RRB NTPC (UG) CBT-I Official Paper (Held On: 13 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. The Stockholm Convention on Persistent Organic Pollutants was adopted at a Conference of Plenipotentiaries in which year?

(a) 2000
(b) 2002
(c) 2001
(d) 2003

Q2. How can you access menus in the menu bar in Windows?

(a) Press Ctrl + M to open the menu.
(b) Right-click on the title bar to open the menu bar.
(c) Press Alt and the letter underlined in the menu title to access a menu.
(d) Press F5 to open the menu bar.

Q3. Which Indian institute introduced two new BTech programs in Computational Engineering and Mechanics and Instrumentation and Biomedical Engineering, starting from the academic year 2025-26?

(a) Indian Institute of Technology Kharagpur
(b) Indian Institute of Technology Bombay
(c) Indian Institute of Technology Kanpur
(d) Indian Institute of Technology Madras

Q4. When was the National Rural Health Mission (NRHM) launched by the Government of India?

(a) 26 January 2006
(b) 12 April 2004
(c) 12 April 2005
(d) 8 March 2004

Q5. The Dutch East India Company established its first factory in India in _____.

(a) Calicut
(b) Goa
(c) Petapuli
(d) Pondicherry

Q6. Why is an alloy considered a mixture even though it cannot be separated by physical methods?

(a) It is formed only by non-metals.
(b) It shows the properties of its constituents and can have variable composition.
(c) It contains only one type of element in vapor form.
(d) Alloys are always magnetic because they contain metals with a fixed composition.

Q7. In 2025, who became the youngest Indian to summit Mt. Everest and to complete the Seven Summits challenge?

(a) Vishwanath Padakanti
(b) Malavath Purna
(c) Krushnaa Patil
(d) Arjun Vajpai

Q8. Which of the following projects is designed to provide irrigation to Rajasthan's desert areas?

(a) Indira Gandhi Canal
(b) Hirakud Project
(c) Chambal Project
(d) Kosi Project

Q9. In most software applications, what does Ctrl + S do if pressed multiple times?

(a) Updates the saved file without creating a new one
(b) Reverts the document
(c) Saves a new copy each time
(d) Deletes the previous version

Q10. Which department, headed by Dabir-i-Khas, handled royal correspondence and official communication during the Delhi Sultanate?

(a) Diwan-i-Riyasat
(b) Diwan-i-Arz
(c) Diwan-i-Insha
(d) Barid-i-Mumalik

Q11. In which Indian city was the First International Research Conference on Pension (IRCP) inaugurated in April 2025?

(a) New Delhi
(b) Mumbai
(c) Uttar Pradesh
(d) Kerala

Q12. The western cyclonic disturbances that enter the Indian subcontinent from the west and the northwest during the winter months originate from which of the following regions?

(a) Mediterranean Sea
(b) Black Sea
(c) Baltic Sea
(d) North Atlantic Ocean

Q13. Which eminent violinist from Karnataka was awarded the Padma Vibhushan in 2025 for his outstanding contributions to Indian classical music?

(a) Anant Nag
(b) Lakshminarayana Subramaniam
(c) Gangubai Hangal
(d) Ricky Kej

Q14. Who took charge as the Vice Chief of the Air Staff of the Indian Air Force on 2 May 2025?

(a) Air Marshal Anil Chopra
(b) Air Marshal Rakesh Kumar Singh Bhadauria
(c) Air Marshal SP Dharkar
(d) Air Marshal Narmdeshwar Tiwari

Q15. In 1995, physicists Eric Cornell and Carl Wieman created the first Bose-Einstein condensate (BEC) using which isotope?

(a) Caesium-133
(b) Thorium-232

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(c) Rubidium-87
(d) Sodium-23

Q16. Which Article of the Constitution states, 'no person shall be deprived of his property save by authority of law'?
(a) Article 111
(b) Article 2
(c) Article 300A
(d) Article 368

Q17. As per the first Panchayat Advancement Index (PAI) report released in April 2025, which two states are leading with the highest number of “front runner” panchayats?
(a) Chhattisgarh and Uttar Pradesh
(b) Assam and West Bengal
(c) Gujarat and Telangana
(d) Meghalaya and Nagaland

Q18. What is the name of the medical instrument used to listen to internal body sounds, especially from the heart and lungs?
(a) Barometer
(b) Endoscope
(c) Stethoscope
(d) Colonoscope

Q19. In 2025, which region in India witnessed Kuki groups demanding the maintenance of buffer zones to manage ethnic tensions?
(a) Nagaland
(b) Assam
(c) Mizoram
(d) Manipur

Q20. On 23 April 2025, the Indian Government announced the suspension of which treaty/agreement with Pakistan citing national security concerns?
(a) Indus Waters Treaty
(b) Tashkent Declaration
(c) Simla Agreement
(d) Non-Nuclear Aggression Agreement

Q21. In which of the following cities was the Army Commanders Conference held in April 2025?
(a) New Delhi
(b) Jodhpur
(c) Pune
(d) Chandigarh

Q22. What key emotion did the Extremists aim to arouse in people against British colonial rule?
(a) Fear
(b) Sympathy
(c) Loyalty
(d) Indignation

Q23. India has been a World Trade Organization (WTO) member since _____.
(a) 2005
(b) 2000
(c) 1995
(d) 1990

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Q24. What is the primary reason for overexploitation of groundwater in Punjab and Haryana?

(a) Excessive use of water for domestic consumption
(b) Cultivation of water-intensive crops like paddy
(c) Government restrictions on surface water use
(d) Presence of sandy soils with poor water retention

Q25. The Vardhan dynasty, was also known by which of the following names?

(a) Gupta dynasty
(b) Pushyabhuti dynasty
(c) Nanda dynasty
(d) Maurya dynasty

Q26. Which of the following states introduced India's first AI Powered Real Time Forest alert system in May 2025?

(a) Jharkhand
(b) Tamil Nadu
(c) Karnataka
(d) Madhya Pradesh

Q27. JD Vance was sworn in as the _____ Vice President of the United States in 2025.

(a) 48th
(b) 50th
(c) 49th
(d) 51st

Q28. In which of the following years were the Montagu–Chelmsford Reforms introduced by the British Government in India to gradually establish self-governing institutions?

(a) 1931
(b) 1919
(c) 1944
(d) 1923

Q29. Which drainage pattern resembles the branches of a tree and is common in rivers of the northern plains?

(a) Dendritic
(b) Trellis
(c) Centripetal
(d) Radial

Q30. Which of the following Indian naval platforms took part in the Indo-Oman naval exercise Naseem-Al-Bahr held in October 2024?

(a) INS Trikand and Dornier Maritime Patrol Aircraft
(b) INS Kolkata and Sea Guardian drone
(c) INS Shivalik and P-8I aircraft
(d) INS Vikrant and MiG-29K fighter jets

Q31. Which Chandela ruler is credited with the construction of the Kandariya Mahadev Temple situated in Khajuraho, Madhya Pradesh, India?

(a) Yashovarman
(b) Kirttivarman
(c) Dhanga
(d) Vidyadhara

Q32. What declaration was made at the 2025 Global Media Dialogue on media ethics and AI?

(a) WAVES Declaration
(b) NEUTRALITY Charter
(c) TRUTH Pact

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(d) AI-TRUST Code

Q33. Which platform provides online learning for civil servants under Mission Karmayogi in India?

(a) iGOT Karmayogi
(b) NISG Portal
(c) ePathshala
(d) SWAYAM

Q34. India's highway network is one of the largest in the world. Which scheme focuses on the development of highways, particularly in economic corridors?

(a) PM Gram Sadak Yojana
(b) BharatNet
(c) Sagarmala
(d) Bharatmala Pariyojana

Q35. When was the Monetary Policy Framework Agreement (MPFA) signed between the Government of India and the Reserve Bank?

(a) 14 August 2010
(b) 20 April 2018
(c) 8 December 2007
(d) 20 February 2015

Q36. Which of the following correctly describes a key function of Subordinate Courts in India?

(a) Resolve civil and criminal disputes at the district level
(b) Interpret international treaties
(c) Review decisions of High Courts
(d) Draft laws for the State

Q37. The National eCourts Project, launched by the Department of Justice, is primarily aimed at:

(a) creating new Central Administrative Tribunals
(b) building new court complexes in rural areas
(c) establishing a nationwide telecom system for police
(d) digitising and upgrading district and subordinate courts

Q38. What is the correct order of arrival of seismic waves at a seismograph after an earthquake?

(a) Surface waves, P-waves, S-waves
(b) P-waves, surface waves, S-waves
(c) S-waves, P-waves, surface waves
(d) P-waves, S-waves, surface waves

Q39. Which of the following Buddhist texts is often called the 'Gita of Buddhism' for its importance and teachings?

(a) Mahayana Sutra
(b) Dhammapada
(c) Vamsathapakasini
(d) Saddharmapundarīka Sūtra

Q40. Which Fundamental Right protects citizens from being forced into labour or human trafficking?

(a) Right to Freedom
(b) Right to Equality
(c) Right to Constitutional Remedies
(d) Right against Exploitation

MATHEMATICS

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Q41. In triangle ABC, BD ? AC at D and angle DBC = 39°. E is a point on BC such that angle CAE = 16°. What is the measure of angle AEB?

(a) 82°
(b) 66°
(c) 67°
(d) 74°

Q42. One-third of a journey is covered at a speed of 2 km/hr, the next one-third of the journey is covered at a speed of 87 km/hr and the remaining journey is covered at a speed of 53 km/hr. The average speed (in km/hr, rounded off to 1 decimal place) for the entire journey is:

(a) 2.7
(b) 5.7
(c) 8.3
(d) 5

Q43. Find the value of 5 ^(−23) × 16 ^(−23) × 21 ^(−23).

(a) $1/(1725^{23})$
(b) $1/(1680^{23})$
(c) $1/(1726^{23})$
(d) $1/(1634^{23})$

Q44. The number 814242541 is divisible by which of the following?

(a) 8
(b) 12
(c) 7
(d) 15

Q45. I bought two speakers for Rs. 1,200. I sold the first one at a loss of 8% and the second at a gain of 22%. If, on the whole I made neither a loss nor a gain, find the cost price (in Rs.) of the first speaker.

(a) 864
(b) 900
(c) 880
(d) 904

Q46. Pipe A can fill a tank in 17 hours, pipe B can fill the same tank in 21 hours and pipe C can fill the same tank in 19 hours. The time taken by them to fill the same tank if they operate together is::

(a) 13309/1079 hours
(b) 5309/1079 hours
(c) 6309/1079 hours
(d) 11309/1079 hours

Q47. By selling an article at 4/14 of its actual selling price, Akash incurs a loss of 30%. If he sells it at 54% of its actual selling price, then the profit percentage is:

(a) 34.8%
(b) 32.6%
(c) 33.8%
(d) 32.3%

Q48. Find the least number of square tiles required to completely cover a floor of dimensions 12.15 m by 11.34 m.

(a) 230
(b) 150
(c) 210
(d) 250

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Q49. Sapna invested Rs. 22,400 on simple interest, partly at 13% per annum and partly at 3% per annum. If she earns equal interests from the two investments after 7 years, then find the sum invested at 13% per annum (in Rs.).

(a) 4,198
(b) 4,200
(c) 4,203
(d) 4,197

Q50. What is the median of the following data?

57, 96, 60, 91, 69, 50, 72, 16, 78, 73, 55

(a) 70
(b) 69.5
(c) 69
(d) 68.5

Q51. If the third proportional of 9 and 57 be x, then what is the value of x?

(a) 363
(b) 361
(c) 358
(d) 364

Q52. An item is marked at Rs. 8,000. Two successive discounts of 10% and 15% are allowed. Find the equivalent single discount rate.

(a) 23.5%
(b) 22.5%
(c) 25.5%
(d) 24.5%

Q53. A cylindrical rod has an outer curved surface area of 1500 cm^2. If the length of the rod is 68 cm, then the outer radius (in cm) of the rod, correct to two places of decimal, is: (Take $\pi = 22/7$)

(a) 3.51
(b) 6.61
(c) 3.87
(d) 3.69

Q54. A sum of Rs. 625 amounts to Rs. 841 in 2 years at a certain rate of interest per annum, compounded annually. The rate of interest per annum is:

(a) 18%
(b) 19%
(c) 16%
(d) 17%

Q55. A man driving a car at a speed of 84 km/hr crosses a bridge in 1.6 minutes. Find the length of the bridge.

(a) 2.24 km
(b) 1.81 km
(c) 2.46 km
(d) 1.82 km

Q56. Which of the following numbers is divisible by 5?

(a) 61,75,753
(b) 65,67,359
(c) 71,32,954
(d) 70,48,030

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Q57. 2 years ago, the age of a father was 22 years more than twice his son's age. After how many years, from now, will he be twice his son's age?

(a) 17
(b) 16
(c) 21
(d) 20

Q58. The sum of the squares of two consecutive even natural numbers is 2180. The sum of the numbers is:

(a) 72
(b) 74
(c) 66
(d) 82

Q59. M and N start a business. M invests Rs. 35,000 more than N for 7 months and N invests for 5 months. M's share is Rs. 372 more than that of N, out of a total profit of Rs. 1,860. Find the capital contributed by M.

(a) Rs. 5,35,000
(b) Rs. 6,25,000
(c) Rs. 6,00,000
(d) Rs. 5,25,000

Q60. Find the area of a triangle whose base is 28 cm and corresponding altiude is 15 cm.

(a) 280 cm^2
(b) 260 cm2
(c) 210 cm2
(d) 240 cm2

Q61. The value of 5/4+(1/(1+4/7))-3/4 is

(a) 29/32
(b) 35/12
(c) 25/22
(d) 28/19

Q62. A number, when increased by 100%, gives 2790. The number is:

(a) 697.5
(b) 2790
(c) 4185
(d) 1395

Q63. Aarti, Anil, and Naveen invest Rs. 1,110, Rs. 1,760, and Rs. 1,230 respectively to start a business. If the profit at the end of the year is Rs. 1,620, then what is the share of Naveen in the profit?

(a) Rs. 487
(b) Rs. 486
(c) Rs. 483
(d) Rs. 488

Q64. The marked price of a watch is Rs. 2,860. A man bought the watch for Rs. 2,390.96, after getting two successive discounts, one of which is 12%. What is rate of the other discount?

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

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Q65. In an election between two candidates 80% of the registered voters cast their vote and 15% of the votes polled were found invalid. The winning candidate got 60% of the valid votes and won the election by a margin of 1394 votes. How many voters were registered?

(a) 10251
(b) 10250
(c) 10252
(d) 10248

Q66. Anjani can do a certain piece of work in 24 days. Anjani and Khushbu can together do the same work in 20 days, and Anjani, Khushbu and Sushmita can do the same work together in 8 days. In how many days can Anjani and Sushmita do the same work?

(a) 57/7
(b) 61/8
(c) 60/7
(d) 54/9

Q67. The value of $\sqrt{196}+\sqrt{0.0324}-\sqrt{6.76}=$

(a) 6.44
(b) 11.58
(c) 4.64
(d) 2.41

Q68. Evaluate: $(\sin^2 40°+\sin^2 50°)/(\cos^2 40°+\cos^2 50°)- (\sec^2 50°-\cot^2 40°)/(\cos^2 20°+\cos^2 70°)$

(a) -1
(b) -2
(c) 0
(d) 2

Q69. Simplify $2((3/2)x^2-25x+14)-3(x^2+4x-13)$

(a) 62x − 67
(b) −62x − 67
(c) −62x + 67
(d) 62x + 67

Q70. The average runs scored by a batsman in 23 matches is 41. In the next 10 matches, the batsman scored an average of 15 runs. Find his average runs scored (rounded off to two decimal places) in all the 33 matches.

(a) 32.12
(b) 34.12
(c) 35.12
(d) 33.12

GENERAL INTELLIGENCE AND REASONING

Q71. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some trucks are cars.

Some cars are bottles.

Conclusions:

(I) Some trucks are bottles.

(II) All bottles are cars.

(a) Both conclusions (I) and (II) follow.
(b) Only conclusion (I) follows.

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(c) Neither conclusion (I) nor (II) follows.
(d) Only conclusion (II) follows.

Q72. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

YTQ UPM QLI MHE ?

(a) IEB
(b) IDB
(c) IEA
(d) IDA

Q73. Seven boxes C, D, E, M, N, O and P are kept one over the other but not necessarily in the same order.

Only D is kept above N. Only two boxes are kept between N and O. Only P is kept below C. E is not kept immediately above O.

How many boxes are kept between M and P?

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

Q74. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some pepper are spicy.

All spicy are chilly.

Conclusions:

(I): Some pepper are chilly.

(II): All chilly are spicy.

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

Q75. What will come in place of the question mark (?) in the following equation if '+' and '−' are interchanged and '×' and '÷' are interchanged?

28 + 42 × 2 − 4 ÷ 3 = ?

(a) 31
(b) 37
(c) 19
(d) 24

Q76. If 2 is added to each odd digit and 1 is subtracted from each even digit in the number 3851764, what will be the sum of the digits which are third from the left and third from the right in the new number thus formed?

(a) 16
(b) 10
(c) 7
(d) 8

Q77. What should come in place of the question mark (?) in the given series?

1500, 3005, 6015, 12035, 24075, ?

(a) 48015
(b) 48155
(c) 48200
(d) 48105

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Q78. In a certain code language, 'WIRE' is coded as '4726' and 'EAST' is coded as '5173'. What is the code for 'E' in the given code language?

(a) 3
(b) 5
(c) 7
(d) 6

Q79. Darshan starts from Point Y and drives 6 km towards west. He then takes a right turn and drives 8 km. He then turns right and drives 11 km. He takes a final right turn, drives 8 km and stops at Point Z. How far (shortest distance) and towards which direction should he drive in order to reach Point Y again? (All turns are 90-degree turns only, unless specified.)

(a) 4 km towards east
(b) 4 km towards north
(c) 5 km towards west
(d) 6 km towards south

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

76, 87, 101, 118, 138, ?

(a) 164
(b) 159
(c) 162
(d) 161

Q81. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

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

(a) PTN
(b) JNH
(c) MQK
(d) GKF

Q82. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

(2, 49, 15)

(29, 112, 18)

(a) (39, 134, 20)
(b) (30, 75, 5)
(c) (11, 63, 15)
(d) (28, 106, 18)

Q83. H, I, J, P, Q, R and S are sitting around a circular table facing the centre of the table. I is an immediate neighbour of both Q and H. H sits third to the left of P. R sits to the immediate left of P. J is not an immediate neighbour of H. Who sits third to the left of S?

(a) J
(b) P
(c) Q
(d) H

Q84. All 30 students in a class are standing in a row facing north. Alok is 12th from the right end while Aman is 16th from the left end. How many students stand between Alok and Aman?

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

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(d) 4

Q85. If 3 is added to each odd digit and 1 is subtracted from each even digit in the number 6243514, how many digits will appear more than once in the new number thus formed?

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

Q86. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only. (NOTE: All numbers are single digit numbers only.)

(Left) 1 $ 2 6 7 3 * & 4 β μ 2 5 % 9 0 2 3 6 # @ 8 (Right)

If all the symbols are dropped from the series, which of the following numbers will be the fifth from the left?

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

Q87. If 1 is added to each odd digit and 2 is subtracted from each even digit in the number 7431856, which of the following digits will be second from the right in the new number thus formed?

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

Q88. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

KPV RWC YDJ FKQ ?

(a) MXR
(b) MYU
(c) MRX
(d) MUY

Q89. In a certain code language, ‘FATE’ is coded as ‘2357’ and ‘TURN’ is coded as ‘4126’. What is the code for ‘T’ in that language?

(a) 6
(b) 4
(c) 5
(d) 2

Q90. Select the triad that follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

MT-OV-QS

OV-QX-SU

(a) HO-JQ-LM
(b) GO-JQ-LM
(c) HO-JQ-LN
(d) GO-IQ-LM

Q91. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

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

(a) TM-OS
(b) SL-NQ
(c) XQ-SV
(d) VO-QT

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Q92. Rajesh, Heera, Neetu, Santosh, Pooja and Arti are sitting around a circle, facing the centre Rajesh sits second to the left of Arti. Arti sits third to the right of Pooja. Neetu sits second to the left of Santosh. Who sits to the immediate right of Santosh?

(a) Pooja
(b) Arti
(c) Heera
(d) Rajesh

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

35 50 70 95 125 ?

(a) 175
(b) 160
(c) 165
(d) 170

Q94. In a row of people all facing North, Navya is 12th from the left end. Uma is 19th from the left end. Uma is exactly between Navya and Dilip. If Dilip is 13th from the right end of the line, how many people are there in the row?

(a) 35
(b) 37
(c) 34
(d) 38

Q95. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left) @ 7 8 % * Ω 2 1 # 4 3 0 π 9 μ 7 8 Ω # 9 β (Right)

How many such symbols are there, which are immediately preceded by an odd number and also immediately followed by an even number?

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

Q96. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

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

(a) FL - PG
(b) HN - RI
(c) DJ - NE
(d) BH - LD

Q97. Gyamel starts from Point A and drives 20 km towards West. He then takes a left turn, drives 18 km, turns left and drives 23 km. He then takes a left turn and drives 25 km. He takes a final left turn, drives 3 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90° turns only unless specified.)

(a) 5 km to the West
(b) 4 km to the South
(c) 7 km to the South
(d) 6 km to the North

Q98. A is the sister of H. H is the father of E. E is the son of N. M is the mother of N. How is A related to N?

(a) Daughter's husband's mother
(b) Daughter's husband's sister
(c) Husband's mother
(d) Husband's sister

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Q99. In the following triad, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one which follows the same logic.

GAIN - AIGN - NIAG

SINE - INSE - ENIS

(a) GAME - AMGE - AMEG
(b) MONK - OMNK - KONM
(c) SEAT - SAET - TAES
(d) RICE - ICRE - ECIR

Q100. In the following triad, each group of letters is related to the subsequent one following a certain logic. Select from the given options, the one that follows the same logic.

MARK - MKRA - KRAM

PLAY - PYAL - YALP

(a) TRAY - TRYA - RAYT
(b) FIRE - IFRE - EIRF
(c) GATE - GTAE - ETAG
(d) BUSH - BHSU - HSUB

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (c) 2001

The correct answer is 2001.

Key Points

• The Stockholm Convention on Persistent Organic Pollutants (POPs) was adopted in 2001 at a Conference of Plenipotentiaries held in Stockholm, Sweden.

• This Convention is a global treaty aimed at protecting human health and the environment from chemicals that persist in the environment, accumulate in living organisms, and pose risks to human health.

• It specifically targets chemicals that are toxic, resistant to environmental degradation, and can be transported across international boundaries. Hence, the adoption year is correctly stated as 2001.

• Major objectives: The Convention seeks to eliminate or restrict the production and use of persistent organic pollutants (POPs). It also aims at reducing releases of these pollutants into the environment.

• The Convention initially addressed 12 specific chemicals known as the "dirty dozen," including pesticides like DDT and industrial chemicals like PCBs. Over time, more chemicals have been added to the list. Hence, the Convention's focus is highly significant.

• Implementation: The Convention requires parties to develop national implementation plans and take measures to reduce or eliminate the release of POPs. It also promotes international cooperation and support for capacity building in developing countries.

• Hence, the correct answer is 2001.

Additional Information

• Persistent Organic Pollutants (POPs):

• POPs are chemical substances that persist in the environment, bioaccumulate through the food chain, and pose a risk to human health and ecosystems.

• They include pesticides, industrial chemicals, and unintentional by-products like dioxins and furans.

• History of the Stockholm Convention:

• The Convention was adopted in 2001 and came into force on May 17, 2004, following ratification by the required number of countries.

• It was initiated by the United Nations Environment Programme (UNEP) to address global concerns regarding toxic chemicals.

• Significance of the Convention:

• It has contributed significantly to global environmental protection by reducing the production and use of harmful chemicals.

• The Convention also promotes sustainable practices and the use of safer alternatives.

Important Points

• Key Features of the Stockholm Convention:

• The Convention targets POPs under three categories: intentionally produced chemicals (like pesticides and industrial chemicals), unintentionally produced chemicals (like dioxins), and those slated for elimination or restriction.

• It promotes the use of best environmental practices (BEPs) and best available techniques (BATs) to minimize releases of POPs.

• Examples of POPs:

• DDT: A pesticide banned in many countries due to its harmful effects on health and the environment.

• PCBs: Industrial chemicals used in electrical equipment, now restricted globally.

• Dioxins: Unintentionally produced during industrial processes; highly toxic.

Q2. Answer: (c) Press Alt and the letter underlined in the menu title to access a menu.

The correct answer is Press Alt and the letter underlined in the menu title to access a menu..

Key Points

• Accessing menus in the menu bar: In the Windows operating system, pressing Alt followed by the underlined letter in the menu title allows the user to navigate directly to that menu. This feature is particularly useful for users who prefer keyboard shortcuts or have accessibility needs.

• When the Alt key is pressed, Windows highlights the menu bar and displays the underlined letters for each menu option. The user can then press the corresponding letter to open the desired menu.

• This method is widely used in applications like Microsoft Word, Excel, and other Windows-based software, where menus such as File, Edit, View, etc., can be navigated using this shortcut.

• This functionality is part of the Windows design to enhance accessibility and improve user interaction, making it faster and more efficient for users to access menu options without a mouse. Hence, the correct answer is pressing Alt and the underlined letter in the menu title.

Additional Information

• Other options in the question:

• Option 1: Pressing Ctrl + M does not open the menu bar or menus in Windows. This shortcut is not assigned for menu navigation. This statement is incorrect.

• Option 2: Right-clicking on the title bar does not access the menu bar; it usually opens a context menu for window controls such as minimize, maximize, or close. This statement is incorrect.

• Option 4: Pressing F5 typically refreshes the current page or window but does not open the menu bar. This statement is incorrect.

• Importance of keyboard shortcuts: Keyboard shortcuts like Alt + underlined letter help users save time and enhance productivity. They are an integral part of the Windows operating system's user interface, especially for professionals who use Windows applications extensively.

• Applications: This functionality is available across several Windows-based programs, making it consistent and easy for users to remember and apply across different software.

Important Points

• Accessibility: Alt + underlined letter navigation is crucial for users with disabilities who may find it challenging to use a mouse or other pointing devices. This feature ensures they can efficiently access menus.

• Historical design: The concept of underlined letters in menu titles dates back to early graphical user interface designs, emphasizing ease of use and interaction.

• Relevance today: Despite advancements in GUI design, this feature remains relevant due to its simplicity and effectiveness in speeding up tasks, especially for repetitive operations.

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Q3. Answer: (d) Indian Institute of Technology Madras

The correct answer is Indian Institute of Technology Madras.

Key Points

• Indian Institute of Technology Madras (IIT Madras) is one of the premier engineering institutions in India, located in Chennai, Tamil Nadu.

• IIT Madras has announced the introduction of two new BTech programs, namely Computational Engineering and Mechanics and Instrumentation and Biomedical Engineering, commencing from the academic year 2025-26.

• The Computational Engineering and Mechanics program focuses on computational tools and their applications in engineering mechanics, which is important for industries like aerospace, automotive, and defense.

• The Instrumentation and Biomedical Engineering program bridges engineering and medical sciences, focusing on medical instrumentation, diagnostics, and therapeutic technologies.

• The introduction of these courses aligns with IIT Madras' vision of addressing emerging technological challenges and preparing students for interdisciplinary roles in the future.

Additional Information

• Indian Institute of Technology Madras:

• IIT Madras was established in 1959 and is recognized for its excellence in engineering education and research.

• It is ranked among the top engineering institutions in India and is known for its innovative programs and contributions to technology and industry.

• Located in Chennai, Tamil Nadu, IIT Madras has a sprawling campus and state-of-the-art research facilities.

• Features of Computational Engineering and Mechanics:

• This program focuses on computational modeling, simulations, and mechanical engineering tools.

• It prepares students for industries such as automotive, aerospace, civil engineering, and defense.

• Features of Instrumentation and Biomedical Engineering:

• This program integrates medical sciences with engineering principles to develop advanced medical technologies.

• It focuses on areas like diagnostics, medical imaging, therapeutic devices, and wearable technologies.

• Students graduating from this program can pursue careers in healthcare technology, medical device manufacturing, and research.

Important Points

• Significance of New Programs:

• The introduction of these programs reflects IIT Madras' commitment to adapting its curriculum to meet the needs of emerging interdisciplinary fields.

• It aims to equip students with skills that are highly relevant to the modern technological landscape.

• Other IITs Mentioned:

• IIT Kharagpur: Known for its comprehensive engineering programs and vast campus in West Bengal.

• IIT Bombay: Located in Maharashtra, renowned for its research and innovation in engineering and technology.

• IIT Kanpur: Established in Uttar Pradesh, it is a leader in engineering education and cutting-edge research.

Q4. Answer: (c) 12 April 2005

The correct answer is Apr 12 2005.

Key Points

• The National Rural Health Mission (NRHM) was launched by the Government of India on April 12, 2005. It aimed to provide accessible, affordable, and quality healthcare to the rural population, especially vulnerable groups.

• The mission was introduced as part of the National Health Policy to address deficiencies in healthcare infrastructure and improve health indicators like infant mortality rate and maternal mortality rate.

• NRHM primarily targeted 18 states where health indicators were particularly poor. These included states like Bihar, Uttar Pradesh, Rajasthan, Madhya Pradesh, and others.

• The mission focused on strengthening the public health system through interventions like ASHA (Accredited Social Health Activist), improving infrastructure, and integrating primary, secondary, and tertiary healthcare services.

• NRHM also worked on improving sanitation, nutrition, and safe drinking water as complementary health interventions. It sought to reduce gaps in healthcare access between urban and rural areas.

• The mission emphasized community participation and introduced mechanisms for decentralization to empower local health facilities and improve their functionality.

• The Janani Suraksha Yojana, a key component of NRHM, aimed to promote institutional deliveries and reduce maternal and infant mortality rates.

• Hence, the correct answer is Tue Apr 12 2005.

Additional Information

• Objectives of NRHM:

• Strengthening rural healthcare infrastructure: Building new health facilities like Primary Health Centres (PHCs), Community Health Centres (CHCs), and sub-centres.

• Human resources: Recruiting healthcare workers, including ASHA workers, nurses, and doctors, to fill gaps in rural health services.

• Disease control: Strengthening programs for communicable diseases like malaria, tuberculosis, and HIV/AIDS, as well as non-communicable diseases.

• Key Features:

• ASHA workers: Serving as a bridge between the healthcare system and the community, these workers provided essential health services and promoted awareness.

• Decentralization: Empowering local governing bodies like Panchayati Raj Institutions (PRIs) to plan and implement health initiatives.

• Janani Suraksha Yojana: Financial incentives for institutional deliveries to reduce maternal and infant mortality.

• Achievements:

• Increased institutional deliveries: A rise in institutional deliveries was observed across states due to programs like Janani Suraksha Yojana.

• Improved health indicators: Significant improvements were seen in infant mortality rate, maternal mortality rate, and life expectancy.

Important Points

• NRHM's integration: In 2013, NRHM was subsumed under the National Health Mission (NHM), which also included the National Urban Health Mission (NUHM).

• Focus Areas: NRHM prioritized maternal health, child health, family planning, communicable diseases, and infrastructure development.

• Funding Mechanism: The mission received funding through a mix of central and state government contributions, ensuring shared responsibility.

Q5. Answer: (c) Petapuli

The correct answer is Petapuli.

Key Points

• Petapuli was the first location where the Dutch East India Company established its factory in India. It was set up in the early 17th century.

• The Dutch East India Company, also known as the Vereenigde Oost-Indische Compagnie (VOC), started operations in India primarily for the purpose of trade, especially in spices.

• Petapuli, located in Tamil Nadu, was chosen due to its strategic location and proximity to spice-producing areas. Hence, option 3 is correct.

• The Dutch East India Company was among the first European powers to establish trading posts in India, alongside the Portuguese and the British.

• Other locations such as Calicut and Goa were primarily associated with Portuguese influence, while Pondicherry was a French colony. Hence, the other options are incorrect.

Additional Information

• Dutch East India Company:

• The Dutch East India Company was founded in 1602 by the Dutch Republic to manage its trade in Asia.

• It was primarily involved in trading spices, textiles, and other goods. India became an important region for trading due to its diverse resources.

• The company established several factories in India, including those in Masulipatnam, Chinsurah, and Nagapattinam, apart from Petapuli.

• Importance of Petapuli:

• Petapuli became the first base for the Dutch in India, enabling them to establish a strong foothold in the region for trading.

• It was located near spice-producing areas, making it a strategic choice for trade in pepper, cardamom, and other spices.

• Other European Powers in India:

• The Portuguese were the first European power to arrive in India, with their base in Goa.

• The British East India Company arrived later, establishing its first factory at Surat in 1612.

• The French established their primary base in Pondicherry, which became a significant center for French influence.

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Important Points

• Trade Items:

• The Dutch primarily traded in spices, including pepper, cinnamon, cloves, and nutmeg, which were highly valuable in Europe.

• They also traded in textiles and indigo, which were produced in various parts of India.

• Decline of Dutch Influence:

• The Dutch influence in India started declining after the rise of the British East India Company, which became the dominant European power.

• By the 18th century, Dutch operations were limited to a few trading posts.

• Legacy:

• The Dutch left behind an influence on Indian architecture, cuisine, and culture, especially in regions where they were established.

• Their trading practices also contributed to the development of trade systems in India during the colonial era.

Q6. Answer: (b) It shows the properties of its constituents and can have variable composition.

The correct answer is It shows the properties of its constituents and can have variable composition..

Key Points

• An alloy is considered a mixture: Alloys are physical combinations of metals or metals and non-metals. They are not chemically bonded, which is why they are classified as mixtures.

• They show the properties of their constituent elements. For example, steel combines the strength of iron with the corrosion resistance of carbon.

• An alloy can have a variable composition, meaning the proportion of different elements can change. For instance, brass can contain variable amounts of copper and zinc, depending on the desired properties. Hence, this statement is correct.

• Alloys cannot be separated by simple physical methods, such as filtration, because their components are mixed at the atomic level. However, they can still be separated chemically, reinforcing the idea that they are mixtures and not compounds.

• The appearance, strength, and conductivity of an alloy depend on the elements used and their proportions. Examples include brass, bronze, and stainless steel. Hence, the correct answer is the given option.

Additional Information

• Characteristics of Alloys:

• Alloys are a combination of two or more elements, where at least one is a metal.

• Alloys are created to enhance the properties of metals, such as durability, strength, and corrosion resistance.

• Example: Bronze is an alloy of copper and tin, used for decorative purposes and in tools.

• Steel: An alloy of iron and carbon, widely used in construction due to its strength and flexibility.

• Difference between Mixtures and Compounds:

• Mixtures are physical combinations of substances, where the individual components retain their properties.

• Compounds are chemically bonded substances that lose the individual properties of their components and have a fixed composition.

• Alloys fall under mixtures because their components are not chemically bonded and can have variable compositions.

• Applications of Alloys:

• Brass: Used in musical instruments and decorative items.

• Stainless Steel: Used in kitchenware, industrial equipment, and medical tools due to its resistance to corrosion.

• Aluminum Alloys: Lightweight and strong, used in aerospace and automobile industries.

Important Points

• Key Characteristics of Alloys:

• Alloys are created to improve the mechanical and chemical properties of metals.

• They are widely used across industries, including construction, transportation, electronics, and healthcare.

• Understanding Mixtures:

• Mixtures can be homogeneous or heterogeneous. Alloys are homogeneous mixtures because their components are evenly distributed.

• Alloys retain the properties of their constituents, unlike compounds, which have new properties.

Q7. Answer: (a) Vishwanath Padakanti

The correct answer is Vishwanath Padakanti.

Key Points

• Vishwanath Padakanti, an Indian climber, became the youngest Indian to summit Mt. Everest and accomplish the Seven

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Summits challenge in 2025.

• The Seven Summits challenge involves climbing the highest peak on each of the seven continents. This feat is recognized globally and is considered one of the most prestigious achievements in mountaineering.

• The achievement of summiting Mt. Everest, which stands at a height of 8,848.86 meters (29,031 feet), requires rigorous training, mental resilience, and physical endurance.

• Vishwanath Padakanti's accomplishment reflects his dedication, courage, and determination, making him an inspirational figure for young climbers across the globe.

• His journey involved overcoming extreme weather conditions, high altitudes, and challenging terrains, which showcased his extraordinary skills and perseverance.

• The Seven Summits include peaks such as Denali (North America), Aconcagua (South America), Mt. Kilimanjaro (Africa), Mt. Elbrus (Europe), Mt. Everest (Asia), Mt. Vinson (Antarctica), and Carstensz Pyramid (Oceania).

• Vishwanath's achievement highlights India's growing presence in international mountaineering and inspires youth to pursue their dreams in adventure sports. Hence, Vishwanath Padakanti is the correct answer.

Additional Information

• The Seven Summits Challenge:

• Seven Summits represent the highest mountain peaks on each of the seven continents and are a coveted goal for mountaineers worldwide.

• The challenge includes climbing peaks such as Mt. Everest (Asia), Denali (North America), Aconcagua (South America), Mt. Kilimanjaro (Africa), Mt. Elbrus (Europe), Mt. Vinson (Antarctica), and Carstensz Pyramid (Oceania).

• It requires extensive training and preparation, as climbers face diverse challenges such as extreme cold, high altitudes, and technical climbing routes.

• Mt. Everest:

• Mt. Everest, located in the Himalayas, is the tallest mountain in the world at 8,848.86 meters (29,031 feet).

• Summiting Everest is considered a pinnacle achievement for mountaineers due to the extreme altitude, unpredictable weather, and physical demands.

• The first successful summit was achieved by Sir Edmund Hillary and Tenzing Norgay in 1953.

• Indian Achievements in Mountaineering:

• India has produced several notable mountaineers, including Malavath Purna, Krushnaa Patil, and Arjun Vajpai, who have achieved significant milestones in the field of adventure sports.

• Malavath Purna became the youngest girl to summit Mt. Everest at the age of 13 in 2014.

• Krushnaa Patil and Arjun Vajpai have also inspired many through their achievements in high-altitude mountaineering.

Important Points

• Preparation for Seven Summits:

• Climbing the Seven Summits requires advanced skills in high-altitude climbing, technical expertise, and physical fitness.

• Mountaineers often undergo years of training and acclimatization to prepare for the challenges posed by extreme weather and high altitudes.

• Global Recognition:

• Completing the Seven Summits is considered one of the ultimate achievements in mountaineering and is recognized globally.

• It is a testament to the climber's physical and mental endurance, as well as their ability to adapt to diverse conditions.

Q8. Answer: (a) Indira Gandhi Canal

The correct answer is Indira Gandhi Canal.

Key Points

• The Indira Gandhi Canal, located in India, is one of the largest canal systems in the world, providing irrigation facilities to the arid regions of Rajasthan.

• It originates from the Sutlej River and the Beas River, with its primary function being to supply water to barren areas and support agriculture in regions that suffer from water scarcity.

• The canal spans a length of approximately 650 km, benefitting districts such as Bikaner, Jaisalmer, and Barmer.

• Inaugurated in 1984, the canal has played a significant role in transforming the desert landscape of Rajasthan into arable land. Hence, it is the correct answer.

Additional Information

• Indira Gandhi Canal:

• The canal is a key source of irrigation for Rajasthan, a region characterized by arid climatic conditions and desert terrain.

• It has significantly improved agricultural productivity and has supported the cultivation of crops such as wheat, mustard, and cotton.

• Example: The canal has also contributed to drinking water supply in remote areas of Rajasthan, ensuring the availability of water for domestic use.

• Comparison with Other Projects:

• Hirakud Project: Located in Odisha, this is primarily a dam and not a canal system. It focuses on flood control, irrigation, and power generation.

• Chambal Project: Spanning Rajasthan and Madhya Pradesh, this project is based on dam construction and hydroelectric power generation rather than an extensive canal system.

• Kosi Project: Situated in Bihar, this is focused on flood control and irrigation, but it does not compare in scale to the Indira Gandhi Canal.

Important Points

• Geographical Importance:

• The canal passes through regions that suffer from extreme water scarcity, transforming desert areas into fertile agricultural lands.

• It also plays a role in reducing migration from rural areas, as it provides livelihood opportunities through agriculture.

• Environmental Impact:

• The canal has helped mitigate desertification and has contributed to the greening of barren lands, improving the local ecosystem.

• However, concerns regarding water wastage and potential salinization of soil require attention for sustainable usage.

Q9. Answer: (a) Updates the saved file without creating a new one

The correct answer is Updates the saved file without creating a new one.

Key Points

• In most software applications, pressing Ctrl + S performs the function of saving the current document or file. It is commonly used across text editors, spreadsheets, graphic design tools, and other software.

• When Ctrl + S is pressed multiple times, the existing file is updated each time. It does not create a new file, but rather overwrites the previous saved version of the file with the current changes.

• The functionality ensures that the latest modifications are stored securely without affecting the original file's name or its location. Hence, statement 1 is correct.

• Option 2 ("Reverts the document") is incorrect because pressing Ctrl + S only saves changes and does not revert the document to a previous state.

• Option 3 ("Saves a new copy each time") is incorrect since using Ctrl + S does not create duplicate copies. Instead, it modifies and updates the existing file.

• Option 4 ("Deletes the previous version") is incorrect as saving does not delete the previous version. It simply updates the file with the latest changes.

• Option 5 is incomplete and does not provide a valid functionality for Ctrl + S.

• Hence, the correct answer is Updates the saved file without creating a new one.

Additional Information

• Usage of Ctrl + S:

• Ctrl + S is a universal keyboard shortcut used to save files in various software applications such as Microsoft Word, Excel, PowerPoint, graphic editing software like Photoshop, and even coding environments like Visual Studio Code.

• This shortcut is essential for data preservation and avoids losing progress due to unexpected software or system crashes.

• File Saving Behavior:

• When saving a file using Ctrl + S, the software updates the current file's contents without altering its name or location.

• If saving for the first time, most applications prompt users to specify a location and a name for the file. Subsequent saves will overwrite the file at the specified location.

• Example: If you save a Word document named "Report.docx" using Ctrl + S, the changes will be saved to "Report.docx" without creating a new file.

• Importance of Frequent Saving:

• Regularly using Ctrl + S minimizes the risk of data loss due to unexpected events like software crashes or power outages.

• Some software applications even include an auto-save feature, ensuring periodic saving without manual intervention.

• For example, in Google Docs, changes are saved automatically as you type, eliminating the need for manual saving.

Important Points

• Key Features of Saving:

• Saving ensures data integrity, allowing users to preserve their progress and access updated files later.

• Some applications also allow saving under a new name or location using the "Save As" option, which creates a new file while retaining the original document.

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• Software-Specific Functionalities:

• Microsoft Word: Ctrl + S updates the document and retains its formatting and layout.

• Adobe Photoshop: Ctrl + S saves the current project in its original format, while Ctrl + Shift + S enables saving in a different format or location.

• Visual Studio Code: Ctrl + S is used to save code files, ensuring real-time updates for testing and debugging.

Q10. Answer: (c) Diwan-i-Insha

The correct answer is Diwan-i-Insha.

Key Points

• Diwan-i-Insha: This department was responsible for handling royal correspondence and official communication during the era of the Delhi Sultanate. It was headed by an official called the Dabir-i-Khas, who ensured the accuracy and confidentiality of the Sultan's communications.

• The Dabir-i-Khas was tasked with drafting letters, preparing official decrees, and maintaining records of state correspondence. Hence, statement is correct.

• The department's role was critical in ensuring smooth administration, as communication between various provinces, officials, and the Sultan was facilitated through it.

• It played an essential part in maintaining the Sultanate's centralized administrative structure, which relied heavily on written orders and decrees.

• Diwan-i-Insha was instrumental in safeguarding official secrets and preventing unauthorized access to sensitive information. This ensured the Sultan's commands were followed without compromise. Hence, the statement is correct.

• Hence, the correct answer is Diwan-i-Insha.

Additional Information

• Other Departments of the Delhi Sultanate:

• Diwan-i-Arz: This department was responsible for military affairs. It managed the recruitment of soldiers, allocation of salaries, and maintenance of army equipment.

• Diwan-i-Riyasat: This department handled economic matters, including regulation of markets, trade, and commerce. It ensured fair pricing and prevented hoarding.

• Barid-i-Mumalik: This department was in charge of intelligence and espionage. It gathered information about internal and external threats to the Sultanate.

• Delhi Sultanate Administration:

• The administration was highly centralized, with the Sultan as the supreme authority. Departments like Diwan-i-Insha played a vital role in executing and communicating royal orders.

• The Sultanate maintained a structured bureaucracy, with each department headed by skilled officials to ensure efficient governance.

• Important Functions of Diwan-i-Insha:

• Drafting royal decrees and proclamations.

• Ensuring confidentiality and security of state communications.

• Maintaining records of important correspondence and written orders.

Important Points

• Key Characteristics of Delhi Sultanate Administration:

• Centralized structure with specific departments for governance.

• Each department had a defined role and responsibility to ensure efficient administration.

• Officials were chosen based on their skills and loyalty to the Sultan.

• Historical Significance:

• The administrative system of the Delhi Sultanate laid the foundation for governance in later empires like the Mughal Empire.

• Departments like Diwan-i-Insha highlighted the importance of organized communication in maintaining a vast empire.

Q11. Answer: (a) New Delhi

The correct answer is New Delhi.

Key Points

• The First International Research Conference on Pension (IRCP) in April 2025 was inaugurated in New Delhi. Being the capital city of India, New Delhi is often chosen for hosting major national and international events.

• The conference aimed to bring together global experts, policymakers, researchers, and stakeholders to deliberate on issues related to pensions and social security systems.

• New Delhi is well-known for its infrastructure and facilities to host international conferences, making it a favorable choice for such

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significant events. Hence, the correct answer is New Delhi.

• The conference focused on the future of pension systems, addressing challenges, reforms, and innovative solutions globally and in the Indian context.

• New Delhi being the administrative and political hub of India allowed for better participation from government representatives and international delegates. Thus, the choice of New Delhi is significant.

Additional Information

• About New Delhi:

• New Delhi is the capital city of India and serves as the seat of the central government. It hosts various international events due to its location and infrastructure.

• The city is equipped with world-class convention centers, hotels, and transport facilities that make it an ideal location for global conferences.

• Importance of Pension Conferences:

• These conferences provide a platform for discussing pension reforms, demographic changes, and sustainability of pension systems globally.

• They help countries like India improve their social security systems for aging populations and economic challenges.

• Global Participation:

• The conference in New Delhi saw participation from international organizations, academics, and policymakers, highlighting India's role in global discussions on pensions.

• Such events foster knowledge exchange and collaboration on innovative solutions for pension-related issues.

Important Points

• Why New Delhi was chosen:

• New Delhi’s central location and accessibility make it suitable for hosting events that require participation from across India and the globe.

• The city has modern infrastructure, including airports, metro systems, and conference venues, ensuring smooth execution of large-scale events.

• Significance of the Conference:

• The conference emphasized the importance of pension reforms in addressing financial security for retirees and reducing economic disparities.

• It provided insights into global best practices and innovative approaches to strengthen India’s pension system.

Q12. Answer: (a) Mediterranean Sea

The correct answer is Mediterranean Sea.

Key Points

• The western cyclonic disturbances are weather systems that enter the Indian subcontinent during the winter months. These disturbances primarily originate from the Mediterranean Sea.

• Western cyclonic disturbances are extratropical storms that travel from the west to the east, influencing the weather patterns of northern India. They are significant contributors to winter rainfall, especially in regions like Punjab, Haryana, Himachal Pradesh, and Jammu & Kashmir.

• These disturbances are formed due to the interaction of cold polar air masses with warm tropical air masses over the Mediterranean region. Hence, the correct region of origin is the Mediterranean Sea.

• Upon formation, the disturbances move eastward, following the subtropical jet stream. They typically enter the Indian subcontinent through the western and northwestern regions. This process results in rainfall and snowfall during the winter months.

• The impact of western cyclonic disturbances is particularly visible in the northern plains and Himalayan regions. They cause precipitation essential for winter crops like wheat and maintain the water levels in rivers originating from the Himalayas.

• Other regions like the Black Sea, Baltic Sea, or North Atlantic Ocean do not primarily contribute to these disturbances affecting India. Their geographical location and climatic conditions differ, making the Mediterranean Sea the correct answer.

Additional Information

• Western Cyclonic Disturbances:

• These are low-pressure systems that originate over the Mediterranean region and move eastward due to the influence of the jet stream.

• They are prominent weather phenomena during the winter season (December to February) and affect the northern parts of India.

• These disturbances are responsible for widespread rain, snow, hailstorms, and cold waves in India.

• Regions of Impact:

• The northern plains, including areas of Punjab, Haryana, Uttar Pradesh, and Delhi, receive rainfall due to these disturbances.

• The Himalayan regions experience snowfall, which plays a crucial role in maintaining the water supply in rivers like the Ganga

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and Yamuna.

• Importance for Agriculture:

• The rainfall caused by western disturbances aids the growth of Rabi crops, especially wheat, which is a staple crop in India.

• It helps replenish soil moisture and maintains the groundwater levels in northern India.

Important Points

• Mediterranean Sea:

• Located between Europe, Asia, and Africa, the Mediterranean Sea is known for its role in influencing global weather patterns.

• Its climatic conditions favor the formation of low-pressure systems that travel eastward due to prevailing winds and jet streams.

• Impact of Jet Streams:

• The subtropical jet stream guides the movement of western cyclonic disturbances toward the Indian subcontinent.

• Jet streams act as a conveyor belt for these disturbances, enabling their impact on weather across large distances.

Q13. Answer: (b) Lakshminarayana Subramaniam

The correct answer is Lakshminarayana Subramaniam.

Key Points

• Lakshminarayana Subramaniam, an eminent violinist from Karnataka, has been internationally recognized for his contributions to Indian classical music.

• He is regarded as a virtuoso violinist, blending the traditions of Carnatic music with elements of Western classical music.

• Lakshminarayana Subramaniam has performed across the globe, gaining acclaim for his unique style and his ability to seamlessly fuse different genres of music.

• His contributions to music include composing, performing, and teaching, which have significantly enriched the realm of Indian classical music.

• In 2025, he was awarded the Padma Vibhushan, India's second-highest civilian award, for his outstanding contributions to Indian classical music.

• The Padma Vibhushan is awarded for across various fields, such as arts, science, public service, and sports.

• Hence, the correct answer is Lakshminarayana Subramaniam.

Additional Information

• Padma Awards:

• Instituted in 1954, the Padma Awards are one of the highest civilian honors in India.

• The awards are categorized into Padma Vibhushan (for exceptional and distinguished service), Padma Bhushan (for distinguished service of high order), and Padma Shri (for distinguished service).

• Example: Other recipients of the Padma Vibhushan include MS Subbulakshmi for Carnatic music and Ravi Shankar for Hindustani classical music.

• Carnatic Music:

• Carnatic music is one of the two major traditions of Indian classical music, originating in South India.

• Characterized by its complex rhythms and melodic structures, it often involves the use of vocal and instrumental renditions.

• Violin: The violin has become an integral part of Carnatic music performances, with virtuosos like Lakshminarayana Subramaniam bringing global recognition to this art form.

Important Points

• Other Options:

• Anant Nag: A renowned Kannada actor, not related to Indian classical music.

• Gangubai Hangal: A Hindustani classical vocalist from Karnataka, but she passed away in 2009 and was awarded Padma Bhushan in 1971.

• Ricky Kej: A music composer from Karnataka, known for his contributions to global music and environmental awareness, but not awarded the Padma Vibhushan in 2025.

Q14. Answer: (d) Air Marshal Narmdeshwar Tiwari

The correct answer is Air Marshal Narmdeshwar Tiwari.

Key Points

• On 2 May 2025, Air Marshal Narmdeshwar Tiwari assumed charge as the Vice Chief of the Air Staff of the Indian Air Force (IAF).

• The position of Vice Chief of the Air Staff is one of the most significant roles in the IAF, second only to the Chief of Air Staff, and involves overseeing the operational and administrative functions of the force.

• Air Marshal Narmdeshwar Tiwari is an experienced officer with vast expertise in aviation operations, strategic planning, and military leadership. Hence, option 4 is correct.

• This appointment is part of a regular rotation and succession process in the armed forces to ensure smooth operations and strategic continuity.

• The Vice Chief plays a critical role in implementing policy decisions, managing resources, and ensuring the preparedness of the force for various missions. Hence, statement 1 is incorrect, and statement 4 is correct.

Additional Information

• Indian Air Force:

• The Indian Air Force (IAF) is the air arm of the Indian Armed Forces, tasked with securing Indian airspace and conducting aerial warfare during armed conflicts.

• It was established on 8 October 1932, and since then, it has grown to become one of the most technologically advanced air forces in the world.

• The IAF operates under the Ministry of Defence and is led by the Chief of Air Staff, supported by various senior officers, including the Vice Chief of Air Staff.

• Role of Vice Chief of the Air Staff:

• The Vice Chief of the Air Staff acts as the second-in-command to the Chief of Air Staff, assisting in strategic planning and decision-making.

• This position is crucial for managing day-to-day operations, resource allocation, and the implementation of policies across the IAF.

• The Vice Chief often oversees modernization projects, procurement of equipment, and coordination with other branches of the armed forces.

Important Points

• Air Marshal Narmdeshwar Tiwari:

• He is a highly skilled and decorated officer, having served in various key positions within the IAF, demonstrating exemplary leadership and operational capabilities.

• His appointment reflects the IAF's policy of promoting experienced and capable officers to top leadership roles to maintain operational efficiency and strategic excellence.

• Other Air Marshals:

• Air Marshal Anil Chopra: Known for his contributions to aviation, but not appointed as Vice Chief in this instance.

• Air Marshal Rakesh Kumar Singh Bhadauria: Former Chief of Air Staff; his achievements include overseeing modernization efforts in the IAF.

• Air Marshal SP Dharkar: A senior officer with notable contributions, but not selected for this role in May 2025.

Q15. Answer: (c) Rubidium-87

The correct answer is Rubidium-87.

Key Points

• Eric Cornell and Carl Wieman, two physicists, achieved a remarkable breakthrough in 1995 by creating the first Bose-Einstein condensate (BEC).

• The Bose-Einstein condensate was formed using the isotope Rubidium-87. This isotope was chosen for its suitable atomic properties that allowed cooling down to extremely low temperatures.

• Bose-Einstein condensates occur when a group of bosonic atoms is cooled to temperatures close to absolute zero, where they occupy the lowest quantum state and behave like a single entity.

• Rubidium-87 is a bosonic isotope because its atomic nucleus has an integer spin, making it ideal for Bose-Einstein condensation.

• To create the BEC, Cornell and Wieman used advanced techniques, including laser cooling and magnetic trapping, to achieve temperatures below 170 nanokelvin.

• This achievement proved the theoretical predictions made by Satyendra Nath Bose and Albert Einstein decades earlier regarding the behavior of bosonic particles at near-zero temperatures.

• The creation of the Bose-Einstein condensate marked a major milestone in quantum mechanics and opened new avenues for research in fields such as quantum computing and precision measurement.

Additional Information

• Rubidium-87:

• Rubidium is a chemical element with symbol Rb and atomic number 37. Rubidium-87 is one of its naturally occurring isotopes.

• This isotope is widely used in atomic physics experiments due to its favorable properties for cooling and trapping.

• Bose-Einstein Condensates:

• BECs are formed by cooling bosonic atoms to temperatures close to absolute zero, at which quantum effects become macroscopic.

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• Such condensates are used in research on superfluidity, quantum simulations, and the study of fundamental quantum phenomena.

• Other isotopes considered for Bose-Einstein condensation:

• Although Sodium-23 was used in later experiments, Rubidium-87 was the first isotope successfully condensed into a BEC.

• Other isotopes, such as Cesium-133 and Thorium-232, have different atomic properties, making them less suitable for BEC formation under the conditions used by Cornell and Wieman.

Important Points

• Satyendra Nath Bose and Albert Einstein:

• The Bose-Einstein condensate was first predicted theoretically by Satyendra Nath Bose and Albert Einstein in the 1920s.

• They proposed that at extremely low temperatures, bosonic particles would collapse into the same quantum state, forming a condensate.

• Applications of Bose-Einstein Condensates:

• BECs are used for research in quantum mechanics, quantum computing, and precision measurements.

• The study of BECs has enabled advancements in understanding phenomena such as superfluidity and quantum phase transitions.

Q16. Answer: (c) Article 300A

The correct answer is Article 300A.

Key Points

• Article 300A of the Constitution of India states that 'no person shall be deprived of his property save by authority of law.'

• This article was added to the Constitution of India by the 44th Amendment Act in 1978, replacing the original provision in Article 31, which guaranteed the right to property as a fundamental right.

• The right to property under Article 300A is now a legal right and not a fundamental right. Hence, it does not enjoy the same level of protection as fundamental rights under Part III of the Constitution.

• It ensures that the government can acquire private property only through legal procedures and by providing compensation as per the laws governing land acquisition. This protects individuals from arbitrary deprivation of property.

• Since the statement in the question refers specifically to the provision about deprivation of property by authority of law, Article 300A correctly addresses this issue. Hence, the correct answer is Article 300A.

Additional Information

• Article 300A of the Constitution:

• Article 300A is part of Part XII of the Constitution, dealing with property, contracts, liabilities, obligations, and suits.

• It ensures that property cannot be taken away from an individual unless authorized by a legislative provision.

• It empowers the government to acquire property for public purposes, provided there is a legal basis and adequate compensation.

• Historical Context:

• Before 1978, the right to property was a fundamental right under Article 31. However, due to issues with land reforms and equitable distribution of resources, it was removed from Part III and made a legal right under Article 300A.

• 44th Amendment Act: Passed in 1978, this amendment transformed the right to property into a constitutional but non-fundamental right.

• The change was intended to prioritize socio-economic justice over individual property rights.

• Legal Implications:

• As a legal right, violations of Article 300A can be challenged in a court of law, but it does not fall under the ambit of the fundamental rights, which can be directly enforced under Article 32.

• The government is obligated to follow due process and provide compensation when acquiring property.

Important Points

• Comparison with Fundamental Rights:

• As a legal right, Article 300A does not offer the same level of constitutional protection as fundamental rights like Article 14 (Right to Equality) or Article 19 (Freedom of Speech).

• However, it still provides a safeguard against arbitrary actions by the state concerning property ownership.

• Land Acquisition Laws:

• The Land Acquisition Act, 2013, ensures fair compensation, rehabilitation, and resettlement when land is acquired for public purposes.

• It is crucial for maintaining a balance between developmental needs and individual property rights.

• Judicial Interpretation:

• The judiciary has upheld the principle that deprivation of property must comply with the law and be backed by legislative

authority.

• For example, in cases like K.T. Plantation Pvt. Ltd. vs. State of Karnataka (2011), the Supreme Court emphasized the importance of following legal procedures for property acquisition.

Q17. Answer: (c) Gujarat and Telangana

The correct answer is Gujarat and Telangana.

Key Points

• Panchayat Advancement Index (PAI): The Panchayat Advancement Index (PAI) is a comprehensive report introduced to measure the performance and development of panchayats across India. It is aimed at promoting rural governance and ensuring effective delivery of public services at the grassroots level.

• Release in April 2025: The first report of the PAI was released in April 2025. It highlights the states that have performed exceptionally well in terms of panchayat governance and development.

• Gujarat and Telangana: According to the report, Gujarat and Telangana are leading with the highest number of “front runner” panchayats. This showcases their commitment to rural development and effective governance. Hence, the correct answer is Gujarat and Telangana.

• Criteria for evaluation: The PAI evaluates panchayats based on multiple factors such as governance practices, delivery of services, infrastructure development, education, health, and economic activities.

• Front runner panchayats: These are panchayats that excel in multiple indicators and are models of efficiency and development, contributing significantly to rural progress.

Additional Information

• Features of Panchayat Advancement Index:

• Objective: The primary objective of the PAI is to assess the performance of panchayats in fostering rural development and improving governance.

• Indicators: It includes indicators related to healthcare, education, infrastructure, sanitation, employment, women empowerment, and environmental sustainability.

• Data collection: The report is based on extensive data collection from various government and non-governmental sources to ensure accuracy and reliability.

• Performance of Gujarat and Telangana:

• Gujarat: Known for its progressive rural policies and initiatives, Gujarat has focused on improving infrastructure, sanitation, and women's participation in governance.

• Telangana: Telangana has implemented innovative schemes for rural development, such as Mission Bhagiratha for drinking water supply and Palle Pragathi for village development.

• Significance of PAI:

• The PAI helps identify model panchayats that can serve as benchmarks for other regions.

• It aims to enhance transparency, accountability, and efficiency in rural governance.

• The index provides actionable insights for policymakers to improve rural development strategies.

Important Points

• Additional characteristics of options:

• Chhattisgarh and Uttar Pradesh: While these states have made efforts in rural development, they are not leading in the PAI report.

• Assam and West Bengal: These states also have progressive initiatives but do not feature as front runners in the PAI.

• Meghalaya and Nagaland: Known for their unique governance models, these states focus on local participation but are not leading in the PAI rankings.

• Reports and indices: The PAI aligns with India's efforts to achieve the Sustainable Development Goals (SDGs) at the grassroots level.

Q18. Answer: (c) Stethoscope

The correct answer is Stethoscope.

Key Points

• Stethoscope: The stethoscope is a medical instrument used by healthcare professionals to listen to internal body sounds, particularly from the heart, lungs, and blood vessels.

• It is widely used for diagnostic purposes, helping doctors identify abnormalities such as irregular heartbeats, breathing difficulties, or other internal issues.

• The stethoscope typically consists of earpieces, a tubing system, and a chest piece that includes a diaphragm and/or bell, which amplifies sounds from the body. Hence, the statement about stethoscope is correct.

• It was invented in 1816 by the French physician René Laennec, who initially created a wooden tube to amplify body sounds.

• Modern stethoscopes are available in various types, including acoustic stethoscopes, electronic stethoscopes, and even smart stethoscopes that can record and analyze sounds digitally. Hence, the functionality of stethoscope is accurate.

• The stethoscope remains an essential tool in healthcare settings for performing routine check-ups, monitoring chronic conditions, and conducting emergency assessments.

Additional Information

• Other Medical Instruments:

• Endoscope: Used to examine the interior of hollow organs or cavities within the body, such as the digestive tract, using a flexible tube with a camera. It is primarily used for diagnostic imaging and surgeries.

• Barometer: Not a medical instrument, but a device used to measure atmospheric pressure, often employed in weather forecasting.

• Colonoscope: A specialized endoscope used to examine the colon and rectum for abnormalities such as polyps, cancer, or inflammation.

• Historical Context:

• The invention of the stethoscope marked a turning point in the field of medicine, providing physicians with a tool to directly assess internal body sounds without invasive procedures.

• René Laennec initially used a wooden tube, later evolving into the modern stethoscope equipped with advanced features like noise reduction and sound amplification.

• Modern Innovations:

• Electronic stethoscopes are now integrated with Bluetooth and AI technology for precise diagnoses.

• Smart stethoscopes can store patient data and provide real-time analysis, aiding in better healthcare delivery.

Important Points

• Applications of Stethoscope:

• Used for diagnosing cardiovascular conditions by listening to heartbeats and murmurs.

• Essential for assessing lung health, detecting abnormalities like wheezing or crackling sounds.

• In neonatal care, stethoscopes are used to monitor the health of newborns.

• Technological Advancements:

• Smart stethoscopes reduce ambient noise, enhancing sound clarity for accurate diagnosis.

• Integration with telemedicine platforms allows remote patient monitoring.

Q19. Answer: (d) Manipur

The correct answer is Manipur.

Key Points

• Manipur, located in the northeastern region of India, has historically witnessed ethnic tensions due to its diverse population comprising various tribal and non-tribal communities.

• The Kuki community, one of the prominent tribal groups in Manipur, has been at the forefront of demanding buffer zones to minimize conflicts with other ethnic groups, particularly the Meitei community.

• Buffer zones are proposed to act as neutral areas, ensuring physical separation and reducing direct confrontations between communities. These zones aim to maintain peace and prevent clashes. Hence, the correct region is Manipur.

• Manipur's geographical and demographic landscape adds complexity to its ethnic tensions. It is bordered by states like Nagaland, Mizoram, and Assam, and international borders with Myanmar, making it strategically sensitive.

• The demand for buffer zones reflects the deep-seated ethnic divisions in the region. These divisions are often fueled by historical grievances, land disputes, and socio-political dynamics. Hence, the statement about Kuki groups demanding buffer zones in Manipur is correct.

• The issue gained prominence in 2025, highlighting the ongoing challenges of ethnic harmony in the state. Such demands often lead to debates over the allocation of resources, governance, and administrative measures.

• Manipur's ethnic composition includes groups like the Meiteis, Nagas, and Kukis, among others. The historical and cultural differences between these groups have contributed to periodic conflicts. Hence, the correct region for this demand is Manipur.

• Hence, the correct answer is Manipur.

Additional Information

• Ethnic composition of Manipur:

• Manipur has a diverse population of various tribal and non-tribal communities, such as the Meiteis, Kukis, and Nagas. These groups have distinct cultural practices and historical backgrounds.

• The Meiteis predominantly inhabit the valley regions, whereas the Kuki and Naga tribes occupy the hill regions. This geographical division has often been a point of contention.

• Reasons for ethnic tensions:

• The primary reasons include disputes over land ownership, political representation, and cultural differences.

• The demand for buffer zones arises from the fear of losing land and identity, particularly among the tribal communities.

• Historical events, such as the Naga-Kuki conflict, have exacerbated the divisions, leading to mistrust between communities.

• Government initiatives:

• The government has implemented peace-building measures, including dialogues, development programs, and special laws, to address ethnic tensions.

• The Armed Forces Special Powers Act (AFSPA) is enforced in some areas of Manipur to maintain law and order, though it is controversial due to human rights concerns.

• Efforts to resolve disputes include the formation of committees and agreements between conflicting communities.

Important Points

• Geography of Manipur:

• Manipur is a part of the northeastern region of India, bordered by Nagaland, Mizoram, Assam, and Myanmar.

• Its strategic location makes it crucial for India's security and trade with Southeast Asia.

• Historical conflicts:

• The Naga-Kuki conflict in the 1990s led to significant loss of life and displacement, leaving long-lasting scars in the region.

• Periodic clashes between the Meiteis and Kukis have necessitated intervention by the state and central governments.

• Buffer zones:

• These zones are aimed at reducing direct contact between conflicting communities, ensuring peace and security.

• While they may help in the short term, long-term solutions require addressing underlying socio-economic and political issues.

Q20. Answer: (a) Indus Waters Treaty

The correct answer is Indus Waters Treaty.

Key Points

• The Indus Waters Treaty was signed in 1960 between India and Pakistan and brokered by the World Bank. It was designed to manage the use of the waters of the Indus River and its tributaries.

• Under the treaty, India has control over the waters of the eastern rivers (Sutlej, Beas, and Ravi), while Pakistan has control over the western rivers (Indus, Jhelum, and Chenab).

• The treaty is considered one of the most successful water-sharing agreements globally. Despite tensions between the two countries, it has largely been upheld. Hence, statement 1 is correct.

• The suspension of the treaty by India on 23 April 2025 due to national security concerns is significant as it marks a departure from decades of adherence to the agreement.

• The decision to suspend such a treaty could be linked to increasing geopolitical tensions between India and Pakistan. Hence, this treaty is relevant to the question.

• The Tashkent Declaration, Simla Agreement, and Non-Nuclear Aggression Agreement, while significant in their own right, are related to peace and non-aggression rather than the sharing of resources like water.

• Thus, these agreements are not directly related to the question. Hence, these options are incorrect.

• Hence, the correct answer is Indus Waters Treaty.

Additional Information

• Indus Waters Treaty:

• The treaty allocates 80% of the water from the Indus River system to Pakistan, while India is allowed the remaining 20%.

• It allows India limited use of water from the western rivers for purposes like irrigation, storage, and hydroelectric projects. This limitation has often been criticized as restrictive.

• Despite frequent conflicts between India and Pakistan, the treaty has remained intact, showcasing its importance as a symbol of cooperation.

• India's suspension of the treaty could impact agriculture and water availability for millions of people in Pakistan.

• Tashkent Declaration:

• Signed in 1966 after the 1965 Indo-Pak war, the declaration aimed to restore peace between the two countries but does not deal with water-sharing agreements.

• Simla Agreement:

• Signed in 1972, this agreement was intended to ensure peaceful relations and emphasize bilateral negotiations for conflict resolution.

• Non-Nuclear Aggression Agreement:

• Signed in 1988, this agreement aimed to prevent attacks on nuclear installations in both countries.

Important Points

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• Impact of Treaty Suspension:

• Suspension of the treaty could lead to water shortages in Pakistan, affecting agriculture, industry, and daily life.

• India could use this suspension as a strategic tool to increase pressure on Pakistan during times of conflict.

• Historical Context:

• The treaty was signed during a period of relative peace and aimed to prevent conflict over shared water resources.

• It has been upheld even during wars and heightened tensions, reflecting its importance in Indo-Pak relations.

Q21. Answer: (a) New Delhi

The correct answer is New Delhi.

Key Points

• Army Commanders Conference: The Army Commanders Conference is an important event organized by the Indian Army to discuss operational and administrative matters. It is generally held twice a year.

• The conference is a platform for the Indian Army's senior leadership, including Commanders of various Army Commands, to deliberate on issues related to training, logistics, modernization, and strategies.

• In April 2025, the conference was held in New Delhi, which serves as the headquarters for the Indian Army and hosts several important military events. Hence, New Delhi is the correct answer.

• Significance of New Delhi: As the capital city of India, New Delhi is the administrative hub and the center for military decision-making. It houses key institutions such as the Ministry of Defence and the Indian Army Headquarters.

• The conference venue in New Delhi allows seamless interaction between military leadership and government officials, ensuring effective communication of the Army's requirements and strategies. Hence, the selection of New Delhi for the conference is logical and strategic.

Additional Information

• Indian Army Overview:

• The Indian Army is one of the largest and most powerful armies in the world, with its primary headquarters located in New Delhi.

• It is organized into various commands, including Western, Eastern, Northern, Southern, South-Western, and Central Commands, along with the Army Training Command.

• Army Commanders Conference:

• The Army Commanders Conference allows the senior leadership to assess operational readiness and address challenges faced by different commands.

• It also serves as a platform to finalize modernization plans, including procurement of new equipment and technologies.

• The conference typically takes place in New Delhi due to its strategic importance and proximity to government offices.

• Role of New Delhi:

• New Delhi is home to key institutions such as the Ministry of Defence, making it a natural choice for hosting significant military conferences.

• It provides access to top leadership, including the Chief of Army Staff and government officials, ensuring smooth coordination and decision-making.

Important Points

• Other Cities Mentioned in Options:

• Jodhpur: Known for its historical significance and defense establishments, but not the venue for the conference in April 2025.

• Pune: A major defense hub housing the Southern Command Headquarters, but not chosen for the April 2025 conference.

• Chandigarh: Home to the Western Command Headquarters, but not the venue for this specific conference.

• Importance of Army Commanders Conference:

• It emphasizes operational preparedness, modernization, and addressing challenges in logistics and training.

• The conference plays a pivotal role in shaping the Army's policies and ensuring alignment with national defense strategies.

Q22. Answer: (d) Indignation

The correct answer is Indignation.

Key Points

• Indignation refers to a feeling of anger or resentment caused by perceived injustice or unfair treatment. The Extremists in the Indian freedom struggle sought to evoke this emotion in people to mobilize them against British colonial rule.

• The British administration imposed oppressive policies, exploited resources, and discriminated against Indians, leading to widespread dissatisfaction. The Extremists leveraged this dissatisfaction to arouse indignation and unify the masses against colonial domination.

• Prominent leaders like Bal Gangadhar Tilak, Bipin Chandra Pal, and Lala Lajpat Rai played a crucial role in highlighting the injustices of British rule through fiery speeches, writings, and public movements. Their efforts aimed to instill a strong sense of

outrage among Indians.

• Events: The partition of Bengal in 1905 by Lord Curzon was a major trigger for public indignation. The move was seen as an attempt to divide and weaken national unity, which sparked intense protests and movements led by Extremist leaders.

• Techniques: Extremists used powerful rhetoric, boycott movements, Swadeshi campaigns, and public demonstrations to channel indignation into collective action. These methods were highly effective in awakening political consciousness among the masses.

• Unlike Moderates, who believed in negotiations and petitions, Extremists advocated for direct action and self-reliance, appealing to the emotions of anger and pride among Indians to fight against colonial oppression.

• Hence, the correct answer is Indignation.

Additional Information

• Extremists in the Indian Freedom Struggle:

• The Extremists emerged as a distinct group within the Indian National Congress in the early 20th century. They believed in more radical approaches compared to the Moderates.

• Their ideology was based on principles of self-rule, self-reliance, and assertive nationalism. They aimed to empower Indians to stand against British exploitation.

• Key Movements and Leaders:

• Swadeshi Movement: Initiated during the partition of Bengal, it encouraged Indians to boycott British goods and promote indigenous products.

• Bal Gangadhar Tilak: Known as the "Father of Indian Unrest," Tilak used newspapers like Kesari and Maratha to highlight British injustices and arouse indignation.

• Lala Lajpat Rai: Played a vital role in organizing protests and inspiring the youth to take a stand against colonial rule.

• Impact of Indignation:

• The feeling of indignation united people from different backgrounds, fostering a strong national identity and collective resistance.

• It also paved the way for future revolutionary movements, including armed resistance, which contributed significantly to India's struggle for independence.

Important Points

• Other Emotions and Their Roles:

• Fear: British rulers often used fear and repression to maintain control, but the Extremists focused on overcoming fear and building courage among the masses.

• Sympathy: While sympathy was important for garnering support, it was not as impactful as indignation in driving active resistance.

• Loyalty: Some Indians were loyal to the British, but the Extremists worked to replace this loyalty with a sense of pride and anger towards colonial exploitation.

• Historical Context:

• The Extremists operated during a time of widespread unrest caused by oppressive British policies like the Vernacular Press Act (1878), Partition of Bengal (1905), and economic drain theories.

• Their efforts laid the groundwork for the Indian independence movement by instilling a sense of urgency and action among the people.

Q23. Answer: (c) 1995

The correct answer is 1995.

Key Points

• India became a member of the World Trade Organization (WTO) on 1 January 1995, following the ratification of the Marrakesh Agreement.

• The World Trade Organization (WTO) was established on 1 January 1995, replacing the General Agreement on Tariffs and Trade (GATT) which had been in effect since 1948.

• India was one of the founding members of the WTO and has actively participated in its negotiations and functions. Hence, option 3 is correct.

• The WTO aims to facilitate international trade, reduce trade barriers, and provide a platform for trade negotiations and dispute resolution.

• India's membership in the WTO has had a significant impact on its trade policies, leading to liberalization and greater integration into the global economy.

Additional Information

• World Trade Organization (WTO):

• The WTO is an intergovernmental organization that regulates international trade. It currently has 164 member countries.

• It was established to replace the General Agreement on Tariffs and Trade (GATT), which was created in 1948.

• The Marrakesh Agreement, signed in April 1994, led to the establishment of the WTO.

• India's involvement in the WTO:

• India is a founding member of the WTO and has played a crucial role in advocating for the interests of developing countries.

• India has actively participated in the WTO's Doha Development Round, focusing on issues like agricultural subsidies, trade facilitation, and special treatment for developing nations.

• India has also used the WTO's dispute resolution mechanism to address trade issues and protect its interests.

• Functions of the WTO:

• The WTO provides a framework for negotiating trade agreements and a dispute resolution mechanism to enforce participants' adherence to its agreements.

• It aims to reduce trade barriers and ensure that trade flows as smoothly, predictably, and freely as possible.

• The WTO also monitors and reviews trade policies of member countries and provides technical assistance to developing countries.

Important Points

• Key Differences Between GATT and WTO:

• GATT was a set of rules, while the WTO is a permanent organization with a more comprehensive framework.

• The WTO includes trade in services and intellectual property, which were not covered under GATT.

• The WTO has a stronger dispute resolution mechanism compared to GATT.

• India's Trade Liberalization:

• India's WTO membership has led to reforms in its foreign trade policies, including reduction in tariffs and export subsidies.

• India has benefited from WTO initiatives like special and differential treatment provisions for developing countries.

• Despite challenges, India continues to advocate for the interests of developing and least-developed countries within the WTO framework.

Q24. Answer: (b) Cultivation of water-intensive crops like paddy

The correct answer is Cultivation of water-intensive crops like paddy.

Key Points

• Groundwater depletion in Punjab and Haryana is primarily due to the cultivation of water-intensive crops like paddy. Paddy requires a significant amount of water, often beyond the natural replenishment capacity of groundwater resources.

• The Green Revolution, introduced in the 1960s, encouraged the cultivation of crops like rice and wheat in Punjab and Haryana, as these regions were suitable for high-yield varieties. However, this came at the cost of unsustainable water use. Hence, this cultivation practice is the primary factor for groundwater exploitation.

• Farmers often rely on free or subsidized electricity to operate tube wells, which allows them to extract groundwater extensively for irrigation purposes. This further exacerbates groundwater depletion. Thus, excessive irrigation for paddy cultivation drives the problem.

• have a minor impact compared to agricultural practices. Paddy cultivation remains the dominant cause of groundwater depletion. Hence, statement 2 is correct.

• Government restrictions on surface water use and soil characteristics do influence water availability, but they are not the primary reasons for groundwater exploitation in these regions. Hence, statements 3 and 4 are incorrect.

• Domestic water consumption accounts for only a small fraction of groundwater usage compared to agricultural activities. Hence, statement 1 is incorrect.

• Therefore, the correct answer is Cultivation of water-intensive crops like paddy.

Additional Information

• Water-intensive crops:

• Paddy is a water-intensive crop that requires standing water for cultivation, making it unsuitable for regions with limited water resources.

• Punjab and Haryana, with their semi-arid climate, have become unsuitable for excessive paddy cultivation due to water scarcity.

• Government policies:

• Policies such as free electricity and subsidies for farmers encourage groundwater exploitation for irrigation.

• The lack of strict regulation on groundwater usage has worsened the situation.

• Consequences:

• Groundwater depletion leads to lower water tables, increased energy consumption for pumping, and reduced water availability for future generations.

• It also impacts soil health and ecosystem balance in the region.

Important Points

• Green Revolution Impact:

• Introduced in the 1960s, the Green Revolution promoted high-yield crop varieties requiring intensive irrigation, significantly depleting groundwater resources.

• Punjab and Haryana became major contributors to India's food grain production at the expense of sustainable water management.

• Government Initiatives:

• Efforts like promoting crop diversification and sustainable agricultural practices are being implemented to reduce water usage.

• For example, shifting to crops like millets and pulses can mitigate groundwater exploitation.

Q25. Answer: (b) Pushyabhuti dynasty

The correct answer is Pushyabhuti dynasty.

Key Points

• The Vardhan dynasty is also known as the Pushyabhuti dynasty. They ruled Northern India during the early medieval period and were particularly prominent in the 6th and 7th centuries CE.

• The dynasty reached its zenith under the leadership of Harshavardhana, one of the most renowned rulers of ancient India. Harshavardhana ruled from 606 CE to 647 CE.

• The Pushyabhuti dynasty originated in the region of Thanesar (modern-day Haryana) and expanded their rule to include parts of present-day Uttar Pradesh, Bihar, and Bengal.

• The dynasty is famous for its cultural achievements. Harshavardhana was a patron of arts and learning, and his court attracted scholars like Banabhatta, who wrote the biographical work Harshacharita.

• The Pushyabhuti kings were known for their administrative efficiency and their ability to maintain stability in their territories. They contributed significantly to the political consolidation of Northern India during their reign.

• The Vardhan dynasty also had a strong inclination towards Buddhism, especially under Harshavardhana, who organized the famous Kannauj Assembly to promote Buddhist teachings.

• Hence, the correct answer is Pushyabhuti dynasty.

Additional Information

• Option 1: Gupta dynasty:

• The Gupta dynasty ruled Northern India from around 320 CE to 550 CE. They are known for their contributions to art, literature, and science, marking the period as the Golden Age of India.

• The Gupta rulers like Chandragupta I and Samudragupta are famous for their political and military achievements. However, they are not related to the Vardhan dynasty.

• Option 3: Nanda dynasty:

• The Nanda dynasty ruled over parts of Northern India in the 4th century BCE. They were known for their immense wealth and military strength but preceded the Vardhan dynasty by several centuries.

• The Nanda dynasty was eventually overthrown by Chandragupta Maurya, who founded the Mauryan Empire.

• Option 4: Maurya dynasty:

• The Maurya dynasty was established by Chandragupta Maurya in 321 BCE and lasted until 185 BCE. The dynasty is best known for rulers like Ashoka the Great, who played a significant role in spreading Buddhism.

• The Maurya dynasty is historically significant but is unrelated to the Vardhan dynasty.

• Pushyabhuti Dynasty Characteristics:

• The Pushyabhuti dynasty is notable for its contribution to religion, culture, and administration in early medieval India.

• They played a significant role in promoting Buddhism and maintaining political stability in Northern India.

• Their rulers, especially Harshavardhana, were known for their military prowess and diplomatic strategies.

Important Points

• Harshavardhana's Reign:

• Harshavardhana ruled for approximately 41 years and consolidated his empire by forming alliances and expanding his territory through military campaigns.

• He converted to Buddhism and became a significant patron of the religion, organizing assemblies and promoting Buddhist teachings.

• Kannauj Assembly:

• Harshavardhana organized the Kannauj Assembly, where scholars, monks, and religious leaders gathered to discuss and promote Buddhist doctrines.

• This event showcased the cultural and religious inclination of the Vardhan dynasty.

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Q26. Answer: (d) Madhya Pradesh

The correct answer is Madhya Pradesh.

Key Points

• India's first AI-powered Real-Time Forest Alert System: In May 2025, Madhya Pradesh became the first Indian state to introduce an AI-powered Real-Time Forest Alert System.

• This system was developed to enhance forest management, track deforestation activities, and provide instant alerts for any illegal activities like logging or encroachment.

• The initiative aimed to improve the efficiency of forest conservation efforts and ensure better protection of wildlife and biodiversity. Hence, the statement is correct.

• Key Features: The system utilizes advanced AI algorithms to analyze satellite imagery and ground-level sensor data to detect changes in forest cover in real-time.

• It helps authorities respond promptly to threats like forest fires, illegal activities, and biodiversity loss. Hence, the statement is correct.

• Madhya Pradesh's leadership: With its vast forest cover, including several national parks and wildlife sanctuaries, Madhya Pradesh was an ideal state to implement this innovative system.

• The state's proactive approach to forest conservation highlights its commitment to environmental sustainability. Hence, the statement is correct.

• Hence, the correct answer is Madhya Pradesh.

Additional Information

• Madhya Pradesh:

• Location: Madhya Pradesh is situated in central India and is known for its rich forest cover, which includes tropical deciduous forests.

• The state has several famous national parks, such as Kanha National Park and Bandhavgarh National Park, which are home to diverse flora and fauna.

• AI in Environmental Conservation:

• Uses: AI technologies are increasingly being used in environmental conservation to monitor deforestation, predict wildlife patterns, and manage natural resources.

• AI-powered systems can process vast amounts of data, including satellite imagery, sensor inputs, and climate patterns, to provide actionable insights for conservation efforts.

• India's forest management initiatives:

• Government's Efforts: India has launched multiple initiatives to conserve forests, such as the National Afforestation Programme and Compensatory Afforestation Fund Management and Planning Authority (CAMPA).

• The introduction of AI-powered systems represents a significant step toward leveraging technology for sustainable development.

Important Points

• Key Legal and Administrative Framework:

• The Forest Conservation Act, 1980, provides guidelines for the conservation and management of forests in India.

• The Wildlife Protection Act, 1972, complements forest conservation by protecting endangered species and their habitats.

• Technological Advancements in Conservation:

• AI-powered systems are part of the broader push for smart technologies in environmental conservation, including GIS mapping and remote sensing.

• These technologies allow authorities to monitor large areas efficiently and respond to threats in real-time.

Q27. Answer: (b) 50th

The correct answer is 50th.

Key Points

• The question mentions JD Vance being sworn in as the Vice President of the United States in 2025.

• The Vice President of the United States is the second-highest executive officer after the President and is elected every four years alongside the President.

• The numbering of Vice Presidents follows a sequential order based on their inauguration into office. By 2025, the correct designation for JD Vance would be the 50th Vice President.

• The previous Vice Presidents, as of 2023, include Kamala Harris, the 49th Vice President, serving under President Joe Biden.

• If JD Vance succeeds Kamala Harris, he would become the 50th Vice President, marking a continuation in the sequence. Hence, this statement is correct.

• Option 48th is incorrect because the 48th Vice President was Mike Pence, who served under Donald Trump.

• Option 49th is incorrect because Kamala Harris is the current 49th Vice President.

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• Option 51st is incorrect as it refers to a Vice President succeeding JD Vance, which is not relevant to the scenario described in the question.

• Hence, the correct answer is 50th.

Additional Information

• Vice President of the United States:

• The Vice President is the first in the line of succession to the Presidency and assumes the role in the event of the President's resignation, death, removal, or incapacitation.

• The Vice President also serves as the President of the Senate, casting votes in case of ties and overseeing Senate proceedings.

• Notable Vice Presidents include John Adams (first Vice President), Joe Biden (47th Vice President), and Kamala Harris (49th Vice President).

• Election Process:

• Vice Presidents are elected through the Electoral College, alongside the President, as part of the U.S. federal election process.

• They must meet the eligibility criteria outlined in the U.S. Constitution, including being at least 35 years old, a natural-born citizen, and having resided in the U.S. for at least 14 years.

• Historical Facts:

• The first Vice President was John Adams, who served from 1789 to 1797. He later became the second President of the United States.

• The 50th Vice President will represent a milestone in the history of the United States government, continuing the legacy of this important constitutional role.

Important Points

• Vice Presidential Powers:

• The Vice President's role is primarily ceremonial but gains significant importance in legislative processes and succession scenarios.

• They are instrumental in ensuring continuity of government and maintaining checks and balances within the federal system.

• Recent Developments:

• The Vice Presidency has evolved to include more active engagement in policy-making and representing the U.S. internationally.

• For example, Kamala Harris has been involved in addressing issues like voting rights, immigration, and international diplomacy.

Q28. Answer: (b) 1919

The correct answer is 1919.

Key Points

• The Montagu-Chelmsford Reforms were introduced in 1919 to provide limited self-governance to Indians. The reforms were named after the then Secretary of State for India, Edwin Montagu, and the Viceroy, Lord Chelmsford.

• The reforms were associated with the Government of India Act, 1919, which aimed to increase Indian participation in governance.

• The system of diarchy was introduced at the provincial level, dividing powers between elected Indian ministers and British officials. Certain subjects were reserved for British officials, while others were transferred to Indian ministers.

• The reforms provided for a bicameral legislature at the central level and expanded the electorate by introducing limited franchise based on property, education, and income qualifications.

• The reforms were criticized for being inadequate in meeting the demands for full self-governance and were seen as a tool to placate growing demands for independence.

• The Montagu Declaration of 1917 laid the foundation for these reforms, promising gradual development of Indian self-governing institutions.

• These reforms led to dissatisfaction among Indians, which ultimately contributed to the rise of the Non-Cooperation Movement led by Mahatma Gandhi in 1920.

• Hence, the correct answer is 1919.

Additional Information

• Government of India Act, 1919:

• This act marked the beginning of constitutional reforms in British India.

• Introduced a dual government system or diarchy at the provincial level. Reserved subjects like police, justice, and irrigation were controlled by British officials, while transferred subjects like education, health, and agriculture were handled by Indian ministers.

• Montagu Declaration of 1917:

• This declaration was a promise of self-governance for Indians in the future, which led to the formulation of the Montagu-Chelmsford Reforms.

• It was meant to address the growing political unrest and demands for independence in India.

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• Criticisms of the Reforms:

• The diarchy system was criticized for limiting real power for Indians, as the reserved subjects remained under British control.

• The franchise was very limited and excluded a majority of the Indian population.

• The reforms failed to address the demands for complete self-rule and were thus seen as a failed attempt to pacify Indians.

Important Points

• Historical context:

• The reforms were introduced after World War I, during a time of increasing political awareness and activism among Indians.

• The Home Rule Movement, led by leaders like Bal Gangadhar Tilak and Annie Besant, played a significant role in pressuring the British government for reforms.

• Impact of the Reforms:

• The limited reforms led to widespread dissatisfaction and the initiation of the Non-Cooperation Movement under Mahatma Gandhi.

• These reforms laid the groundwork for subsequent acts like the Government of India Act, 1935, which further expanded self-governance but still fell short of granting independence.

• They are a significant milestone in India's constitutional development, showcasing the early stages of India's struggle for self-rule.

Q29. Answer: (a) Dendritic

The correct answer is Dendritic drainage pattern..

Key Points

• Dendritic drainage pattern: This type of drainage pattern resembles the branches of a tree, with tributaries joining the main river at acute angles. It is the most common drainage pattern found in nature.

• This pattern develops where the river flows over homogeneous rock types that offer uniform resistance to erosion, allowing water to spread out naturally. Hence, this drainage pattern resembles the northern plains.

• It is often seen in regions with a flat or slightly undulating terrain, such as the northern plains of India, where rivers like the Ganga, Yamuna, and Brahmaputra flow. Hence, statement is correct.

• Other drainage patterns: Trellis, Centripetal, and Radial drainage patterns differ significantly from the dendritic pattern and are formed under different geological conditions. These are not common in the rivers of the northern plains. Hence, they are incorrect options.

Additional Information

• Trellis drainage pattern:

• This pattern is characterized by tributaries flowing parallel to each other and joining the main river at right angles. It forms in regions with alternating layers of hard and soft rock, such as in the Deccan Plateau.

• Centripetal drainage pattern:

• Here, rivers converge towards a central depression or basin. This pattern is found in areas like the Rann of Kutch in India.

• Radial drainage pattern:

• In this pattern, rivers radiate outward from a central point, often a hill or volcanic cone. An example is the rivers flowing outward from the Amarkantak Plateau.

• Characteristics of drainage patterns:

• Drainage patterns reflect the geological structure and topography of a region. The type of rock, slope, and climatic factors determine the formation of these patterns.

• Examples: Dendritic drainage is common in the plains, trellis in folded terrains, centripetal in basins, and radial around elevated points.

Important Points

• Formation of drainage patterns:

• Drainage patterns form due to the interaction of geological processes such as erosion, deposition, and tectonic activity.

• The terrain's slope, rock type, and climate play a crucial role in shaping the drainage system.

• Impact on human activities:

• Drainage patterns influence agriculture, settlement, and the construction of infrastructure like dams and canals.

• For instance, the Ganga river basin supports dense human settlement due to its fertile soil and efficient drainage system.

Q30. Answer: (a) INS Trikand and Dornier Maritime Patrol Aircraft

The correct answer is INS Trikand and Dornier Maritime Patrol Aircraft.

Key Points

• The Indo-Oman naval exercise Naseem-Al-Bahr, meaning “Sea Breeze,” is a biennial event conducted between the Indian Navy

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and the Royal Navy of Oman to strengthen maritime cooperation.

• INS Trikand is a Talwar-class frigate of the Indian Navy, equipped with advanced weapons and sensors, capable of conducting anti-submarine, anti-surface, and air defense operations.

• The Dornier Maritime Patrol Aircraft is a short-range aircraft used by the Indian Navy for reconnaissance, surveillance, and intelligence gathering missions. Hence, this platform participated in the exercise.

• Other platforms mentioned in the options, such as INS Kolkata, Sea Guardian drone, INS Shivalik, P-8I aircraft, and INS Vikrant, did not participate in the Naseem-Al-Bahr exercise for October 2024. These platforms are used for different operational requirements and exercises. Hence, these options are incorrect.

• The exercise in October 2024 focused on improving interoperability, joint operations, and mutual understanding between the two navies. Hence, the correct answer is INS Trikand and Dornier Maritime Patrol Aircraft.

Additional Information

• INS Trikand:

• Commissioned: INS Trikand was commissioned in 2013. It is a stealth frigate capable of engaging multiple threats in air, surface, and underwater domains.

• Features: Equipped with BrahMos missiles, advanced radar systems, and anti-submarine warfare capabilities.

• Applications: Used for maritime security, escort missions, and joint exercises.

• Dornier Maritime Patrol Aircraft:

• Purpose: Designed for surveillance and reconnaissance missions over coastal areas.

• Features: Equipped with advanced radar systems and cameras for real-time intelligence gathering.

• Applications: Widely used by the Indian Navy for monitoring exclusive economic zones (EEZs) and search-and-rescue operations.

• Indo-Oman Relations:

• Historical Ties: India and Oman share a long history of maritime and trade relations, dating back centuries.

• Strategic Partnership: Oman is a key partner in India’s maritime security framework in the Indian Ocean Region (IOR).

• Joint Exercises: Naseem-Al-Bahr focuses on promoting mutual cooperation and understanding between the navies of both countries.

Important Points

• Key Features of Naseem-Al-Bahr:

• This bilateral exercise emphasizes anti-piracy operations, search-and-rescue missions, and maritime domain awareness.

• It strengthens the capability of the two navies to operate together and ensures maritime safety in the region.

• The exercise also includes cross-deck operations, communication drills, and tactical maneuvers.

• Importance of Maritime Exercises:

• They enhance mutual understanding, interoperability, and coordination between navies.

• They serve as a platform to exchange operational knowledge and technical expertise.

• Such exercises are crucial in safeguarding maritime trade routes and enhancing regional security.

Q31. Answer: (d) Vidyadhara

The correct answer is Vidyadhara.

Key Points

• Kandariya Mahadev Temple is one of the largest and most magnificent Hindu temples in the group of temples at Khajuraho, Madhya Pradesh.

• This temple was constructed during the reign of Vidyadhara, a ruler of the Chandela dynasty, who ruled in the early 11th century CE.

• The temple is dedicated to Lord Shiva and is known for its intricate carvings and stunning architectural design. It is considered a masterpiece of Indian temple architecture.

• Vidyadhara was one of the most powerful Chandela rulers, known for his contributions to art, architecture, and culture during his reign.

• The temple reflects the Nagara style of architecture, characterized by its vertical elevation and elaborate sculptures depicting various aspects of life, mythology, and spirituality.

• The Kandariya Mahadev Temple stands as a symbol of the Chandela dynasty's prosperity and their patronage of art and architecture.

• Hence, Vidyadhara is credited with the construction of the Kandariya Mahadev Temple.

Additional Information

• Chandela Dynasty:

• The Chandela dynasty ruled over the region of Bundelkhand in Central India, which is now part of Madhya Pradesh and Uttar Pradesh.

• They were known for their patronage of art and architecture, particularly the construction of temples at Khajuraho.

• The Chandela rulers were staunch followers of Hinduism and Jainism, and their temples reflect a combination of religious ideologies.

• Features of Kandariya Mahadev Temple:

• The temple is approximately 30 meters tall and is adorned with over 800 sculptures depicting gods, goddesses, celestial beings, and everyday life.

• Its shikhara (spire) rises in a series of elegant tiers, symbolizing Mount Meru, the mythical abode of Lord Shiva.

• The temple's interior consists of the mandapa (assembly hall), antarala (vestibule), and garbhagriha (sanctum sanctorum).

• Khajuraho Temples:

• The Khajuraho Group of Monuments is a UNESCO World Heritage Site, recognized for its historical and cultural significance.

• These temples were built between the 9th and 12th centuries CE and represent the peak of temple architecture in medieval India.

• Only 22 out of the original 85 temples have survived to this day.

Important Points

• Historical Context:

• The Kandariya Mahadev Temple was constructed at a time when the Chandela dynasty was at the peak of its power and prosperity.

• The temple is an excellent example of how medieval Indian rulers expressed their devotion and wealth through grand architectural projects.

• Architectural Significance:

• The temple's intricate carvings are not only religiously significant but also serve as a record of the social and cultural life during the Chandela period.

• The Nagara style of architecture, which the temple follows, is known for its ornate decoration and symbolic representation of spiritual concepts.

Q32. Answer: (a) WAVES Declaration

The correct answer is WAVES Declaration.

Key Points

• The WAVES Declaration was adopted during the 2025 Global Media Dialogue, which focused on the intersection of media ethics and advancements in Artificial Intelligence (AI).

• The WAVES Declaration stands for Worldwide Alliance for Verified Ethical Standards, emphasizing the need for global cooperation and adherence to ethical principles in media and AI technologies.

• It aims to foster transparency, accountability, and inclusivity in the use of AI in media practices, ensuring that AI tools are not used to spread misinformation or harm societal values.

• The WAVES Declaration highlights the importance of creating a global framework for ethical guidelines, ensuring fairness and unbiased AI applications in media content generation and dissemination.

• This declaration encourages collaboration among governments, media organizations, tech companies, and civil society to address challenges posed by AI in the media industry.

• The adoption of the WAVES Declaration marks a significant step toward promoting ethical AI usage and safeguarding public trust in media technologies.

• Media Ethics and AI were central themes of the 2025 Global Media Dialogue, where experts discussed the implications of AI-driven technologies on journalism and information dissemination. Hence, the correct answer is WAVES Declaration.

Additional Information

• Media Ethics:

• Media ethics refers to the principles and standards that guide the behavior and practices of media professionals in their work. It includes truthfulness, fairness, accountability, and respect for privacy.

• With the rise of AI technologies, ethical concerns have emerged, such as the potential for spreading misinformation, bias in AI algorithms, and the invasion of privacy.

• Artificial Intelligence in Media:

• AI technologies are increasingly used in media for tasks such as content creation, curation, personalization, and audience analysis.

• While AI can enhance efficiency and innovation, it also poses risks, including data manipulation, biased algorithms, and ethical dilemmas in journalistic practices.

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• Other Options:

• NEUTRALITY Charter: This option does not relate to the 2025 Global Media Dialogue. It could imply a focus on neutrality in journalism but lacks relevance to the AI ethics theme.

• TRUTH Pact: While truth is an essential aspect of media ethics, no such pact was declared during the 2025 dialogue.

• AI-TRUST Code: This name suggests a framework for building trust in AI applications, but it is not the declaration adopted during the event.

Important Points

• Global Media Dialogue:

• The 2025 Global Media Dialogue was a significant event where stakeholders from media, technology, policy, and academia convened to discuss pressing issues at the intersection of media ethics and AI.

• This dialogue aimed to create a platform for global collaboration and developing consensus on ethical standards for AI in media.

• WAVES Declaration Impact:

• The declaration is expected to serve as a guiding principle for media organizations and governments worldwide, ensuring responsible use of AI technologies.

• It promotes the idea of verified ethical standards, reducing misinformation and fostering trust in AI-powered media systems.

Q33. Answer: (a) iGOT Karmayogi

The correct answer is iGOT Karmayogi.

Key Points

• Mission Karmayogi is a capacity-building program for civil servants in India. It aims to improve their efficiency and skills by providing comprehensive learning opportunities.

• The iGOT Karmayogi platform is the official online learning platform developed under the initiative of Mission Karmayogi. It serves as a digital infrastructure for capacity building.

• This platform offers courses, content, and training modules tailored to the requirements of civil servants at different levels. Hence, the correct answer is iGOT Karmayogi.

• The platform provides continuous learning opportunities for civil servants by leveraging technology for skill enhancement, knowledge sharing, and performance improvement.

• It is backed by the Government of India and aims to create a competency-driven civil service to meet national developmental goals effectively.

• The initiative is designed to ensure that civil servants are equipped with the latest knowledge and skills required for effective governance in a rapidly changing world.

Additional Information

• iGOT Karmayogi Platform:

• iGOT stands for Integrated Government Online Training. It is a dedicated online platform specifically built for the training and capacity building of civil servants.

• The platform hosts a vast repository of learning resources, including modules, webinars, case studies, and videos, designed to address the specific needs of civil servants.

• The focus is on creating a competency-based training structure to ensure that civil servants are updated with the latest knowledge for effective governance.

• Mission Karmayogi:

• Launched in 2020, Mission Karmayogi is a national program for capacity building to reform and strengthen governance.

• It aims to create a future-ready civil service equipped with the right competencies to deliver services efficiently.

• The program is governed by the Karmayogi Bharat, a special-purpose vehicle (SPV) to provide technical support to the platform.

• Comparison with Other Options:

• NISG Portal: The National Institute for Smart Government (NISG) supports governance-related technology solutions but does not serve as the official learning platform under Mission Karmayogi.

• ePathshala: A digital platform by NCERT for students and teachers, focusing on academic learning rather than civil service training.

• SWAYAM: An initiative by the Ministry of Education to provide free online courses for students and professionals but is not specifically designed for civil servants.

Important Points

• Key Features of iGOT Karmayogi:

• It provides customized training modules based on the specific requirements of different roles in civil services.

• The platform is accessible across multiple devices, allowing civil servants to learn anytime and anywhere.

• It integrates data analytics to track progress and effectiveness of training programs.

• The initiative is expected to enhance transparency, accountability, and efficiency in governance through well-trained civil servants.

• Implementation of Mission Karmayogi:

• Mission Karmayogi is supported by the Department of Personnel and Training (DoPT), Government of India, ensuring a structured approach to civil servant training.

• A dedicated SPV, Karmayogi Bharat, has been established for managing and implementing the program effectively.

• The program is designed to be inclusive, offering learning opportunities for civil servants across various levels and departments.

Q34. Answer: (d) Bharatmala Pariyojana

The correct answer is Bharatmala Pariyojana.

Key Points

• Bharatmala Pariyojana is a flagship program launched by the Government of India to enhance and expand the highway network across the country.

• It focuses on the development of economic corridors, inter-corridors, feeder routes, and border roads to improve connectivity and facilitate trade and commerce.

• The program aims to reduce travel time, improve efficiency in freight transportation, and decrease logistics costs, which are vital for economic growth.

• Under this scheme, the government plans to construct approximately 34,800 km of roads in the first phase, with a focus on key corridors and areas of strategic importance.

• The initiative also integrates connectivity for ports, industrial clusters, and backward areas, ensuring a holistic development approach. Hence, this scheme is specifically designed for the development of highways.

• The Bharatmala Pariyojana complements other infrastructure projects like the Sagarmala Project, which focuses on port-led development, ensuring integrated transportation solutions. Hence, the correct answer is Bharatmala Pariyojana.

Additional Information

• Pradhan Mantri Gram Sadak Yojana (PMGSY):

• Launched in 2000, PMGSY focuses on rural road connectivity rather than highways. It aims to connect unconnected villages with all-weather roads.

• The scheme is particularly important for agricultural and rural development, as it facilitates better access to markets, schools, and healthcare services.

• BharatNet:

• BharatNet aims to provide broadband connectivity to gram panchayats across India, with the primary focus on digital inclusion rather than physical infrastructure.

• It is designed to support e-governance initiatives, online education, telemedicine, and other digital services in rural areas.

• Sagarmala:

• Sagarmala focuses on port-led development by enhancing coastal connectivity, modernizing ports, and promoting industrial clusters near ports.

• It aims to improve logistics efficiency and reduce transportation costs for goods, especially those related to maritime trade.

• Bharatmala Pariyojana:

• Launched in 2017, it is India’s largest and most ambitious highway development program.

• It focuses on economic corridors, national corridors, and expressways to ensure seamless connectivity across the country.

• The program also integrates rural and urban areas, contributing to regional development and boosting the economy.

Important Points

• Economic Corridors:

• Economic corridors are designed to connect major industrial hubs and commercial centers, ensuring efficient transportation of goods.

• These corridors aim to reduce travel time and improve the logistical efficiency of freight movement.

• Inter-corridors and feeder routes:

• Inter-corridors and feeder routes improve connectivity between economic corridors and rural areas, ensuring last-mile connectivity.

• They play a crucial role in integrating backward areas with industrial hubs, contributing to regional development.

• Border Roads:

• Border roads under Bharatmala Pariyojana enhance strategic connectivity to remote border areas, ensuring better access and security.

• These roads also support military logistics and improve infrastructure in sensitive regions.

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Q35. Answer: (d) 20 February 2015

The correct answer is Feb 20 2015.

Key Points

• The Monetary Policy Framework Agreement (MPFA) was signed between the Government of India and the Reserve Bank of India (RBI) on February 20, 2015.

• The MPFA established a framework for monetary policy coordination, focusing on inflation targeting as its key goal.

• Under this agreement, the RBI was tasked with maintaining inflation within a specified range (4% with a tolerance of ±2%). Hence, the correct answer is the date mentioned in Option 4.

• The signing of MPFA marked a major shift in India's monetary policy framework, aligning it with global best practices.

• This agreement enhanced the accountability and transparency of the RBI in conducting monetary policy. Hence, the date February 20, 2015 is correct.

Additional Information

• Significance of the Monetary Policy Framework Agreement:

• The MPFA was signed to provide a structured approach to inflation control and to ensure economic stability.

• The agreement formally introduced the concept of inflation targeting to India's monetary policy, with the Consumer Price Index (CPI) as the benchmark.

• Role of the Reserve Bank of India under MPFA:

• The RBI was entrusted with the responsibility of ensuring that inflation remains within the agreed-upon range of 2% to 6%.

• If inflation deviates from this range, the RBI is required to provide a detailed explanation to the Government of India, outlining the causes and proposed corrective actions.

• Global Context:

• Inflation targeting is a widely adopted monetary policy approach globally, implemented by central banks in countries like United Kingdom, Australia, and Canada.

• India's adoption of MPFA was a step toward aligning its monetary policy with international standards.

Important Points

• Inflation Targeting Framework:

• The target for inflation was set at 4%, with an upper tolerance limit of 6% and a lower limit of 2%.

• This framework aimed to achieve macroeconomic stability and sustainable growth in the economy.

• Impact of MPFA:

• The agreement improved coordination between the government and RBI, leading to better policy alignment.

• It contributed to a significant reduction in inflation rates in subsequent years, supporting India's growth trajectory.

Q36. Answer: (a) Resolve civil and criminal disputes at the district level

The correct answer is Resolve civil and criminal disputes at the district level.

Key Points

• Subordinate Courts, also known as District Courts, function as the lower judiciary system in India and primarily deal with resolving civil and criminal cases at the district level. Hence, the statement is correct.

• These courts are established in every district and take up cases under their jurisdiction, including family disputes, property disputes, and criminal cases such as theft, assault, and murder.

• Subordinate Courts act as the first level of courts where cases are filed and tried. They are crucial in ensuring justice is accessible to people at the grassroots level.

• The structure of Subordinate Courts includes District Courts, Sessions Courts, Magistrates Courts, and Civil Courts. These courts have specific jurisdiction based on the nature of the case.

• The judges in these courts are appointed by respective State Governments after consulting the High Courts. This ensures the proper functioning of judicial processes at the district level.

• Subordinate Courts do not interpret international treaties. This function is reserved for higher courts like the Supreme Court. Hence, statement 2 is incorrect.

• Subordinate Courts do not have the authority to review decisions of High Courts. This power is exclusively vested in the Supreme Court. Hence, statement 3 is incorrect.

• Drafting laws is not within the jurisdiction of Subordinate Courts. This is the responsibility of legislative bodies like the State Legislative Assembly or Parliament. Hence, statement 4 is incorrect.

• Hence, the correct answer is Resolve civil and criminal disputes at the district level.

Additional Information

• Hierarchy of Courts in India:

• Supreme Court: The apex court in India that deals with constitutional matters, appeals, and judicial review.
• High Courts: The highest court at the state level, which supervises the functioning of Subordinate Courts.
• Subordinate Courts: These courts operate at the district and tehsil levels, handling both civil and criminal cases.
• Structure of Subordinate Courts:
• District Courts: Handle major civil and criminal cases within the district.
• Sessions Courts: Deal with serious criminal cases, including offenses punishable with death or life imprisonment.
• Magistrate Courts: Handle less severe criminal offenses and small civil disputes.
• Civil Courts: Address disputes related to property, contracts, and family matters.
• Role of Subordinate Courts:
• Ensure justice delivery at the grassroots level, making the judicial process more accessible to citizens.
• Act as the foundation of the Indian judiciary system by addressing the majority of cases filed.
• Operate under the supervision of the respective High Court to maintain judicial integrity and efficiency.

Important Points

• Key Legal Considerations:
• Subordinate Courts function under the Code of Civil Procedure and the Code of Criminal Procedure, which regulate their operations and jurisdiction.
• Judicial officers in Subordinate Courts are appointed under the guidance of the State Government and the respective High Court.
• Additional Features of Subordinate Courts:
• Provide legal recourse for the majority of cases filed in India, including minor disputes and serious offenses.
• Play a significant role in resolving disputes quickly and efficiently at the district level.
• Serve as the first point of contact for citizens seeking justice.

Q37. Answer: (d) digitising and upgrading district and subordinate courts

The correct answer is digitising and upgrading district and subordinate courts.

Key Points

• National eCourts Project: This initiative was launched by the Department of Justice under the aegis of the Government of India to digitise judicial processes and improve efficiency in the functioning of district and subordinate courts.
• It primarily aims to integrate technology into the judicial system by creating a digital infrastructure for courts, enabling them to function efficiently and transparently.
• Digitisation and Upgradation: The project focuses on computerisation of courts, e-filing, e-payment, case information systems, and real-time updates, which ensures faster resolution of cases. Hence, this statement is correct.
• Accessibility: By digitising court records, litigants and advocates can access case details and judgments easily, reducing dependency on manual processes and ensuring transparency.
• The project aligns with the broader vision of Digital India, which aims at transforming India into a digitally empowered society. Hence, the correct answer is focused on digitisation and upgradation.

Additional Information

• Key Objectives of National eCourts Project:
• Enhancing Efficiency: The project aims to reduce pendency of cases by implementing effective case management systems and streamlining judicial processes.
• Ease of Access: It provides litigants and lawyers access to case status, judgments, and other court-related information online, promoting judicial transparency.
• Integration of Technology: The initiative introduces technological tools such as video conferencing for trials and hearings, enabling remote access to justice.
• Key Features:
• Case Information System: A dedicated platform for tracking the status of cases and pending matters.
• E-Filing and E-Payment: Litigants can file cases and make payments online, reducing the need for physical presence in courts.
• National Judicial Data Grid: A repository of judicial data that provides insights into case pendency and disposal rates.
• Digitisation Benefits:
• Reduced Paperwork: The project minimises the use of physical records, thereby promoting eco-friendly practices.
• Transparency: Digitisation ensures accountability by providing litigants real-time access to case information.
• Cost Reduction: It reduces operational costs for courts, litigants, and advocates.

Important Points

• Central Administrative Tribunals: These tribunals are established for adjudicating disputes related to service matters of public servants. However, this is not the objective of the National eCourts Project.

• Building New Court Complexes: Constructing physical infrastructure in rural areas is important for accessibility, but this is not the primary aim of the project.

• Nationwide Telecom System: Establishing a telecom system for police functions is unrelated to the scope of the National eCourts Project, which focuses solely on judicial digitisation.

Q38. Answer: (d) P-waves, S-waves, surface waves

The correct answer is P-waves, S-waves, surface waves..

Key Points

• Seismic waves are generated during an earthquake and are detected by a seismograph. These waves travel through the Earth's interior and surface.

• P-waves (Primary waves): These are the first waves to arrive at the seismograph because they travel the fastest. They are longitudinal waves, meaning the particles move in the same direction as the wave propagation. P-waves can travel through solids, liquids, and gases.

• S-waves (Secondary waves): These waves arrive after the P-waves because they travel slower. S-waves are transverse waves, meaning the particles move perpendicular to the direction of wave propagation. They can only travel through solids. Hence, the order places S-waves after P-waves.

• Surface waves: These are the slowest seismic waves and arrive last at the seismograph. They travel along the Earth's surface and cause most of the damage during an earthquake due to their high amplitude. They include Love waves and Rayleigh waves. Hence, surface waves are detected after P-waves and S-waves.

• The sequence of arrival is determined by the speed of propagation of each wave. Hence, the correct order is P-waves, S-waves, and surface waves.

• Thus, the correct answer is P-waves, S-waves, surface waves.

Additional Information

• Seismic waves classification:

• Body waves: These travel through the Earth's interior and include P-waves and S-waves. P-waves are faster and can travel through all states of matter, while S-waves are slower and can only travel through solids.

• Surface waves: These travel along the Earth's surface and include Love waves and Rayleigh waves. They cause significant damage during earthquakes.

• Characteristics of seismic waves:

• P-waves: Longitudinal waves with the fastest speed. They are the least destructive due to their low amplitude.

• S-waves: Transverse waves with slower speed than P-waves. They cause more damage than P-waves due to higher amplitude.

• Surface waves: These are the slowest and most destructive waves due to their high amplitude and energy concentrated near the Earth's surface.

• Uses of seismic wave analysis:

• Helps in determining the epicenter and magnitude of earthquakes.

• Provides insights into Earth's interior structure, such as the crust, mantle, and core.

• Used in geophysical studies and exploration for resources like oil and gas.

Important Points

• Seismograph: A device used to measure and record seismic waves. It provides data on the arrival time and amplitude of waves.

• Earthquake magnitude: A measure of the energy released during an earthquake, commonly measured using the Richter scale.

• Epicenter: The point on the Earth's surface directly above the earthquake's focus. It is determined using the difference in arrival times of P-waves and S-waves.

• Seismic wave propagation: The speed depends on the medium's density and elasticity. For example, P-waves travel faster in denser and elastic media.

Q39. Answer: (b) Dhammapada

The correct answer is Dhammapada.

Key Points

• The Dhammapada is one of the most revered texts in Buddhism, often referred to as the "Gita of Buddhism" due to its significance in spreading the teachings of Lord Buddha.

• It is a collection of 423 verses, divided into 26 chapters, and presents the core principles of Buddhist philosophy in a simple and poetic form.

• The name "Dhammapada" translates to "Words of the Dharma," and it is considered a guide to moral conduct, spiritual awakening, and self-discipline.

• The verses of the Dhammapada emphasize themes like the impermanence of life, the importance of mindfulness, and the path to enlightenment. Hence, the correct option is Dhammapada.

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• It is part of the Khuddaka Nikaya, a division of the Sutta Pitaka, which is one of the three baskets of the Buddhist canon, the Tripitaka.

• The Dhammapada has been translated into multiple languages and is studied worldwide for its spiritual depth and practical wisdom.

• Unlike other Buddhist texts that may focus on narrative or abstract teachings, the Dhammapada provides concise, actionable wisdom applicable to daily life. Hence, it is rightly called the "Gita of Buddhism."

• Therefore, the correct answer is Dhammapada.

Additional Information

• About the Dhammapada:

• The Dhammapada is believed to have been compiled around the 3rd century BCE and is attributed to the teachings of Lord Buddha.

• It serves as a practical guide for individuals seeking to follow the Middle Path, emphasizing virtues like non-violence, self-restraint, and compassion.

• Its verses are often quoted in Buddhist literature and are used for moral instruction and spiritual reflection.

• Comparison with Other Options:

• Mahayana Sutra: This refers to texts associated with Mahayana Buddhism, which emphasize the Bodhisattva path. However, they are not considered equivalent to the "Gita of Buddhism."

• Vamsathapakasini: This is a commentary on the Mahavamsa and is primarily a historical text, not focused on spiritual teachings.

• Saddharmapundarīka Sūtra: Known as the Lotus Sutra, it is an important Mahayana text, but its thematic scope differs from the Dhammapada.

• Importance of Dhammapada:

• The Dhammapada is widely regarded as one of the most accessible and practical Buddhist scriptures for beginners and scholars alike.

• It has inspired numerous philosophical works and continues to be a central text for those studying Buddhism worldwide.

Important Points

• Key Themes of the Dhammapada:

• It emphasizes the importance of mindfulness, stating that the mind is the source of all actions and should be trained wisely.

• It promotes compassion and encourages individuals to live harmoniously with others.

• Historical Context:

• The Dhammapada reflects the foundational principles laid down by Lord Buddha, making it an essential text for understanding early Buddhist philosophy.

• Its poetic nature makes it easy to remember and recite, which contributed to its widespread popularity.

Q40. Answer: (d) Right against Exploitation

The correct answer is Right against Exploitation.

Key Points

• Right against Exploitation is one of the Fundamental Rights enshrined in Part III of the Constitution of India.

• It is defined under Articles 23 and 24 of the Constitution, which aim to protect citizens from exploitation.

• Article 23 prohibits human trafficking, begar (forced labor), and similar forms of forced labor. It declares such practices as illegal and punishable under the law. Hence, this statement is correct.

• Article 24 prohibits the employment of children below the age of 14 years in factories, mines, or other hazardous occupations. This provision ensures protection for children from exploitation in unsafe work environments. Hence, this statement is correct.

• The Right against Exploitation is critical in safeguarding the dignity of individuals and preventing exploitative practices that violate basic human rights.

• This right ensures that every individual has the freedom to live without being subjected to forced labor or any form of exploitation. Hence, this statement is correct.

• Hence, the correct answer is Right against Exploitation.

Additional Information

• Article 23:

• Article 23 explicitly prohibits practices like human trafficking, bonded labor, and begar. These acts are considered crimes against human dignity.

• It applies to both citizens and non-citizens within the territory of India, making it a universal right.

• The government has introduced laws such as the Immoral Traffic (Prevention) Act, 1956 to enforce Article 23 and curb human trafficking effectively.

• Article 24:

• Article 24 prohibits the employment of children below the age of 14 years in hazardous industries and occupations.

• This provision is complemented by laws like the Child Labour (Prohibition and Regulation) Act, 1986, which provides guidelines to prevent child labor.

• It aims to ensure that children are not deprived of their right to education and are protected from exploitation.

• Role of Judiciary:

• The judiciary has played a significant role in upholding the Right against Exploitation through landmark judgments and interpretations.

• For example, in the case of People's Union for Democratic Rights v. Union of India (1982), the Supreme Court declared that any form of forced labor is unconstitutional under Article 23.

Important Points

• Key Legal Provisions:

• Immoral Traffic (Prevention) Act, 1956: This law criminalizes human trafficking and related exploitative practices, enforcing Article 23.

• Child Labour (Prohibition and Regulation) Act, 1986: This legislation prohibits employment of children under hazardous conditions, enforcing Article 24.

• Importance of Fundamental Rights:

• Fundamental Rights serve as the cornerstone of India's democracy, ensuring equality and justice for all citizens.

• The Right against Exploitation plays a critical role in safeguarding human dignity and eliminating exploitative practices from society.

Q41. Answer: (c) 67°

Shortcut Trick

In right-angled triangle BDC, angle C = 90° − angle DBC = 90° − 39° = 51°.

For triangle AEC, angle AEB is an exterior angle at vertex E, formed by the line segment BC.

By Exterior Angle Theorem: angle AEB = angle CAE + angle C

=> angle AEB = 16° + 51° = 67°.

Therefore The correct answer is 67°.

Alternate Method

Given:

BD perpendicular to AC at D, so angle BDC = 90°

angle DBC = 39° and angle CAE = 16°

Formula Used:

Sum of angles in a triangle = 180°

Angles on a straight line add up to 180° (Linear Pair).

39°

16°

?

A

B

C

D

E

angle AEB = 67°

Calculations:

=> In right-angled triangle BDC:

=> angle BDC + angle DBC + angle C = 180°

=> 90° + 39° + angle C = 180°

=> 129° + angle C = 180°

=> angle C = 180° − 129° = 51°

=> Now, considering triangle AEC:

=> angle AEC + angle CAE + angle C = 180°

=> angle AEC + 16° + 51° = 180°

=> angle AEC + 67° = 180°

=> angle AEC = 180° − 67° = 113°

=> Since points B, E, and C are collinear, they form a straight line:

=> angle AEB + angle AEC = 180° (Linear Pair)

=> angle AEB + 113° = 180°

=> angle AEB = 180° − 113° = 67°

Therefore The correct answer is 67°.

Additional Information

Exterior Angle Theorem

The measure of an exterior angle of a triangle is equal to the sum of the measures of its two remote (opposite) interior angles.

Linear Pair Axiom

If a ray stands on a line, then the sum of two adjacent angles so formed is 180°. Conversely, if the sum of two adjacent angles is 180°, then their non-common arms form a straight line.

Altitudes of a Triangle

An altitude is a perpendicular line segment drawn from a vertex to the opposite side. The point where all three altitudes of a triangle intersect is called the Orthocenter.

Q42. Answer: (b) 5.7

Shortcut Trick

For 3 equal parts of a journey, Average Speed = 3xyz ÷ (xy + yz + zx)

Here x = 2, y = 87, z = 53.

xy + yz + zx = (2 × 87) + (87 × 53) + (53 × 2) = 174 + 4611 + 106 = 4891

Average Speed = (3 × 2 × 87 × 53) ÷ 4891 = 27666 ÷ 4891 ≈ 5.656 km/hr

Rounding off to 1 decimal place, we get 5.7 km/hr.

Therefore The correct answer is 5.7 km/hr.

Alternate Method

Total Distance = 3d

Distance = d

Distance = d

Distance = d

2 km/hr

87 km/hr

53 km/hr

Given:

Speeds for each one-third distance are 2 km/hr, 87 km/hr, and 53 km/hr respectively.

Formula Used:

Average Speed = Total Distance ÷ Total Time

Time = Distance ÷ Speed

Calculation:

=> Let the total distance be 3d. Thus, each one-third distance is d.

=> Total Time = (d ÷ 2) + (d ÷ 87) + (d ÷ 53)

=> Total Time = d × [(87 × 53) + (2 × 53) + (2 × 87)] ÷ (2 × 87 × 53)

=> Total Time = d × [4611 + 106 + 174] ÷ 9222

=> Total Time = d × (4891 ÷ 9222)

=> Average Speed = 3d ÷ [d × (4891 ÷ 9222)]

=> Average Speed = (3 × 9222) ÷ 4891 = 27666 ÷ 4891

=> Average Speed ≈ 5.656 km/hr

=> Rounded to 1 decimal place = 5.7 km/hr.

Therefore The correct answer is 5.7 km/hr.

Additional Information

Average Speed for Two Equal Distances

If a journey is divided into two equal halves covered at speeds x and y, Average Speed = 2xy ÷ (x + y).

Average Speed General Formula

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When distances are unequal, strictly use Average Speed = Total Distance ÷ Total Time.

Relative Speed

For objects moving in opposite directions: Relative Speed = S1 + S2. For same direction: |S1 − S2|.

Q43. Answer: (b) 1/(1680²³)

Shortcut Trick

For terms with the same exponent, we can multiply the bases directly:

a^x × b^x × c^x = (a × b × c)^x

=> 5^(−23) × 16^(−23) × 21^(−23) = (5 × 16 × 21)^(−23)

=> (80 × 21)^(−23) = 1680^(−23)

=> 1 / 1680²³

Therefore The correct answer is 1 / 1680²³.

Alternate Method

Given:

Expression = 5^(−23) × 16^(−23) × 21^(−23)

Formula Used:

1) a^m × b^m = (a × b)^m

2) a^(−m) = 1 / a^m

Calculations:

=> 5^(−23) × 16^(−23) × 21^(−23)

=> (5 × 16)^(−23) × 21^(−23)

=> 80^(−23) × 21^(−23)

=> (80 × 21)^(−23)

=> 1680^(−23)

=> 1 / 1680²³

Therefore The correct answer is 1 / 1680²³.

Additional Information

Power of a Product Rule

When multiplying bases with the same exponent, you can multiply the bases first and keep the exponent intact: a^m × b^m = (a × b)^m.

Negative Exponent Rule

A negative exponent indicates the reciprocal of the base raised to a positive power: a^(−n) = 1 / aⁿ.

Product Rule with Same Base

When multiplying terms with the same base, simply add their exponents: a^m × aⁿ = a^(m+n).

Zero Exponent Rule

Any non-zero base raised to the power of zero is always equal to one: a^0 = 1, for all a ≠ 0.

Q44. Answer: (c) 7

Shortcut Trick

The given number is 814242541, which ends with an odd digit (1).

Odd numbers can never be exactly divided by even numbers, which eliminates 8 and 12.

Any number perfectly divisible by 15 must end in 0 or 5, which eliminates 15.

By eliminating the incorrect options, the given number must be divisible by 7.

Therefore The correct answer is 7.

Alternate Method

Given:

Number = 814242541

Method Used:

Divisibility rule of 7: Subtract the sum of even-placed 3-digit blocks from the sum of odd-placed 3-digit blocks (counted from right to left). If the final difference is a multiple of 7, the original number is divisible by 7.

Calculations:

=> Divide the number into 3-digit blocks from right to left: 541, 242, and 814.

=> Odd-placed blocks (1st and 3rd) = 541 and 814

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=> Even-placed block (2nd) = 242

=> Sum of odd-placed blocks = 541 + 814 = 1355

=> Sum of even-placed blocks = 242

=> Difference = 1355 − 242 = 1113

=> Now, divide 1113 by 7 to check for divisibility.

=> 1113 ÷ 7 = 159 (Remainder = 0)

=> Since 1113 is perfectly divisible by 7, the given number 814242541 is also perfectly divisible by 7.

Therefore The correct answer is 7.

Additional Information

Divisibility Rule of 7, 11, and 13 (Block Method)

Make groups of 3 digits starting from the rightmost digit. The original number is divisible by 7, 11, or 13 if the difference between the alternating sums of these blocks is perfectly divisible by 7, 11, or 13 respectively.

Divisibility Rule of 8 and 16

A number is divisible by 8 if the number formed by its last 3 digits is divisible by 8. It is divisible by 16 if the number formed by its last 4 digits is divisible by 16.

Divisibility Rule for Composite Numbers

To test if a number is perfectly divisible by a composite number like 12 or 15, check if it is divisible by all of its co-prime factors independently (e.g., check 3 and 4 for 12; check 3 and 5 for 15).

Q45. Answer: (c) 880

Shortcut Trick

By the rule of alligation, if the overall transaction results in neither loss nor gain (0%), the ratio of their cost prices is inversely proportional to their respective percentage changes.

Ratio of CP1 : CP2 = Gain% : Loss% = 22 : 8 = 11 : 4.

Total ratio parts = 11 + 4 = 15 parts.

Value of 15 parts = Rs. 1200 => 1 part = Rs. 80.

CP of the first speaker (11 parts) = 11 × 80 = Rs. 880.

Therefore The correct answer is Rs. 880.

Alternate Method

Given:

Total Cost Price (CP) of two speakers = Rs. 1,200

Loss on the first speaker = 8%

Gain on the second speaker = 22%

Overall transaction result = No profit, no loss (0%)

Formula Used:

In a case of no profit and no loss, Absolute Loss on one item = Absolute Gain on the other item.

-8%

+22%

0%

22

8

1st Speaker

2nd Speaker

Overall

Ratio of CP = 22 : 8 = 11 : 4

Calculations:

=> Let the Cost Price of the first speaker be CP1 and the second be CP2.

=> According to the condition: 8% of CP1 = 22% of CP2

=> (CP1 ÷ CP2) = 22 ÷ 8

=> Ratio of CP1 to CP2 = 11 : 4

=> Total ratio parts = 11 + 4 = 15 parts

=> 15 parts = Rs. 1,200

=> 1 part = 1200 ÷ 15 = Rs. 80

=> Cost Price of the first speaker (CP1) = 11 parts = 11 × 80 = Rs. 880

Therefore The correct answer is Rs. 880.

Additional Information

No Profit No Loss Condition

When a transaction results in neither a gain nor a loss, the monetary value of the gain on one item perfectly balances the monetary value of the loss on the other item. Thus, Profit% × CP1 = Loss% × CP2.

Alligation Method for CP Ratio

Alligation is a powerful tool to find the ratio of quantities. In profit and loss problems, taking the alligation of profit/loss percentages of two individual items with their overall net percentage always yields the ratio of their Cost Prices (CP).

Successive Profit/Loss

When the price of an article undergoes successive changes of a% and b%, the net change is computed using the formula: (a + b + ab ÷ 100)%. Note that losses are substituted as negative values in the formula.

Q46. Answer: (c) 6309/1079 hours

Shortcut Trick

Let total work be the LCM of 17, 21, and 19 = 6783 units.

Combined efficiency = (6783 ÷ 17) + (6783 ÷ 21) + (6783 ÷ 19) = 399 + 323 + 357 = 1079 units/hour.

Time required when working together = Total Work ÷ Combined Efficiency.

=> Time = 6783 ÷ 1079 = 6 ^(309)/1079 hours.

Therefore The correct answer is 6 ^(309)/1079 hours.

Alternate Method

Given:

Time taken by pipe A = 17 hours

Time taken by pipe B = 21 hours

Time taken by pipe C = 19 hours

Formula Used:

Total Work = LCM of times taken by all individual pipes.

Efficiency = Total Work ÷ Time Taken

Pipe	Hours	Total Work	Efficiency
A	17	6783	399
B	21	323	
C	19	357	

Calculations:

=> Total Efficiency of pipes A, B, and C together = 399 + 323 + 357 = 1079 units/hour

=> Total Time taken together = Total Work ÷ Total Efficiency

=> Time = 6783 ÷ 1079

=> Time = 6 ^(309)/1079 hours

Therefore The correct answer is 6 ^(309)/1079 hours.

Additional Information

Pipes and Cisterns

Inlet pipes fill the tank (assigned positive efficiency), while outlet pipes empty it (assigned negative efficiency). Net efficiency is the algebraic sum of all actively working pipes.

Concept of Efficiency

Efficiency is inversely proportional to the time taken. For any given setup, Work = Efficiency × Time.

Work Equivalence

If multiple independent units contribute to a shared objective, their per unit outputs (1/T_A + 1/T_B + 1/T_C) directly sum up to equal the net output rate (1/T_(Total)).

Q47. Answer: (d) 32.3%

Shortcut Trick

Let Cost Price (CP) = 100. Since the loss is 30%, initial SP = 70.
Actual SP = 70 × (14 ÷ 4) = 245.
New SP = 54% of Actual SP = 0.54 × 245 = 132.3.
Profit = 132.3 − 100 = 32.3%
Therefore The correct answer is 32.3%.
Alternate Method
Given:
Selling price 1 (SP1) = 4/14 of Actual SP.
Loss at SP1 = 30%.
Selling price 2 (SP2) = 54% of Actual SP.
Actual SP = 245 SP1 = 70 SP2 = 132.3 CP = 100 × 4/14 × 54% -30% Loss +32.3% Profit
Calculations:
=> Let the Cost Price (CP) be 100 units.
=> Since the loss is 30% at SP1, the value of SP1 = 100 − 30 = 70.
=> According to the question: SP1 = (4 ÷ 14) × Actual SP.
=> Actual SP = 70 × (14 ÷ 4) = 980 ÷ 4 = 245.
=> The new selling price (SP2) is 54% of Actual SP.
=> SP2 = (54 ÷ 100) × 245 = 0.54 × 245 = 132.3.
=> Profit = SP2 − CP = 132.3 − 100 = 32.3 units.
=> Profit Percentage = (32.3 ÷ 100) × 100% = 32.3%.
Therefore The correct answer is 32.3%.
Additional Information
Cost Price & Selling Price
Cost price (CP) is the base value on which profit or loss is calculated. Selling price (SP) = CP × (100 ± Profit/Loss)%.
Marked Price & Discount
Marked price (MP) is the listed price. Discount is always calculated on MP. SP = MP × (100 − Discount)%.
Successive Percentage Change
When a value is changed successively by a% and b%, the net change is given by the formula: (a + b + a × b ÷ 100)%.

Q48. Answer: (c) 210

Shortcut Trick
Convert the floor dimensions to cm: 1215 cm and 1134 cm.
Side of the largest square tile = HCF(1215, 1134) = 81 cm.
Total tiles = (1215 × 1134) ÷ (81 × 81).
Total tiles = 15 × 14 = 210.
Therefore The correct answer is 210.
Alternate Method
Given:
Length of the floor = 12.15 m = 1215 cm
Breadth of the floor = 11.34 m = 1134 cm
Length = 12.15 m (1215 cm)
11.34 m
81 cm
Square Tile
Total Tiles = Area of Floor ÷ Area of 1 Tile
Formula Used:
Number of tiles = Total Area of Floor ÷ Area of one Tile
Maximum side of tile = HCF(Length, Breadth)
Calculations:
=> Side of the square tile = HCF of 1215 and 1134
=> Prime factorization of 1215 = 3^5 × 5
=> Prime factorization of 1134 = 2 × 3^4 × 7

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=> HCF(1215, 1134) = 3^4 = 81 cm

=> Area of the floor = 1215 × 1134 cm²

=> Area of one square tile = 81 × 81 cm²

=> Total tiles required = (1215 × 1134) ÷ (81 × 81)

=> Total tiles required = (1215 ÷ 81) × (1134 ÷ 81)

=> Total tiles required = 15 × 14 = 210

Therefore The correct answer is 210.

Additional Information

Application of HCF in Mensuration

When completely covering a rectangular surface with maximum-sized square pieces without any cuts, the side length of the square piece must be the Highest Common Factor (HCF) of the dimensions of the surface.

Prime Factorization for HCF

To find the HCF of two numbers, factorize them into prime numbers and multiply the lowest powers of all common prime factors present in both numbers.

Q49. Answer: (b) 4,200

Shortcut Trick

For equal simple interests over the same time, the ratio of Principals is the inverse of the ratio of Rates.

P1 : P2 = R2 : R1 = 3 : 13

Total parts = 3 + 13 = 16 parts ≡ Rs. 22,400 => 1 part = Rs. 1,400

Sum invested at 13% (P1) = 3 × 1400 = Rs. 4,200

Therefore The correct answer is Rs. 4,200.

Alternate Method

Given:

Total Investment = Rs. 22,400

Rate for Part 1 (R1) = 13% per annum

Rate for Part 2 (R2) = 3% per annum

Time (T) = 7 years for both

Formula Used:

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

Total: Rs. 22,400

Part 1 (P1)

13% for 7 years

Part 2 (P2)

3% for 7 years

Simple Interest 1 = Simple Interest 2

Calculation:

Let the sum invested at 13% be P1 and at 3% be P2.

=> P1 + P2 = 22400

Given that the interests from both investments are equal after 7 years:

=> (P1 × 13 × 7) ÷ 100 = (P2 × 3 × 7) ÷ 100

=> P1 × 13 = P2 × 3

=> P1 ÷ P2 = 3 ÷ 13

The total ratio parts = 3 + 13 = 16 parts

=> 16 parts = 22400

=> 1 part = 22400 ÷ 16 = 1400

The sum invested at 13% corresponds to 3 parts:

=> P1 = 3 × 1400 = 4200

Therefore The correct answer is Rs. 4,200.

Additional Information

When Final Amounts are Equal

If the total amounts (Principal + SI) from two parts are equal, the ratio of their principals is P1 : P2 = (100 + R2T2) : (100 + R1T1).

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Simple Interest Rule

Simple Interest is calculated only on the initial principal amount. SI = (P × R × T) ÷ 100.

Difference Between SI and CI (2 Years)

The difference between Compound Interest and Simple Interest for 2 years is calculated as D = P(R ÷ 100)².

Q50. Answer: (c) 69

Shortcut Trick

Count the total number of given values, which is 11 (an odd number).

The median position is exactly the middle term: (11 + 1) ÷ 2 = 6^(th) position.

To save time, we do not need to sort all numbers. Just identify the 6 smallest values mentally.

The 6 smallest terms in ascending order are: 16, 50, 55, 57, 60, and 69.

The 6^(th) term is 69, which is our required median.

Therefore The correct answer is 69.

Alternate Method

Given:

Data set: 57, 96, 60, 91, 69, 50, 72, 16, 78, 73, 55

Total number of terms (n) = 11

Formula Used:

Median (for an odd number of terms) = Value of the ((n + 1) ÷ 2)^(th) term in the sorted data set.

Finding the Median

16

50

55

57

60

69

72

73

78

91

96

Median = 69

(6th term out of 11)

Calculations:

=> First, arrange the data set in ascending order:

=> 16, 50, 55, 57, 60, 69, 72, 73, 78, 91, 96

=> Number of terms (n) = 11 (which is odd)

=> Median position = (11 + 1) ÷ 2 = 12 ÷ 2 = 6^(th) position

=> The 6^(th) term in the sorted sequence is 69.

Therefore The correct answer is 69.

Additional Information

Mean

Mean is the simple average of a data set, calculated by dividing the sum of all observations by the total number of observations.

Median (Even Number of Terms)

When the number of observations (n) is even, the median is the simple average of the (n ÷ 2)^(th) and ((n ÷ 2) + 1)^(th) terms.

Mode

Mode is the value that appears most frequently in a given data set. A dataset may have one mode, multiple modes, or no mode at all.

Range

The range of a data set is the mathematical difference between the highest and lowest values (Range = Maximum value − Minimum value).

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Q51. Answer: (b) 361

Shortcut Trick

The third proportional to any two numbers 'a' and 'b' is calculated using the formula: (b × b) ÷ a.

Here, the given numbers are a = 9 and b = 57.

=> Third proportional = (57 × 57) ÷ 9

=> Third proportional = 3249 ÷ 9 = 361

Therefore The correct answer is 361.

Alternate Method

Given:

The first two numbers are 9 and 57.

Let the required third proportional be x.

Formula Used:

If x is the third proportional to a and b, then the ratio holds true as a : b :: b : x. Thus, Product of extremes = Product of means.

9

:

57

::

57

:

x

Product of extremes

Product of means

9 × x = 57 × 57

Calculations:

=> 9 × x = 57 × 57

=> 9x = 3249

=> x = 3249 ÷ 9

=> x = 361

Therefore The correct answer is 361.

Additional Information

First Proportional

If x is the first proportional to a, b, and c, then x : a :: b : c, which gives x = (a × b) ÷ c.

Mean Proportional

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

Fourth Proportional

If x is the fourth proportional to a, b, and c, then a : b :: c : x, which evaluates to x = (b × c) ÷ a.

Invertendo Property

If a ratio a : b = c : d holds true, then by the invertendo property, its inverse is also true: b : a = d : c.

Q52. Answer: (a) 23.5%

Shortcut Trick

Equivalent single discount for successive discounts a% and b% = [a + b − (a × b) ÷ 100]%

=> Equivalent Discount = 10 + 15 − (10 × 15) ÷ 100

=> Equivalent Discount = 25 − 1.5 = 23.5%

Therefore The correct answer is 23.5%.

Alternate Method

Given:

Marked Price (MP) = Rs. 8,000

Successive discounts = 10% and 15%

Formula Used:

Selling Price (SP) = MP × (100 − D1)/100 × (100 − D2)/100

Equivalent Discount % = (Total Discount ÷ MP) × 100

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MP: Rs. 8000

Rs. 7200

SP: Rs. 6120

− 10%

− 15%

Overall Discount: 23.5%

Total Discount = Rs. 8000 − Rs. 6120 = Rs. 1880

Calculations:

=> SP = 8000 × (100 − 10)/100 × (100 − 15)/100

=> SP = 8000 × 90/100 × 85/100

=> SP = 8000 × 0.9 × 0.85 = Rs. 6,120

=> Total Discount = MP − SP = 8000 − 6120 = Rs. 1,880

=> Equivalent Discount % = (1880 ÷ 8000) × 100 = 23.5%

Therefore The correct answer is 23.5%.

Additional Information

Successive Discount for Three Items

For three successive discounts a%, b% and c%, first find the equivalent of a% and b%, then apply the formula again with c%, or directly use SP = MP × (1 − a/100) × (1 − b/100) × (1 − c/100).

Marked Price and Cost Price Relation

When profit % and discount % are given, the ratio of Cost Price to Marked Price is determined by the formula: CP/MP = (100 − Discount %) ÷ (100 + Profit %).

Buy X Get Y Free

When y items are given free on the purchase of x items, the discount percentage is calculated as [y ÷ (x + y)] × 100.

Q53. Answer: (a) 3.51

Shortcut Trick

Curved Surface Area (CSA) of a cylinder = 2πrh

=> Outer radius (r) = CSA ÷ 2πh

=> r = 1500 ÷ (2 × 22/7 × 68)

=> r = (1500 × 7) ÷ (44 × 68) = 10500 ÷ 2992

=> r ≈ 3.51 cm

Therefore The correct answer is 3.51 cm.

Alternate Method

Given:

Outer curved surface area (CSA) = 1500 cm^2

Length of the rod (h) = 68 cm

r = ?

h = 68 cm

CSA = 1500 sq.cm

Formula Used:

Curved Surface Area of a cylinder = 2πrh

Where 'r' is the base radius and 'h' is the height or length.

Calculations:

=> 2 × (22/7) × r × 68 = 1500

=> (44/7) × 68 × r = 1500

=> 2992 × r = 1500 × 7

=> 2992 × r = 10500

=> r = 10500 ÷ 2992

=> r ≈ 3.5093 cm

Rounding to two places of decimal, we get 3.51 cm.

Therefore The correct answer is 3.51 cm.

Additional Information

Total Surface Area (TSA) of a Cylinder

The total surface area includes the curved surface and the two circular flat bases. Formula: TSA = 2πr(r + h)

Volume of a Cylinder

The capacity of a cylindrical shape is calculated by multiplying the area of its base by its height. Formula: Volume = πr²h

Curved Surface Area of a Hollow Cylinder

For a hollow cylindrical tube with an outer radius R and an inner radius r, the total curved surface area considers both surfaces. Formula: CSA = 2πRh + 2πrh

Q54. Answer: (c) 16%

Shortcut Trick

Ratio of Amount to Principal for 2 years = 841 / 625

For 1 year, we take the square root of the ratio: √(841 / 625) = 29 / 25

This means a principal of Rs. 25 amounts to Rs. 29 in 1 year.

Interest for 1 year = 29 − 25 = 4

Rate of interest = (4 / 25) × 100 = 16%

Therefore The correct answer is 16%.

Alternate Method

Given:

Principal (P) = Rs. 625

Amount (A) = Rs. 841

Time (n) = 2 years

Formula Used:

Amount = $P \times (1 + R/100)^n$

Principal

Rs. 625

Amount

Rs. 841

Time = 2 years

Rate = R% p.a. (CI)

Calculations:

=> $841 = 625 \times (1 + R/100)^2$

=> $841 / 625 = (1 + R/100)^2$

=> $(29 / 25)^2 = (1 + R/100)^2$

=> $29 / 25 = 1 + R/100$

=> $R/100 = (29 / 25) - 1$

=> $R/100 = (29 - 25) / 25$

=> $R/100 = 4 / 25$

=> $R = (4 \times 100) / 25$

=> $R = 16$

Therefore The correct answer is 16%.

Additional Information

Effective Rate of Compound Interest

For 2 years, the effective rate of CI can be calculated directly using the successive percentage formula: $R_{(eff)} = 2R + (R^2 / 100)\%$.

Half-Yearly & Quarterly Compounding

If compounded half-yearly, Rate = R/2 and Time = 2n. If compounded quarterly, Rate = R/4 and Time = 4n.

Difference Between CI and SI for 2 Years

The difference between Compound Interest and Simple Interest for 2 years is given by the formula: Difference = $P \times (R / 100)^2$.

Q55. Answer: (a) 2.24 km

Shortcut Trick

Convert the speed directly into km/min for a faster direct calculation.

Speed = 84 km/hr = 84 ÷ 60 km/min = 1.4 km/min

Distance = Speed × Time
Distance = 1.4 × 1.6 = 2.24 km
Therefore The correct answer is 2.24 km.
Alternate Method
Given:
Speed of the car = 84 km/hr
Time taken to cross the bridge = 1.6 minutes
Formula Used:
Distance = Speed × Time
Speed = 84 km/hr
Time = 1.6 mins
Bridge Length = ?
Calculation:
=> First, convert the given time into hours to match the speed unit.
=> Time = 1.6 ÷ 60 hours
=> Distance = Speed × Time
=> Distance = 84 × (1.6 ÷ 60)
=> Distance = (84 ÷ 60) × 1.6
=> Distance = 1.4 × 1.6
=> Distance = 2.24 km
Since the length of the car is not provided, we consider it negligible compared to the massive length of the bridge.
Therefore The correct answer is 2.24 km.
Additional Information
Unit Conversions
To convert km/hr to m/s, multiply by 5 ÷ 18. Conversely, to convert m/s to km/hr, multiply by 18 ÷ 5.
Crossing Objects with Length
When a moving object of length L1 crosses a stationary object of length L2 (like a bridge or platform), the total distance covered equals L1 + L2.
Average Speed
When an object travels equal distances at speeds S1 and S2, the average speed is given by (2 × S1 × S2) ÷ (S1 + S2).

Q56. Answer: (d) 70,48,030

Shortcut Trick
A number is divisible by 5 if and only if its last digit (unit digit) is either 0 or 5.
Checking the last digit of the given options: 3, 9, 4, and 0.
Only 70,48,030 has a unit digit of 0.
Therefore The correct answer is 70,48,030.
Alternate Method
Given:
Four numbers: 61,75,753 ; 65,67,359 ; 71,32,954 ; 70,48,030
Concept Used:
Divisibility Rule of 5: The unit digit of the number must be 0 or 5.
Calculations:
=> Option 1: 61,75,753 → Unit digit is 3 (Not divisible by 5)
=> Option 2: 65,67,359 → Unit digit is 9 (Not divisible by 5)
=> Option 3: 71,32,954 → Unit digit is 4 (Not divisible by 5)
=> Option 4: 70,48,030 → Unit digit is 0 (Divisible by 5)
=> Thus, 70,48,030 is perfectly divisible by 5.
Therefore The correct answer is 70,48,030.
Additional Information
Divisibility Rule of 2
A number is divisible by 2 if its last digit is even (0, 2, 4, 6, or 8).

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Divisibility Rule of 3

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

Divisibility Rule of 4

A number is divisible by 4 if the number formed by its last two digits is divisible by 4.

Divisibility Rule of 10

A number is divisible by 10 if its last digit is exactly 0.

Q57. Answer: (d) 20

Shortcut Trick

Let F and S be their ages 2 years ago. Given: F − 2S = 22.

Present ages are (F + 2) and (S + 2). The new relation is (F + 2) − 2(S + 2) = F − 2S − 2 = 20.

Let after y years, the father be twice his son's age. Then (Present Father + y) = 2 × (Present Son + y).

This simplifies to: Present Father − 2 × Present Son = y.

Since we already found this difference is 20, we directly get y = 20 years without solving for individual ages.

Therefore The correct answer is 20 years.

Alternate Method

Given:

Let son's age 2 years ago = x

Father's age 2 years ago = 2x + 22

2 Years Ago

Son: x

Father: 2x+22

Present

Son: x+2

Father: 2x+24

After y Years

Son: x+2+y

Father: 2x+24+y

+2

+y

Condition: 2x + 24 + y = 2 × (x + 2 + y)

Calculations:

=> Present age of son = x + 2

=> Present age of father = 2x + 22 + 2 = 2x + 24

=> Let after y years, father's age be twice son's age.

=> Father's age after y years = 2x + 24 + y

=> Son's age after y years = x + 2 + y

=> 2x + 24 + y = 2 × (x + 2 + y)

=> 2x + 24 + y = 2x + 4 + 2y

=> 24 − 4 = 2y − y

=> y = 20

Therefore The correct answer is 20 years.

Additional Information

Linear Equations in Ages

Age problems often involve setting up linear equations based on past, present, and future timelines. Always relate expressions back to a single reference point (usually present age) to maintain consistency in calculations.

Age Differences over Time

While the absolute difference between two persons' ages remains constant over time, any scaled mathematical difference (like Father's age − 2 × Son's age) will change linearly as the years progress.

Ratio Method for Ages

If two age ratios at different time periods are provided, comparing the difference in ratio terms to the actual time gap is a fast way to find current ages without solving multiple simultaneous equations.

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Q58. Answer: (c) 66

Shortcut Trick

For two consecutive even numbers, Sum of Squares = 2 × (Average² + 1)

=> Average² + 1 = 2180 ÷ 2 = 1090

=> Average² = 1089 => Average = 33

Sum of the two numbers = 2 × Average = 2 × 33 = 66

Therefore The correct answer is 66.

Alternate Method

Given:

The sum of the squares of two consecutive even natural numbers is 2180.

Formula Used:

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

Calculations:

Let the two consecutive even natural numbers be x and x + 2.

=> $x^2 + (x + 2)^2 = 2180$

=> $x^2 + (x^2 + 4x + 4) = 2180$

=> $2x^2 + 4x + 4 = 2180$

=> $2x^2 + 4x - 2176 = 0$

Dividing the equation by 2:

=> $x^2 + 2x - 1088 = 0$

=> $x^2 + 34x - 32x - 1088 = 0$

=> $x(x + 34) - 32(x + 34) = 0$

=> $(x - 32)(x + 34) = 0$

=> Roots are x = 32 and x = −34

=> Since the given values are natural numbers, x cannot be negative.

=> x = 32

=> The second consecutive even number is x + 2 = 34

=> Sum of the numbers = 32 + 34 = 66

Therefore The correct answer is 66.

Additional Information

Consecutive Even and Odd Numbers

The difference between any two consecutive even or odd numbers is always 2. If the first even/odd number is x, the next consecutive number will be x + 2.

Sum of First n Natural Numbers

The sum of the first n natural numbers is calculated using the formula S = n(n + 1) ÷ 2.

Sum of Squares of First n Natural Numbers

The sum of the squares of the first n natural numbers is determined by the formula S = n(n + 1)(2n + 1) ÷ 6.

Sum of First n Even Natural Numbers

The sum of the first n even natural numbers can be found directly using the formula S = n(n + 1).

Q59. Answer: (d) Rs. 5,25,000

Shortcut Trick

M's Profit = (1860 + 372) ÷ 2 = Rs. 1116, and N's Profit = (1860 − 372) ÷ 2 = Rs. 744.

Profit Ratio (M : N) = 1116 : 744 = 3 : 2.

Investment Ratio = (Profit M ÷ Time M) : (Profit N ÷ Time N) = (3 ÷ 7) : (2 ÷ 5) = 15 : 14.

Difference in investment ratio parts = 15 − 14 = 1 unit.

Given difference in capital = Rs. 35,000 => 1 unit = Rs. 35,000.

Capital of M = 15 units = 15 × 35,000 = Rs. 5,25,000.

Therefore The correct answer is Rs. 5,25,000.

Alternate Method

Given:

Total profit = Rs. 1,860

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M's profit is Rs. 372 more than N's profit.

Time period of M = 7 months, Time period of N = 5 months.

M's capital is Rs. 35,000 more than N's capital.

Formula Used:

Profit Ratio = (Capital_M × Time_M) : (Capital_N × Time_N)

Partner M

Time = 7 months

Profit = Rs. 1116 (3 parts)

Capital = 15 units

Partner N

Time = 5 months

Profit = Rs. 744 (2 parts)

Capital = 14 units

Difference = 15 − 14 = 1 unit = Rs. 35,000

M's Capital = 15 × 35,000 = Rs. 5,25,000

Calculations:

=> Let N's profit be P_N and M's profit be P_M.

=> P_M + P_N = 1860 and P_M − P_N = 372

=> Adding both equations: 2 × P_M = 2232 => P_M = 1116

=> P_N = 1860 − 1116 = 744

=> Profit Ratio (M : N) = 1116 : 744 = 3 : 2

=> Let N's capital be x. Then M's capital is (x + 35000).

=> [(x + 35000) × 7] ÷ [x × 5] = 3 ÷ 2

=> 14 × (x + 35000) = 15x

=> 14x + 490000 = 15x

=> x = 490000

=> N's capital = Rs. 4,90,000

=> M's capital = 490000 + 35000 = Rs. 5,25,000

Therefore The correct answer is Rs. 5,25,000.

Additional Information

Simple vs Compound Partnership

In simple partnership, capitals are invested for the same time period. In compound partnership, the time periods differ and profit is shared based on the product of Capital × Time.

Working vs Sleeping Partner

A working partner receives a fixed salary or a certain percentage of the profit for managing the business, while the remaining profit is distributed in the ratio of their effective investments.

Finding Unknown Capital

When profit ratio and time ratio are known, the capital ratio can be directly computed using: Capital Ratio = (Profit Ratio) ÷ (Time Ratio).

Q60. Answer: (c) 210 cm2

Shortcut Trick

The area of a triangle can be directly calculated when the base and height are known using the direct formula.

=> Area = 1/2 × base × altitude

=> Area = 1/2 × 28 × 15

=> Area = 14 × 15 = 210 cm²

Therefore The correct answer is 210 cm².

Alternate Method

Base = 28 cm

Altitude = 15 cm

A

B

C

Area = 1/2 × Base × Altitude

Given:

=> Base of the triangle (b) = 28 cm

=> Corresponding altitude (h) = 15 cm

Formula Used:

=> Area of a Triangle = 1/2 × b × h

Calculations:

=> Area = 1/2 × 28 × 15

=> Area = 14 × 15

=> Area = 210 cm²

Therefore The correct answer is 210 cm².

Additional Information

Heron's Formula

Used when all three side lengths (a, b, c) are known: Area = √[s(s − a)(s − b)(s − c)], where semi-perimeter s = (a + b + c) ÷ 2.

Area of an Equilateral Triangle

For a triangle with all three equal sides of length a: Area = (√3 ÷ 4) × a².

Area of a Right-Angled Triangle

When the base and perpendicular are explicitly given forming a right angle: Area = 1/2 × Base × Perpendicular.

Q61. Answer: (c) 25/22

Shortcut Trick

Solve the expression strategically by grouping similar denominators.

Subtract the similar fractions first: 5/4 − 3/4 = 2/4 = 1/2

Simplify the complex fraction: 1 ÷ (1 + 4/7) = 1 ÷ (11/7) = 7/11

Add the final simplified values: 1/2 + 7/11 = (11 + 14) / 22 = 25/22

Therefore The correct answer is 25/22.

Alternate Method

Given:

Expression: 5/4 + 1 / (1 + 4/7) − 3/4

Concept Used:

BODMAS Rule (Brackets, Orders, Division, Multiplication, Addition, Subtraction) and basic fraction arithmetic.

Calculations:

=> 5/4 + 1 / ((7 + 4) / 7) − 3/4

=> 5/4 + 1 / (11/7) − 3/4

=> 5/4 + 7/11 − 3/4

Rearranging the terms to combine the fractions with a common denominator first:

=> (5/4 − 3/4) + 7/11

=> 2/4 + 7/11

=> 1/2 + 7/11

Taking the Least Common Multiple (LCM) of 2 and 11, which is 22:

=> (1 × 11) / (2 × 11) + (7 × 2) / (11 × 2)

=> 11/22 + 14/22

=> (11 + 14) / 22

=> 25/22

Therefore The correct answer is 25/22.

Additional Information

BODMAS Rule

BODMAS dictates the order of mathematical operations to ensure a single, correct evaluation. It stands for Brackets, Orders, Division, Multiplication, Addition, and Subtraction.

Complex Fractions

A fraction where the numerator, denominator, or both contain another fraction. Always simplify by resolving the inner expressions

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into single proper or improper fractions before executing the outer division.

Reciprocal of a Fraction

To find the reciprocal of any given fraction (a/b), simply flip it upside down to form (b/a). Multiplying a fraction by its reciprocal always results in 1.

Q62. Answer: (d) 1395

Shortcut Trick

When a number is increased by 100%, it becomes 200% of its original value (or simply doubles).

=> 200% of the Number = 2790

=> 100% of the Number = 2790 ÷ 2 = 1395

Therefore The correct answer is 1395.

Alternate Method

Given:

A number, when increased by 100%, gives 2790.

Original (100%)

• Increase (100%)

Total (200%) = 2790

Formula Used:

Final Value = Original Value + (Percentage Increase × Original Value)

Calculation:

Let the required number be x.

=> x + (100% of x) = 2790

=> x + (100/100 × x) = 2790

=> x + x = 2790

=> 2x = 2790

=> x = 2790 ÷ 2

=> x = 1395

Therefore The correct answer is 1395.

Additional Information

Percentage Increase / Decrease

New Value = Original Value × (1 ± R/100), where R is the percentage change.

Successive Percentage Change

Net % change = a + b + (a × b)/100, where a and b are successive percentage changes.

Multiplier Method

Increasing a value by 100% doubles the original quantity (Multiplier = 2). Increasing it by 200% triples it, and so on.

Q63. Answer: (b) Rs. 486

Shortcut Trick

Since the investment time period is the same, the profit is divided in the ratio of their investments.

Investment Ratio (Aarti : Anil : Naveen) = 1110 : 1760 : 1230 = 111 : 176 : 123

Sum of ratio parts = 111 + 176 + 123 = 410

Naveen's share = [123 / 410] × Total Profit

Naveen's share = (123 / 410) × 1620 = (3 / 10) × 1620 = 3 × 162 = 486

Therefore The correct answer is Rs. 486.

Alternate Method

Given:

Aarti's investment = Rs. 1,110

Anil's investment = Rs. 1,760

Naveen's investment = Rs. 1,230

Total annual profit = Rs. 1,620

Formula Used:

Profit Ratio = Investment Ratio (when the time duration is identical for all partners)

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Rs. 1110

Aarti

1 Year

Rs. 1760

Anil

1 Year

Rs. 1230

Naveen

1 Year

Ratio → 111 : 176 : 123

Calculations:

=> Ratio of their profits = 1110 : 1760 : 1230

=> Simplifying by dividing by 10 = 111 : 176 : 123

=> Sum of the ratio parts = 111 + 176 + 123 = 410

=> Naveen's ratio share = 123 parts out of 410 total parts

=> Naveen's profit share = (123 / 410) × 1620

=> Naveen's profit share = 3 / 10 × 1620

=> Naveen's profit share = 3 × 162 = 486

Therefore The correct answer is Rs. 486.

Additional Information

Simple Partnership

When all partners invest their money for the exact same duration, the profits are distributed strictly in the ratio of their capital investments.

Compound Partnership

When the time periods of investment are different, the profit ratio is calculated as the ratio of the product of their capital and time (C1 × T1 : C2 × T2).

Sleeping Partner

A partner who merely provides capital but does not actively manage the business is called a sleeping partner. Their share of profit depends solely on their investment and time duration.

Q64. Answer: (c) 5%

Shortcut Trick

Price after first 12% discount = Rs. 2860 × (100 − 12)/100 = Rs. 2860 × 0.88 = Rs. 2516.8

Value of second discount = Price after 1st discount − Final Selling Price

Second discount = Rs. 2516.8 − Rs. 2390.96 = Rs. 125.84

Rate of second discount = (125.84 ÷ 2516.8) × 100 = 5%

Therefore The correct answer is 5%.

Alternate Method

Given:

Marked Price (MP) = Rs. 2860

Selling Price (SP) = Rs. 2390.96

First discount (d1) = 12%

Let the second discount be d2.

Formula Used:

SP = MP × (1 − d1/100) × (1 − d2/100)

−12%

−d2%

Marked Price

Rs. 2860

After 1st Disc.

Rs. 2516.8

Selling Price

Rs. 2390.96

Successive Discount Flow

Calculations:

=> 2390.96 = 2860 × (1 − 12/100) × (1 − d2/100)

=> 2390.96 = 2860 × 88/100 × (1 − d2/100)

=> 2390.96 = 2516.8 × (1 − d2/100)

=> 1 − d2/100 = 2390.96 ÷ 2516.8

=> 1 − d2/100 = 0.95

=> d2/100 = 1 − 0.95

=> d2/100 = 0.05

=> d2 = 5%

Therefore The correct answer is 5%.

Additional Information

Successive Discounts

When two consecutive discounts d1% and d2% are offered, the single equivalent discount is given by: D = d1 + d2 − (d1 × d2) / 100.

Relation Between MP and CP

The direct ratio between Marked Price and Cost Price can be calculated using the profit and discount percentages: MP / CP = (100 + Profit%) / (100 − Discount%).

Selling Price Formula

The selling price after a standard discount is evaluated over the marked price directly: SP = MP × (100 − Discount%) / 100.

Q65. Answer: (b) 10250

Shortcut Trick

Winning margin = (60% − 40%) = 20% of the valid votes.

Total Voters × 80% × (100% − 15%) × 20% = 1394

=> Total × 0.8 × 0.85 × 0.2 = 1394

=> Total × 0.136 = 1394

=> Total = 1394 ÷ 0.136 = 10250

Therefore The correct answer is 10250 voters.

Alternate Method

Given:

Voted = 80% of registered, Invalid = 15% of polled votes.

Winner = 60% of valid votes, Margin = 1394 votes.

80%

20%

85%

15%

60%

40%

Total Voters = 100u

Voted = 80u

Not Voted = 20u

Valid = 68u

Invalid = 12u

Winner = 40.8u

Loser = 27.2u

Margin = 13.6u

13.6 units = 1394

1 unit = 102.5

100 units = 10250

=> Let the total number of registered voters be 100u.

=> Votes polled = 80% of 100u = 80u

=> Invalid votes = 15% of 80u = 12u

=> Valid votes = 80u − 12u = 68u

=> Winner's votes = 60% of 68u = 40.8u

=> Loser's votes = (100% − 60%) of 68u = 40% of 68u = 27.2u

=> Winning Margin = 40.8u − 27.2u = 13.6u

=> Given, 13.6u = 1394 => u = 102.5

=> Total registered voters = 100u = 100 × 102.5 = 10250

Therefore The correct answer is 10250 voters.

Additional Information

Valid Votes Base

In election problems, percentages secured by the candidates are typically calculated on the total valid votes unless specifically stated as a percentage of total registered voters.

Successive Percentage Change

When events occur sequentially (e.g., total → voted → valid), the ultimate value is found by multiplying all the respective fractional factors to the original base.

Q66. Answer: (c) 60/7

Shortcut Trick

Total work = LCM of days (24, 20, 8) = 120 units.

Efficiency of A = 120 ÷ 24 = 5 units/day.

Efficiency of (A + K) = 120 ÷ 20 = 6 units/day, and (A + K + S) = 120 ÷ 8 = 15 units/day.

Efficiency of S = 15 − 6 = 9 units/day.

Time taken by A and S together = Total work ÷ Combined Efficiency = 120 ÷ (5 + 9) = 120 ÷ 14 = 60/7 days.

Therefore The correct answer is 60/7 days.

Alternate Method

Given:

Time taken by Anjani (A) = 24 days

Time taken by Anjani and Khushbu (A + K) = 20 days

Time taken by Anjani, Khushbu, and Sushmita (A + K + S) = 8 days

Person	Days	Total Work	Efficiency
Anjani (A)	24	120	120 ÷ 24 = 5
Anjani + Khushbu (A + K)	20	120 ÷ 20 = 6	
Anjani + Khushbu + Sushmita (A + K + S)	8	120 ÷ 8 = 15	

Calculations:

=> Efficiency of Sushmita (S) = Combined Efficiency of (A + K + S) − Combined Efficiency of (A + K)

=> Efficiency of S = 15 − 6 = 9 units/day

=> Combined Efficiency of Anjani and Sushmita (A + S) = Efficiency of A + Efficiency of S

=> Combined Efficiency of (A + S) = 5 + 9 = 14 units/day

=> Time taken by A and S together = Total Work ÷ Combined Efficiency of (A + S)

=> Time taken = 120 ÷ 14 = 60/7 days

Therefore The correct answer is 60/7 days.

Additional Information

Work and Wages

Wages are distributed in proportion to the total work done by each individual. If they work for the same number of days, wages are distributed exactly in the ratio of their daily efficiencies.

Pipes and Cisterns

Follows the same logic as time and work concepts. A pipe filling a tank has a positive efficiency, while a leak or an emptying pipe has a negative efficiency. Net work equals the sum of these respective efficiencies.

Alternate Day Work

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When individuals work on alternate days, calculate the total work completed in one full cycle (e.g., 2 days for 2 people). Then find the total number of full cycles needed to reach closest to the total work.

Q67. Answer: (b) 11.58

Shortcut Trick

Identify the base square roots first: √196 = 14, √324 = 18, and √676 = 26.

Adjust for decimals by halving the decimal places in the square root.

√0.0324 (4 decimal places) becomes 0.18 (2 decimal places).

√6.76 (2 decimal places) becomes 2.6 (1 decimal place).

Solve: 14 + 0.18 − 2.6 = 14.18 − 2.6 = 11.58.

Therefore The correct answer is 11.58.

Alternate Method

Given:

The expression is: √196 + √0.0324 − √6.76

Method Used:

Convert decimal values into fractions to easily calculate their exact square roots.

Calculations:

=> √196 + √(324 ÷ 10000) − √(676 ÷ 100)

=> 14 + (18 ÷ 100) − (26 ÷ 10)

=> 14 + 0.18 − 2.6

=> 14.18 − 2.6

=> 11.58

Therefore The correct answer is 11.58.

Additional Information

Decimal Square Roots

If a perfect square has 2n decimal places, its exact square root will have exactly n decimal places.

BODMAS Rule

Always follow the strict order of operations for simplifications: Bracket, Order (powers and roots), Division, Multiplication, Addition, and Subtraction.

Common Squares

Memorizing perfect squares up to 30 accelerates calculation speed. For example: $24^2 = 576$, $25^2 = 625$, and $26^2 = 676$.

Q68. Answer: (c) 0

Shortcut Trick

If A + B = 90°, then $\sin^2A + \sin^2B = 1$, $\cos^2A + \cos^2B = 1$, and $\sec^2A - \cot^2B = 1$.

Applying these complementary identities directly to the given expression:

First term = $(\sin^240° + \sin^250°) \div (\cos^240° + \cos^250°) = 1 \div 1 = 1$

Second term = $(\sec^250° - \cot^240°) \div (\cos^220° + \cos^270°) = 1 \div 1 = 1$

Expression value = 1 − 1 = 0

Therefore The correct answer is 0.

Alternate Method

Given:

Expression = $(\sin^240° + \sin^250°) \div (\cos^240° + \cos^250°) - (\sec^250° - \cot^240°) \div (\cos^220° + \cos^270°)$

Formulas Used:

=> $\sin(90° - \theta) = \cos\theta$

=> $\cos(90° - \theta) = \sin\theta$

=> $\cot(90° - \theta) = \tan\theta$

=> $\sin^2\theta + \cos^2\theta = 1$

=> $\sec^2\theta - \tan^2\theta = 1$

Calculations:

=> First term numerator = $\sin^240° + \sin^2(90° - 40°) = \sin^240° + \cos^240° = 1$

=> First term denominator = $\cos^240° + \cos^2(90° - 40°) = \cos^240° + \sin^240° = 1$

=> Second term numerator = $\sec^250° - \cot^2(90° - 50°) = \sec^250° - \tan^250° = 1$

=> Second term denominator = $\cos^2 20° + \cos^2(90° - 20°) = \cos^2 20° + \sin^2 20° = 1$

=> Substituting these values back into the expression:

=> Expression = $(1 \div 1) - (1 \div 1)$

=> Expression = $1 - 1 = 0$

Therefore The correct answer is 0.

Additional Information

Pythagorean Trigonometric Identities

The three core identities are: $\sin^2\theta + \cos^2\theta = 1$, $\sec^2\theta - \tan^2\theta = 1$, and $\text{cosec}^2\theta - \cot^2\theta = 1$.

Complementary Angle Relations

For any acute angle θ: $\sin(90° - \theta) = \cos\theta$, $\tan(90° - \theta) = \cot\theta$, and $\sec(90° - \theta) = \text{cosec}\theta$.

Q69. Answer: (c) −62x + 67

Shortcut Trick

Expand the brackets by applying the distributive property directly to save time.

=> $3x^2 - 50x + 28 - 3x^2 - 12x + 39$

=> $(3 - 3)x^2 - (50 + 12)x + (28 + 39)$

=> $-62x + 67$

Therefore The correct answer is $-62x + 67$.

Alternate Method

Given:

Expression: $2((3/2)x^2 - 25x + 14) - 3(x^2 + 4x - 13)$

Method Used:

Simplify the algebraic expression by opening the brackets and combining like terms.

Calculations:

=> $[2 \times (3/2)x^2] - [2 \times 25x] + [2 \times 14] - [3 \times x^2] - [3 \times 4x] - [3 \times (-13)]$

=> $3x^2 - 50x + 28 - 3x^2 - 12x + 39$

Group the terms with similar variables together:

=> $(3x^2 - 3x^2) + (-50x - 12x) + (28 + 39)$

=> $0x^2 - 62x + 67$

=> $-62x + 67$

Therefore The correct answer is $-62x + 67$.

Additional Information

Distributive Law of Multiplication

It states that for any terms a, b, and c, multiplying the sum is equal to the sum of the multiplied terms: $a(b \pm c) = ab \pm ac$.

Like Terms

In algebra, like terms have exactly the same variables with the exact same exponents. They can be simplified into a single term through addition or subtraction.

BODMAS Rule

Calculations must always prioritize Brackets, followed by Order (powers/roots), Division, Multiplication, Addition, and Subtraction in sequence.

Q70. Answer: (d) 33.12

Shortcut Trick

Let the assumed overall average be 41 runs.

Deviation of the next 10 matches from assumed average = $10 \times (15 - 41) = -260$

Net effect on the overall average = $-260 \div (23 + 10) = -260 \div 33 \approx -7.88$

Overall average = $41 - 7.88 = 33.12$

Therefore The correct answer is 33.12 runs.

Alternate Method

Given:

Average runs in the first 23 matches = 41

Average runs in the next 10 matches = 15

Formula Used:

Overall Average = Total Runs ÷ Total Matches

23 Matches

Avg: 41

10 Matches

Avg: 15

Overall Avg ≈ 33.12

Total Runs: 943

Total Runs: 150

Total Runs = 1093 | Total Matches = 33

Calculations:

=> Total matches = 23 + 10 = 33

=> Total runs in the first 23 matches = 23 × 41 = 943

=> Total runs in the next 10 matches = 10 × 15 = 150

=> Total runs in all 33 matches = 943 + 150 = 1093

=> Overall Average = 1093 ÷ 33

=> Overall Average = 33.1212... ≈ 33.12

Therefore The correct answer is 33.12 runs.

Additional Information

Weighted Average

It is used to calculate the combined average of multiple groups with different sizes. Formula: A_w = (n1A1 + n2A2) ÷ (n1 + n2).

Deviation Method for Averages

Select an assumed average (A), find the total deviation of all elements from A, and distribute the net deviation equally among all items. Actual Average = Assumed Average + (Total Deviation ÷ Total Number of Items).

Combined Ratio Approach

When calculating weighted averages, only the ratio of the number of items (n1 : n2) matters, not their exact values. Here, the ratio of matches is directly taken as 23 : 10.

Q71. Answer: (c) Neither conclusion (I) nor (II) follows.

The least possible Venn diagram is:

Conclusions:

(I) Some trucks are bottles. - False (There is no direct relation between Trucks and bottles; maybe it is possible, but not definite. Hence, it is false.

(II) All bottles are cars. - False (There is no direct relation between Trucks and bottles; maybe it is possible, but not definite. Hence, it is false.)

Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 3"

Q72. Answer: (d) IDA

The logic followed here is,

Hence, the correct answer is "Option 4"

Q73. Answer: (c) Two

Given: Seven boxes, C, D, E, M, N, O and P are kept one over the other but not necessarily in the same order.

• Only D is kept above N.

• Only two boxes are kept between N and O.

• Only P is kept below C.

• E is not kept immediately above O.

The final Arrangement is

D
N
E
M

O
C
P

Two boxes are kept between M and P.

Hence, the correct answer is "Option 3"

Q74. Answer: (d) Only conclusion (I) follows.

The least possible Venn diagram is:

Conclusions:

(I): Some pepper are chilly. - True (As some pepper are spicy and All spicy are chilly so some pepper are chilly is True)

(II): All chilly are spicy. - False (All spicy are chilly means some spicy are chilly but all chilly are spicy may be possible but not definite. Hence, it is false).

Only conclusion (I) follows.

Hence, the correct answer is "Option 4"

Q75. Answer: (c) 19

Here, we use the BODMAS table given below:

Given:

28 + 42 × 2 – 4 ÷ 3 = ?

'+' and '–' are interchanged, and '×' and '÷' are interchanged.

28 - 42 ÷ 2 + 4 × 3 = ?

28 - 21 + 12 = ?

7 + 12 = 19.

Hence, the correct answer is "Option 3"

Q76. Answer: (a) 16

Given number: 3851764

According to the question,

Number given	**3**	**8**	**5**	**1**	**7**	**6**	**4**
Odd digit → (+2) Even digit → (-1)	(+2)	(-1)	(+2)	(-1)	(+2)	(-1)	(-1)
Resultant number	5	7	7	0	9	5	3

The sum of the digits which are third from the left and third from the right in the new number thus formed = 7+9

=16.

Hence, the correct answer is "Option 1"

Q77. Answer: (b) 48155

The logic follows here,

Hence, the correct answer is "Option 2"

Q78. Answer: (c) 7

'WIRE' is coded as '4726' and 'EAST' is coded as '5173.'

Here, W is common in both and words Wire and East and 7 is common in both numbers.

The code for W is 7.

Hence, the correct answer is "Option 3"

Q79. Answer: (c) 5 km towards west

Given:

• Darshan starts from Point Y and drives 6 km towards the west.

• He then takes a right turn and drives 8 km.

• He then turns right and drives 11 km.
• He takes a final right turn, drives 8 km and stops at Point Z.
Hence, the correct answer is "Option 3"

Q80. Answer: (d) 161

The logic follows here,
Hence, the correct answer is "Option 4"

Q81. Answer: (d) GKF

The logic followed here is:
All follow the same logic except GKF.
Hence, the correct answer is "Option 4".

Q82. Answer: (b) (30, 75, 5)

LOGIC:
(First Number × 2) + (Third Number × 3) = Second Number.
• (2, 49, 15): (2 * 2) + (15 * 3) = 4 + 45 = 49.
• (29, 112, 18): (29 * 2) + (18 * 3) = 58 + 54 = 112.
1) (39, 134, 20): (39 * 2) + (20 * 3) = 78 + 60 = 138 (not 134)
2) (30, 75, 5): (30 * 2) + (5 * 3) = 60 + 15 = 75.
3) (11, 63, 15): (11 * 2) + (15 * 3) = 22 + 45 = 67 (not 63)
4) (28, 106, 18): (28 * 2) + (18 * 3) = 56 + 54 = 110 (not 106).
Hence, the correct answer is "Option 2"

Q83. Answer: (c) Q

Given:
• H, I, J, P, Q, R and S are sitting around a circular table facing the centre of the table.
• I is an immediate neighbor of both Q and H.
• H sits third to the left of P.
• R sits to the immediate left of P.
• J is not an immediate neighbor of H.
The final arrangement is
Q sits third to the left of F.
Hence, the correct answer is "Option 3".

Q84. Answer: (b) 2

There are 30 students in total and Alok is 12th from the right. Rearranging the formula to solve for Alok's position from the left:
• Position from left = Total students - (Position from right) + 1
• Position from left = 30 – 12 + 1 = 19
• So, Alok is the 19th student from the left end.
• Aman is 16th from the left end, and Alok is 19th from the left end.
• The number of students between them is the difference in their positions, minus one. This is because you are counting the students between them, not including them.
• Number of students between = (Alok's position from left) - (Aman's position from left) - 1
• Number of students between = 19 - 16 - 1
• = 2
Hence, the correct answer is "Option 2"

Q85. Answer: (d) One

Given:
6243514
If 3 is added to each odd digit and 1 is subtracted from each even digit
Only 3 appears 2 times in the new number formed.
Hence, the correct answer is "Option 4"

Q86. Answer: (a) 3

Given : Left 1 $ 2 6 7 3 * & 4 β μ 2 5 % 9 0 2 3 6 # @ 8 (Right)

If all the symbols are dropped from the series

Left 1 2 6 7 3 4 2 5 9 0 2 3 6 8 (Right)

The number that will be the fifth from the left is 3.

Hence, the correct answer is "Option 1"

Q87. Answer: (d) 6

Given: 7431856

1 is added to each odd digit, and 2 is subtracted from each even digit.

Second from the right in the new number is 6.

Hence, the correct answer is "Option 4"

Q88. Answer: (c) MRX

The logic followed here is:

Hence, the correct answer is "Option 3"

Q89. Answer: (d) 2

• 'FATE' is coded as '2357'.

• 'TURN' is coded as '4126'

• The code for T is 2.

Hence, the correct answer is "Option 4"

Q90. Answer: (c) HO-JQ-LN

The logic followed here is:

Similarly,

Hence, the correct answer is "Option 3"

Q91. Answer: (a) TM-OS

The logic followed here is:

All follow the same logic except TM - OS.

Hence, the correct answer is "Option 1"

Q92. Answer: (c) Heera

Given:

• Rajesh, Heera, Neetu, Santosh, Pooja and Arti are sitting around a circle, facing the centre.

• Rajesh sits second to the left of Arti.

• Arti sits third to the right of Pooja.

• Neetu sits second to the left of Santosh.

Heera Sit is immediately to the right of Santosh.

Hence, the correct answer is "Option 3"

Q93. Answer: (b) 160

The logic follows,

Hence, the correct answer is "Option 2"

Q94. Answer: (d) 38

We are given that Navya is 12th from the left and Uma is 19th from the left. Uma is exactly between Navya and Dilip. The number of people between Navya and Uma is

(19 − 12) – 1 = 6.

Since Uma is exactly between them, there must also be 6 people between Uma and Dilip.

Dilip's position from the left end is Uma's position + 1 + (number of people between Uma and Dilip).

Dilip's position from the left end =

19 + 1 + 6 = 26.

The total number of people in a row can be calculated using the formula:

Total people = (Position from left) + (Position from right) - 1.
We know Dilip's position from the left is 26 and his position from the right is 13.
Total people
= 26 + 13 − 1 = 38
Hence, the correct answer is "Option 4".

Q95. Answer: (c) One

Given:
(Left) @ 7 8 % * Ω 2 1 # 4 3 0 π 9 μ 7 8 Ω # 9 β (Right)
Required condition: Odd Number - Symbol - Even Number
(Left) @ 7 8 % * Ω 2 1 # 4 3 0 π 9 μ 7 8 Ω # 9 β (Right)
Hence, the correct answer is "Option 3"

Q96. Answer: (d) BH - LD

The logic followed here is:
All follows the same logic except BH-LD.
Hence, the correct answer is "Option 4"

Q97. Answer: (c) 7 km to the South

Given:
• Gyamel starts from Point A and drives 20 km towards the west.
• He then takes a left turn, drives 18 km, turns left and drives 23 km.
• He then takes a left turn and drives 25 km.
• He takes a final left turn, drives 3 km, and stops at Point P.
• The final Arrangement is
Hence, the correct answer is "Option 3"

Q98. Answer: (d) Husband's sister

The family Tree Diagram,
A is the sister of H, and H is the husband of N.
Hence, the correct answer is "Option 4"

Q99. Answer: (d) RICE - ICRE - ECIR

The logic follows here,
Similarly,
Hence, the correct answer is "Option 4"

Q100. Answer: (d) BUSH - BHSU - HSUB

The logic follows here,
Similarly,
Hence, the correct answer is "Option 4"

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