations, videos, sculptures, and interactive art.

• She received the prestigious Asia Arts Pathbreaker Award at the 2025 Asia Arts Game Changer Awards for her outstanding contribution to contemporary art.

• Her art often explores themes of identity, human rights, borders, and freedom of expression, making her a significant voice in the global art community.

• Gupta's work has been displayed in several global platforms, including Biennales such as the Venice Biennale and the Kochi-Muziris Biennale, as well as at major art institutions worldwide.

• Her innovative and thought-provoking art resonates with audiences globally, addressing complex socio-political issues through unique and engaging mediums.

Additional Information

• Asia Arts Game Changer Awards:

• This award recognizes individuals who have made significant contributions to contemporary art in Asia.

• It is organized by the Asia Society, a leading global organization dedicated to strengthening partnerships between Asia and the world.

• The award celebrates artists who have challenged conventions and pushed the boundaries of artistic expression.

• Shilpa Gupta’s Art:

• She frequently uses text, sound, and interactive elements in her works to engage audiences and provoke thought.

• Her notable works include "My East is Your West," an installation exploring the idea of borders, and "100 Hand-drawn Maps of India," which questions the rigid definitions of nations and territories.

• She is also known for her sound-based installations, which often incorporate themes of freedom and censorship.

• Other Renowned Indian Contemporary Artists:

• Bharti Kher: Known for her use of bindis and hybrid sculptures, her works explore themes of identity, femininity, and mythology.

• Anupam Sood: Famous for her intricate prints and etchings, focusing on human emotions and relationships.

• Jayeeta Chatterjee: Recognized for her abstract paintings that use vibrant colors and patterns.

• Importance of Contemporary Art:

• Contemporary art serves as a powerful medium to reflect and critique societal and political issues.

• It fosters global conversations on critical topics such as identity, migration, and climate change.

• Artists like Shilpa Gupta play a pivotal role in using art to promote understanding and dialogue across cultures.

Important Points

• The Asia Society, established in 1956, is a non-profit organization aimed at fostering mutual understanding and partnerships between Asia and the world across various disciplines, including art, culture, business, and education.

• The Asia Arts Game Changer Awards is one of the most prestigious platforms recognizing Asian artists for their transformative contributions to art and culture.

• Shilpa Gupta's work is often rooted in her experiences and observations of social, political, and cultural issues, making her a unique and essential figure in the field of contemporary art.

• Her innovative approach to art, combining traditional and modern techniques, has garnered her international acclaim.

Q13. Answer: (b) Nylon-6,6

The correct answer is Nylon-6,6.

Key Points

• Nylon-6,6 is a synthetic polymer widely used in industrial applications. It is produced by the polymerization of hexamethylenediamine and adipic acid, which are petroleum-based monomers.

• This polymer has high tensile strength, excellent resistance to wear and abrasion, and is used in products like textiles, automotive parts, and industrial components.

• Nylon-6,6 is classified as a thermoplastic material, meaning it becomes moldable at high temperatures and solidifies upon cooling, making it ideal for manufacturing purposes.

• In contrast to natural polymers like starch and cellulose, which are derived from biological sources, Nylon-6,6 is entirely synthetic, originating from chemical processes.

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• Its durability and resistance to environmental factors make it a preferred material in the production of ropes, machine parts, and even parachutes.

Additional Information

• Starch:

• Starch is a natural polymer made up of glucose monomers. It is found in plants and serves as an energy reserve.

• It is used in the food industry as a thickening agent and in biodegradable packaging but is not a synthetic polymer.

• Starch does not have the high durability or resistance required for industrial applications.

• Cellulose:

• Cellulose is another natural polymer made of glucose units and is a major component of plant cell walls.

• It is used in the production of paper, textiles, and bio-based plastics.

• While it is biodegradable and renewable, it is not considered a synthetic polymer.

• Rubber:

• Natural rubber is a polymer derived from the latex of rubber trees and is composed of isoprene monomers.

• It is widely used in making tires, gloves, and other products due to its elasticity and strength.

• However, synthetic rubbers like styrene-butadiene rubber (SBR) are also available but differ from Nylon-6,6 in terms of chemical composition and properties.

• Characteristics of Synthetic Polymers:

• Synthetic polymers like Nylon-6,6 are man-made through chemical reactions, unlike natural polymers derived from biological sources.

• They exhibit properties such as high durability, resistance to chemicals and heat, and versatility in applications.

• Examples include Nylon, polyester, and polyethylene, all of which are extensively used in industrial and commercial sectors.

Important Points

• Applications of Nylon-6,6:

• Used in textile manufacturing, such as in the production of carpets and clothing.

• Integral to engineering plastics, which are used in making gears, bearings, and automotive parts.

• Widely used in making ropes, fishing lines, and nets due to its strength and resistance to wear and tear.

• It is also applied in the aerospace industry for making lightweight and durable components.

• Advantages of Synthetic Polymers:

• They are more durable and versatile compared to natural polymers.

• Can be tailored to have specific properties like flexibility, rigidity, or thermal resistance.

• Widely used in daily life, ranging from household items to industrial machinery.

• Environmental Concerns:

• Many synthetic polymers, including Nylon-6,6, are non-biodegradable and contribute to plastic pollution.

• Efforts are being made to recycle synthetic polymers and develop biodegradable alternatives.

Q14. Answer: (d) ICF, Chennai

The correct answer is ICF, Chennai.

Key Points

• The Integral Coach Factory (ICF), Chennai, is one of the leading production units of the Indian Railways, known for manufacturing a variety of rail coaches, including modern and state-of-the-art trains.

• In September 2024, the first Vande Bharat sleeper train was unveiled at the ICF in Chennai, marking a significant milestone in the modernization of Indian Railways.

• The Vande Bharat sleeper train is an extension of the highly successful Vande Bharat Express, which is a semi-high-speed train known for its comfort, speed, and advanced features.

• This sleeper variant has been developed to cater to long-distance travelers, ensuring comfort and convenience during overnight journeys.

• The ICF, Chennai, has been instrumental in developing these advanced trains with a focus on promoting ‘Make in India’ and enhancing passenger experience.

Additional Information

• Integral Coach Factory (ICF), Chennai:

• Established in 1955, the ICF is one of the oldest coach manufacturing units of the Indian Railways.

• It has been the hub for designing and manufacturing various types of coaches, including metro coaches, luxury coaches, and high-speed trains.

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• The ICF has consistently contributed to the Indian Railways' goal of modernizing train travel in the country.

• Vande Bharat Trains:

• Also known as Train 18, Vande Bharat is India's first indigenously designed and manufactured semi-high-speed train.

• It is equipped with modern amenities like onboard Wi-Fi, GPS-based passenger information systems, bio-vacuum toilets, and automatic doors.

• The sleeper variant extends the scope of Vande Bharat trains to overnight journeys, combining high-speed travel with comfort for long-distance routes.

• Other Locations Mentioned in the Options:

• BEML Complex, Bengaluru: Known for manufacturing metro cars, defense equipment, and heavy earth-moving machinery, but not for passenger trains.

• Rail Coach Factory, Kapurthala: Another key coach manufacturing unit of Indian Railways, but it has not been involved in unveiling the Vande Bharat sleeper train.

• Metro Rail Depot, Mumbai: Primarily focuses on metro rail operations and maintenance, not related to the manufacturing or unveiling of Indian Railways' trains.

• 'Make in India' Initiative:

• The Vande Bharat trains are a part of the 'Make in India' campaign, aimed at boosting indigenous manufacturing capabilities.

• ICF, Chennai, has played a pivotal role in achieving this vision by producing high-quality coaches domestically.

Q15. Answer: (d) Nitrogen

The correct answer is Nitrogen.

Key Points

• Lassaigne's test is a qualitative analysis method used to detect the presence of specific elements, such as nitrogen, sulfur, and halogens, in organic compounds.

• The test involves fusing the organic compound with sodium metal, converting the elements into water-soluble ionic forms like sodium cyanide (NaCN), sodium sulfide (Na2S), or sodium halides.

• In the presence of nitrogen, sodium reacts with the organic compound to form sodium cyanide (NaCN), which is soluble in water.

• When the solution containing sodium cyanide is heated with iron(II) sulfate (FeSO4) and then acidified with dilute sulfuric acid, a blue-colored precipitate of Prussian blue (ferric ferrocyanide) forms, confirming the presence of nitrogen.

• The formation of Prussian blue is a characteristic test for nitrogen, and no such reaction occurs for other elements like carbon, oxygen, or hydrogen.

Additional Information

• Elements Detected in Lassaigne's Test:

• Nitrogen: Detected by the formation of Prussian blue precipitate (ferric ferrocyanide) after reaction with FeSO4 and sulfuric acid.

• Sulfur: Identified by the production of a black precipitate of lead sulfide (PbS) when the filtrate is treated with lead acetate.

• Halogens: Detected by adding silver nitrate to the filtrate after acidifying it with nitric acid; a white, yellow, or pale precipitate indicates the presence of halogens like chlorine, bromine, or iodine.

• Mechanism of Prussian Blue Formation:

• Sodium reacts with nitrogen-containing organic compounds to form sodium cyanide (NaCN).

• Iron(II) sulfate (FeSO4) reacts with NaCN to produce ferrocyanide ions ([Fe(CN)6]4−).

• Upon acidification, the ferrocyanide reacts with iron(III) ions to form ferric ferrocyanide (Fe4[Fe(CN)6]3), which appears as Prussian blue precipitate.

• Applications of Lassaigne's Test:

• Used in qualitative organic analysis to detect the presence of nitrogen, sulfur, and halogens.

• Helpful in analyzing unknown compounds in chemical research and forensic investigations.

• Specific Characteristics of Options:

• Oxygen: Oxygen is not detected by Lassaigne's test as it does not form any specific ionic compound during sodium fusion.

• Carbon: Although present in organic compounds, carbon is not specifically tested using Lassaigne's test.

• Hydrogen: Hydrogen is not identified via Lassaigne's test as its presence is inferred from the overall composition of organic compounds.

• Nitrogen: Forms NaCN during sodium fusion and is confirmed by the formation of Prussian blue precipitate.

Important Points

• Historical Context: Lassaigne's test was introduced by the French chemist Jean Louis Lassaigne in the 19th century.

• Safety Precautions: Sodium fusion must be performed with caution due to the reactive nature of sodium and the possibility of violent reactions.

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• Limitations: The test is qualitative and cannot determine the exact quantity of elements present in the compound.

Q16. Answer: (a) Industrial and economic practices

The correct answer is Industrial and economic practices.

Key Points

• Infrastructure is the backbone of any economy as it provides the basic facilities and systems needed for the functioning of an economy, including transportation, communication, utilities, and public institutions.

• The primary function of infrastructure is to support industrial and economic activities by providing essential services like power, water, transportation, and communication systems.

• Well-developed infrastructure enhances productivity, reduces production costs, and facilitates the movement of goods and services, thereby contributing to economic growth.

• Infrastructure development creates a conducive environment for businesses, attracting domestic and foreign investments, which are critical for industrialization and economic development.

• It also plays a crucial role in promoting employment opportunities, improving living standards, and fostering overall economic prosperity.

Additional Information

• Types of Infrastructure:

• Economic Infrastructure: Includes transportation systems (roads, railways, ports, airports), communication systems, energy production and distribution, and financial systems. These directly contribute to economic production and distribution activities.

• Social Infrastructure: Comprises facilities that improve quality of life such as schools, hospitals, housing, and recreational facilities. These indirectly contribute to economic growth by enhancing human capital.

• Examples of Infrastructure Projects:

• The Golden Quadrilateral Project in India, which connects major cities through highways, has significantly boosted trade and connectivity.

• The BharatNet Project aims to provide high-speed broadband connectivity to rural areas, promoting digital inclusion.

• The development of smart cities in India is an example of combining economic and social infrastructure for sustainable urban growth.

• Benefits of Infrastructure Development:

• Improves ease of doing business, leading to industrial growth.

• Enhances regional connectivity, promoting balanced economic development.

• Boosts exports by reducing logistics costs and increasing competitiveness in the global market.

• Improves living standards by providing access to healthcare, education, and clean water.

• Challenges in Infrastructure Development:

• Funding constraints: Large-scale infrastructure projects require significant investments, often posing financial challenges for governments.

• Environmental concerns: Infrastructure development, especially in ecologically sensitive areas, can lead to deforestation and habitat destruction.

• Project delays: Issues like land acquisition, regulatory approvals, and project mismanagement often delay completion.

Important Points

• Global Infrastructure Trends:

• The World Bank emphasizes the role of infrastructure in achieving sustainable development goals (SDGs), particularly for poverty reduction and economic resilience.

• According to the Global Infrastructure Outlook, an estimated investment of $94 trillion is required globally by 2040 to meet the infrastructure demand.

• Infrastructure financing has seen a rise in public-private partnerships (PPPs) to overcome resource constraints.

• Indian Government Initiatives:

• The National Infrastructure Pipeline (NIP) was launched in 2019 to improve infrastructure across sectors like energy, transport, water, and digital infrastructure with an investment of Rs. 111 lakh crore.

• The PM Gati Shakti Master Plan, launched in 2021, aims to develop multimodal connectivity infrastructure to boost logistics and economy.

• Programs like UDAN (Ude Desh ka Aam Nagrik) focus on improving regional air connectivity and making air travel affordable.

Q17. Answer: (c) Solar and wind

The correct answer is Solar and wind.

Key Points

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• India's renewable energy sector achieved a record-breaking growth of 24.5 GW in 2024, which included 3.4 GW of renewable energy generation capacity.

• This growth was primarily driven by the expansion in the solar and wind energy sectors, which are the largest contributors to India's renewable energy capacity.

• India has been aggressively expanding its solar energy sector, with initiatives like the National Solar Mission, which aims to achieve 280 GW of solar energy capacity by 2030.

• Similarly, the wind energy sector in India has seen substantial development due to its abundant wind resources, especially in states like Gujarat, Tamil Nadu, and Maharashtra.

• The Ministry of New and Renewable Energy (MNRE) is playing a critical role in policy implementation, providing subsidies, and encouraging private investment in renewable energy projects. Hence, the correct answer is Solar and Wind.

Additional Information

• Solar Energy:

• India is one of the largest markets for solar energy, with a strong focus on achieving renewable energy targets.

• The country has launched several initiatives, including the International Solar Alliance (ISA), which promotes solar energy adoption globally.

• India’s solar parks, like the Bhadla Solar Park in Rajasthan, are among the largest in the world.

• Solar energy contributes significantly to achieving India’s Nationally Determined Contributions (NDCs) under the Paris Agreement.

• Wind Energy:

• India ranks among the top five countries globally for installed wind power capacity.

• The government supports wind energy through schemes such as the Wind-Solar Hybrid Policy and National Offshore Wind Energy Policy.

• As of 2023, India’s installed wind energy capacity exceeded 43 GW, with significant projects in Tamil Nadu and Gujarat.

• Wind power is a crucial part of India’s strategy to achieve 500 GW of renewable energy capacity by 2030.

• Other Renewable Energy Sources:

• Hydropower: Contributes significantly to India’s energy mix, especially in the northern and northeastern regions.

• Biomass: Used in rural areas for cooking and heating and is also being tapped for electricity generation.

• Tidal and Geothermal Energy: These are emerging energy sources but have limited contribution compared to solar and wind energy.

• Government Policies and Initiatives:

• The National Renewable Energy Policy promotes renewable energy sources, particularly solar and wind.

• Subsidies and tax benefits are provided to encourage private investment in the renewable energy sector.

• The Green Energy Corridor Project aims to integrate renewable energy into the national grid.

Important Points

• India's Renewable Energy Targets:

• India aims to achieve 500 GW of non-fossil fuel energy capacity by 2030, contributing significantly to its climate action goals.

• The focus is on reducing greenhouse gas emissions intensity by 33-35% by 2030 from 2005 levels.

• Private Sector Participation:

• India has attracted major investments from companies like Adani Green Energy, Tata Power Solar, and Suzlon Energy in renewable energy projects.

• The government provides incentives such as renewable energy certificates (RECs) and generation-based incentives to encourage private-sector participation.

• Global Recognition:

• India is recognized as a global leader in renewable energy and is a founding member of the International Solar Alliance (ISA).

• The country’s renewable energy initiatives are considered a model for other developing nations aiming to transition to clean energy.

Q18. Answer: (a) Measles

The correct answer is Measles.

Key Points

• Measles is caused by a virus known as the Measles virus, which belongs to the Paramyxoviridae family. It is highly contagious and spreads through respiratory droplets.

• The symptoms of measles include fever, cough, runny nose, inflamed eyes, and a distinctive red rash that starts on the face and spreads to the rest of the body.

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• Measles can lead to complications such as pneumonia, encephalitis, and even death, especially in children and individuals with weakened immune systems.

• Vaccination is the most effective way to prevent measles. The Measles, Mumps, and Rubella (MMR) vaccine is commonly administered to protect against measles.

• Efforts by the World Health Organization (WHO) and national health bodies aim to eradicate measles through vaccination campaigns worldwide.

Additional Information

• Tuberculosis (TB):

• Tuberculosis is caused by the bacterium Mycobacterium tuberculosis, not a virus.

• It primarily affects the lungs but can also impact other parts of the body.

• It spreads through airborne droplets when an infected person coughs or sneezes.

• Treatment includes a long-term course of antibiotics such as rifampin and isoniazid.

• Malaria:

• Malaria is caused by Plasmodium parasites, which are transmitted to humans through the bite of infected female Anopheles mosquitoes.

• Symptoms include fever, chills, and flu-like illness.

• It is treated using antimalarial medications like chloroquine and artemisinin-based combination therapies (ACTs).

• Cholera:

• Cholera is caused by the bacterium Vibrio cholerae, not a virus.

• It is usually spread through contaminated food or water, leading to severe diarrhea and dehydration.

• Immediate treatment includes oral rehydration salts (ORS) and, in severe cases, intravenous fluids and antibiotics.

• Measles – Additional Facts:

• Measles is one of the leading causes of death among young children globally, despite the availability of a safe and effective vaccine.

• The WHO aims to achieve a 95% vaccination rate to establish herd immunity and prevent outbreaks.

• According to the WHO, over 23 million deaths were prevented by measles vaccination between 2000 and 2018.

Important Points

• The measles virus is highly contagious and can remain viable for up to two hours in the air or on surfaces.

• Measles outbreaks are often linked to low vaccination coverage. Achieving herd immunity is critical to prevent the spread of the disease.

• In 2019, there was a significant increase in measles cases worldwide, with over 200,000 deaths reported, mostly in children under 5 years old.

• Vaccination campaigns such as the Measles & Rubella Initiative aim to reduce measles-related mortality and achieve global eradication.

Q19. Answer: (c) It is created by a special Act, has independent legal status and can be sued.

The correct answer is It is created by a special Act, has independent legal status and can be sued..

Key Points

• Statutory Corporations are distinct legal entities created by a specific Act of Parliament or State Legislature. These Acts define their powers, functions, and responsibilities, ensuring their independent status.

• They have independent legal status, separate from the government, which means they can enter into contracts, sue, and be sued in their own name. This characteristic is crucial for their operational autonomy.

• Examples include the State Bank of India (SBI), Life Insurance Corporation of India (LIC), and the Airports Authority of India. Each of these entities operates under specific legislation governing their establishment and functioning.

• These corporations are owned and controlled by the government, and their primary objective is to provide public services rather than profit maximization.

• Unlike other government departments, their employees are not considered regular civil servants. Instead, their employment terms are governed by the provisions of the specific Act under which they are established.

Additional Information

• Distinctive Features of Statutory Corporations:

• Statutory corporations are established by legislation, which provides them with a specific mandate and autonomy.

• They are wholly or partially funded by the government but operate independently in terms of management and decision-making.

• They are responsible for carrying out specific functions, such as financial services (e.g., SBI), insurance (e.g., LIC), or infrastructure development (e.g., Airports Authority of India).

• Comparison with Other Entities:

• Government Departments: Operate directly under the government and do not have separate legal status. Their employees are civil servants.

• Private Corporations: Owned by private shareholders, focus on profit maximization, and operate without government funding or direct control.

• Public Sector Undertakings (PSUs): These may not be statutory corporations but are government-owned companies registered under the Companies Act.

• Examples in India:

• Life Insurance Corporation (LIC): Established by the LIC Act, 1956, it provides life insurance services and operates independently.

• State Bank of India (SBI): Governed by the SBI Act, 1955, it serves as a major banking institution in India.

• Airports Authority of India: Responsible for managing airports and air navigation services, established under the Airports Authority of India Act, 1994.

• Legal Framework:

• Every statutory corporation is governed by a special Act, which outlines its structure, powers, and functions.

• Employees of these corporations are subject to employment rules specified in the Act, not general civil service rules.

• They are subject to audits and oversight to ensure public accountability while maintaining operational autonomy.

Important Points

• Key Legal Characteristics:

• Independent Legal Status: Enables statutory corporations to enter into contracts, own assets, and sue or be sued.

• Government Ownership: While owned by the government, they operate independently and are not treated as direct government entities.

• Established by Legislation: Their powers and responsibilities are clearly defined by the Act under which they are formed.

• Examples of Statutory Corporations Globally:

• In the UK, the BBC operates as a statutory corporation under the Royal Charter.

• In the US, entities like the Tennessee Valley Authority function similarly to statutory corporations.

• Historical Context in India:

• Statutory corporations became prominent post-Independence as tools for economic and industrial development.

• They were established to undertake functions that private entities might not prioritize due to low profitability but were crucial for public welfare.

Q20. Answer: (a) Hungary

The correct answer is Hungary.

Key Points

• Greece's women's team achieved a historic victory by defeating Hungary in the final to win the gold medal at the 2025 World Aquatics World Cup.

• This marks the first gold medal victory for Greece's women's team in the World Aquatics World Cup, showcasing their dominance in the sport.

• Hungary is known for its strong tradition and performance in aquatic sports, making this victory even more significant for Greece.

• The World Aquatics World Cup is a highly competitive event, with top teams from around the globe participating in various disciplines such as swimming, water polo, and diving.

• Greece's victory reflects their strategic gameplay, excellent teamwork, and rigorous preparation leading up to the tournament.

Additional Information

• World Aquatics World Cup:

• The World Aquatics World Cup is an international competition organized by the World Aquatics Federation, formerly known as FINA.

• The event includes multiple disciplines such as swimming, diving, water polo, and artistic swimming, attracting elite athletes globally.

• The 2025 edition showcased intense competition among top teams, with Greece and Hungary being standout performers in the women's water polo category.

• This tournament serves as a platform for nations to compete and demonstrate their strength in aquatic sports.

• Hungary in Aquatic Sports:

• Hungary has a rich history of excellence in aquatic sports, particularly in water polo.

• The country has won multiple gold medals in international competitions, establishing itself as a powerhouse in the sport.

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• Hungary's women's water polo team is known for its aggressive playing style, tactical brilliance, and experienced players.
• Their defeat by Greece in the 2025 World Cup final highlights the latter's remarkable progress and performance.
• Greece's Journey to Victory:
• Greece's women's water polo team has shown consistent improvement in recent years, culminating in their historic win at the 2025 World Aquatics World Cup.
• The team benefited from robust coaching, rigorous training, and a strong team spirit.
• This achievement is expected to boost the popularity of water polo in Greece and inspire a new generation of athletes.
• The victory has placed Greece firmly on the map as a rising force in aquatic sports.

Important Points

• Water Polo:
• Water polo is a team water sport that combines elements of swimming, soccer, and basketball.
• It is played in a pool, with teams consisting of seven players each (six field players and one goalkeeper).
• The objective is to score goals by throwing the ball into the opposing team's net.
• Water polo requires stamina, agility, teamwork, and strategic planning.
• Impact of Greece's Win:
• Greece's victory in the 2025 World Aquatics World Cup is a milestone in the country's sports history.
• It highlights the team's growth, determination, and ability to compete against established teams like Hungary.
• The win is expected to encourage greater investment in aquatic sports infrastructure in Greece.
• It serves as an inspiration for upcoming athletes and boosts national pride.

Q21. Answer: (d) Inclusion of sentiments

The correct answer is Inclusion of sentiments.

Key Points

• Classical Indian drama is characterized by its integration of sentiments and emotions, known as "Rasa." It is a central theme in Indian aesthetics and art forms.
• The Natya Shastra, written by Bharata, is the foundational text on Indian drama and performing arts. It emphasizes the importance of eliciting nine Rasas, such as love, humor, anger, and heroism, to create a profound emotional connection with the audience.
• Unlike Western drama, which often focuses heavily on either comedy or tragedy, Indian classical drama incorporates various emotional elements to engage the audience on multiple levels.
• It is not limited to a single aspect of performance such as dance or comedy; rather, it combines acting, music, dance, and dialogue seamlessly to portray human emotions and relationships.
• The use of elaborate costumes and makeup is also a defining feature of classical Indian drama, enhancing the visual and emotional impact of the performance.

Additional Information

• Rasa Theory:
• The concept of Rasa was introduced by Bharata in the Natya Shastra.
• There are nine Rasas: Shringara (love), Hasya (humor), Karuna (compassion), Raudra (anger), Veera (valor), Bhayanaka (fear), Bibhatsa (disgust), Adbhuta (wonder), and Shanta (peace).
• The goal of classical Indian drama is to evoke these Rasas in the audience, creating a profound emotional and spiritual experience.
• Role of Music and Dance:
• Music and dance are integral to classical Indian drama. They not only enhance the narrative but also communicate emotions and moods effectively.
• In many traditional performances, the actors sing and dance while enacting the story, making the performance a multi-dimensional art form.
• Costumes and Makeup:
• Classical Indian drama often involves the use of elaborate costumes and intricate makeup to represent different characters and their emotions vividly.
• For example, in Kathakali, the makeup and costumes are so elaborate that they become an art form in themselves, helping to convey the essence of the character.
• Forms of Classical Indian Drama:
• Some of the famous forms of classical Indian drama include Kutiyattam from Kerala, Yakshagana from Karnataka, and Bhavai from Gujarat.

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• These forms are deeply rooted in the cultural and religious traditions of India and often depict stories from Indian epics like the Ramayana and Mahabharata.

• Historical Context:

• Classical Indian drama dates back to ancient India and is believed to have originated around 200 BCE to 200 CE.

• It was performed in various settings, from royal courts to public spaces, and played a significant role in disseminating moral and social messages.

Important Points

• Natya Shastra: The Natya Shastra is an ancient Indian treatise on performing arts, attributed to the sage Bharata. It is considered the foundation of classical Indian drama, dance, and music.

• Sentiments (Rasas): Classical Indian drama focuses on the integration of nine sentiments, which are essential to creating an emotional connection with the audience.

• Key Features: Integration of acting, dance, music, and dialogue; elaborate costumes and makeup; and the portrayal of human emotions and divine themes.

Q22. Answer: (c) Andhra Pradesh

The correct answer is Andhra Pradesh.

Key Points

• Andhra Pradesh has announced plans to establish India's first Quantum Computing Village by the year 2025.

• The aim of this project is to promote research and development in quantum computing technology and establish India as a global hub for quantum technology and innovation.

• This initiative is expected to attract investments, create job opportunities, and contribute to the development of a knowledge-based economy in Andhra Pradesh.

• The project aligns with the Government of India's focus on fostering cutting-edge technology and innovation as part of its Digital India and Atmanirbhar Bharat (Self-Reliant India) missions.

• The village will offer facilities such as research labs, collaboration spaces, and training centers for students, researchers, and entrepreneurs working in quantum computing and related fields.

Additional Information

• Quantum Computing:

• Quantum computing is an advanced field of computing that uses principles of quantum mechanics, such as superposition and entanglement, to perform calculations much faster than classical computers.

• It has applications in areas like cryptography, artificial intelligence, materials science, and optimization problems.

• Leading global tech companies like IBM, Google, and Microsoft are actively investing in quantum computing research.

• India's Quantum Mission:

• The Indian government launched the National Quantum Mission in 2023, with an outlay of Rs. 6,000 crore, to boost research and development in quantum technologies.

• The mission aims to make India a global leader in quantum technologies by 2031.

• It includes objectives such as developing quantum computers, quantum communication systems, and quantum sensing technologies.

• Role of Andhra Pradesh in Technology:

• Andhra Pradesh has been a frontrunner in adopting and promoting advanced technologies, with initiatives like Fintech Valley Vizag and collaborations with global tech companies.

• The state government has also launched policies to support startups and foster innovation, such as the Andhra Pradesh Innovation and Startup Policy.

• The establishment of the Quantum Computing Village further strengthens Andhra Pradesh's position as a hub for technology and innovation.

• Global Quantum Computing Initiatives:

• Countries like the United States, China, and Germany are leading in quantum computing research and development.

• The European Union has launched the Quantum Flagship Program with a budget of €1 billion to advance quantum technologies.

• China has developed a 66-qubit quantum computer called "Zuchongzhi", which is one of the most advanced quantum computers in the world.

Q23. Answer: (d) Reliance Industries Limited

The correct answer is Reliance Industries Limited.

Key Points

• Reliance Industries Limited (RIL) ranked second in the Future Brand Index 2024, showcasing its global recognition and

leadership in the business world.

• The Future Brand Index evaluates the world's top companies based on their market capitalization and assesses their overall brand strength, leadership, innovation, and sustainability.

• Reliance Industries Limited is a multinational conglomerate company headquartered in Mumbai, India. It operates in various sectors such as energy, petrochemicals, textiles, retail, telecommunications, and more.

• The company is led by Mukesh Ambani, one of the richest individuals globally, and has consistently been recognized for its contribution to innovation and economic development in India and globally.

• Other Indian companies, such as Tata Consultancy Services (TCS) and Hindustan Unilever Limited (HUL), are also highly ranked, but RIL secured the second position in this global index.

Additional Information

• Reliance Industries Limited (RIL):

• Founded by Dhirubhai Ambani in 1966, RIL is one of the largest Indian conglomerates.

• The company is engaged in various industries, including oil refining, petrochemicals, retail, telecommunications, and digital services.

• RIL is the first Indian company to cross the $200 billion market capitalization mark.

• Its subsidiary, Reliance Jio, revolutionized the telecommunications sector in India by introducing affordable data plans and driving digital transformation.

• FutureBrand Index:

• The FutureBrand Index is an annual global brand perception study that reorders PwC's Global Top 100 Companies by Market Capitalization on perception strength rather than financial strength.

• It evaluates how companies perform across attributes such as purpose, innovation, trust, individuality, and authenticity.

• This index provides valuable insights into how the world's leading companies are perceived by the public and stakeholders.

• Tata Consultancy Services (TCS):

• TCS is a global leader in IT services, consulting, and business solutions headquartered in India.

• It is one of the largest Indian companies by market capitalization and a major contributor to India's IT sector.

• It has a presence in over 46 countries and is known for its extensive services across industries like banking, healthcare, and technology.

• Hindustan Unilever Limited (HUL):

• HUL is one of the largest fast-moving consumer goods (FMCG) companies in India.

• It offers products in categories like personal care, home care, and food & beverages.

• HUL has a history of over 80 years in India and continues to be a market leader in various segments.

Important Points

• Key Developments for Reliance Industries Limited:

• RIL has been investing heavily in green energy and aims to become a net-zero carbon company by 2035.

• Its telecom arm, Jio, has disrupted the market with affordable data plans, becoming the largest mobile network operator in India.

• RIL's retail arm, Reliance Retail, is one of the largest and most profitable retail businesses in India, offering a wide range of consumer goods.

• In 2020, RIL made significant progress in its digital services with investments from global giants like Facebook and Google.

Q24. Answer: (a) Damodar Valley Project

The correct answer is Damodar Valley Project.

Key Points

• The Damodar Valley Project was developed in collaboration with the Tennessee Valley Authority (TVA), USA, which served as an inspiration for its design and functioning.

• Established in 1948, the Damodar Valley Corporation (DVC) aimed to control floods, provide irrigation, and generate hydroelectric power along the Damodar River, often referred to as the "River of Sorrows" due to frequent flooding.

• The project spans Jharkhand and West Bengal, covering the Damodar Basin and adjoining areas, promoting industrial and agricultural growth in these regions.

• The collaboration with TVA guided the DVC in implementing a multi-purpose river valley development model, including hydroelectric power generation, flood control, irrigation systems, and afforestation.

• It introduced several dams such as Tilaya, Maithon, Panchet, Konar, and Durgapur Barrage, contributing significantly to flood management and energy generation.

• The Damodar Valley Project was one of India's earliest and most ambitious attempts to replicate the success of river valley development projects worldwide.

Additional Information

• Tennessee Valley Authority (TVA):

• The TVA was established in 1933 under President Franklin D. Roosevelt's New Deal to foster economic development in the Tennessee Valley region of the USA.

• It focused on flood control, hydroelectric power generation, navigation improvements, and regional development.

• The TVA model showcased how river management could be utilized for economic and social development, inspiring projects like the Damodar Valley Project.

• The success of TVA demonstrated the importance of multi-purpose river valley projects in developing countries.

• Damodar River:

• The Damodar River flows through Jharkhand and West Bengal.

• Previously known as the "River of Sorrows," it caused severe flooding, affecting agriculture and livelihood in its basin.

• With the implementation of the Damodar Valley Project, the river was transformed into a resource for hydroelectric power, irrigation, and flood control.

• Benefits of the Damodar Valley Project:

• Provides irrigation facilities to agricultural fields in Jharkhand and West Bengal, enhancing food production.

• Generates hydroelectric power, supporting industrialization in the region.

• Controls floods that previously caused widespread devastation.

• Promotes afforestation and environmental conservation along the river basin.

• Other River Valley Projects in India:

• Nagarjuna Sagar Project: Located on the Krishna River in Andhra Pradesh and Telangana, primarily for irrigation and power generation.

• Bhakra Nangal Project: Built on the Sutlej River in Punjab and Himachal Pradesh, it is India's largest dam and a significant source of power and irrigation.

• Tehri Project: Situated on the Bhagirathi River in Uttarakhand, it provides hydroelectric power, irrigation, and drinking water supply.

Important Points

• Historical Significance:

• The Damodar Valley Project was one of India’s first large-scale river valley development projects, marking the beginning of multi-purpose dam construction in the country.

• Its establishment in 1948 set a precedent for similar projects aimed at addressing flooding, irrigation, and power generation needs.

• Economic Impact:

• Boosted industrial growth in Jharkhand and West Bengal due to reliable power supply.

• Improved agricultural productivity through enhanced irrigation facilities.

• Environmental Impact:

• Focused on afforestation to reduce soil erosion and improve ecological balance.

• Contributed to sustainable development through integrated resource management.

Q25. Answer: (d) Right-click on the desktop and go to New Folder

The correct answer is Right-click on the desktop and go to New Folder.

Key Points

• To create a new folder on the desktop in the Windows operating system, you need to right-click on an empty area of the desktop.

• After right-clicking, a context menu will appear. From the list, hover your cursor over the option "New".

• Once you hover over "New," a secondary menu will appear. Select the "Folder" option from the list.

• A new folder will appear on the desktop with the default name "New Folder." You can immediately rename it by typing the desired name and pressing Enter.

• This method is the most common and user-friendly way to create a folder on the desktop in Windows operating systems, including Windows 10 and Windows 11.

Additional Information

• Other Methods to Create a Folder:

• You can also create a folder on the desktop by using the shortcut keys Ctrl + Shift + N. This will instantly create a new folder on the desktop with the default name "New Folder."

• Another way is through the File Explorer: Open File Explorer, navigate to the desktop folder, and right-click to select "New" > "Folder."

• Features of Folders in Windows:

• Folders are used to store and organize files and other folders (subfolders).

• Folders help users maintain a structured workspace and make it easier to locate and access files.

• Folders can also be customized by changing their names or icons, providing better visual organization.

• Incorrect Options Explained:

• Option 1: Dragging an icon from the Start Menu to the desktop creates a shortcut to the application or file. It does not create a new folder.

• Option 2: The Task Manager does not have a feature to create folders. It is mainly used to monitor system performance and manage running processes.

• Option 3: Pressing Ctrl+S is a shortcut for saving files in most applications, not for creating folders.

• Applications of Folders:

• Organizing work files, such as documents, presentations, spreadsheets, and other project materials.

• Storing multimedia files like images, videos, and audio in specific categories for ease of access.

• Grouping applications or shortcuts for quick access, such as creating a folder for frequently used software on the desktop.

Important Points

• Windows Versions: The steps to create a folder may vary slightly depending on the version of Windows, but the described method is consistent across Windows 7, Windows 8, Windows 10, and Windows 11.

• Shortcut Tips: Using Ctrl + Shift + N is a faster method to create folders, especially for users who prefer keyboard shortcuts over using the mouse.

• Customization: Folders in Windows can be customized by assigning unique names, colors, or even setting custom folder icons for identification purposes.

• File Management: Effective use of folders can significantly improve productivity and reduce the time spent searching for files on your system.

Q26. Answer: (b) Inclusion of Muslim women and all sects on boards

The correct answer is Inclusion of Muslim women and all sects on boards.

Key Points

• The Waqf (Amendment) Act, 2025 introduces measures to enhance inclusivity and diversity within Waqf Boards.

• One of the primary features of the amendment is the inclusion of Muslim women and members from all sects in the composition of Waqf Boards.

• This amendment aims to provide equal representation and participation of all sections of the Muslim community, ensuring gender equality and inclusiveness in decision-making processes.

• By including women and members of diverse sects, the Act addresses historical underrepresentation and ensures that the voices of all community members are heard.

• Such inclusiveness fosters a sense of unity and ensures transparency and accountability in the administration of Waqf properties.

Additional Information

• Waqf:

• The term "Waqf" refers to a religious endowment in Islam, typically involving property or assets dedicated to religious or charitable purposes.

• Waqf properties are managed by Waqf Boards, which are statutory bodies established under the Waqf Act.

• The primary purpose of Waqf properties is to serve the socio-economic and religious needs of the Muslim community.

• Waqf Boards:

• Waqf Boards are responsible for managing and overseeing Waqf properties, ensuring they are used for the benefit of the community.

• They function under the provisions of the Waqf Act, 1995, which was amended in 2013 and now again in 2025.

• The boards consist of members from various sections of the Muslim community, including religious scholars and government-nominated members.

• Other Important Amendments in the Waqf Act:

• The previous amendment in 2013 brought in significant changes, such as the establishment of a Waqf Tribunal for the resolution of disputes related to Waqf properties.

• The 2025 Amendment further strengthens the representation of marginalized groups within the Waqf Boards.

• Uniform Civil Code Guidelines:

• The Uniform Civil Code (UCC) refers to a proposal to replace personal laws of various communities with a common set of laws applicable to all citizens of India.

• It has no direct connection with the Waqf (Amendment) Act, 2025, making Option 1 incorrect.

Important Points

• Nationalisation of all Waqf Properties:

• Option 3 is incorrect, as the Waqf (Amendment) Act, 2025, does not entail the nationalization of Waqf properties. Waqf properties continue to be managed by the respective Waqf Boards.

• Abolition of Waqf Boards:

• Option 4 is also incorrect. The amendment does not abolish the Waqf Boards but instead aims to make them more inclusive and representative of the Muslim community.

Q27. Answer: (c) Paika rebellion

The correct answer is Paika Rebellion.

Key Points

• The Paika Rebellion of 1817, also known as the Paika Bidroha, was led by the Paikas, the traditional militia or foot soldiers of Odisha.

• The rebellion was primarily against the oppressive policies of the British East India Company, including heavy taxation and the loss of land rights by the Paikas.

• The leader of this rebellion was Bakshi Jagabandhu Bidyadhar, a prominent military commander of the Khurda Kingdom who played a significant role in organizing the revolt.

• Paikas served as land-owning militia under the Gajapati kings of Odisha and provided military service in return for land grants. However, the British confiscated their lands, leading to widespread discontent.

• The rebellion is considered one of the first organized uprisings against British colonial rule in India, occurring much before the First War of Indian Independence in 1857.

Additional Information

• Background of the Paika Rebellion:

• The Paikas were a hereditary warrior class who also acted as peasant militia during peacetime.

• With the advent of British rule, their land tenure system was disrupted, and they were heavily taxed, pushing them into poverty.

• The British confiscated the lands of many Paikas under the Permanent Settlement System, leaving them landless and stripping them of their traditional warrior status.

• Key Features of the Rebellion:

• The rebellion started in March 1817 and quickly spread across various parts of Odisha, including Khurda, Puri, and Cuttack.

• The Paikas attacked British officials, looted treasury offices, and burnt police stations.

• Although the rebellion was eventually suppressed, it inspired later movements against British rule in Odisha.

• Legacy of the Paika Rebellion:

• The rebellion holds a significant place in Indian history as one of the earliest revolts against British colonial oppression.

• In 2017, the Government of India recognized the Paika Rebellion as the first war of Indian independence and commemorated its 200th anniversary.

• Other Revolts for Comparison:

• Ahom Revolt: A revolt in Assam against British annexation in the early 19th century, led by the Ahom nobility.

• Wahabi Movement: An Islamic reformist movement in India during the 19th century, aimed at purifying Islam and resisting colonial rule.

• Faraizi Revolt: A religious movement in Bengal during the 19th century that later evolved into an anti-British struggle under the leadership of Haji Shariatullah and his son Dudu Miyan.

Important Points

• The Paika Rebellion was not a spontaneous uprising but a well-organized movement that involved different sections of society, including zamindars, tribal leaders, and peasants.

• The British implemented harsh retaliatory measures, including public executions and the destruction of villages, to suppress the rebellion and re-e

Q28. Answer: (b) NITI Aayog

The correct answer is NITI Aayog.

Key Points

• NITI Aayog (National Institution for Transforming India) is an executive body and not a statutory or constitutional body.

• It was established on January 1, 2015, by a resolution of the Union Cabinet, replacing the Planning Commission.

• The NITI Aayog acts as a policy think tank of the Government of India, providing strategic and technical advice.

• Unlike statutory bodies, which derive their powers from an act of Parliament, and constitutional bodies, which derive their authority from the Constitution, NITI Aayog is non-statutory and non-constitutional.

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• Its main objectives include fostering cooperative federalism, facilitating economic policy formulation, and promoting sustainable development goals (SDGs).

Additional Information

• Attorney General of India:

• The Attorney General of India is a constitutional body established under Article 76 of the Indian Constitution.

• The Attorney General serves as the chief legal advisor to the Government of India and represents the government in legal matters.

• This position is appointed by the President and is the highest law officer of the country.

• Central Information Commission (CIC):

• The CIC is a statutory body established under the Right to Information Act (RTI), 2005.

• Its role is to ensure transparency and accountability in governance by providing citizens access to information held by public authorities.

• The commission has the power to handle complaints and appeals related to RTI requests.

• National Human Rights Commission (NHRC):

• The NHRC is a statutory body established under the Protection of Human Rights Act, 1993.

• It safeguards human rights and investigates complaints of violations of these rights.

• The commission has the authority to recommend measures to improve human rights protection in the country.

• Statutory and Constitutional Bodies:

• Statutory bodies derive their authority from laws enacted by Parliament. Examples: CIC, NHRC, etc.

• Constitutional bodies derive their authority directly from the Constitution. Examples: Election Commission, Finance Commission, etc.

• Non-statutory and non-constitutional bodies, like NITI Aayog, are created by government resolutions, not by legislative acts or constitutional provisions.

Important Points

• NITI Aayog Key Features:

• It promotes cooperative federalism by fostering partnerships between the central and state governments.

• Focuses on innovation, technology upgrades, and sustainable development goals (SDGs).

• Its Governing Council includes the Prime Minister as the chairperson and Chief Ministers of all states and Union territories.

• Unlike the Planning Commission, NITI Aayog does not have the power to allocate funds. It acts as a policy advisory body.

• It has launched several initiatives such as Aspirational Districts Programme, Atal Innovation Mission, and India Innovation Index.

Q29. Answer: (c) Patna

The correct answer is Patna.

Key Points

• The Surya Kiran Aerobatic Team (SKAT) of the Indian Air Force (IAF) performed an air show in Patna in April 2025. This event was organized as a tribute to the 1857 hero Babu Kunwar Singh.

• Babu Kunwar Singh was a prominent leader during the Indian Rebellion of 1857. He is celebrated for his courageous leadership in the fight against British colonial rule.

• Patna, being the capital city of Bihar, holds significant historical and cultural importance, making it an ideal location for such a tribute.

• The Indian Air Force's Surya Kiran team is known for its precision aerobatic performances, showcasing India's air power and paying homage to national heroes.

• This event was part of efforts to commemorate and honor freedom fighters who played a pivotal role in India's independence struggle.

Additional Information

• Babu Kunwar Singh:

• He was a zamindar of Jagdishpur (now in Bihar) and one of the most notable leaders of the 1857 uprising.

• Despite being in his 80s, he actively fought against the British East India Company and is remembered for his valor and tactics.

• He is considered a symbol of resistance and patriotism in Indian history.

• Surya Kiran Aerobatic Team:

• The Surya Kiran team is the aerobatic demonstration team of the Indian Air Force, formed in 1996.

• They primarily use Hawk Mk-132 aircraft, known for their speed, agility, and precision.

• The team performs complex aerial maneuvers, showcasing the skill and discipline of the IAF.

• Their motto is "Sadaiv Sarvottam" (Always the Best).

• Significance of Patna:

• Patna is the capital city of Bihar and one of the oldest continuously inhabited cities in the world.

• The city has been a center of culture, learning, and political activity since ancient times.

• It is associated with historical figures like Chandragupta Maurya, Ashoka, and Guru Gobind Singh.

• Indian Rebellion of 1857:

• It was India's first large-scale uprising against British rule, often referred to as the First War of Independence.

• Leaders like Babu Kunwar Singh, Rani Lakshmibai, Tantia Tope, and others played key roles in the revolt.

• The rebellion marked a turning point in Indian history, leading to significant changes in British policies and governance.

Q30. Answer: (b) Munda uprising

The correct answer is Munda uprising.

Key Points

• The Munda uprising was a tribal rebellion led by Birsa Munda, a revered tribal leader from the region of Ranchi in present-day Jharkhand.

• The rebellion began as a religious movement in the late 19th century and later evolved into a struggle against colonial policies, specifically those concerning land settlement, moneylenders, and forest contractors.

• Birsa Munda, also known as Dharti Abba (Father of the Earth), mobilized the Munda tribal community to fight against the oppressive British administration and the exploitative practices of landlords and moneylenders.

• The rebellion was aimed at reclaiming the rights of the tribal people to their land and resources, which were being seized under the British Zamindari system.

• Though the uprising was eventually suppressed by the British in 1900, it played a crucial role in inspiring tribal resistance movements and contributed to the tribal identity and independence struggle in India.

Additional Information

• Birsa Munda:

• He was born on 15 November 1875 in Ulihatu, now in Jharkhand.

• Birsa Munda envisioned a golden age called "Ulgulan" or the Great Rebellion, where tribals would live in harmony, free from oppression.

• He emphasized the importance of tribal identity and culture while rejecting the exploitative practices of the colonial and feudal systems.

• Causes of Munda Rebellion:

• The introduction of the Zamindari system by the British led to the loss of traditional tribal lands.

• Moneylenders, landlords, and forest contractors exploited the Munda community, leading to extreme poverty and injustice.

• The erosion of tribal customs and culture due to the influence of missionaries and colonial administration further fueled discontent.

• Legacy of the Munda Uprising:

• Though short-lived, the rebellion highlighted the plight of tribal communities under the British regime.

• Birsa Munda became a symbol of tribal resistance and empowerment, and his contributions are celebrated to this day.

• The state of Jharkhand recognizes his legacy, and 15 November is celebrated as "Birsa Munda Jayanti".

• Details of Other Options:

• Kuka Rebellion: It was a Sikh uprising against British colonial rule, led by the Namdhari sect in Punjab during the 1870s.

• Sannyasi Revolt: This revolt occurred in Bengal in the late 18th century, where Sannyasis (Hindu ascetics) fought against the British due to religious restrictions and economic exploitation.

• Wahabi Movement: A revivalist Islamic movement in India during the 19th century, aimed at purifying Islam and resisting British colonial influence.

Important Points

• Historical Significance: The Munda Rebellion was among the most significant tribal uprisings in colonial India, demonstrating the agency and resistance of indigenous communities against systemic oppression.

• Birsa Munda's Death: He died on 9 June 1900 in Ranchi Jail under mysterious circumstances, making him a martyr for the tribal cause.

• Impact on Tribal Policies: The uprising forced the British to introduce the Chotanagpur Tenancy Act, 1908, which aimed to protect tribal lands from being transferred to non-tribals.

• Recognition: Birsa Munda is commemorated across India, especially in tribal-dominated regions, as a freedom fighter and social reformer.

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Q31. Answer: (c) Twenty-Sixth Amendment Act, 1971

The correct answer is Twenty-Sixth Amendment Act, 1971.

Key Points

• The Twenty-Sixth Amendment Act, 1971 abolished the privy purse and privileges of the former rulers of princely states in India.

• The privy purse was a payment made to the rulers of princely states as part of their agreement to integrate into the Indian Union after independence.

• The amendment removed Article 291 and Article 362 of the Indian Constitution, which guaranteed privy purses and privileges to the former rulers.

• The abolition was justified on grounds of maintaining equality and ending the feudal system that was inconsistent with the democratic framework of India.

• This amendment was introduced by the government of Prime Minister Indira Gandhi, reflecting her commitment to social equity and democratic principles.

Additional Information

• Privy Purse System:

• The privy purse was introduced as part of the Instrument of Accession signed by princely states during the process of India's integration post-independence.

• The payments were intended to compensate the rulers for their loss of ruling rights and provide them with financial stability.

• The amount varied based on the size and income of the princely state; some received payments in lakhs, while others received higher sums.

• Articles Removed:

• Article 291: Guaranteed payment of privy purses to the rulers of princely states.

• Article 362: Ensured the recognition of the rulers' rights and privileges.

• Historical Context:

• The abolition of privy purses was a contentious issue, leading to debates over whether it violated the agreements made during accession.

• The Supreme Court initially ruled against the abolition, but the government later passed the Twenty-Sixth Amendment to enforce it.

• This step was part of Indira Gandhi's broader efforts to reduce inequality and feudal structures.

• Impact:

• The abolition of privy purses marked the end of special privileges for the former rulers, ensuring greater equality among citizens.

• It also strengthened the democratic framework by removing remnants of monarchy and feudalism.

• This move aligned with the principles of a socialist state as envisioned in the Indian Constitution.

Important Points

• Key Constitutional Amendments:

• The Twenty-Fourth Amendment Act, 1971: Empowered Parliament to amend any part of the Constitution, including Fundamental Rights.

• The Twenty-Fifth Amendment Act, 1971: Restricted the right to property by introducing the concept of "Directive Principles of State Policy" taking precedence over Fundamental Rights.

• The Thirty-First Amendment Act, 1972: Increased the maximum number of Lok Sabha seats from 525 to 545.

• The Twenty-Sixth Amendment Act, 1971: Abolished privy purses and privileges, ensuring equality among citizens.

• Indira Gandhi's Reforms:

• Indira Gandhi's tenure as Prime Minister was marked by significant reforms aimed at reducing inequality and promoting social justice.

• The abolition of privy purses was part of her broader agenda to build a socialist and democratic India.

• Other notable reforms included bank nationalization and land ceiling laws.

• Debates and Controversies:

• The abolition of privy purses faced resistance from the former rulers and certain political groups.

• It raised questions about the sanctity of agreements made during accession and whether they could be overridden by constitutional amendments.

• Despite the opposition, the amendment was widely hailed as a progressive step towards equality and democracy.

Q32. Answer: (a) Zydus Lifesciences Limited

The correct answer is Zydus Lifesciences Limited.

Key Points

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• Shri Pankaj R Patel, a notable figure in the Indian pharmaceutical industry, was the Chairman of Zydus Lifesciences Limited as of April 2025.

• He is recognized for his invaluable contributions to the pharmaceutical sector, earning the prestigious Padma Bhushan award in 2025, highlighting his significant impact in healthcare and industry advancements.

• Zydus Lifesciences Limited, formerly known as Cadila Healthcare, is one of India's leading pharmaceutical companies, headquartered in Ahmedabad, Gujarat.

• Zydus Lifesciences is known for its innovative approach in pharmaceuticals, specializing in the development of generic drugs, biologics, and biosimilars.

• The company has played a pivotal role in improving access to affordable medicines and fostering healthcare solutions both in India and globally.

Additional Information

• Zydus Lifesciences Limited:

• Founded in 1952, Zydus Lifesciences is one of the oldest pharmaceutical companies in India.

• The company is engaged in manufacturing a wide range of products, including vaccines, APIs (Active Pharmaceutical Ingredients), generic drugs, and consumer healthcare products.

• Zydus has a strong presence in domestic and international markets, operating in over 50 countries worldwide.

• The company has been actively involved in research and development, particularly in the fields of oncology, cardiology, and infectious diseases.

• Shri Pankaj R Patel:

• Pankaj R Patel is a well-known industrialist and the driving force behind Zydus Lifesciences Limited.

• He has been instrumental in steering Zydus Lifesciences towards innovation and global recognition.

• His leadership has earned the company multiple awards, including recognition for its COVID-19 vaccine development efforts.

• Patel's achievements in the pharmaceutical sector led to his recognition with the Padma Bhushan award in 2025, one of India's highest civilian honors.

• Other Major Indian Pharmaceutical Companies:

• Dr. Reddy's Laboratories: Founded in 1984, it is headquartered in Hyderabad and specializes in generic formulations and API manufacturing.

• Sun Pharmaceutical Industries: Established in 1983, it is one of the largest pharmaceutical companies in India, focusing on specialty generics.

• Cipla: Established in 1935, Cipla is renowned for its contributions to respiratory and anti-retroviral therapies.

Important Points

• Pharmaceutical Industry in India:

• India is the world's largest provider of generic medicines, accounting for approximately 20% of global exports.

• The pharmaceutical sector contributes significantly to India's GDP and exports, with a market size of over USD 50 billion.

• India has a robust regulatory framework for drug manufacturing and distribution, ensuring quality standards.

• Recognition and Awards:

• The Padma Bhushan award is India's third-highest civilian honor and is awarded for distinguished service of high order.

• Shri Pankaj R Patel's receipt of this award underscores his exceptional contributions to healthcare and the pharmaceutical industry.

Q33. Answer: (c) Doldrums

The correct answer is Doldrums.

Key Points

• The Doldrums is a region near the equator characterized by a low-pressure belt that encircles the Earth.

• This region is also referred to as the Intertropical Convergence Zone (ITCZ), where the trade winds of both hemispheres converge.

• The Doldrums are typically located between approximately 5 degrees north and 5 degrees south of the equator.

• Due to intense solar heating at the equator, air rises rapidly, resulting in low atmospheric pressure and calm winds or light and variable winds.

• The Doldrums are known for their unpredictable weather, which includes sudden thunderstorms and heavy rainfall caused by the rising warm, moist air.

Additional Information

• Polar Front:

• The Polar Front is the boundary or interface between the cold polar air masses and the warm tropical air masses.

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• It is typically located at approximately 50° to 60° latitude in both hemispheres.

• It is associated with the development of mid-latitude cyclones and is not related to the equatorial low-pressure belt.

• Horse Latitudes:

• The Horse Latitudes are subtropical regions located around 30° north and south of the equator.

• These regions are characterized by calm winds and little precipitation.

• The term "Horse Latitudes" is believed to have originated during the age of sailing ships, where ships would often get stuck in these calm areas.

• Doldrums:

• The Doldrums are a low-pressure area around the equator where trade winds converge, creating a calm and windless zone.

• The term "doldrums" also refers to a state of inactivity or stagnation, derived from the calm and sluggish conditions in this region.

• This region is of crucial importance for global weather patterns and ocean currents.

• Trade Wind Belt:

• The Trade Wind Belt is located between 0° and 30° latitude in both hemispheres.

• Trade winds are persistent easterly winds that flow from the subtropical high-pressure belts towards the equatorial low-pressure zone.

• These winds played a vital role in early transoceanic trade and navigation.

Important Points

• Climatic Impact of Doldrums:

• Due to the intense heating at the equator, warm air rises, leading to the formation of cumulonimbus clouds and frequent rainstorms.

• The Doldrums play a critical role in the global climate system and are a major contributor to the Hadley Cell circulation.

• Navigation Challenges:

• Historically, the Doldrums were feared by sailors due to their calm winds, which could leave ships stranded for days.

• Advancements in modern technology have helped mitigate these challenges in maritime and air navigation.

Q34. Answer: (a) Minnesota

The correct answer is Minnesota.

Key Points

• The 'Connect India 2025' event was organized by the Indian association I AM in the United States.

• This event was aimed at bringing together partner organizations from various sectors to collaborate and strengthen their networks for the benefit of the Indian community abroad.

• The correct location of the event was Minnesota, a state in the United States known for hosting a vibrant Indian diaspora and being a hub for such international events.

• The event emphasized fostering connections and partnerships in diverse areas like technology, education, healthcare, and business to strengthen ties between India and the Indian diaspora in the United States.

• Minnesota has a significant Indian-American population and has hosted numerous cultural and business events focused on India's development and global partnerships.

Additional Information

• I AM (Indian Association of Minnesota):

• I AM is an Indian community organization based in Minnesota, USA, that works to promote Indian culture and foster collaboration among Indian-Americans and other communities.

• The association organizes events, cultural programs, and business summits to build stronger ties between India and the United States.

• Significance of Minnesota:

• Minnesota is known for its robust economy and diverse industries, including healthcare, education, and technology, making it an ideal location for events like 'Connect India 2025'.

• The state has a growing Indian-American community actively involved in cultural, educational, and professional domains.

• Focus of 'Connect India 2025':

• The event aimed to bring together stakeholders from multiple sectors, such as technology, healthcare, education, and entrepreneurship, to explore opportunities for collaboration.

• It also aimed to enhance the cultural and economic ties between India and the Indian diaspora in the United States.

• Other U.S. States Mentioned:

• California: While California has a significant Indian population and hosts numerous cultural events, it was not the venue for 'Connect India 2025'.

• New York: Known for its vibrant Indian-American community, New York regularly hosts Indian cultural and business events, but it was not the location for this specific event.

• Texas: Texas has a growing Indian community and is a hub for technology and business, but it was also not the venue for 'Connect India 2025'.

Q35. Answer: (b) Jharkhand and Chhattisgarh

The correct answer is Jharkhand and Chhattisgarh.

Key Points

• The Fifth Schedule of the Indian Constitution pertains to the administration and control of Scheduled Areas and Scheduled Tribes in specific states of India.

• The states that come under the Fifth Schedule include Andhra Pradesh, Telangana, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, and Rajasthan.

• Jharkhand and Chhattisgarh are among the states with designated Scheduled Areas under the Fifth Schedule. These regions have a significant tribal population, and special provisions are made to protect their rights and socio-economic interests.

• The Fifth Schedule provides for the establishment of a Tribes Advisory Council (TAC) in each of these states to advise on issues relating to the welfare and advancement of Scheduled Tribes.

• The purpose of the Fifth Schedule is to ensure self-governance and safeguard the cultural and economic interests of the Scheduled Tribes in these areas.

Additional Information

• Fifth Schedule:

• The Fifth Schedule is provided in Article 244(1) of the Indian Constitution.

• It deals with the administration and control of Scheduled Areas and Scheduled Tribes in specific states other than the states of Assam, Meghalaya, Tripura, and Mizoram, which are covered under the Sixth Schedule.

• The President has the power to declare an area as a Scheduled Area or remove an area from the Scheduled Areas list.

• These areas are identified for special governance due to their large tribal population and their unique socio-economic conditions.

• Scheduled Tribes:

• Scheduled Tribes (STs) are communities that are explicitly recognized in the Constitution of India under Article 342.

• These tribes are provided with special rights and privileges to help them overcome socio-economic and educational disadvantages.

• The government implements various welfare schemes and development programs for the upliftment of Scheduled Tribes.

• Tribes Advisory Council (TAC):

• As per the Fifth Schedule, each state having Scheduled Areas must establish a Tribes Advisory Council (TAC).

• The TAC advises the Governor on matters related to the welfare and advancement of Scheduled Tribes in the state.

• The Governor has the authority to frame rules for the better governance of Scheduled Areas, following the advice of the TAC.

• Difference Between Fifth and Sixth Schedules:

• The Fifth Schedule applies to ten states, including Jharkhand and Chhattisgarh, while the Sixth Schedule applies to states in the northeastern region such as Assam, Meghalaya, Tripura, and Mizoram.

• The Sixth Schedule provides for Autonomous District Councils (ADCs) with legislative, executive, and judicial powers, while the Fifth Schedule emphasizes the role of the Governor and TAC.

Important Points

• Jharkhand:

• Jharkhand was formed in 2000 by bifurcating it from Bihar.

• The state has a significant population of Scheduled Tribes like Santhal, Oraon, Munda, Ho, etc.

• It has several Scheduled Areas as per the Fifth Schedule to ensure the welfare of tribal communities.

• Chhattisgarh:

• Chhattisgarh was also formed in 2000 by carving it out of Madhya Pradesh.

• It is home to tribes like Gond, Baiga, Halba, and others.

• The state has a large number of Scheduled Areas under the Fifth Schedule for safeguarding tribal interests.

• Other States under Fifth Schedule:

• States like Odisha, Madhya Pradesh, Maharashtra, and Rajasthan also have Scheduled Areas.

• These areas are designated based on the high tribal population, economic backwardness, and lack of adequate infrastructure.

• Constitutional Safeguards:

• The Constitution empowers the Parliament to make laws for the protection of tribal interests in Scheduled Areas.

• Panchayats (Extension to Scheduled Areas) Act, 1996 (PESA) is an important legislation for the self-governance of tribal

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communities in Scheduled Areas.

Q36. Answer: (d) National e-Vidhan Application (NeVA)

The correct answer is National e-Vidhan Application (NeVA).

Key Points

• National e-Vidhan Application (NeVA) is a mission-mode project initiated by the Ministry of Parliamentary Affairs to promote paperless functioning of State and Union Territory Legislatures in India.

• It aims to transform legislative proceedings into a digital, environment-friendly format by reducing the use of paper, thereby contributing to sustainable governance.

• The implementation of NeVA enables legislators to access all relevant legislative documents such as agenda, bills, notifications, and reports through electronic devices like tablets or laptops.

• NeVA is aligned with the broader vision of Digital India to improve transparency, efficiency, and accessibility in governance.

• This application ensures real-time availability of legislative data and allows seamless integration of the operations of legislatures across India.

Additional Information

• Features of NeVA:

• NeVA provides a cloud-based solution for the digitalization of legislative proceedings.

• It facilitates online communication between legislators and government officials, enhancing efficiency in decision-making.

• Legislators can use NeVA to search and retrieve archived documents for reference during proceedings.

• The application supports multilingual functionality, making it accessible across India’s diverse linguistic landscape.

• Digital India Mission:

• Launched in 2015, the Digital India initiative aims to transform India into a digitally empowered society and knowledge economy.

• It encompasses various projects like e-Governance, e-Kranti, and BharatNet for improving digital infrastructure and delivering services electronically.

• e-Parliament:

• The e-Parliament initiative focuses on modernizing parliamentary systems by integrating digital tools.

• It primarily aims at making parliamentary operations more transparent and efficient, but its scope is limited compared to NeVA, which targets both state and UT legislatures.

• Environmental Impact:

• NeVA significantly reduces the usage of paper in legislative proceedings, making it an eco-friendly initiative.

• It aligns with global efforts to promote sustainability and reduce carbon footprints in governance.

Important Points

• Implementation:

• NeVA is being implemented in a phased manner across various states and union territories under the guidance of the Ministry of Parliamentary Affairs.

• The application has gained traction in states like Himachal Pradesh, which became the first state to adopt NeVA for conducting legislative proceedings.

• Benefits:

• NeVA enhances legislative efficiency by providing quick access to legislative content and reducing procedural delays.

• It promotes transparency by making legislative information available to the public in digital formats.

• Challenges:

• The implementation of NeVA requires extensive digital infrastructure and training for legislators to adapt to the new system.

• Some states face difficulties in transitioning due to technical and financial constraints.

Q37. Answer: (c) Shunga Dynasty

The correct answer is Shunga Dynasty.

Key Points

• Pushyamitra Shunga was the founder of the Shunga Dynasty. He overthrew the Mauryan Empire by assassinating the last Mauryan ruler, Brihadratha, during a military parade.

• The Shunga Dynasty was established in approximately 185 BCE and lasted until 73 BCE.

• Pushyamitra Shunga was a military general under the Mauryan ruler Brihadratha and later became the ruler by staging a coup. He declared himself king and established the Shunga Dynasty.

• The Shunga Dynasty ruled over a significant part of Northern and Central India, including the regions of Magadha, Pataliputra, and Ujjain.

• While the Shungas succeeded the Mauryan Empire, their reign was marked by a revival of Brahmanical traditions, as opposed to the Buddhist ideals supported by the Mauryas.

Additional Information

• The Shunga Dynasty:

• The Shunga Dynasty was a Brahmin dynasty that emphasized the revival of Vedic culture and traditions.

• The dynasty ruled for around 112 years, with Pataliputra as its capital.

• Pushyamitra Shunga was succeeded by his son, Agnimitra, who was known for being a patron of arts and culture.

• During the Shunga period, there was significant patronage of art and architecture, including the development of stupas and chaityas like the Great Stupa at Sanchi.

• Decline of the Mauryan Empire:

• The Mauryan Empire, founded by Chandragupta Maurya, began to decline after the death of Ashoka in 232 BCE.

• The empire weakened due to internal conflicts, administrative inefficiency, and the lack of strong successors to Ashoka.

• Brihadratha, the last Mauryan emperor, was considered weak and unable to manage the vast Mauryan territory effectively.

• Comparison with Other Dynasties:

• Kanva Dynasty: The Kanva Dynasty succeeded the Shunga Dynasty around 73 BCE. It was a short-lived dynasty that ruled for approximately 45 years.

• Satavahana Dynasty: This dynasty ruled in the Deccan region from around 230 BCE to 220 CE. They were contemporaries of the Shungas and were known for promoting trade and culture in South India.

• Gupta Dynasty: The Gupta Empire, established much later in 319 CE, marked the golden age of Indian culture, science, and art.

• Important Contributions of the Shunga Period:

• Art and architecture flourished, with significant contributions to Buddhist stupas and Hindu temples.

• The Shungas contributed to the development of Sanskrit literature and promoted Brahmanical traditions.

• The dynasty played a significant role in resisting invasions by foreign powers, such as the Indo-Greeks.

Important Points

• The Shunga Dynasty's establishment marked the decline of the Mauryan Empire and the beginning of a new era in ancient Indian history.

• Pushyamitra Shunga was known for his military prowess and efforts to strengthen Brahmanical traditions.

• The Shungas played a crucial role in preserving Indian cultural and political identity during a time of significant external pressures.

• Their reign saw the continuation of both Hinduism and Buddhism, with notable contributions to religious art and architecture.

Q38. Answer: (c) Administrative facility

The correct answer is Administrative facility.

Key Points

• The Partition of Bengal was announced on 20th July 1905 by the then Viceroy of India, Lord Curzon, and came into effect on 16th October 1905.

• The British justified the partition on the grounds of administrative convenience, stating that Bengal, which was the largest province of British India, was becoming too large to be administered efficiently. Hence, administrative facility was cited as the reason for the partition.

• Before the partition, Bengal had a population of over 78 million, making it difficult for the British administration to manage effectively.

• The partition divided Bengal into two regions: Eastern Bengal and Assam, with a Muslim majority, and Western Bengal, which had a Hindu majority.

• The move sparked widespread opposition, particularly from the Hindus in Bengal, who saw the partition as an attempt to divide and weaken Indian nationalism. Hence, the partition was perceived as politically motivated rather than merely administrative.

• The opposition to the partition led to the Swadeshi Movement, where Indians boycotted British goods and promoted indigenous products.

Additional Information

• Partition of Bengal – Key Details:

• The partition was carried out to create two provinces: Eastern Bengal and Assam (capital: Dhaka) and Western Bengal (capital: Calcutta).

• It was seen as a deliberate attempt by the British to create religious divisions between Hindus and Muslims and weaken the growing Indian nationalist movement.

• Lord Curzon, the architect of the partition, argued that it would improve administrative efficiency, but many believed the real intent was to curb the influence of educated Hindus who were prominent in Bengal's politics.

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• Swadeshi Movement:

• The opposition to the partition led to the launch of the Swadeshi Movement, where Indians boycotted British goods and encouraged the use of indigenous products.

• It also involved protests, public meetings, and the promotion of national education and Indian industries.

• The movement spread across the country and became a precursor to the later phases of the Indian independence struggle.

• Revocation of Partition:

• Due to widespread protests and the failure to suppress the nationalist movement, the British government decided to revoke the partition in 1911.

• Bengal was reunited, and the capital of British India was shifted from Calcutta to Delhi.

• Other Options Explained:

• Economic prosperity: The partition was not aimed at economic prosperity but rather at dividing the population based on religion.

• Religious harmony: Instead of promoting harmony, the partition created tensions between Hindus and Muslims.

• Spread of education: The partition had no direct link to the spread of education and was instead seen as a move to suppress the influence of educated Bengali Hindus.

Important Points

• Lord Curzon:

• He served as the Viceroy of India from 1899 to 1905.

• He was known for his imperial policies and controversial decisions, including the Partition of Bengal.

• Significance of the Partition:

• The Partition of Bengal marked the beginning of large-scale nationalist movements in India.

• It highlighted the British strategy of divide and rule and strengthened the resolve of Indian leaders to fight for independence.

• Legacy:

• The partition set the tone for the communal divide in India, the effects of which are still felt today.

• It also emphasized the importance of unity in the Indian independence movement.

Q39. Answer: (b) 10° N parallel

The correct answer is 10° N parallel.

Key Points

• The Andaman and Nicobar Islands are separated by the 10° N parallel, which divides the two groups of islands geographically.

• The Andaman Islands lie to the north of the 10° N parallel, while the Nicobar Islands are situated to the south of this line.

• The 10° N parallel acts as a natural geographical marker between these two island groups, emphasizing their distinct environmental and socio-cultural characteristics.

• The separation also influences the flora, fauna, and climatic conditions between the two island groups, making each unique in its biodiversity.

• This division is significant in terms of administration, as the Andaman Islands and Nicobar Islands are managed collectively as a union territory but maintain distinct identities.

Additional Information

• Geographical Features:

• The Andaman and Nicobar Islands consist of over 500 islands, of which only a few are inhabited.

• The islands are located in the Bay of Bengal, close to Southeast Asia, making them strategically important.

• They are known for their pristine beaches, coral reefs, and rich biodiversity.

• Climate and Biodiversity:

• The islands experience a tropical climate with heavy rainfall during the monsoon season.

• Both the Andaman and Nicobar Islands host endemic species of plants and animals, including rare species like the Andaman wild pig and the Nicobar pigeon.

• Cultural and Ethnic Diversity:

• The islands are home to several indigenous tribes, including the Great Andamanese, Onges, Sentinelese, and Shompens.

• These tribes have distinct cultures, languages, and traditions, often living in isolation from the modern world.

• Strategic Importance:

• The islands are of strategic importance to India due to their location near international shipping lanes and proximity to Southeast Asia.

• India has established a strong military presence on the islands to safeguard its maritime interests.

Important Points

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• 10° Channel:

• The 10° Channel is the water body that lies along the 10° N parallel and separates the Andaman Islands from the Nicobar Islands.

• It is approximately 150 km wide and plays a crucial role in shipping and navigation.

• Historical Significance:

• The islands were historically used as a penal settlement by the British during colonial times, with the famous Cellular Jail located in Port Blair.

• The islands were also occupied by the Japanese during World War II, adding to their historical importance.

• Tourism:

• The Andaman and Nicobar Islands are a major tourist destination, attracting visitors with attractions like Radhanagar Beach, Havelock Island, and Neil Island.

• Activities such as scuba diving, snorkeling, and trekking are popular among tourists.

Q40. Answer: (a) Chalukyas

The correct answer is Chalukyas.

Key Points

• The Virupaksha Temple located at Pattadakal, Karnataka, was built during the 8th century CE under the rule of the Chalukyas of Badami.

• This temple was commissioned by Queen Lokamahadevi, the consort of King Vikramaditya II, to commemorate his victory over the Pallavas of Kanchipuram.

• The Virupaksha Temple is dedicated to Lord Shiva and is renowned for its Dravidian architecture, integrated with elements of Nagara style.

• Pattadakal, known as the "City of Crown Rubies," was the ceremonial capital of the Chalukya dynasty, where kings were crowned and temples were constructed to showcase their power and devotion.

• The temple is part of the UNESCO World Heritage Site group at Pattadakal, which includes several other significant monuments.

Additional Information

• The Chalukya Dynasty:

• The Chalukyas were a prominent South Indian dynasty that ruled between the 6th and 12th centuries CE.

• Their empire was divided into three distinct branches: the Badami Chalukyas, the Eastern Chalukyas, and the Kalyani Chalukyas.

• Their contributions to Indian art and architecture, particularly in Karnataka, are highly significant.

• Pattadakal Group of Monuments:

• The Pattadakal monuments are a blend of Dravidian (Southern) and Nagara (Northern) architectural styles, symbolizing the cultural exchange during the Chalukya era.

• The site includes 10 major temples, with the Virupaksha Temple being the largest and most intricately designed.

• Other notable temples at Pattadakal include the Mallikarjuna Temple, the Papanatha Temple, and the Sangameshwara Temple.

• Architectural Features of Virupaksha Temple:

• The temple features a sanctum (garbhagriha), a mandapa (pillared hall), and an ornate vimana (tower).

• It has intricately carved depictions of Hindu deities and epics, such as the Ramayana and Mahabharata, on its walls and pillars.

• The temple also has a Nandi mandapa, housing a statue of Nandi, the sacred bull of Lord Shiva.

• Other Dynasties Mentioned:

• Vardhanas: This dynasty, under rulers like Harshavardhana, was prominent in Northern India during the 7th century CE. However, they were not involved in the construction of the Virupaksha Temple.

• Vakatakas: They were a Central Indian dynasty (3rd–5th centuries CE) known for their patronage of the Ajanta Caves but had no connection to Pattadakal.

• Pallavas: A South Indian dynasty that rivaled the Chalukyas, they are known for their magnificent rock-cut temples at Mahabalipuram, not Pattadakal.

Important Points

• UNESCO World Heritage Site: The Pattadakal monuments were inscribed as a UNESCO World Heritage Site in 1987 due to their architectural and historical significance.

• Chalukya Architecture: The Chalukyas introduced a unique architectural style that combined elements of North and South Indian temple designs, influencing later dynasties such as the Hoysalas.

• Significance of Virupaksha Temple: It served not only as a place of worship but also as a symbol of Chalukyan power and artistic excellence.

• King Vikramaditya II: He was one of the most powerful rulers of the Chalukya dynasty and is celebrated for his military victories

and cultural contributions.

Q41. Answer: (c) 920

Shortcut Trick

In a no profit no loss transaction, the absolute loss amount on the first item equals the absolute profit amount on the second.

Ratio of CP1 to CP2 = Profit% on 2nd : Loss% on 1st = 23 : 7

Total CP parts = 23 + 7 = 30 parts → Rs. 1200

Value of 1 part = 1200 ÷ 30 = Rs. 40

CP of the first frock = 23 parts × Rs. 40 = Rs. 920

Therefore The correct answer is Rs. 920.

Alternate Method

Given:

Total Cost Price (CP) of two frocks = Rs. 1200

Loss on the first frock = 7%

Profit on the second frock = 23%

Net overall profit or loss = 0%

Method Used:

We can use the Alligation method to find the ratio of their Cost Prices directly.

−7%

Frock 1 (Loss)

+23%

Frock 2 (Profit)

0%

Net Effect

23

7

CP Ratio = 23 : 7

Calculations:

Let the Cost Price of the first frock be x and the second frock be y.

=> Total CP = x + y = 1200

Since there is no net profit or loss, the loss on the first frock exactly equals the profit on the second frock.

=> 7% of x = 23% of y

=> (7 ÷ 100) × x = (23 ÷ 100) × y

=> 7x = 23y

=> x ÷ y = 23 ÷ 7

=> The ratio of their cost prices is 23 : 7

=> Total parts in the ratio = 23 + 7 = 30 parts

=> 30 parts = 1200

=> 1 part = 1200 ÷ 30 = 40

=> Cost price of the first frock (x) = 23 parts = 23 × 40 = 920

Therefore The correct answer is Rs. 920.

Additional Information

No Profit No Loss Principle

When a complete transaction yields overall zero profit and zero loss, the absolute loss incurred on the first item perfectly offsets the absolute profit gained on the second item. Thus, Loss Amount = Profit Amount.

Alligation on Profit and Loss

Alligation can be effectively applied on profit (+%) and loss (−%) rates. The middle value represents the net percent change. The ratio found at the bottom always denotes the ratio of the base quantities, which in this case is their Cost Prices (CP).

Basic Profit and Loss Formulae

Selling Price (SP) = CP × (100 + Profit%) ÷ 100

Selling Price (SP) = CP × (100 − Loss%) ÷ 100

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Q42. Answer: (d) 1/2

Shortcut Trick

Put θ = 45° to quickly evaluate the given trigonometric expression.

Numerator = (1/√2)^6 + (1/√2)^6 + 3 × (1/√2)² × (1/√2)² = 1/8 + 1/8 + 3/4 = 1

Denominator = csc 45° × sec 45° × [(sin 45° + cos 45°)² − 1] = √2 × √2 × [(√2)² − 1] = 2 × 1 = 2

Result = Numerator ÷ Denominator = 1/2

Therefore The correct answer is 1/2.

Alternate Method

Given:

Expression = (cos^6 θ + sin^6 θ + 3 sin² θ cos² θ) ÷ [csc θ sec θ ((sin θ + cos θ)² − 1)]

Formula Used:

=> a³ + b³ = (a + b)³ − 3ab(a + b)

=> sin² θ + cos² θ = 1

Calculations:

=> Let us first simplify the numerator:

=> Numerator = (cos² θ)³ + (sin² θ)³ + 3 sin² θ cos² θ

=> Numerator = (cos² θ + sin² θ)³ − 3 cos² θ sin² θ (cos² θ + sin² θ) + 3 sin² θ cos² θ

=> Substituting sin² θ + cos² θ = 1:

=> Numerator = (1)³ − 3 cos² θ sin² θ (1) + 3 sin² θ cos² θ

=> Numerator = 1 − 3 sin² θ cos² θ + 3 sin² θ cos² θ = 1

=> Now, let us simplify the denominator:

=> Denominator = csc θ sec θ [(sin² θ + cos² θ + 2 sin θ cos θ) − 1]

=> Denominator = (1 ÷ (sin θ cos θ)) × [(1 + 2 sin θ cos θ) − 1]

=> Denominator = (1 ÷ (sin θ cos θ)) × 2 sin θ cos θ = 2

=> Final Expression = Numerator ÷ Denominator = 1/2

Therefore The correct answer is 1/2.

Additional Information

Pythagorean Identities

Fundamental identities include sin² θ + cos² θ = 1, sec² θ − tan² θ = 1, and csc² θ − cot² θ = 1.

Algebraic Identities in Trigonometry

A widely used identity is a³ + b³ = (a + b)³ − 3ab(a + b). It simplifies sin^6 θ + cos^6 θ into 1 − 3 sin² θ cos² θ.

Reciprocal and Quotient Relations

We know that csc θ = 1 ÷ sin θ, sec θ = 1 ÷ cos θ, and tan θ = sin θ ÷ cos θ. These formulas help easily convert complex structures into primary trigonometric forms.

Q43. Answer: (c) 45 km/hr

Shortcut Trick

Since the train length (distance) is constant, relative speed is inversely proportional to the time taken.

Time ratio = 13.5 : 15 = 135 : 150 = 9 : 10

Relative speed ratio = 10 : 9

Let the relative speeds be 10x and 9x. The difference is 1x = 12.6 − 9 = 3.6 km/hr.

Relative speed with the 1st person = 10 × 3.6 = 36 km/hr.

Train speed = 36 + 9 = 45 km/hr.

Therefore The correct answer is 45 km/hr.

Alternate Method

Train, V km/hr

P1

9 km/hr

t = 13.5 s

Train, V km/hr

P2

12.6 km/hr

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t = 15 s

Given:

Speed of the 1st person = 9 km/hr

Speed of the 2nd person = 12.6 km/hr

Time taken to cross 1st person (t1) = 13.5 sec

Time taken to cross 2nd person (t2) = 15 sec

Formula Used:

Distance = Relative Speed × Time

When bodies move in the same direction, Relative Speed = V1 − V2

Calculations:

Let the speed of the train be V km/hr and its length be L.

Since the train crosses both moving persons, the distance covered equals its own length L in both cases.

=> Relative speed for 1st person = (V − 9) km/hr

=> Relative speed for 2nd person = (V − 12.6) km/hr

Equating the length of the train (Distance = Speed × Time) for both cases:

=> (V − 9) × 13.5 = (V − 12.6) × 15

(Note: The conversion factor from km/hr to m/s cancels out entirely from both sides)

=> 13.5V − (9 × 13.5) = 15V − (12.6 × 15)

=> 13.5V − 121.5 = 15V − 189

=> 15V − 13.5V = 189 − 121.5

=> 1.5V = 67.5

=> V = 67.5 ÷ 1.5 = 45 km/hr

Therefore The correct answer is 45 km/hr.

Additional Information

Relative Speed

When two objects move in the same direction, their relative speed is the difference of their individual speeds (S1 − S2). If they move in opposite directions, it is the sum of their speeds (S1 + S2).

Train Crossing a Person or Pole

When a train crosses a stationary or moving person, pole, or point object, the total distance covered is strictly equal to the length of the train itself.

Speed Conversions

To convert a speed from km/hr to m/s, simply multiply the value by 5/18. Conversely, to convert m/s back to km/hr, multiply by 18/5.

Q44. Answer: (d) 1024π cm²

Shortcut Trick

Surface area of a sphere = 4 × π × r²

=> Surface area = 4 × π × 16²

=> 4 × π × 256 = 1024π

Therefore The correct answer is 1024π cm².

Alternate Method

r = 16 cm

Surface Area = 4πr²

Given:

Radius of the sphere (r) = 16 cm

Formula Used:

Surface Area of a sphere = 4πr²

Calculations:

=> Surface Area = 4 × π × (16)²

=> Surface Area = 4 × π × 256

=> Surface Area = 1024π cm²

Therefore The correct answer is 1024π cm².

Additional Information

Volume of a Sphere

The amount of space occupied by a sphere is given by the formula: Volume = (4 ÷ 3) × π × r^3.

Curved Surface Area of a Hemisphere

When a sphere is cut into two equal halves, the curved surface area of one half is: CSA = 2 × π × r^2.

Total Surface Area of a Hemisphere

The total surface area includes the curved surface and the flat circular base: TSA = 3 × π × r^2.

Q45. Answer: (b) 11

Shortcut Trick

Apply the divisibility rule for 11 directly.

Sum of odd position digits (from right) = 3 + 7 + 7 + 7 + 7 = 31

Sum of even position digits (from right) = 2 + 9 + 5 + 4 = 20

Difference = 31 − 20 = 11 (which is a multiple of 11)

Therefore The correct answer is 11.

Alternate Method

Given:

Number = 747579723

Method Used:

We test the divisibility of the given number by checking the rules for each option.

=> Divisibility by 8: The last three digits are 723. Since 723 is an odd number, it is not divisible by 8.

=> Divisibility by 9: The sum of all digits is 7 + 4 + 7 + 5 + 7 + 9 + 7 + 2 + 3 = 51. Since 51 is not a multiple of 9, the number is not divisible by 9.

=> Divisibility by 11: The difference between the sum of digits at odd places and even places must be 0 or a multiple of 11.

=> Sum of odd place digits = 3 + 7 + 7 + 7 + 7 = 31

=> Sum of even place digits = 2 + 9 + 5 + 4 = 20

=> Difference = 31 − 20 = 11

=> Since the difference is 11, the given number is completely divisible by 11.

Therefore The correct answer is 11.

Additional Information

Divisibility Rule of 8

A number is divisible by 8 if its last three digits form a number that is completely divisible by 8.

Divisibility Rule of 9

A number is divisible by 9 if the sum of all its individual digits is a multiple of 9.

Divisibility Rule of 13

A number is divisible by 13 if the alternating sum of blocks of three digits from right to left is a multiple of 13.

Q46. Answer: (d) 57^(−43)

Shortcut Trick

For operations on the same base, subtract exponents for division and add exponents for multiplication.

Expression = 57^(−8 − 17 + (−18))

=> 57^(−25 − 18)

=> 57^(−43)

Therefore The correct answer is 57^(−43).

Alternate Method

Given:

Expression = 57^(−8) ÷ 57^(17) × 57^(−18)

Formula Used:

a^m ÷ a^n = a^(m − n)

a^m × a^n = a^(m + n)

Calculation:

According to the BODMAS rule, evaluate the expression from left to right for multiplication and division:

=> (57^(−8) ÷ 57^(17)) × 57^(−18)
=> 57^(−8 − 17) × 57^(−18)
=> 57^(−25) × 57^(−18)
=> 57^(−25 + (−18))
=> 57^(−43)
Therefore The correct answer is 57^(−43).
Additional Information
Negative Exponents
A negative exponent means taking the reciprocal of the base: a^(−n) = 1 ÷ a^n
Power of a Power Rule
When raising a power to another power, multiply the exponents: $(a^m)^n$ = a^(m × n)
Zero Exponent Rule
Any non-zero number raised to the power of zero is always equal to 1: a^0 = 1

Q47. Answer: (c) 80

Shortcut Trick
We know that: First Number × Second Number = HCF × LCM
Second Number = (HCF × LCM) ÷ First Number
Second Number = (16 × 240) ÷ 48
Second Number = 240 ÷ 3 = 80
Therefore The correct answer is 80.
Alternate Method
Given:
HCF = 16
LCM = 240
One number = 48
Formula Used:
Product of two numbers = HCF × LCM
Calculations:
=> 48 × Other Number = 16 × 240
=> Other Number = (16 × 240) ÷ 48
=> Other Number = 240 ÷ 3
=> Other Number = 80
Therefore The correct answer is 80.
Additional Information
Relation between HCF and LCM
The product of any two given numbers is always equal to the product of their HCF and LCM. (A × B = HCF × LCM)
Co-prime Numbers
Two numbers are considered co-prime if their highest common factor (HCF) is 1. The LCM of two co-prime numbers is exactly equal to their product.
Fractions Rule
LCM of fractions = (LCM of Numerators) ÷ (HCF of Denominators)
HCF of fractions = (HCF of Numerators) ÷ (LCM of Denominators)

Q48. Answer: (a) 30% loss

Shortcut Trick
Given: 40 × SP = 28 × CP
Ratio of SP to CP => SP / CP = 28 / 40 = 7 / 10
Let CP = 10 units and SP = 7 units.
Loss = CP − SP = 10 − 7 = 3 units.
Loss % = (Loss / CP) × 100 = (3 / 10) × 100 = 30%.
Therefore The correct answer is 30% loss.

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Alternate Method

Given:

Selling price of 40 books = Cost price of 28 books

Formula Used:

Loss = CP − SP

Loss % = (Loss / CP) × 100

SP (7 units)

Loss (3 units)

Total CP (10 units)

Profit / Loss Diagram

− 30%

Calculations:

=> Let the cost price (CP) of 1 book be Rs. 1.

=> Total CP of 40 books = Rs. 40.

=> Total Selling price (SP) of 40 books = CP of 28 books = Rs. 28.

=> Since SP is less than CP, there is a loss.

=> Loss on 40 books = CP − SP = 40 − 28 = Rs. 12.

=> Loss % = (Loss / Total CP) × 100

=> Loss % = (12 / 40) × 100

=> Loss % = 3 × 10 = 30%

Therefore The correct answer is 30% loss.

Additional Information

Profit and Loss Basics

Profit occurs when the Selling Price (SP) is greater than the Cost Price (CP). Profit = SP − CP. Loss occurs when CP > SP. Loss = CP − SP.

Profit/Loss Percentage Formula

Both profit and loss percentages are always calculated on the base of the Cost Price (CP) unless stated otherwise. Profit % = (Profit ÷ CP) × 100. Loss % = (Loss ÷ CP) × 100.

Dishonest Dealer Concept

If a trader sells goods at CP but uses a false weight, the actual cost price is based on the false weight given. Profit % = [Error ÷ (True Value − Error)] × 100.

Q49. Answer: (b) 55/3

Shortcut Trick

Total work = LCM(30, 22, 15) = 330 units.

Efficiency of Hema = 330 ÷ 30 = 11 units/day.

Efficiency of Hema, Raji, and Smita = 330 ÷ 15 = 22 units/day.

Efficiency of Hema and Raji = 330 ÷ 22 = 15 units/day => Smita's efficiency = 22 − 15 = 7 units/day.

Combined efficiency of Hema and Smita = 11 + 7 = 18 units/day => Time = 330 ÷ 18 = 55/3 days.

Therefore The correct answer is 55/3 days.

Alternate Method

Given:

Time taken by Hema = 30 days

Time taken by Hema and Raji = 22 days

Time taken by Hema, Raji, and Smita = 15 days

Formula Used:

Efficiency = Total Work ÷ Time taken

Person	Days	Total Work	Efficiency
Hema	30	330	11
Hema + Raji	22	15	
Hema + Raji + Smita	15	22	

Calculations:

=> Efficiency of Hema = 11 units/day

=> Efficiency of Hema + Raji = 15 units/day

=> Efficiency of Hema + Raji + Smita = 22 units/day

=> Efficiency of Smita = (Efficiency of Hema + Raji + Smita) − (Efficiency of Hema + Raji)

=> Efficiency of Smita = 22 − 15 = 7 units/day

=> Combined efficiency of Hema and Smita = 11 + 7 = 18 units/day

=> Time taken by Hema and Smita = Total Work ÷ Combined Efficiency

=> Time taken = 330 ÷ 18 = 55/3 days

Therefore The correct answer is 55/3 days.

Additional Information

Pipes & Cisterns

Similar to Time & Work. Inlet pipes have positive efficiency, and outlet pipes (leaks) have negative efficiency. Net efficiency = ∑ Inlet − ∑ Outlet.

Work & Wages

Wages are distributed in direct proportion to the amount of total work done. If people work for the exact same number of days, wages are shared in the direct ratio of their efficiencies.

Alternate Day Work

When workers work on alternate days, calculate the combined work done in a complete cycle (e.g., 2 days for 2 workers) and then find the remaining work for the next turns.

Q50. Answer: (d) 9,125

Shortcut Trick

When Simple Interest and Time are equal for two investments, the principal is distributed in the inverse ratio of their rates.

Ratio of Principal (P1 : P2) = R2 : R1 = 10 : 14 = 5 : 7.

Total ratio parts = 5 + 7 = 12.

Amount invested at 14% (P1) = (5 ÷ 12) × 21900 = 5 × 1825 = 9125.

Therefore The correct answer is Rs. 9,125.

Alternate Method

Given:

Total amount invested = Rs. 21,900

Let the amount invested at 14% be P1 and at 10% be P2.

Time (T) = 2 years

Rs. 21,900

P1 @ 14%

T = 2 yrs

P2 @ 10%

T = 2 yrs

SI1 = SI2

Formula Used:

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

Calculations:

=> Interest from first part (SI1) = (P1 × 14 × 2) ÷ 100

=> Interest from second part (SI2) = (P2 × 10 × 2) ÷ 100

Since the interest from both investments is equal after 2 years:

=> (P1 × 14 × 2) ÷ 100 = (P2 × 10 × 2) ÷ 100

=> 28 × P1 = 20 × P2

=> P1 ÷ P2 = 20 ÷ 28 = 5 ÷ 7

=> Sum of ratio parts = 5 + 7 = 12

=> Amount invested at 14% (P1) = (5 ÷ 12) × 21900

=> P1 = 5 × 1825 = 9125

Therefore The correct answer is Rs. 9,125.

Additional Information

Equal Simple Interest For Multiple Parts

If a total sum is divided into parts such that their simple interests are equal, the ratio of parts is P1 : P2 : P3 = 1 ÷ (R1T1) : 1 ÷ (R2T2) : 1 ÷ (R3T3).

Equal Amount After Simple Interest

If a sum is divided such that the amounts after simple interest are equal, the ratio of parts is 1 ÷ (100 + R1T1) : 1 ÷ (100 + R2T2).

Simple Interest Rule

Simple Interest is calculated only on the initial principal amount. Hence, it remains uniform for every year, unlike Compound Interest where interest is calculated on accumulated interest.

Q51. Answer: (d) 168

Shortcut Trick

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

Here, the total number of terms given is n = 167.

Average = 167 + 1 = 168.

Therefore The correct answer is 168.

Alternate Method

Given:

We need to find the average of the first 167 even numbers.

Formula Used:

For an Arithmetic Progression (A.P.):

Average = (First term + Last term) ÷ 2

2

1st term

4

6

...

334

167th term

168

Average

(2 + 334) ÷ 2 = 168

Calculations:

=> Total terms (n) = 167

=> First even number (a) = 2

=> 167th even number (l) = 167 × 2 = 334

=> Average = (a + l) ÷ 2

=> Average = (2 + 334) ÷ 2

=> Average = 336 ÷ 2

=> Average = 168

Therefore The correct answer is 168.

Additional Information

Average of First n Odd Numbers

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

Average of First n Natural Numbers

The average of the first n consecutive natural numbers is calculated as (n + 1) ÷ 2.

Average of an Arithmetic Progression

For any sequence with a constant difference (like even numbers, odd numbers, or multiples), the average is simply the mean of the first and last terms.

Sum of First n Even Numbers

The total sum of the first n even natural numbers is given by the formula n × (n + 1).

Q52. Answer: (b) 87°

Shortcut Trick

Based on the standard pattern for this question, BD must be perpendicular to AC (angle BDC = 90°).

In right ΔBDC, angle C = 90° − 40° = 50°.

For ΔAEC, the exterior angle at vertex E is angle AEB.

By the Exterior Angle Theorem: angle AEB = angle C + angle CAE

=> angle AEB = 50° + 37° = 87°.

Therefore The correct answer is 87°.

Alternate Method

Note: The problem statement has a common typographical omission where the perpendicular symbol (perpendicular to) was missed. BD is mathematically required to be perpendicular to AC.

Given:

=> BD perpendicular to AC => angle BDC = 90°

=> angle DBC = 40°

=> angle CAE = 37°

40° 37° ? A B C D E

Calculations:

=> In ΔBDC, the sum of all interior angles is 180°.

=> angle C = 180° − (angle BDC + angle DBC)

=> angle C = 180° − (90° + 40°) = 50°

=> In ΔAEC, the sum of all interior angles is 180°.

=> angle AEC = 180° − (angle C + angle CAE)

=> angle AEC = 180° − (50° + 37°) = 93°

=> Since B, E, and C lie on a straight line, angle AEB and angle AEC form a linear pair.

=> angle AEB + angle AEC = 180°

=> angle AEB = 180° − 93° = 87°

Therefore The correct answer is 87°.

Additional Information

Exterior Angle Theorem

The measure of an exterior angle of a triangle is always equal to the sum of the measures of its two remote interior angles. Formula: angle Exterior = angle Int1 + angle Int2.

Linear Pair Axiom

If a ray stands on a straight line, then the sum of the two adjacent angles formed is exactly 180°. These angles are supplementary.

Altitude of a Triangle

An altitude is a perpendicular line segment drawn from a vertex to the line containing the opposite side, forming a right angle (90°) with it.

Q53. Answer: (a) 9.25

Shortcut Trick

First value = 65% of 65 = 42.25 (since $65^2 = 4225$)

Second value = 3/5 of 55 = 3 × 11 = 33

Difference = 42.25 − 33 = 9.25

Therefore The correct answer is 9.25.

Alternate Method

Given:

Expression 1 = 65% of 65

Expression 2 = 3/5 of 55

Calculation:

=> Expression 1 = (65 ÷ 100) × 65

=> Expression 1 = 4225 ÷ 100 = 42.25

=> Expression 2 = (3 ÷ 5) × 55

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=> Expression 2 = 3 × 11 = 33

=> Difference = 42.25 − 33 = 9.25

Therefore The correct answer is 9.25.

Additional Information

Square of numbers ending in 5

To square a number ending in 5 like 65, multiply the tens digit (6) by the next integer (7) to get 42, and append 25 to the result. Hence, $65^2 = 4225$.

Percentage to Fraction Conversion

A percentage can be converted to a fraction by dividing by 100. For example, 65% = 65 ÷ 100 = 13/20.

BODMAS Rule

In mathematical expressions, the word 'of' indicates multiplication but is evaluated before standard multiplication or division.

Q54. Answer: (a) 875

Shortcut Trick

Let the total registered voters be V.

Valid votes = V × 92% × 80% = 0.736V

Margin = (75% − 25%) of Valid votes = 50% of 0.736V = 0.368V

=> 0.368V = 322 => V = 322 ÷ 0.368 = 875

Therefore The correct answer is 875.

Alternate Method

Given:

Percentage of registered voters who cast their ballots = 92%

Percentage of invalid votes = 20%

Winning candidate's share of valid votes = 75%

Winning margin = 322 votes

Reg: 100x

92%

−8%

Cast: 92x

80%

−20%

Valid: 73.6x

Winner: 75%

= 55.2x

Loser: 25%

= 18.4x

Margin = 55.2x − 18.4x = 36.8x = 322 → 100x = 875

Calculations:

Let the total number of registered voters be 100x.

=> Number of votes cast = 92% of 100x = 92x

=> Number of valid votes = (100% − 20%) of 92x = 80% of 92x = 73.6x

=> Votes secured by the winner = 75% of 73.6x = 55.2x

=> Votes secured by the loser = (100% − 75%) of 73.6x = 25% of 73.6x = 18.4x

=> Winning margin = Winner's votes − Loser's votes

=> Winning margin = 55.2x − 18.4x = 36.8x

According to the question,

=> 36.8x = 322

=> x = 322 ÷ 36.8 = 8.75

=> Total registered voters = 100x = 100 × 8.75 = 875

Therefore The correct answer is 875.

Additional Information

Successive Percentage

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When multiple percentages are applied sequentially, the final value is found by multiplying the base with consecutive multiplying factors: Final = Base × (1 ± x/100) × (1 ± y/100).

Election Problems Key Terms

Cast Votes: Total registered voters minus those who did not show up to vote.

Valid Votes: Total cast votes minus the invalid (rejected) votes. Win margins are strictly calculated on valid votes unless stated otherwise.

Margin of Victory

Margin percentage is simply the difference between the winner's vote percentage and the runner-up's percentage. If a winner gets X% of valid votes, the loser gets (100 − X)%, making the margin X − (100 − X) = (2X − 100)%.

Q55. Answer: (c) 9600 cm²

Shortcut Trick

Total surface area of a cube is 6 times the area of one square face.

Area of one face = 40 × 40 = 1600 cm².

Total Surface Area = 6 × 1600 = 9600 cm².

Therefore The correct answer is 9600 cm².

Alternate Method

Given:

Side of the cube (a) = 40 cm

Formula Used:

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

a = 40 cm

40 cm

40 cm

Calculations:

=> Total Surface Area = 6 × (40)²

=> Total Surface Area = 6 × 1600

=> Total Surface Area = 9600 cm²

Therefore The correct answer is 9600 cm².

Additional Information

Volume of a Cube

The volume of space enclosed by a cube is given by V = a³, where a is the side length.

Lateral Surface Area

The lateral surface area includes only the four side faces (excluding the top and bottom faces), calculated as LSA = 4a².

Diagonal of a Cube

The length of the main diagonal connecting two opposite corners of the cube is given by d = a√3.

Q56. Answer: (a) Rs. 585

Shortcut Trick

Since the time is constant, Profit Ratio = Capital Ratio = 2030 : 1700 : 1010 = 203 : 170 : 101.

Difference in ratio parts of P and R = 203 − 101 = 102 units.

Given 170 units = Rs. 975.

So, 102 units = (975 ÷ 170) × 102 = (975 ÷ 5) × 3 = 195 × 3 = Rs. 585.

Therefore The correct answer is Rs. 585.

Alternate Method

Given:

Investment by P = Rs. 2,030

Investment by Q = Rs. 1,700

Investment by R = Rs. 1,010

Q's profit share = Rs. 975

Formula Used:

When the time period of investment is the same for all partners, Profit Ratio = Investment Ratio.

203 units

P (Rs. 2,030)

170 units

Rs. 975

Q (Rs. 1,700)

101 units

R (Rs. 1,010)

Difference (P − R) = 203 − 101 = 102 units = Rs. 585

Calculations:

=> Profit ratio of P : Q : R = 2030 : 1700 : 1010

=> Simplifying by dividing by 10, Profit ratio = 203 : 170 : 101

=> Let the profit earned by P, Q, and R be 203x, 170x, and 101x respectively.

=> According to the question, Q's profit share = Rs. 975

=> 170x = 975

=> x = 975 ÷ 170

=> We need to find the difference in profits earned by P and R.

=> Difference = P's profit − R's profit

=> Difference = 203x − 101x = 102x

=> Difference = 102 × (975 ÷ 170)

=> Difference = 102 × (195 ÷ 34)

=> Difference = 3 × 195 = 585

Therefore The correct answer is Rs. 585.

Additional Information

Simple Partnership

When partners invest their capital for the same time period, the profit or loss is distributed purely in the ratio of their invested capital.

Compound Partnership

When partners invest their capital for different time periods, the overall profit ratio is the ratio of the product of their capital and their respective time periods of investment (Profit Ratio = C1T1 : C2T2).

Working vs Sleeping Partner

A working partner receives a fixed salary or a certain percentage of the total profit for actively managing the business, and the remaining profit is then distributed among all partners according to their capital investments.

Q57. Answer: (d) 18

Shortcut Trick

The third proportional to numbers a and b is given by the direct formula: $c = b^2 \div a$.

Here, the first number a = 32 and the second number b = 24.

Third proportional (x) = (24 × 24) ÷ 32

x = 576 ÷ 32 = 18

Therefore The correct answer is 18.

Alternate Method

Given:

First number (a) = 32

Second number (b) = 24

Third proportional (c) = x

Formula Used:

For a continuous proportion of three numbers: a : b :: b : c

Product of extremes = Product of means

=> a × c = b × b

32

First (a)

:

24

Second (b)
::
24
Second (b)
:
x
Third (c)
Extremes (a × c) = Means (b × b)
Calculations:
=> 32 : 24 :: 24 : x
=> 32 × x = 24 × 24
=> 32x = 576
=> x = 576 ÷ 32
=> x = 18
Therefore The correct answer is 18.
Additional Information
Fourth Proportional
For three given numbers a, b, and c, the fourth proportional d satisfies the relation a : b :: c : d, which gives d = (b × c) ÷ a.
Mean Proportional
The mean proportional between two quantities a and b is given by √(a × b). It acts as the middle term x satisfying a : x :: x : b.
Continuous Proportion
Three non-zero quantities a, b, and c are said to be in continuous proportion if the ratio of the first to the second is equal to the ratio of the second to the third (a : b = b : c).

Q58. Answer: (c) Rs. 232

Shortcut Trick
Let the original price of a pen be x and a pencil be y.
Given: 7x + 8y = 230 and 14(x − 1) + 4(y + 7) = 150.
Simplifying the second equation gives: 14x + 4y = 136 => 7x + 2y = 68.
Subtracting 7x + 2y = 68 from 7x + 8y = 230 leaves 6y = 162 => y = 27.
Substituting y = 27 in 7x + 2y = 68 yields 7x = 14 => x = 2.
Price of 8 pens and 8 pencils = 8(x + y) = 8 × (2 + 27) = 8 × 29 = 232.
Therefore The correct answer is Rs. 232.
Alternate Method
Given:
Original cost of 7 pens and 8 pencils = Rs. 230
New cost of 14 pens and 4 pencils = Rs. 150
Price change: Pen price reduced by Rs. 1, Pencil price increased by Rs. 7
7 Pens
2 Pencils
6 Pencils
= Rs. 230
7 Pens
2 Pencils
= Rs. 68
Difference: 6 Pencils = Rs. 162 → 1 Pencil = Rs. 27
7 Pens = 68 − 2(27) = 14 → 1 Pen = Rs. 2
Calculations:
=> Let the initial price of 1 pen be x and 1 pencil be y.
=> 7x + 8y = 230 ... (Equation 1)
=> For the modified quantities and prices: 14(x − 1) + 4(y + 7) = 150
=> 14x − 14 + 4y + 28 = 150

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=> 14x + 4y + 14 = 150

=> 14x + 4y = 136

=> 7x + 2y = 68 ... (Equation 2)

=> Subtracting Equation 2 from Equation 1:

=> (7x + 8y) − (7x + 2y) = 230 − 68

=> 6y = 162

=> y = 27 (Original price of 1 pencil)

=> Substituting y = 27 into Equation 2:

=> 7x + 2(27) = 68

=> 7x + 54 = 68

=> 7x = 14

=> x = 2 (Original price of 1 pen)

=> Original price of 8 pens and 8 pencils = 8x + 8y

=> 8(x + y) = 8(2 + 27)

=> 8 × 29 = 232

Therefore The correct answer is Rs. 232.

Additional Information

Linear Equations in Two Variables

An equation of the form ax + by + c = 0 where a and b are not zero. These require at least two distinct equations to find unique values for the two variables.

Elimination Method

A systematic algebraic approach where adding or subtracting the given linear equations eliminates one variable completely, allowing direct calculation of the remaining variable.

Scaling Equations

Multiplying or dividing an entire linear equation by a non-zero constant does not change its mathematical solution but can help match coefficients for simpler elimination.

Q59. Answer: (b) 3

Shortcut Trick

All prime numbers greater than 3 are of the form 6n − 1 or 6n + 1.

For the range 389 to 403, we check the multiples of 6: 390, 396, and 402.

Potential primes: (389, 391), (395, 397), and (401, 403).

Checking these numbers: 391 = 17 × 23, 395 is divisible by 5, and 403 = 13 × 31.

The remaining values 389, 397, and 401 are prime numbers.

Therefore The correct answer is 3.

Alternate Method

Given:

The range of numbers from 389 to 403.

Method Used:

To check if a number N is prime, test its divisibility by all prime numbers ≤ √N.

For N ≤ 403, the maximum prime to check is ≤ 20. Primes to check: 2, 3, 5, 7, 11, 13, 17, 19.

Calculations:

=> Even numbers and numbers ending in 5 are not prime.

=> The remaining odd numbers to check: 389, 391, 393, 397, 399, 401, 403.

=> 393 and 399 are divisible by 3 (sum of their digits is a multiple of 3). Not prime.

=> 389: Not divisible by 7, 11, 13, 17, or 19. It is prime.

=> 391: 391 ÷ 17 = 23. Not prime.

=> 397: Not divisible by 7, 11, 13, 17, or 19. It is prime.

=> 401: Not divisible by 7, 11, 13, 17, or 19. It is prime.

=> 403: 403 ÷ 13 = 31. Not prime.

=> The prime numbers in the given range are 389, 397, and 401.

Therefore The correct answer is 3.

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Additional Information

Prime Numbers

A natural number greater than 1 that has exactly two distinct positive divisors: 1 and itself.

Testing for Prime Numbers

To check if a number N is prime, test its divisibility by all prime numbers ≤ √N. If it is not divisible by any of them, N is a prime number.

6n ± 1 Rule for Primes

Every prime number greater than 3 can be expressed in the form 6n + 1 or 6n − 1, where n is a natural number. However, keep in mind that the converse is not always true (e.g., 25 is 6(4) + 1 but is not prime).

Q60. Answer: (d) Rs. 18,000

Shortcut Trick

Given condition: 2A = 9B = 6C

Find ratio A : B : C by hiding each variable's coefficient and multiplying the remaining two: (9 × 6) : (2 × 6) : (2 × 9) = 54 : 12 : 18 = 9 : 2 : 3.

Total sum of ratio parts = 9 + 2 + 3 = 14 parts.

A's share = (9 ÷ 14) × 28000 = 9 × 2000 = 18000.

Therefore The correct answer is Rs. 18,000.

Alternate Method

Given:

Total Amount = Rs. 28,000

2 times A's share = 9 times B's share = 6 times C's share

Total Amount = Rs. 28,000 (14 parts)

A: 9 parts

B: 2 parts

C: 3 parts

A's Share = ?

Calculations:

Let 2A = 9B = 6C = k

=> A = k ÷ 2, B = k ÷ 9, C = k ÷ 6

=> Ratio of their shares, A : B : C = 1/2 : 1/9 : 1/6

Multiply by the LCM of denominators (2, 9, 6) which is 18:

=> A : B : C = (1/2 × 18) : (1/9 × 18) : (1/6 × 18)

=> A : B : C = 9 : 2 : 3

=> Sum of ratio parts = 9 + 2 + 3 = 14 parts

=> 14 parts = Rs. 28,000

=> 1 part = 28000 ÷ 14 = Rs. 2,000

=> A's share (9 parts) = 9 × 2000 = Rs. 18,000

Therefore The correct answer is Rs. 18,000.

Additional Information

Dividing a Quantity in a Ratio

If a total quantity Q is divided into three parts in the ratio a : b : c, then the first part is calculated as Q × [a ÷ (a + b + c)].

Proportion Equality Rule

If pA = qB = rC, the combined ratio A : B : C is directly found by taking the reciprocals of coefficients (1/p : 1/q : 1/r) and multiplying by their LCM.

Compound Ratio

For two distinct ratios a : b and c : d, the compound ratio is calculated as ac : bd. It is widely used in successive change problems.

Q61. Answer: (d) −114x + 120

Shortcut Trick

Directly calculate the coefficient for each variable power:

Coefficient of x^2 = 3 × (5/3) − 5 × 1 = 5 − 5 = 0

Coefficient of x = 3 × (−28) − 5 × 6 = −84 − 30 = −114

Constant term = 3 × 15 − 5 × (−15) = 45 + 75 = 120

Combining these terms, we get −114x + 120.

Therefore The correct answer is −114x + 120.

Alternate Method

Given:

Expression = 3((5/3)x² − 28x + 15) − 5(x² + 6x − 15)

Calculation:

=> Expand the expression using the distributive property by multiplying the outer numbers into the brackets:

=> (3 × (5/3)x² − 3 × 28x + 3 × 15) − (5 × x² + 5 × 6x − 5 × 15)

=> (5x² − 84x + 45) − (5x² + 30x − 75)

=> Open the second bracket and invert the signs inside it:

=> 5x² − 84x + 45 − 5x² − 30x + 75

=> Group the like terms together:

=> (5x² − 5x²) + (−84x − 30x) + (45 + 75)

=> 0x² − 114x + 120

=> −114x + 120

Therefore The correct answer is −114x + 120.

Additional Information

BODMAS Rule

Simplification problems follow the sequence of Brackets, Orders (Powers and Roots), Division, Multiplication, Addition, and Subtraction.

Like Terms

In algebra, like terms are expressions that have the exact same variables and exponents, allowing their coefficients to be directly added or subtracted.

Distributive Property

Multiplying a number by a sum or difference inside brackets applies the number to every term: a(b ± c) = ab ± ac.

Q62. Answer: (b) 3,186

Shortcut Trick

Ratio of prices = 3 : 5 : 7

Since the ratios are in an arithmetic progression (+2 difference), the average is directly the middle term = 5 units.

Here, 5 units = Rs. 5,310

1 unit = 5310 ÷ 5 = Rs. 1,062

Price of the cheapest item = 3 units = 3 × 1062 = Rs. 3,186

Therefore The correct answer is Rs. 3,186.

Alternate Method

3x

Cheapest

5x

Middle

7x

Highest

Average = 5x = Rs. 5310

Given:

Average price of 3 items of furniture = Rs. 5,310

Ratio of their prices = 3 : 5 : 7

Formula Used:

Average = Sum of all observations ÷ Total number of observations

Calculation:

=> Let the actual prices of the items be 3x, 5x, and 7x respectively.

=> Sum of prices = 3x + 5x + 7x = 15x

=> Average = 15x ÷ 3 = 5x

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=> According to the question, 5x = 5310

=> x = 5310 ÷ 5

=> x = 1062

=> We need to find the price of the cheapest item, which corresponds to the smallest ratio (3x).

=> Cheapest item = 3 × 1062 = 3186

Therefore The correct answer is Rs. 3,186.

Additional Information

Average of Arithmetic Progression

If a set of numbers forms an Arithmetic Progression (i.e., the difference between consecutive terms is constant), their average is always equal to the middle term (if the number of terms is odd) or the average of the two middle terms (if even).

Ratio Multiplier

When values are given in a ratio a : b : c, they can be represented as actual quantities by multiplying each part with a common variable 'x' (i.e., ax, bx, cx).

Combined Average

If two distinct groups of sizes n1 and n2 have averages A1 and A2 respectively, the combined average of the entire group is (n1A1 + n2A2) ÷ (n1 + n2).

Q63. Answer: (d) 232/39 days

Shortcut Trick

Let Total Work = LCM of 22, 10, and 2 = 110 units.

Combined efficiency of A + B + C = 110 ÷ 2 = 55 units/day.

Efficiency of A = 110 ÷ 22 = 5 units/day.

Efficiency of B = 110 ÷ 10 = 11 units/day.

Efficiency of C = 55 − (5 + 11) = 39 units/day.

Time taken by C alone = 110 ÷ 39 = $2^{32}/39$ days.

Therefore The correct answer is $2^{32}/39$ days.

Alternate Method

Given:

Time taken by A = 22 days

Time taken by B = 10 days

Time taken by A, B and C together = 2 days

Formula Used:

Total Work = Efficiency × Time

Person	Days	Total Work	Efficiency
A	22	110	5
B	10	11	
A + B + C	2	55	

Calculations:

=> Efficiency of A + B + C = 55

=> Efficiency of A = 5

=> Efficiency of B = 11

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

=> Efficiency of C = 55 − (5 + 11)

=> Efficiency of C = 55 − 16 = 39 units/day

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

=> Time taken by C alone = 110 ÷ 39 = $2^{32}/39$ days

Therefore The correct answer is $2^{32}/39$ days.

Additional Information

Pipes & Cisterns

Works exactly like Time & Work, but filling pipes have positive efficiency and emptying pipes have negative efficiency.

Work & Wages

Wages are always distributed in the direct ratio of the total work done by each person. If the time worked is the same, wages are distributed in the ratio of their efficiencies.

Alternate Day Work

Find the total work done in a complete cycle (e.g., 2 days for 2 people). Determine how many full cycles fit into the total work and add the remaining work for the next day's turn.

Q64. Answer: (d) Rs. 582

Shortcut Trick

When the sum of two successive discounts (10% + 15%) is equal to the single discount (25%), the difference in the effective discount is directly given by (x × y) ÷ 100.

Difference in discount % = (10 × 15) ÷ 100 = 1.5%

The difference in Selling Price is simply this percentage applied to the Marked Price.

Difference = 1.5% of Rs. 38,800 = 1.5 × 388 = Rs. 582

Therefore The correct answer is Rs. 582.

Alternate Method

Given:

Marked Price (MP) = Rs. 38,800

Discount Scheme 1 = 25% single discount

Discount Scheme 2 = 10% and 15% successive discounts

Formula Used:

Effective Successive Discount = x + y − (x × y) ÷ 100

Discount Value = MP × Discount %

MP

Rs. 38,800

−25% Discount

SP 1

Rs. 29,100

−10% & −15%

SP 2

Rs. 29,682

Diff: Rs. 582

Calculations:

=> Equivalent single discount for 10% and 15% = 10 + 15 − (10 × 15) ÷ 100

=> Effective discount = 25 − 1.5 = 23.5%

=> Difference in discount percentages = 25% − 23.5% = 1.5%

=> The difference in Selling Price is equivalent to the difference in the discount amounts.

=> Difference in Selling Price = 1.5% of Rs. 38,800

=> SP Difference = (1.5 ÷ 100) × 38,800 = 1.5 × 388 = Rs. 582

Therefore The correct answer is Rs. 582.

Additional Information

Successive Discount Formula

When two discounts of x% and y% are given successively, the equivalent single discount is given by: D = [x + y − (x × y) ÷ 100]%.

Marked Price (MP) and Selling Price (SP)

The selling price is calculated after deducting the discount from the marked price: SP = MP × (100 − Discount%) ÷ 100.

Buy X Get Y Free Concept

In promotional offers, the effective discount percentage is determined by: Discount % = [Free Items ÷ Total Items] × 100.

Q65. Answer: (a) 72

Shortcut Trick

Let Ram's age be R and Ramya's age be Y.

Given: 2R − 9Y = 25 and R − 5Y = 4

Multiply the second equation by 2: 2R − 10Y = 8

Subtracting: (2R − 9Y) − (2R − 10Y) = 25 − 8 => Y = 17

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R = 5 × 17 + 4 = 89, Difference = 89 − 17 = 72.

Therefore The correct answer is 72 years.

Alternate Method

Let the age of Ram be x years and the age of Ramya be y years.

According to the first condition:

=> 2x = 9y + 25

=> 2x − 9y = 25 --- (Equation 1)

According to the second condition:

=> 5y = x − 4

=> x − 5y = 4 --- (Equation 2)

Ram (x)

89

Ramya (y)

17

Difference = 72

From Equation 2, we can write:

=> x = 5y + 4

Substitute the value of x in Equation 1:

=> 2(5y + 4) − 9y = 25

=> 10y + 8 − 9y = 25

=> y = 25 − 8

=> y = 17

Now, substitute y = 17 in x = 5y + 4:

=> x = 5 × 17 + 4

=> x = 85 + 4

=> x = 89

Difference in their ages = x − y

=> 89 − 17 = 72

Therefore The correct answer is 72 years.

Additional Information

Linear Equations in Two Variables

Equations of the form ax + by = c. Common methods to solve them include substitution, elimination, and cross-multiplication.

Age-based Problem Framework

When solving age problems, define variables for present ages. If current age is x, age n years ago is (x − n) and n years later is (x + n).

Ratio of Ages

If the ages of two persons are in the ratio a:b, their exact ages can be assumed as ax and bx for calculation purposes.

Q66. Answer: (a) Rs. 360

Shortcut Trick

Discount = 10%

Selling Price is (100 − 10)% = 90% of Marked Price.

SP = 90% of 400

SP = 0.9 × 400 = 360

Therefore The correct answer is Rs. 360.

Alternate Method

MP = Rs. 400

Discount: 10%

− Rs. 40

SP = Rs. 360

Given:

Marked Price (MP) = Rs. 400

Scheme Discount = 10%
Formula Used:
Discount Amount = MP × (Discount% ÷ 100)
Selling Price (SP) = MP − Discount Amount
Calculation:
=> Discount Amount = 400 × (10 ÷ 100)
=> Discount Amount = 400 × 0.10
=> Discount Amount = 40
=> SP = 400 − 40
=> SP = 360
Therefore The correct answer is Rs. 360.
Additional Information
Marked Price and Selling Price
Marked Price is the price printed on the article. Discount is always calculated on the Marked Price. Formula: SP = MP − Discount.
Successive Discounts
When two successive discounts of a% and b% are given, the equivalent single discount is calculated by: (a + b − (a×b)÷100)%.
Profit and Loss
Profit and Loss are always calculated on the Cost Price (CP) of the item. Profit = SP − CP, and Profit% = (Profit ÷ CP) × 100.

Q67. Answer: (a) Rs. 45

Shortcut Trick
2024 is a leap year, so the total number of days in the year is 366.
Time period = 8 days (Feb) + 31 days (Mar) + 22 days (Apr) = 61 days = 1/6 years.
SI = P × R × T ÷ 100
SI = 4000 × 6.75 × (1 ÷ 6) ÷ 100
SI = 40 × 1.125 = Rs. 45
Therefore The correct answer is Rs. 45.
Alternate Method
Given:
Principal (P) = Rs. 4,000
Rate of Interest (R) = 6.75% per annum
Time period (T) = 21 February 2024 to 22 April 2024
Formula Used:
Simple Interest (SI) = (P × R × T) ÷ 100
21 Feb
Deposit
Rs. 4000
29 Feb
31 Mar
22 Apr
Withdraw
SI = ?
8 days
31 days
22 days
Total = 61 days (1/6 year)
Rate = 6.75% p.a.
Calculations:
=> The year 2024 is divisible by 4, meaning it is a leap year with 366 days (February has 29 days).
=> Total days = (29 − 21) days in Feb + 31 days in Mar + 22 days in Apr
=> Total days = 8 + 31 + 22 = 61 days
=> Time (T) in years = 61 ÷ 366 = 1/6 years

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=> SI = (4000 × 6.75 × (1 ÷ 6)) ÷ 100

=> SI = 40 × 6.75 ÷ 6

=> SI = 40 × 1.125

=> SI = 45

Therefore The correct answer is Rs. 45.

Additional Information

Leap Year Calculation

In a leap year, the month of February has 29 days, making the total number of days in the year 366. For interest calculations, time in years (T) = Number of days ÷ 366.

Bank Day Counting Rule

When calculating simple interest on bank deposits over a specific date range, either the day of deposit or the day of withdrawal is included, but not both. Taking the exact difference in days correctly applies this rule.

Simple vs Compound Interest

Simple Interest is calculated solely on the initial principal (SI = P × R × T ÷ 100), whereas Compound Interest includes interest earned on previously accumulated interest.

Q68. Answer: (b) 3

Shortcut Trick

Observe the given values carefully, both x and y are exactly equal to 7^(0.07).

Hence, we can directly conclude that x = y.

The given equation is x^z = y^3.

Substituting y = x into the equation gives x^z = x^3.

By equating the exponents for the same base, we get z = 3.

Therefore The correct answer is 3.

Alternate Method

Given:

x = 7^(0.07)

y = 7^(0.07)

x^z = y^3

Formula Used:

Power of a power rule: $(a^m)^n = a^{(mn)}$

Calculation:

=> Substitute the values of x and y in the given expression.

=> $(7^{(0.07)})^z = (7^{(0.07)})^3$

=> Applying the formula $(a^m)^n = a^{(mn)}$ on both sides.

=> $7^{(0.07 \times z)} = 7^{(0.07 \times 3)}$

=> $7^{(0.07z)} = 7^{(0.21)}$

=> Since bases are equal and non-zero/non-one, their powers must be equal.

=> 0.07z = 0.21

=> z = 0.21 ÷ 0.07

=> z = 3

Therefore The correct answer is 3.

Additional Information

Multiplication Rule of Indices

When multiplying expressions with the same base, add their exponents: $a^m \times a^n = a^{(m+n)}$.

Power of a Power Rule

When raising a power to another power, multiply the exponents: $(a^m)^n = a^{(mn)}$.

Equality of Exponents

If two expressions with the same base are equal, then their exponents are equal: If a^x = a^y, then x = y (for a ≠ -1, 0, 1).

Division Rule of Indices

When dividing expressions with the same base, subtract their exponents: $a^m \div a^n = a^{(m-n)}$.

Q69. Answer: (c) 4.74 km

Shortcut Trick

To find the length of the bridge (distance), multiply speed by time.

Distance = Speed × Time

=> Distance = 79 km/hr × (3.6 ÷ 60) hr

=> Distance = 79 × 0.06 = 4.74 km

Therefore The correct answer is 4.74 km.

Alternate Method

Given:

Speed of the car = 79 km/hr

Time taken to cross the bridge = 3.6 minutes

Formula Used:

Distance = Speed × Time

Start

End

Speed = 79 km/hr

Time = 3.6 mins

Distance = ?

Calculations:

=> First, convert the given time from minutes to hours so that the units align with the speed.

=> Time in hours = 3.6 ÷ 60

=> Time = 0.06 hours

=> Distance = Speed × Time

=> Distance = 79 × 0.06

=> Distance = 4.74 km

Therefore The correct answer is 4.74 km.

Additional Information

Unit Conversions in Speed

To convert km/hr to m/s, multiply the speed value by 5 ÷ 18. To convert m/s to km/hr, multiply by 18 ÷ 5. Converting minutes to hours requires dividing the time value by 60.

Basic Speed Formula

Distance = Speed × Time. In problems where a train or car crosses a platform or bridge, the total distance travelled is equal to the length of the object plus the length of the vehicle (unless vehicle length is deemed negligible, as in this case).

Average Speed Concept

Average Speed is calculated as Total Distance ÷ Total Time. If a vehicle covers two equal distances at speeds a and b respectively, the average speed becomes (2ab) ÷ (a + b).

Q70. Answer: (a) 45

Shortcut Trick

First Number × Second Number = HCF × LCM

55 × Second Number = 5 × 495

Second Number = (5 × 495) ÷ 55

Second Number = 495 ÷ 11 = 45

Therefore The correct answer is 45.

Alternate Method

Given:

Highest Common Factor (HCF) = 5

Least Common Multiple (LCM) = 495

First Number (N1) = 55

Formula Used:

Product of two numbers = Product of their HCF and LCM

Product of Numbers = HCF × LCM

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Numbers
N1 = 55
N2 = ?
HCF & LCM
HCF = 5
LCM = 495
=
55 × N2 = 5 × 495
Calculations:
=> N1 × N2 = HCF × LCM
=> 55 × N2 = 5 × 495
=> N2 = (5 × 495) ÷ 55
=> N2 = 495 ÷ 11
=> N2 = 45
Therefore The correct answer is 45.
Additional Information
Product Rule for HCF & LCM
The rule N1 × N2 = HCF × LCM is strictly valid only for exactly two numbers. It cannot be extended to three or more numbers.
Co-prime Numbers
Two numbers are said to be co-prime if their HCF is 1. The LCM of two co-prime numbers is always equal to their product.
Fractions HCF & LCM
LCM of fractions = (LCM of numerators) ÷ (HCF of denominators). HCF of fractions = (HCF of numerators) ÷ (LCM of denominators).

Q71. Answer: (a) One

Given: (Left) $ \ % % # > ? > ^ # 6 5 > > 4 9 \ 6 ^ \ / (Right)
Now,
Numbers immediately preceded by a symbol and also immediately followed by a symbol.
So, Needed pattern is: Symbol - Number - Symbol.
There is 1 Number immediately preceded by a symbol and also immediately followed by a symbol.
Hence, the correct answer is 'Option 1'.

Q72. Answer: (b) 5 km towards north

Given:
Jhik starts driving from point A and drives 18 km towards the east.
Then he turns left and drives 4 km,
then he turns left and drives 21 km.
Then he turns left and drives 9 km.
He takes a final left turn and drives 3 km and stops at point P.
So, He should drive 5 km towards north to reach back at point A.
Hence, the correct answer is "Option 2".

Q73. Answer: (d) 81

Given:
Mr. Tony ranks from the top: 69th
Mr. Tony ranks from the bottom: 13th
Total Students = (Rank from Top) + (Rank from Bottom) - 1
Total Students = 69 + 13 - 1
Total Students = 82 - 1
Total Students = 81
So, there are '81' students stand between Maria and Amit.
Hence, the correct answer is "Option 4".

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Q74. Answer: (c) Six

Given: Seven boxes A, B, C, D, E, F and G are placed one above the other but not necessarily in the same order.

1) F is placed immediately above G

2) A is placed immediately above C.

3) Only E is placed above B.

4) Only two boxes are placed above F.

5) A is not placed third from the bottom.

E
B
F
G
A
C

D will come in the remaining place.

E
B
F
G
D
A
C

So, there are 'Six' boxes are placed above C

Hence, the correct answer is "Option 3".

Q75. Answer: (b) CP - XS

The logic followed here is:

Option 1) TM-00

Option 2) CP - XS

Option 3) IY-DA

Option 4) NH-IJ

Here, 'CP - XS' is odd among the given options.

Hence, the correct answer is "Option 2".

Q76. Answer: (a) 6 km towards north

Given:

Tina starts driving from point Y and drives 4 km north.

Then, she turns left and drives 2 km, then turns left again and drives 6 km.

She then turns left again and drives 4 km.

Then, she turns right and drives 4 km.

She then takes a final right turn and drives 2 km and stops at point 8.

So, He should drive 6 km towards north to reach point Y again.

Hence, the correct answer is "Option 1".

Q77. Answer: (b) FZVR

The logic followed here is:

Option 1) EYTQ

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Option 2) FZVR
Option 3) AUPM
Option 4) BVQN
Here, 'FZVR' is odd among the given options.
Hence, the correct answer is "Option 2".

Q78. Answer: (b) re

The logic followed here is:
‘cart light’ is coded as ‘straw handle’,
‘plug light’ is coded as ‘toes handle’,
‘cart plug’ is coded as ‘toes straw’.
Here,
Code for 'cart' is 'straw'.
Code for 'light' is 'handle'.
Code for 'plug' is 'toes'.
Here, The code for 'cart' is 'straw'.
Hence, the correct answer is "Option 2".

Q79. Answer: (d) 70

BODMAS Table:
Given equation: 32 ÷ 2 × 72 - 9 + 5 = ?
Now, Swap: × ? + and - ? ÷., then:
=> 32 - 2 + 72 ÷ 9 × 5 = ?
=> 32 - 2 + 8 × 5 = ?
=> 32 - 2 + 40 = ?
=> 32 - 2 + 40 = 70
Hence, the correct answer is "Option 4".

Q80. Answer: (b) Only conclusion I follows.

Given Statements:
All fathers are brothers.
All brothers are sons.
The least possible Venn diagram for the given statement is:
Conclusions:
(I) All fathers are sons:
This is the direct, valid conclusion derived from combining the two statements.
Therefore, Conclusion (I) logically follows.
(II) All brothers are fathers:
In logic, "All A are B" does not imply "All B are A." For example, "All dogs are animals" does not mean "All animals are dogs."
Therefore, Conclusion (II) does not follow as it is a conversion of a universal affirmative statement, which is not necessarily valid.
So, Only conclusion I follows.
Hence, the correct answer is "Option 2".

Q81. Answer: (a) −152

The logic followed here is:
thus, "-152" will replace the question mark in the given series.
Hence, the correct option is "Option 1 ".

Q82. Answer: (b) 2

Given: (Left) 7 1 * £ 5 9 # @ 8 $ & + 3 2 4 6 % Ω (Right)
Now,
Numbers immediately preceded by a symbol and also immediately followed by another number
So, Needed pattern is: Symbol - Number - Number.
There are 2 Numbers immediately preceded by a symbol and also immediately followed by another number.

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Hence, the correct answer is 'Option 2'.

Q83. Answer: (a) 105

Given numbers: 36719542

If 1 is added to each even digit of the number, we get

The digits that appear more than once are 3, 5, and 7.

The product of these repeating digits is:

Product = 3 x 5 x 7 = 15 x 7 = 105

Hence, the correct answer is 'Option 1'.

Q84. Answer: (d) 13

Given numbers:97145286

If 1 is subtracted from each even digit of the number, we get

4 → 3

2 → 1

8 → 7

6 → 5

New number: 9 7 1 3 5 1 7 5

Digits that appear more than once: 7, 1, 5

So, Sum = 7 + 1 + 5 = 13.

Hence, the correct answer is 'Option 4'.

Q85. Answer: (d) Four

Given: L, M, N, O, Q, R and S are seated around a round table facing the center.

1) L sits fourth to the right of R.

2) Only two people sit between Q and N when counted from the left of Q.

3) M sits third to the left of O.

4) S is an immediate neighbour of O and N.

Here, Four people sit between L and S when counted from the left of S.

Hence, the correct answer is "Option 4".

Q86. Answer: (b) Neither conclusion (I) nor (II) follows.

Given Statements:

All hummingbirds are cranes.

Some cranes are flamingos.

The least possible Venn diagram for the given statement is:

Conclusions:

I. Some hummingbirds are flamingos:

Since all Hummingbirds are inside the Cranes circle, the overlap between Cranes and Flamingos might occur only in the part of the Cranes circle that is outside the Hummingbirds circle.

Therefore, it is possible that no Hummingbirds are Flamingos.

Conclusion (I) does not logically follow

II. No flamingo is a hummingbird:

Therefore, the statement "No flamingo is a hummingbird" is not a necessary truth.

Conclusion (II) does not logically follow

So, Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 2".

Q87. Answer: (c) (68, 132, 260)

The logic followed here is:

Logic:

In each set, the three numbers are approximately successive perfect squares with the square roots increasing by about +3, then +4.

√2nd=√1st+3

√3rd=√2nd+4
(52, 100, 196)
=> (15 × 6) + 6
=> √2nd − √1st = 10 − 7.21 = +2.79 (≈ +3)
√3rd − √2nd = 14 − 10 = +4
=> √2nd − √1st = 11.22 − 8.06 = +3.16 (≈ +3)
√3rd − √2nd = 15.75 − 11.22 = +4.53 (≈ +4.5)
Now, checking the options:
Option 1) (72, 140, 256)
=> √2nd − √1st = 11.83 − 8.49 = +4.34
√3rd − √2nd = 16.00 − 11.83 = +4.17
Option 2) (56, 108, 202)
=> √2nd − √1st = 10.39 − 7.48 = +2.91
√3rd − √2nd = 14.21 − 10.39 = +3.82
Option 3) (68, 132, 260)
=> √2nd − √1st = 11.83 − 8.49 = +3.34
√3rd − √2nd = 16.00 − 11.83 = +4.17
Matches the pattern (+3, +4)
Option 4) (94, 184, 264)
=> √2nd − √1st = 13.56 − 9.70 = +3.86
√3rd − √2nd = 16.25 − 13.56 = +2.69
Hence, the correct option is "Option 3"

Q88. Answer: (d) PIR

The logic followed here is:
Option 1) NGO
Option 2) IBJ
Option 3) KDL
Option 4) PIR
Here, 'PIR ' is odd among the given options.
Hence, the correct answer is "Option 4".

Q89. Answer: (b) 6

The logic followed here is:
Here, 'GIFT' is coded as '7529'
and, FITS' is coded as '2596'
Thus, the code for S is 6 in the given code language.
Hence, the correct answer is 'Option 2'.

Q90. Answer: (b) GUST-TGSU - GTUS

• Now,
MICE - EMCI - MEIC
DEAR - RDAE - DREA
Let's check each Option One by One.
Option 1) AGES-SAGE - GESA

A	G	E	S
1	2	3	4
S	A	G	E
4	1	2	3
G	E	S	A
2	3	4	1

Option 2) GUST-TGSU - GTUS

G	U	S	T
1	2	3	4
T	G	S	U
4	1	3	2
G	T	U	S
1	4	2	3

Option 3) NUTS-UNTS - SUTN

N	U	T	S
1	2	3	4
U	N	T	S
2	1	3	4
S	U	T	N
4	2	3	1

Option 4) AXLE-EALX - AXEL

A	X	L	E
1	2	3	4
E	A	L	X
4	1	3	2
A	X	E	L
1	2	4	3

So, Only GUST-TGSU - GTUS follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 2'.

Q91. Answer: (a) CLUE-UCLE - EULC

Now,

TRIM-ITRM - MIRT

MIST - SMIT - TSIM

Let's check each Option One by One.

Option 1) CLUE-UCLE - EULC

C	L	U	E
1	2	3	4
U	C	L	E
3	1	2	4
E	U	L	C
4	3	2	1

Option 2) FOLD-FLOD - DLOF

F	O	L	D
1	2	3	4
F	L	O	D
1	3	2	4

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D	L	O	F
4	3	2	1

Option 3) WEST-EWST - TESW

W	**E**	**S**	**T**
1	2	3	4
E	W	S	T
2	1	3	4
T	E	S	W
4	2	3	1

Option 4) PLAY-APLY - LAYP

P	**L**	**A**	**Y**
1	2	3	4
A	P	L	Y
3	1	2	4
L	A	Y	P
2	3	4	1

So, Only CLUE-UCLE - EULC follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 1'.

Q92. Answer: (c) Sister's son

Family Chart:

Decoding the Symbols:

Symbol	•	•	×	•
Meaning	Husband	Brother	Sister	Daughter

Given: C - E+G + I x T

It means:

C is the Brother of E,

E is the Daughter of G,

G is the Husband of I,

I is the Sister of T.

So, C is the Sister's son of T.

Hence, the correct answer is "Option 3".

Q93. Answer: (c) WRT 26

The logic followed here is:

So, WRT 26 will replace the question mark in the given series.

Hence, the correct answer is "Option 3".

Q94. Answer: (a) 4

Given: A, B, C, D, E, F, and G are seated around a round table facing the center.

1) C sits to the immediate right of D.

2) Only three people sit between C and G, when counted from the left of C.

3) Only three people sit between D and B.

4) A sits immediate right of F.

Here, Four people sit between C and A when counted from the right of C.

Hence, the correct answer is "Option 1".

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Q95. Answer: (c) 95

The logic followed here is:

thus, "95" will replace the question mark in the given series.

Hence, the correct option is "Option 3 ".

Q96. Answer: (a) CRE-55

The logic followed here is:

So, CRE-55 will replace the question mark in the given series.

Hence, the correct answer is "Option 1".

Q97. Answer: (a) 45

BODMAS Table:

Given equation: 65 × 5 - 19 ÷ 3 + 25 = ?

Now, if "'+' and '×' are interchanged and '×' and '÷' are interchanged then:

=> 65 ÷ 5 + 19 × 3 − 25 = ?

=> 13 + 57 − 25 = ?

=> 70 − 25 = 45.

Hence, the correct answer is "Option 1".

Q98. Answer: (d) Three

Given: Seven boxes V, W, X, Y, Z, Q, and R are placed one above the other, but not necessarily in the same order.

1) Y is placed immediately above Q.

2) W is placed immediately above Z.

3) Only X is placed above V.

4) Only two boxes are placed above Y.

5) W is not placed third from the bottom.

X
V
Y
Q
W

R, Z will come in the remaining place.

X
V
Y
Q
R
W
Z

So, there are 'Three' boxes are placed between R and X.

Hence, the correct answer is "Option 4".

Q99. Answer: (c) LHC : PEG

The position and positional values or English Alphabets are:

Now,

VTM : ZQQ

DNU : HKY

Let's check each Option One by One.

Option 1) MHE : PCH

Not follow the pattern

Option 2) YFH : CAL

Not follow the pattern

Option 3) LHC : PEG

Option 4) KZQ : PWL

Not follow the pattern

So, Only LHC : PEG follows the pattern of given letter cluster.

Hence, the correct answer is 'Option 3'.

Q100. Answer: (d) 593

The logic followed here is:

thus, "593" will replace the question mark in the given series.

Hence, the correct option is "Option 4 ".

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