RRB NTPC (UG) CBT-I Official Paper (Held On 20 Jun, 2026 Shift 2) (Previous Year Paper)

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

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MATHEMATICS

Q1. A wholesaler offers a discount of 10% on a commodity, marked at Rs. 3,000, on an order of less than 20 items. Also, on an order of more than 20 items, an additional discount of 5% is offered on the commodity. What amount does a retailer have to pay to purchase 25 items of the commodity whose marked price is Rs. 3,000?

(a) Rs. 25,650
(b) Rs. 64,125
(c) Rs. 72,543
(d) Rs. 26,125

Q2. A floor is paved with 500 identical parallelogram – shaped tiles. The base and corresponding height of each tile are 8 cm and 6 cm, respectively. What is the total area of the floor covered by the tiles (in cm^2)?

(a) 24,000
(b) 20,000
(c) 28,000
(d) 26,000

Q3. If a sphere with radius 10 cm is painted, but 25% of its surface area is masked and not painted, what is the painted area?

(a) 300π cm^2
(b) 200π cm^2
(c) 100π cm^2
(d) 400π cm^2

Q4. The weighted average marks of a student in Physics, Chemistry and Mathematics are 68. The weightages of the subjects Physics, Chemistry and Mathematics are in the ratio 3 : 2 : 5. If the student scored 60 in Physics and 70 in Chemistry, then find the marks in Mathematics.

(a) 74
(b) 66
(c) 72
(d) 68

Q5. A shopkeeper sells a watch at a loss of 10%. If he had sold it for Rs. 450 more, he would have made a profit of 5%. What is the cost price of the watch?

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

Q6. A car travels 120 km at 40 km/h, 120 km at 60 km/h, and 100 km at 80 km/h. What is the average speed of the car for the whole journey?

(a) 62.5 km/h
(b) 54.4 km/h
(c) 55.6 km/h
(d) 65 km/h

Q7. A vertical tower stands on level ground. From a point P, the angle of elevation to the top is 30°. After moving 100 m closer to the tower along the line joining P to the foot of the tower, the angle of elevation becomes 60°. The height of the tower is:

(a) 50√3 meters
(b) 150√3 meters
(c) 75√3 meters
(d) 25√3 meters

Q8. If the interest on a sum of Rs. y at 10% per annum compounded annually for 2 years is Rs. 630, then the total amount payable at the end of the two-year period will be _____.

(a) Rs. 3,540
(b) Rs. 3,630
(c) Rs. 4,100
(d) Rs. 3,950

Q9. Given that 119^(0.49) = x, 119^(0.62) = y and x^z = y^6, then the value of z is close to:

(a) 6.63
(b) 7.59
(c) 6.55
(d) 9.75

Q10. The sum of two digits of a 2-digit number is 9. If the number obtained by interchanging the digits exceeds the original number by 27, find the number.

(a) 63
(b) 36
(c) 45
(d) 27

Q11. In a smart city, the number of electric vehicles increased by 18% in 2021 and 22% in 2022. What is the total percentage increase in electric vehicles over the two years?

(a) 40%
(b) 41.6%
(c) 46%
(d) 43.96%

Q12. The population of a town decreased from 8,000 to 7,200 in one year. What is the percentage decrease?

(a) 15%
(b) 12%
(c) 8%
(d) 10%

Q13. Find the value of m which satisfies

(22/5)^(18) × (5/22)^8 × (22/5)^6 = (5/22)^(9m+4).

(a) -10/9
(b) -16/9
(c) -17/9
(d) -20/9

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Q14. X can finish a job in 20 days. Y can complete the same job in 15 days. If X and Y work together for 5 days and X leaves, how long will Y take to finish the remaining work?

(a) 4.5 days
(b) 6.25 days
(c) 7 days
(d) 5 days

Q15. If the 8-digit number 79243p25 is divisible by 11, then the minimum value of p is:

(a) 8
(b) 2
(c) 7
(d) 4

Q16. If the arithmetic mean of five numbers is 20 and one number is changed from 10 to 20, what happens to the mean?

(a) It decreases by 5
(b) It increases by 2
(c) It stays the same
(d) It decreases by 2

Q17. Two taps can fill a cistern in 4 hours and 17 hours, respectively. A third tap can empty it in 17 hours. How long (in hours) will it take to fill one-fourth of the empty cistern if all the taps are opened together?

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

Q18. Three numbers are in the ratio 3 : 2 : 11, and their LCM is 3564. Their HCF is:

(a) 88
(b) 67
(c) 38
(d) 54

Q19. A, B and C are three batsmen. The ratio of runs scored by them in a certain match was A : B = 15 : 17 and B : C = 14 : 19. At the end of the match, they scored 1542 runs. Find the number of runs scored by A.

(a) 480
(b) 520
(c) 420
(d) 540

Q20. Evaluate $22^3 + (-16)^3 + (-6)^3$

(a) 6220
(b) 6303
(c) 6313
(d) 6336

Q21. Riya, Kabir, and Sana start a business together. Riya invests Rs. 13500 for 8 months, Kabir invests Rs. 21000 for 6 months, and Sana invests Rs. 18000 for 12 months. At the end of the year, they earn a total profit of Rs. 12,600. What is Kabir's share of the profit (in Rs.)?

(a) Rs. 3,528
(b) Rs. 4,030
(c) Rs. 3,722
(d) Rs. 4,285

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Q22. A vendor uses a 50 g stone in place of a 60 g weight while selling salt. If he sells the salt at the cost price per kilogram, what is his profit percentage on the transaction?

(a) 15%
(b) 16.67%
(c) 20%
(d) 18%

Q23. Which single digit should replace the blank in the number 1_36 so that the number is divisible by 9?

(a) 3
(b) 5
(c) 8
(d) 1

Q24. A car travels a distance of 540 km. For the first 3 hours, it travels at a speed of 80 km/h, and for the remaining hours, it reduces its speed to 60 km/h. Find the total time taken by the car to cover the entire distance.

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

Q25. A shopkeeper fixes the marked price of an item 165% above its cost price. What percentage of discount on marked price should be allowed to gain 112%?

(a) 21%
(b) 19%
(c) 20%
(d) 23%

Q26. Three friends P, Q, and R start a business by investing in the ratio 2:3:5. If the total profit is Rs. 10,000, how much more does R receive than P?

(a) Rs. 3,000
(b) Rs. 2,000
(c) Rs. 1,000
(d) Rs. 4,000

Q27. Priya lent Rs. 920 to her friend at 5% per annum simple interest for 3 years. How much simple interest does she earn in this period?

(a) Rs. 150
(b) Rs. 145
(c) Rs. 127
(d) Rs. 138

Q28. The HCF of two numbers is 8, and their LCM is 240. If the sum of the two numbers is 88, what are the numbers?

(a) 24 and 64
(b) 40 and 48
(c) 32 and 56
(d) 16 and 72

Q29. ABC is an equilateral triangle with side 24 cm and AD is the median. If G is the centroid of the triangle ABC, find the length (in cm) of GD.

(a) $9\sqrt{3}$
(b) $4\sqrt{3}$
(c) $6\sqrt{2}$
(d) $3\sqrt{2}$

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Q30. The present ages of P and Q are in the ratio 4 : 5. Eight years ago, the ratio of their ages was 2 : 3. The harmonic mean of their present ages is:

(a) 197/9 years
(b) 167/9 years
(c) 177/9 years
(d) 187/9 years

GENERAL AWARENESS

Q31. The dissolution of which of the following in water makes the solution acidic due to the formation of sulphurous acid?

(a) Sulphur dioxide
(b) Sulphonic acid
(c) Sulphur hexafluoride
(d) Sulphur trioxide

Q32. Which of the following is an example of a fibre crop in India?

(a) Jute
(b) Cucumber
(c) Radish
(d) Turnip

Q33. AR Rahman won the Academy Award for Best Original Score for which film?

(a) Slumdog Millionaire
(b) Rockstar
(c) Dil Se
(d) Lagaan

Q34. In which year was the Ninth Amendment to the Constitution passed in India?

(a) 1962
(b) 1960
(c) 1964
(d) 1950

Q35. As mentioned in the Economic Survey 2024-25, what was the diaspora population of India in 2020?

(a) 12 million
(b) 18 million
(c) 32 million
(d) 26 million

Q36. The Arms Act of 1878 was introduced during the tenure of which Viceroy of British India?

(a) Lord Lytton
(b) Lord Ripon
(c) Lord Curzon
(d) Lord Wellesley

Q37. Diabetes, cancer, and asthma are collectively known as which type of disorders?

(a) Deficiency diseases
(b) Airborne diseases
(c) Non-communicable diseases
(d) Communicable diseases

Q38. Which of the following was a major military reason behind the construction of Siri Fort?

(a) To serve as a trading hub for the Songara Rajputs
(b) To celebrate Khilji's victory over the Cholas
(c) To house Buddhist monasteries

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(d) To protect Delhi from Mongol attacks

Q39. Which mountain range lies immediately to the south of the Vindhyan Range, separated by the Narmada Valley?

(a) Aravalli Range
(b) Eastern Ghats
(c) Satpura Range
(d) Western Ghats

Q40. Which combination correctly matches the device with its primary function?

(a) OMR – Detecting shaded marks on paper
(b) OCR – Recognizing magnetic ink characters
(c) MICR – Reading barcodes
(d) Barcode Reader – Capturing handwritten text

Q41. When using the search term Invoice* in Windows 11 File Explorer, which files will be found?

(a) Files that begin with the word “Invoice”
(b) Files that have “Invoice” anywhere in the name
(c) Files that contain exactly the word “Invoice”
(d) Files that end with the word “Invoice”

Q42. The International Day for the Elimination of Violence against Women marks the beginning of which global campaign?

(a) 30 Days of Human Rights Protection
(b) 10 Days of Equality
(c) 16 Days of Activism against Gender-Based Violence
(d) 7 Days for Women

Q43. Which of the following statements about the National Industrial Corridor Development Programme is INCORRECT?

(a) The program started with the launch of Palakkad-Bangalore-Mumbai-Ahmedabad Industrial Corridor in 2010
(b) It seeks to develop new industrial cities as smart cities by integrating next-generation technologies across infrastructure sectors
(c) It aims at providing complete “plug and play” infrastructure till the plot level along with building sustainable future ready cities
(d) It is an infrastructure initiative that aims to shape the future of urban and industrial development

Q44. Considering the periodic trends, which property explains why noble gases are chemically inert under standard conditions?

(a) Completely filled valence shell
(b) High atomic mass
(c) High electronegativity
(d) Low ionization energy

Q45. In March 2025, ISRO developed Vikram 3201 and Kalpana 3201. These are example of which of the following?

(a) Navigation satellites
(b) Space telescopes
(c) 32-bit microprocessors
(d) New launch vehicles

Q46. What is the primary function of the keyboard shortcut Ctrl + H in applications like MS Word?

(a) Highlights selected text
(b) Opens the Find and Replace dialog box
(c) Opens the Help window
(d) Displays document history

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Q47. The Sardar Sarovar Project is built on which river?

(a) Tapi
(b) Narmada
(c) Sabarmati
(d) Mahi

Q48. Where is the head office of the National Institute of Rural Development and Panchayati Raj in India?

(a) Hyderabad
(b) Lucknow
(c) Delhi
(d) Patna

Q49. Which neighbouring country is separated from India by the Palk Strait?

(a) Maldives
(b) Afghanistan
(c) Myanmar
(d) Sri Lanka

Q50. Which institution is primarily responsible for providing and regulating credit for the promotion of agriculture and rural development in India?

(a) Ministry of Finance
(b) Reserve Bank of India (RBI)
(c) State Bank of India (SBI)
(d) National Bank for Agriculture and Rural Development (NABARD)

Q51. Which of the following traditional art forms originated in the Mithila region of Bihar?

(a) Kalamkari paintings
(b) Madhubani paintings
(c) Pattachitra paintings
(d) Warli paintings

Q52. Which of the following activities formed a central component of the extremist strategy of political mobilisation in the early nationalist phase of India's freedom strugle?

(a) Limiting participation to educated elites through controlled political forums
(b) Adopting British constitutional practices as the primary model for reform
(c) Replacing mass meetings with secret organisations focused on covert action
(d) Promoting swadeshi through the boycott of foreign goods and local production

Q53. Who succeeded Bahlol Lodi and ascended the throne in AD 1489?

(a) Sikandar Lodi
(b) Alam Shah
(c) Muhammad Shah
(d) Ibrahim Lodi

Q54. Which of the following Deccan rulers defeated Harshavardhana and assumed the title “Dakshinapatheshvara” (Lord of the Deccan)?

(a) Dhruva Dharavarsha
(b) Vikramaditya I
(c) Narasimhavarman I
(d) Pulakeshin II

Q55. Which two countries signed a peace accord known as the ‘Kuala Lumpur Peace Accord’ in October 2025?

(a) Malaysia and Indonesia
(b) Cambodia and Thailand
(c) Thailand and Myanmar

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(d) Vietnam and Cambodia

Q56. Who among the following wrote the book 'The World After Gaza'?

(a) Dr. S Jaishankar
(b) Dr. Aishwarya Pandit
(c) Pankaj Mishra
(d) Amitabh Kant

Q57. India and Russia conducted 14th Edition of Maritime Bilateral Exercise INDRA 2025 on which of the following coasts?

(a) Mangaluru
(b) Chennai
(c) Vishakhapatnam
(d) Kochi

Q58. Which of the following correctly pairs the provision and its subject as per the Indian Constitution?

(a) Article 11 – Citizenship by birth
(b) Article 7 – Power of Parliament to regulate citizenship
(c) Article 5 – Citizenship at commencement
(d) Article 9 – Citizenship by registration

Q59. The thorn and scrub vegetation of India is mainly found in which region?

(a) Sundarbans
(b) Malabar Coast
(c) Eastern Himalayas
(d) Western Rajasthan

Q60. Which Indian ministry, in collaboration with the International Council for Circular Economy (ICCE), unveiled the 'I Am Circular' Coffee Table Book in April 2024?

(a) Ministry of Electronics and Information Technology
(b) Ministry of education
(c) Ministry of Information and Broadcasting
(d) Ministry of Finance

Q61. The Supreme Court of India can issue how many types of writs (orders)?

(a) 2
(b) 6
(c) 5
(d) 3

Q62. Which of the following classical dance forms of India originated among the Kathakars (storytellers) of northern India, later incorporating elements of Bhakti traditions as well as Persian and Central Asian influences during the Mughal period?

(a) Kuchipudi
(b) Kathak
(c) Bharatanatyam
(d) Mohiniyattam

Q63. Who among the following announced the UN80 initiative in 2025?

(a) António Guterres
(b) Dr. Tedros Adhanom Ghebreyesus
(c) Bob Rae
(d) Judge Yuji Iwasawa

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Q64. Which Article allows constitutional remedies for enforcement of Fundamental Rights by courts?

(a) Article 32
(b) Article 300
(c) Article 226
(d) Article 44

Q65. A computer's characteristic of Accuracy means it can produce precise and correct results as long as the _____ is/are correct.

(a) resolution of the display screen
(b) size of the system's RAM
(c) input data and instructions
(d) speed of the processor

Q66. Which molecule is primarily responsible for storing genetic information in most living organisms?

(a) DNA
(b) Protein
(c) Lipid
(d) RNA

Q67. The Right to Information Act 2005 was extended to the whole of India except which of the following state/UT at the time of enactment in 2005?

(a) Tripura
(b) Jammu and Kashmir
(c) West Bengal
(d) Mizoram

Q68. In which year was the Hindustan Republican Association (HRA) formed?

(a) 1926
(b) 1924
(c) 1922
(d) 1920

Q69. The governor can dissolve Vidhan Sabha before the completion of its term on the advice of the _____.

(a) Election Commission
(b) Chief Minister
(c) High Court of the State
(d) President

Q70. Under an MoU signed on 2 September 2025 between the Department of Ex-Servicemen Welfare and Patanjali Yoggram, nearly six million veterans and their dependents will receive free access to which type of treatment?

(a) Oncology treatment
(b) Allopathic treatment
(c) AYUSH treatment
(d) Advanced cardiac treatment

GENERAL INTELLIGENCE AND REASONING

Q71. A is the wife of C. L and O are the son and daughter of C, respectively. Q is the wife of L and L is the father of G. M is the husband of O and M is the father of D. How is A related to D?

(a) Mother's mother
(b) Sister
(c) Father's mother
(d) Mother

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Q72. In a certain code language,

A ÷ B means ‘A is the son of B’,

A # B means ‘A is the wife of B’,

A + B means ‘A is the brother of B’ and

A & B means ‘A is the father of B’.

How is S related to H if ‘S + D & R # Y ÷ H’?

(a) Son's wife's father's sister
(b) Wife's father's brother
(c) Son's wife's brother's son
(d) Son's wife's father's brother

Q73. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

PHX 80, TLB 73, XPF 66, BTJ 59, ?

(a) FXN 52
(b) GYM 44
(c) HYN 49
(d) GWM 50

Q74. 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) LG – SC
(b) QM – XJ
(c) HP – OM
(d) RD – YA

Q75. Seven people, A, B, C, D, E, F and G, are sitting in a row, facing north. F sits third to the left of A and F sits third to the right of D. E sits third to the left of B and B sits to the immediate left of G. How many people sit between G and E?

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

Q76. In a certain code language, "JCPV" is coded as "51" and "DYSF" is coded as "48". What is the code for "HTOB" in that given language?

(a) 50
(b) 49
(c) 53
(d) 57

Q77. Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

DCF−GFI

YXA−BAD

(a) TRT−WVY
(b) TSV−VVX
(c) TRT−VUX
(d) RQT−UTW

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Q78. In a certain code language, ‘zip sip unit’ is coded as ‘zm ax jn’ and ‘wife zip house’ is coded as ‘jn yc fj’. How is ‘zip’ coded in that language?

(a) jn
(b) zm
(c) ax
(d) yc

Q79. A, B, D, J, O, T and Z are sitting around a circular table facing the center. Only two people sit between A and Z when counted from the left of A. J is an immediate neighbor of Z. Only one person sits between J and O when counted from the left of J. O is not an immediate neighbor of Z. T sits immediately to the left of D. How many people sit between B and O when counted from the left of O?

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

Q80. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) ICW
(b) FZO
(c) NHB
(d) GAU

Q81. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which is the one that does not belong to that group?

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

(a) NK - PM
(b) PM - NM
(c) IF - KH
(d) KH - MJ

Q82. Read the given statements and conclusions carefully. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. You have to decide which conclusion(s) logically follow(s) from the given statements.

Statements: Some butters are vegetables. All scales are vegetables.

Conclusions (I) Some butters are scales.

Conclusions (II) All vegetables are scales.

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

Q83. What should come in place of the ‘?’ in the given series?

8 15 28 53 ? 199

(a) 102
(b) 103
(c) 101
(d) 104

Q84. Seven boxes, G, H, I, L, M, N and O, are kept one over the other, but not necessarily in the same order.

No box is kept below L. Only four boxes are kept between M and L. H is kept above M. Only two boxes are kept between O and N. I is kept immediately above G. N is not kept immediately above I.

Which box is kept fourth from the bottom?

(a) N
(b) I
(c) M
(d) O

Q85. Each vowel in the word CONTACT is changed to the letter immediately following it in the English alphabetical order and each consonant is changed to the letter immediately preceding it in the English alphabetical order. Which of the following letters will be first from the right in the new group of letters thus formed?

(a) U
(b) S
(c) R
(d) T

Q86. Seven boxes M, N, O, P, X, Y and Z are kept one over the other but not necessarily in the same order. Only N is kept above P. Only two boxes are kept between P and X. Only O is kept below Y. Z is not kept immediately above X. Which box is kept second above M?

(a) X
(b) P
(c) O
(d) Z

Q87. Seven boxes R, A, N, D, O, M and S are kept one over the other but not necessarily in the same order. Only five boxes are kept above N. Only three boxes are kept between N and S. O is kept at one of the positions below N. Only D is kept between S and R. A is kept at one of the positions above S. How many boxes are kept between R and O?

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

Q88. If ‘A’ stands for ‘+’, ‘B’ stands for ‘−’, ‘C’ stands for ‘×’ and ‘D’ stands for ‘÷’, what will come in place of the question mark (?) in the following equation?

34 B 45 D 5 A 2 C 4 = ?

(a) 35
(b) 37
(c) 33
(d) 31

Q89. If 3 is added to each odd digit and 2 is subtracted from each even digit in the number 8254316, then what will be the sum of the digits that are third from the left and third from the right in the new number thus formed?

(a) 15
(b) 14
(c) 13
(d) 12

Q90. What should come in place of ‘?’ in the given series?

47 61 78 98 121 147 ?

(a) 168
(b) 173
(c) 176
(d) 180

Q91. Select the triad that follows the same pattern as that followed by the two triads given below. Both triads follow the same pattern.

FORK – ORKF – RKFO

TUCK – UCKT – CKTU

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(a) BAKE - AKEB - KEBA
(b) THEM - MTHE - EMTH
(c) CLOT - CTLO - COTL
(d) FUND - UNFD - NFUD

Q92. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

OSR NRQ MQP LPO ?

(a) KNM
(b) KPM
(c) KON
(d) KLN

Q93. Select the set in which the numbers are related in the same way as are the numbers of the following sets.

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

(5, 8, 14)

(19, 22, 28)

(a) (34, 37, 43)
(b) (26, 29, 34)
(c) (15, 18, 34)
(d) (41, 44, 52)

Q94. Select the pair which follows the same pattern as that followed by the two sets of pairs given below. Both pairs follow the same pattern.

DKW : HEV

EGK : IAJ

(a) JGX : NAV
(b) FQK : JKL
(c) SOT : WJS
(d) LRD : PLC

Q95. Refer to the given number series and answer the question that follows. All numbers are single-digit numbers only. Counting to be done from left to right only.

(Left) 3 9 5 3 8 4 4 2 9 8 9 4 6 6 5 7 7 2 4 1 3 6 3 (Right)

How many such even digits are there, each of which is immediately preceded by an odd digit and also immediately followed by an even digit?

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

Q96. Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All desktops are fans.

All fans are cups.

Conclusions:

(I) Some cups are fans.

(II) All desktops are cups.

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

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(c) Only conclusion (I) follows
(d) Only conclusion (II) follows

Q97. Anamika starts from Point A and drives 2 km towards the north. She then takes a right turn, drives 5 km, turns right and drives 7 km. She then takes a right turn and drives 8 km. She takes a final right turn, drives 5 km and stops at Point P. How far (shortest distance) and towards which direction should she drive in order to reach Point A again? (All turns are 90-degree turns only unless specified.)

(a) 2 km to the west
(b) 4 km to the east
(c) 1 km to the east
(d) 3 km to the east

Q98. Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) R D A U F U E Q Y U M U Y G J S P B A J L Q S H (Right)

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

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

Q99. If + means -, - means ×, × means ÷, and ÷ means +, then what will come in place of the question mark (?) in the following equation?

41 - 16 ÷ 271 + 611 × 13 = ?

(a) 880
(b) 866
(c) 860
(d) 812

Q100. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

PSV3, WZC13, DGJ23, KNQ33, ?

(a) RUX43
(b) RUY43
(c) RVX43
(d) SUX43

ANSWER KEY

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

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SOLUTIONS

Q1. Answer: (b) Rs. 64,125

Shortcut Trick

Total Marked Price = 25 × 3,000 = Rs. 75,000

Successive Discount % = 10 + 5 − (10 × 5) ÷ 100 = 14.5%

Net Multiplier = 100% − 14.5% = 85.5% = 0.855

Final Amount = 75,000 × 0.855 = Rs. 64,125

Therefore The correct answer is Rs. 64,125.

Alternate Method

Given:

Marked Price (MP) per item = Rs. 3,000

Quantity = 25 items (More than 20 items)

Discounts = 10% (primary) and an additional 5% (successive)

Calculations:

=> Total MP = 25 × 3,000 = Rs. 75,000

=> Since quantity is 25 (which is > 20), both 10% and 5% discounts apply.

=> Price after 10% Discount = 75,000 − (10% of 75,000)

=> Price after 10% Discount = 75,000 − 7,500 = Rs. 67,500

=> Price after Additional 5% Discount = 67,500 − (5% of 67,500)

=> Final Amount = 67,500 − 3,375

=> Final Amount = Rs. 64,125

Therefore The correct answer is Rs. 64,125.

Additional Information

Successive Discount Formula

When two discounts d1 and d2 are applied successively, the single equivalent discount is calculated as (d1 + d2 − (d1 × d2) ÷ 100)%.

Net Selling Price Formula

SP = MP × (100 − d1)/100 × (100 − d2)/100. This is useful for calculating the final price directly after multiple discounts.

Marked Price vs. Selling Price

Marked Price is the price printed on the item, while Selling Price is the final amount paid after deducting all applicable discounts from the MP.

Q2. Answer: (a) 24,000

Shortcut Trick

Total Area = Number of Tiles × (Base × Height)

Total Area = 500 × (8 × 6)

Total Area = 500 × 48 = 24,000 cm^2

Therefore The correct answer is 24,000 cm^2.

Alternate Method

Given:

Total identical tiles = 500

Base (b) of each parallelogram-shaped tile = 8 cm

Height (h) of each parallelogram-shaped tile = 6 cm

Formula used:

Area of a parallelogram = Base × Height

Calculations:

=> Area of one tile = 8 cm × 6 cm

=> Area of one tile = 48 cm^2

=> Total area of the floor = Number of tiles × Area of one tile

=> Total area = 500 × 48 cm^2

=> Total area = 24,000 cm^2

Therefore The correct answer is 24,000 cm².

Additional Information

Area of Parallelogram

The area is determined by multiplying the length of the base by the perpendicular height (A = b × h).

Perimeter of Parallelogram

The perimeter is the total length of the boundary, calculated as P = 2 × (a + b), where 'a' and 'b' are adjacent sides.

Properties of Parallelogram

Opposite sides are parallel and equal, opposite angles are equal, and diagonals bisect each other.

Q3. Answer: (a) 300π cm²

Shortcut Trick

Total surface area of a sphere = 4πr².

If 25% is masked, then the Painted Area = 75% of Total Surface Area.

Painted Area = 75% × 4π(10)² = 0.75 × 400π = 300π cm².

Therefore The correct answer is 300π cm².

Alternate Method

Given:

Radius of the sphere (r) = 10 cm

Masked percentage = 25%

Formula Used:

Total Surface Area (TSA) of a sphere = 4πr²

Painted Area = TSA − Masked Area = TSA × (100% − Masked %)

Calculations:

=> Total Surface Area (TSA) = 4 × π × (10)²

=> TSA = 4 × π × 100 = 400π cm²

=> Masked Area = 25% of 400π = 0.25 × 400π = 100π cm²

=> Painted Area = 400π − 100π

=> Painted Area = 300π cm²

Therefore The correct answer is 300π cm².

Additional Information

Volume of a Sphere

The amount of space occupied by the sphere is given by Volume = (4/3)πr³.

Hemisphere Surface Area

Curved Surface Area (CSA) = 2πr² and Total Surface Area (TSA) = 3πr².

Surface Area to Volume Ratio

For a sphere, the ratio is (4πr²) ÷ (4/3πr³) = 3 ÷ r.

Q4. Answer: (c) 72

Shortcut Trick

Total weighted parts = 3 + 2 + 5 = 10 units.

Total required weighted score = 68 × 10 = 680.

Contribution of Physics and Chemistry = (3 × 60) + (2 × 70) = 180 + 140 = 320.

Required contribution from Mathematics = 680 − 320 = 360.

Mathematics marks = 360 ÷ 5 = 72.

Therefore The correct answer is 72.

Alternate Method

Given:

Ratio of weights (w1 : w2 : w3) = 3 : 2 : 5

Marks in Physics (x1) = 60, Marks in Chemistry (x2) = 70

Weighted Average (A_w) = 68

Formula Used:

Weighted Average (A_w) = (w1x1 + w2x2 + w3x3) ÷ (w1 + w2 + w3)

Calculations:

=> 68 = (3 × 60 + 2 × 70 + 5 × x3) ÷ (3 + 2 + 5)

=> 68 = (180 + 140 + 5x3) ÷ 10

=> 68 × 10 = 320 + 5x3

=> 680 = 320 + 5x3

=> 5x3 = 680 − 320

=> 5x3 = 360

=> x3 = 360 ÷ 5

=> x3 = 72

Therefore The correct answer is 72.

Additional Information

Weighted Average Concept

Unlike a simple average where each value contributes equally, a weighted average assigns specific importance (weights) to each value. The sum of the products of weights and values is divided by the sum of the weights.

Net Deviation Method

The sum of weighted deviations from the weighted average is always zero. $\Sigma w_i(x_i - A_w) = 0$. This can be used to find missing values by balancing positive and negative deviations.

Arithmetic Mean vs Weighted Mean

Arithmetic Mean is a special case of Weighted Mean where all weights are equal (e.g., w1 = w2 = w3 = 1).

Q5. Answer: (d) Rs. 3,000

Shortcut Trick

Net percentage gap between 10% loss and 5% profit = 10% + 5% = 15%.

According to the question, this 15% difference corresponds to Rs. 450.

=> 15% = Rs. 450

=> 1% = Rs. 30

=> Cost Price (100%) = 30 × 100 = Rs. 3,000.

Therefore The correct answer is Rs. 3,000.

Alternate Method

Given: Initial Loss = 10%, Final Profit = 5%, Price Increase = Rs. 450.

=> Let the Cost Price (CP) of the watch be Rs. x.

=> Initial Selling Price (SP1) = CP − 10% of CP = 0.90x

=> New Selling Price (SP2) = CP + 5% of CP = 1.05x

=> According to the problem: SP2 − SP1 = 450

=> 1.05x − 0.90x = 450

=> 0.15x = 450

=> x = 450 ÷ 0.15

=> x = 45000 ÷ 15

=> x = 3000

Therefore The correct answer is Rs. 3,000.

Additional Information

Profit and Loss Percentage

Profit % is always calculated on Cost Price unless stated otherwise. Formula: Profit% = (Profit ÷ CP) × 100.

Marked Price and Discount

Discount is the reduction offered on the Marked Price (MP). SP = MP − Discount.

Successive Percentage Shortcut

For two successive changes of a% and b%, net change = (a + b + ab/100)%.

Q6. Answer: (b) 54.4 km/h

Shortcut Trick

Average speed = Total distance ÷ Total time

Total distance = 120 + 120 + 100 = 340 km

Total time = (120 ÷ 40) + (120 ÷ 60) + (100 ÷ 80) = 3 + 2 + 1.25 = 6.25 hours

Average speed = 340 ÷ 6.25 = 54.4 km/h

Therefore The correct answer is 54.4 km/h.

Alternate Method

Given:

First segment: Distance (d1) = 120 km, Speed (s1) = 40 km/h

Second segment: Distance (d2) = 120 km, Speed (s2) = 60 km/h

Third segment: Distance (d3) = 100 km, Speed (s3) = 80 km/h

Formula Used:

Average Speed = Total Distance ÷ Total Time

Calculations:

=> Time for first part (t1) = 120 ÷ 40 = 3 hours

=> Time for second part (t2) = 120 ÷ 60 = 2 hours

=> Time for third part (t3) = 100 ÷ 80 = 1.25 hours

=> Total Distance = 120 + 120 + 100 = 340 km

=> Total Time = 3 + 2 + 1.25 = 6.25 hours

=> Average Speed = 340 ÷ 6.25 = 54.4 km/h

Therefore The correct answer is 54.4 km/h.

Additional Information

Average Speed for Equal Distances

If a certain distance is covered at s1 speed and the same distance is covered at s2 speed, the average speed is (2 × s1 × s2) ÷ (s1 + s2).

Speed Unit Conversion

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

Relative Speed

When two objects move in the same direction, relative speed is s1 − s2. In opposite directions, it is s1 + s2.

Q7. Answer: (a) 50√3 meters

Shortcut Trick

Use the direct distance formula: d = h(cot θ1 − cot θ2), where d is the distance moved toward the tower.

Here, d = 100 m, θ1 = 30°, and θ2 = 60°.

=> 100 = h(cot 30° − cot 60°)

=> 100 = h(√3 − 1/√3) => 100 = h(2/√3)

=> h = (100 × √3) / 2 = 50√3 m.

Therefore The correct answer is 50√3 m.

Alternate Method

Given: Angle of elevation at point P = 30°, Angle at point Q = 60°, distance PQ = 100 m.

In right triangle ABQ:

=> tan 60° = AB/BQ

=> √3 = h/BQ => BQ = h/√3

In right triangle ABP:

=> tan 30° = AB/BP

=> 1/√3 = h/(BQ + 100)

=> BQ + 100 = h√3

Substituting the value of BQ:

=> h/√3 + 100 = h√3

=> 100 = h√3 − h/√3

=> 100 = (3h − h) / √3

=> 100 = 2h / √3

=> 2h = 100√3

=> h = 50√3 m.

Therefore The correct answer is 50√3 m.

Additional Information

Trigonometric Ratios

In a right-angled triangle, tan θ = Perpendicular/Base and cot θ = Base/Perpendicular.

Special Angles

Standard values: tan 30° = 1/√3, tan 60° = √3, and tan 45° = 1.

Angle of Elevation

The angle formed by the line of sight with the horizontal when looking upward at an object.

Q8. Answer: (b) Rs. 3,630

Shortcut Trick

Effective Compound Interest rate for 2 years at 10% = 10 + 10 + (10 × 10)/100 = 21%.

Given 21% of the Principal (y) = Rs. 630.

Total Amount payable = Principal (100%) + Interest (21%) = 121%.

If 21% → Rs. 630, then 1% → Rs. 30.

121% → 121 × 30 = Rs. 3,630.

Therefore The correct answer is Rs. 3,630.

Alternate Method

Given: Compound Interest (CI) = Rs. 630, Rate (R) = 10% p.a., Time (T) = 2 years, Principal = Rs. y.

Formula: Amount (A) = P(1 + R/100)^T and CI = A − P

=> CI = y[(1 + 10/100)² − 1]

=> 630 = y[(11/10)² − 1]

=> 630 = y[121/100 − 1]

=> 630 = y[21/100]

=> y = (630 × 100) ÷ 21

=> y = 30 × 100 = Rs. 3,000

=> Total Amount (A) = Principal (y) + CI

=> Total Amount (A) = 3000 + 630 = Rs. 3,630

Therefore The correct answer is Rs. 3,630.

Additional Information

Effective Rate of Interest

For a rate R% compounded annually for 2 years, the effective rate is R + R + (R×R)/100 %.

CI and SI Difference (2 Years)

The difference between Compound Interest and Simple Interest for 2 years is given by P(R/100)².

Compound Interest Formula

Amount A = P(1 + r/n)^(nt), where n is the number of times interest is compounded per year.

Q9. Answer: (b) 7.59

Given:

x = 119^(0.49)

y = 119^(0.62)

x^z = y^6

Formula used:

(a^m)^n = a^(m × n)

Calculation:

Substitute the values of x and y into the given relation:

=> (119^(0.49))^z = (119^(0.62))^6

=> 119^(0.49 × z) = 119^(0.62 × 6)

Since the bases are the same, we can equate the exponents:

=> 0.49 × z = 0.62 × 6

=> 0.49 × z = 3.72

=> z = 3.72 ÷ 0.49

=> z ≈ 7.59

Therefore The correct answer is option (2).

Q10. Answer: (b) 36

Shortcut Trick

The difference between a 2-digit number and its reverse is always 9 × (difference of digits).

Given difference = 27 => 9 × (Digit Difference) = 27 => Digit Difference = 3.

Sum of digits = 9 (Given). Let digits be x and y.

Larger digit = (9 + 3) ÷ 2 = 6 | Smaller digit = (9 − 3) ÷ 2 = 3.

Since the reversed number exceeds the original, the units digit must be larger => Number = 36.

Therefore The correct answer is 36.

Alternate Method

Given:

Sum of the digits of a 2-digit number = 9

Difference between interchanged number and original number = 27

Formula Used:

A 2-digit number with tens digit x and units digit y is represented as: 10x + y.

Calculations:

=> Let the tens digit be x and the units digit be y.

=> Original number = 10x + y

=> x + y = 9 → (Equation 1)

=> Number obtained by interchanging the digits = 10y + x

=> (10y + x) − (10x + y) = 27

=> 9y − 9x = 27

=> y − x = 3 → (Equation 2)

=> Adding Equation 1 and Equation 2:

=> (x + y) + (y − x) = 9 + 3

=> 2y = 12 => y = 6

=> Substituting y = 6 in Equation 1: x + 6 = 9 => x = 3

=> Original Number = 10(3) + 6 = 36

Therefore The correct answer is 36.

Additional Information

Number Reversal Property

The difference between a 2-digit number and its reverse is always a multiple of 9, specifically 9 × |tens digit − units digit|.

Sum of Reversed Numbers

The sum of a 2-digit number and its reverse is always a multiple of 11, specifically 11 × (tens digit + units digit).

Place Value Concept

In any n-digit number, the value is the sum of (digit × 10^(position−1)). For a 2-digit number, it is 10a + b.

Q11. Answer: (d) 43.96%

Shortcut Trick

Use the successive percentage formula: x + y + (xy / 100)

Here, x = 18% and y = 22%

Total Increase = 18 + 22 + (18 × 22 / 100)

Total Increase = 40 + 396 / 100 = 40 + 3.96 = 43.96%

Therefore The correct answer is 43.96%.

Alternate Method

Given: Increase in 2021 = 18%; Increase in 2022 = 22%.

Assume the initial number of electric vehicles was 100.

=> Number after 2021 increase = 100 + (18% of 100) = 118

=> Number after 2022 increase = 118 + (22% of 118)

=> 22% of 118 = (22 × 118) / 100 = 25.96

=> Final number of vehicles = 118 + 25.96 = 143.96

=> Total percentage increase = 143.96 − 100 = 43.96%

Therefore The correct answer is 43.96%.

Additional Information

Successive Percentage Formula

For two successive changes of a% and b%, the net change is (a + b + ab/100)%. Use positive values for increase and negative values for decrease.

Multiplying Factor Method

Final Value = Initial Value × (1 + r1/100) × (1 + r2/100). For 18% and 22% increases, the factors are 1.18 and 1.22 respectively.

Three Successive Changes

If there is a third change c%, calculate the net of a and b first, then use that result as a new 'a' with the third value 'c'.

Q12. Answer: (d) 10%

Shortcut Trick

Decrease in population = 8,000 − 7,200 = 800

Fractional decrease = 800 ÷ 8,000 = 1/10

Percentage Decrease = 1/10 × 100 = 10%

Therefore The correct answer is 10%.

Alternate Method

Initial Population of the town = 8,000

Final Population after one year = 7,200

Formula Used: Percentage Decrease = [(Original Value − New Value) ÷ Original Value] × 100

=> Total Decrease = 8,000 − 7,200 = 800

=> Percentage Decrease = (800 ÷ 8,000) × 100

=> Percentage Decrease = (1 ÷ 10) × 100 = 10%

Therefore The correct answer is 10%.

Additional Information

Percentage Change Rule

Percentage change is always calculated on the Initial Value (Base Value). Formula: [(Difference) ÷ (Initial Value)] × 100.

Successive Percentage Change

If a value changes by a% and then by b%, the net change is given by [a + b + (ab/100)]%.

Population Growth Formula

If population grows at a constant rate r% annually, Population after n years = P × $(1 + r/100)^n$.

Q13. Answer: (d) -20/9

Given:

((22/5))^(18) × ((5/22))^8 × ((22/5))^6 = ((5/22))^(9m+4)

Formula used:

$(a/b)^n = (b/a)^{(-n)}$

a^x × a^y = a^(x+y)

Calculation:

To find the value of m, we first equate the bases on the left-hand side to match the right-hand side base of (5/22).

Using the reciprocal rule $(a/b)^n = (b/a)^{(-n)}$:

=> ((5/22))^(−18) × ((5/22))^8 × ((5/22))^(−6) = ((5/22))^(9m+4)

Using the law of exponents (a^x × a^y = a^(x+y)) to combine the terms:

=> ((5/22))^((−18 + 8 − 6)) = ((5/22))^(9m+4)

=> ((5/22))^(−16) = ((5/22))^(9m+4)

Since the bases are now equal, we compare the exponents:

=> −16 = 9m + 4

=> 9m = −16 − 4

=> 9m = −20

=> m = −20/9

Therefore The correct answer is option (4).

Q14. Answer: (b) 6.25 days

Shortcut Trick

Efficiency ratio of X and Y = 15 : 20 = 3 : 4.

Total work = 20 × 3 = 60 units.

Work done by X and Y in 5 days = 5 × (3 + 4) = 35 units.

Remaining work = 60 − 35 = 25 units.

Time taken by Y to finish = 25 ÷ 4 = 6.25 days.

Therefore The correct answer is 6.25 days.

Alternate Method

Given:

Time taken by X = 20 days

Time taken by Y = 15 days

Time worked together = 5 days

Formula used:

Efficiency = Total Work ÷ Time Taken

Person	Days	Total Work (LCM)	Efficiency
X	20	60	60 ÷ 20 = 3
Y	15	60 ÷ 15 = 4	

Calculations:

=> Total efficiency of X and Y = 3 + 4 = 7 units/day

=> Work completed by X and Y in 5 days = 7 × 5 = 35 units

=> Remaining work after X leaves = 60 − 35 = 25 units

=> Time taken by Y to complete 25 units = 25 ÷ 4

=> Time = 6.25 days

Therefore The correct answer is 6.25 days.

Additional Information

Pipes and Cisterns

This concept follows the same principles as time and work, where an inlet pipe has positive efficiency and an outlet pipe has negative efficiency.

Work and Wages

Wages are distributed among workers in the ratio of the total work done by each, which is (Efficiency × Time).

Alternate Day Work

In such problems, calculate the work done in one full cycle (e.g., 2 days) and then find the total cycles needed to approach the total work.

Q15. Answer: (c) 7

Shortcut Trick

For a number to be divisible by 11, the difference between the sum of digits at odd positions and even positions must be 0 or a multiple of 11.

Sum of digits at odd places (7+2+3+2) = 14

Sum of digits at even places (9+4+p+5) = 18 + p

Difference = (18 + p) − 14 = p + 4

For divisibility, p + 4 = 11 => p = 7.

Therefore The correct answer is 7.

Alternate Method

Given: The 8-digit number is 79243p25 and it is divisible by 11.

Formula Used: A number is divisible by 11 if |(Sum of digits at odd places) − (Sum of digits at even places)| is 0, 11, 22, etc.

Calculations:

=> Sum of digits at odd places = 7 + 2 + 3 + 2 = 14

=> Sum of digits at even places = 9 + 4 + p + 5 = 18 + p

=> Difference = (Sum of even places) − (Sum of odd places)

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=> Difference = (18 + p) − 14 = p + 4
=> For the number to be divisible by 11, (p + 4) must be a multiple of 11.
=> Since p is a single digit (0−9), the only possible multiple is 11.
=> p + 4 = 11
=> p = 11 − 4 = 7
Therefore The correct answer is 7.
Additional Information
Divisibility by 3 and 9
A number is divisible by 3 (or 9) if the sum of all its digits is divisible by 3 (or 9).
Divisibility by 8
A number is divisible by 8 if its last three digits are divisible by 8.
Divisibility by 11 (Alternative)
Subtract the last digit from the remaining number. If the result is divisible by 11, the original number is too.

Q16. Answer: (b) It increases by 2

Shortcut Trick
Net change in sum = New value − Old value = 20 − 10 = +10
Net change in mean = Net change in sum ÷ Total count = 10 ÷ 5 = +2
Since the result is positive, the mean increases by the calculated value.
Therefore The correct answer is It increases by 2.
Alternate Method
Given: Total numbers (n) = 5, Initial Arithmetic Mean = 20.
Formula Used: Total Sum = Mean × Number of observations
=> Initial total sum = 20 × 5 = 100
=> One number changes from 10 to 20.
=> New total sum = 100 − 10 + 20 = 110
=> New Arithmetic Mean = 110 ÷ 5 = 22
=> Difference in mean = 22 − 20 = +2
Therefore The correct answer is It increases by 2.
Additional Information
Properties of Arithmetic Mean
If every observation in a data set is increased or decreased by a constant value k, the mean also increases or decreases by k.
Effect of Replacement
When a value x is replaced by y, the change in the mean is given by (y − x) ÷ n, where n is the total number of observations.
Weighted Average
The combined mean of two groups with sizes n1, n2 and means x1, x2 is (n1x1 + n2x2) ÷ (n1 + n2).

Q17. Answer: (d) 1

Shortcut Trick
Since the filling rate of the second tap and the emptying rate of the third tap are identical (both 17 hr), they cancel each other out.
Net filling rate = 1/4 + 1/17 − 1/17 = 1/4 of the cistern per hour.
Time to fill the full cistern = 4 hours.
Time to fill one-fourth of the cistern = 1/4 × 4 = 1 hour.
Therefore The correct answer is 1 hr.
Alternate Method
Given: Filling time for Tap A = 4 hr, Tap B = 17 hr, and emptying time for Tap C = 17 hr.
Total capacity (Work) = LCM of (4, 17, 17) = 68 units.

Tap	Time (hr)	Total Work	Efficiency
Tap A (Fill)	4	68	17
Tap B (Fill)	17	4	
Tap C (Empty)	17	−4	

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=> Total net efficiency = 17 + 4 − 4 = 17 units/hr.

=> Required work (one-fourth of cistern) = 68 ÷ 4 = 17 units.

=> Time required = Required Work ÷ Net Efficiency

=> Time = 17 ÷ 17 = 1 hour.

Therefore The correct answer is 1 hr.

Additional Information

Net Efficiency in Pipes and Cisterns

The net rate of filling is the sum of the rates of inlet pipes minus the sum of the rates of outlet pipes.

Relationship between Time and Work

Total Work = Efficiency × Time. For a cistern, work is represented by the volume or capacity, often calculated as the LCM of time intervals.

Concept of Negative Work

An emptying tap performs negative work. If a tap empties a tank in 'n' hours, its efficiency is taken as −1/n per hour.

Q18. Answer: (d) 54

Shortcut Trick

LCM of numbers = (LCM of ratio parts) × HCF

Ratio of numbers = 3 : 2 : 11

LCM of ratio parts (3, 2, 11) = 3 × 2 × 11 = 66 (since they are co-prime)

66 units = 3564

1 unit (HCF) = 3564 ÷ 66 = 54

Therefore The correct answer is 54.

Alternate Method

Given:

Ratio of three numbers = 3 : 2 : 11

LCM of the numbers = 3564

Formula Used:

If the numbers are ax, bx, and cx, where x is the HCF, then their LCM = x × LCM(a, b, c).

Calculations:

Let the three numbers be 3x, 2x, and 11x, where x is the HCF.

=> LCM(3x, 2x, 11x) = 3564

=> x × LCM(3, 2, 11) = 3564

=> x × (3 × 2 × 11) = 3564

=> 66x = 3564

=> x = 3564 ÷ 66

=> x = 54

Therefore The correct answer is 54.

Additional Information

HCF and LCM Relation

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

Co-prime Numbers

If a set of numbers are co-prime (meaning they have no common factors other than 1), their HCF is 1 and their LCM is the product of the numbers.

HCF and LCM Properties

The HCF of a group of numbers is always a factor of their LCM. HCF is the largest number that divides all given numbers exactly.

Q19. Answer: (c) 420

Shortcut Trick

Combine the ratios by equating the common term B: A : B : C = (15 × 14) : (17 × 14) : (17 × 19) = 210 : 238 : 323.

Total units = 210 + 238 + 323 = 771 units.

Given 771 units = 1542 runs => 1 unit = 2 runs.

A's score = 210 × 2 = 420.

Therefore The correct answer is 420.

Alternate Method

Given:

Ratio A : B = 15 : 17

Ratio B : C = 14 : 19

Total runs scored = 1542

Formula Used:

If A : B = x : y and B : C = p : q, then A : B : C = (x × p) : (y × p) : (y × q)

Calculations:

=> To merge the ratios, find the LCM of B's values (17 and 14), which is 238.

=> A : B = (15 × 14) : (17 × 14) = 210 : 238

=> B : C = (14 × 17) : (19 × 17) = 238 : 323

=> Combined Ratio A : B : C = 210 : 238 : 323

=> Sum of parts = 210 + 238 + 323 = 771

=> Value of 1 part = 1542 ÷ 771 = 2

=> Runs scored by A = 210 × 2 = 420

Therefore The correct answer is 420.

Additional Information

Merging Ratios

To combine ratios like A:B and B:C, the common variable (B) must have the same value in both. Multiply each ratio by the value of B from the other ratio.

Unitary Method in Ratios

Once the total number of parts is known, the value of one part is calculated as (Total Value ÷ Total Parts). Individual shares are then (Individual Parts × Value of 1 part).

Inverse Ratio

The inverse ratio of a : b is 1/a : 1/b, which simplifies to b : a.

Q20. Answer: (d) 6336

Shortcut Trick

Check the sum of the bases: 22 + (−16) + (−6) = 22 − 22 = 0.

Apply the algebraic identity: If a + b + c = 0, then $a^3 + b^3 + c^3 = 3abc$.

Result = 3 × 22 × (−16) × (−6) = 66 × 96 = 6336.

Therefore The correct answer is 6336.

Alternate Method

Given: The expression to evaluate is $22^3 + (-16)^3 + (-6)^3$.

Formula Used: If a + b + c = 0, then the identity $a^3 + b^3 + c^3 = 3abc$ holds true.

=> Assign values: a = 22, b = −16, and c = −6.

=> Verify the condition: a + b + c = 22 + (−16) + (−6) = 22 − 22 = 0.

=> Substitute into the identity: $22^3 + (-16)^3 + (-6)^3 = 3 \times 22 \times (-16) \times (-6)$.

=> Multiply the constants: 3 × 22 = 66 and (−16) × (−6) = 96.

=> Final calculation: 66 × 96 = 66 × (100 − 4) = 6600 − 264 = 6336.

Therefore The correct answer is 6336.

Additional Information

General Algebraic Identity

The complete identity is $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$.

Special Conditions

The expression $a^3 + b^3 + c^3 = 3abc$ occurs when either a + b + c = 0 or a = b = c.

Negative Base Powers

Since the exponent 3 is an odd number, the cube of a negative number remains negative, i.e., $(-x)^3 = -x^3$.

Q21. Answer: (a) Rs. 3,528

Shortcut Trick

Ratio of Profit = (Investment × Time)

Riya : Kabir : Sana = (13500 × 8) : (21000 × 6) : (18000 × 12)

Riya : Kabir : Sana = 108 : 126 : 216 = 6 : 7 : 12
Total units = 6 + 7 + 12 = 25 units → Rs. 12,600
Kabir's share (7 units) = (12600 ÷ 25) × 7 = 504 × 7 = Rs. 3,528
Therefore The correct answer is Rs. 3,528.
Alternate Method
Given:
Riya's investment (C_R) = Rs. 13,500, Time (T_R) = 8 months
Kabir's investment (C_K) = Rs. 21,000, Time (T_K) = 6 months
Sana's investment (C_S) = Rs. 18,000, Time (T_S) = 12 months
Total Profit = Rs. 12,600
Formula Used: Profit Ratio = (C1 × T1) : (C2 × T2) : (C3 × T3)
Calculations:
=> Riya's Profit Share : Kabir's Profit Share : Sana's Profit Share
=> (13500 × 8) : (21000 × 6) : (18000 × 12)
=> 108000 : 126000 : 216000
=> 108 : 126 : 216
=> 6 : 7 : 12 (Dividing by 18)
=> Total Ratio = 6 + 7 + 12 = 25 units
=> 25 units = Rs. 12,600
=> 1 unit = 12600 ÷ 25 = Rs. 504
=> Kabir's share = 7 units = 7 × 504 = Rs. 3,528
Therefore The correct answer is Rs. 3,528.
Additional Information
Partnership Profit Sharing Rule
Profit is distributed in the ratio of the product of Capital and Time. P1 : P2 = (C1 × T1) : (C2 × T2).
Active vs Sleeping Partner
An Active partner manages the business and may receive a salary or extra profit %, while a Sleeping partner only provides capital.
Variable Time Investment
If a partner changes investment mid-way, calculate total investment as: (C1 × T1) + (C2 × T2) for that partner.

Q22. Answer: (c) 20%

Shortcut Trick
For a dishonest vendor selling at Cost Price (CP):
Profit % = (Error in weight ÷ Actual weight given) × 100
Error = 60 g − 50 g = 10 g
Profit % = (10 ÷ 50) × 100 = 20%
Therefore The correct answer is 20%.
Alternate Method
Given:
Stated Weight (what the customer pays for) = 60 g
Actual Weight (what the vendor gives) = 50 g
Formula Used:
Profit % = [(Stated Weight − Actual Weight) ÷ Actual Weight] × 100
Let the Cost Price of 1 g of salt be Rs. 1.
=> Total Cost Price (CP) of salt actually given (50 g) = Rs. 50
=> Total Selling Price (SP) (Price of 60 g at CP) = Rs. 60
=> Profit earned = SP − CP = Rs. 60 − Rs. 50 = Rs. 10
=> Profit Percentage = (Profit ÷ CP) × 100
=> Profit % = (10 ÷ 50) × 100
=> Profit % = 20%
Therefore The correct answer is 20%.
Additional Information

Dishonest Dealer Weight Gain

Profit % = [Gain ÷ (True Weight − Gain)] × 100. This applies when the dealer sells at CP but uses a faulty less weight.

Cheating While Buying and Selling

If a dealer cheats x% in weight while buying and y% while selling, Net Profit % = [((100 + x)(100 + y) ÷ 100) − 100].

Markup and Weight Cheating

If a dealer marks up price by P% and uses a weight of W1 instead of W2, then Net Profit % = [((100 + P) × W2) ÷ (100 × W1) − 1] × 100.

Q23. Answer: (c) 8

Shortcut Trick

For a number to be divisible by 9, the sum of its digits must be divisible by 9.

Sum of existing digits in 1_36 = 1 + 3 + 6 = 10.

The next multiple of 9 greater than 10 is 18.

Required digit = 18 − 10 = 8.

Therefore The correct answer is 8.

Alternate Method

Given: Number = 1x36 (where x is the missing digit), Divisor = 9.

Formula Used: Divisibility Rule of 9 → Sum of digits ÷ 9 = Integer.

Calculations:

=> Sum of digits = 1 + x + 3 + 6

=> Sum = 10 + x

=> For the number to be divisible by 9, (10 + x) must be a multiple of 9 (9, 18, 27...).

=> Since x is a single digit (0−9), 10 + x = 18 is the only valid case.

=> x = 18 − 10

=> x = 8

Therefore The correct answer is 8.

Additional Information

Divisibility by 3

Similar to the rule for 9, a number is divisible by 3 if the sum of its digits is a multiple of 3.

Divisibility by 11

A number is divisible by 11 if the difference between the sum of digits at odd positions and the sum of digits at even positions is either 0 or a multiple of 11.

Divisibility by 8

A number is divisible by 8 if the last three digits of the number are divisible by 8.

Q24. Answer: (b) 8 hours

Shortcut Trick

Distance covered in first 3 hr = 80 × 3 = 240 km.

Remaining distance = 540 − 240 = 300 km.

Remaining time = 300 ÷ 60 = 5 hr.

Total time taken = 3 + 5 = 8 hr.

Therefore The correct answer is 8 hr.

Alternate Method

Given:

Total distance = 540 km

Initial speed (s1) = 80 km/h | Initial time (t1) = 3 hr

Reduced speed (s2) = 60 km/h

Formula Used:

Distance = Speed × Time | Time = Distance ÷ Speed

Calculations:

=> Distance covered in first part = 80 km/h × 3 hr = 240 km

=> Remaining distance = Total distance − Distance covered in Part 1

=> Remaining distance = 540 − 240 = 300 km

=> Time taken for remaining distance = 300 km ÷ 60 km/h = 5 hr

=> Total time = Initial time + Remaining time

=> Total time = 3 hr + 5 hr = 8 hr

Therefore The correct answer is 8 hr.

Additional Information

Average Speed

Average Speed = Total Distance ÷ Total Time. In this case, Average Speed = 540 ÷ 8 = 67.5 km/h.

Unit Conversion

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

Relation between S, T, and D

Speed is inversely proportional to Time (S prop. to 1/T) when Distance is constant, and Speed is directly proportional to Distance (S prop. to D) when Time is constant.

Q25. Answer: (c) 20%

Shortcut Trick

Let the Cost Price (CP) be 100.

Marked Price (MP) = 100 + 165 = 265.

Required Selling Price (SP) for 112% gain = 100 + 112 = 212.

Discount amount = 265 − 212 = 53.

Discount % = (53 ÷ 265) × 100 = 1/5 × 100 = 20%.

Therefore The correct answer is 20%.

Alternate Method

Given:

Markup percentage = 165% above CP

Profit percentage = 112%

Formula Used:

1. Marked Price (MP) = CP × (100 + Markup %)/100

2. Selling Price (SP) = CP × (100 + Gain %)/100

3. Discount % = [(MP − SP) ÷ MP] × 100

Calculations:

=> Let the Cost Price (CP) of the item be 100 units.

=> Since the Marked Price (MP) is 165% above CP:

=> MP = 100 + 165% of 100 = 100 + 165 = 265 units.

=> To gain 112%, the Selling Price (SP) must be:

=> SP = 100 + 112% of 100 = 100 + 112 = 212 units.

=> Discount = MP − SP = 265 − 212 = 53 units.

=> Discount % = (Discount ÷ MP) × 100

=> Discount % = (53 ÷ 265) × 100

=> Discount % = 1/5 × 100 = 20%.

Therefore The correct answer is 20%.

Additional Information

Markup Percentage

It is the percentage by which the cost price is increased to set the marked price: Markup % = [(MP − CP) ÷ CP] × 100.

Effective Formula

The relation between Profit, Markup, and Discount is given by: (100 + P%) = (100 + M%) × (100 − D%) ÷ 100.

Discount Calculation

Discount is always calculated on the Marked Price (MP), whereas Profit or Loss is generally calculated on the Cost Price (CP).

Q26. Answer: (a) Rs. 3,000

Shortcut Trick

Identify the ratio of investment for P, Q, and R as 2 : 3 : 5.

Calculate total ratio parts: 2 + 3 + 5 = 10 units.

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Find the difference in parts between R and P: 5 − 2 = 3 units.
Apply unitary method: 10 units → Rs. 10,000, so 1 unit → Rs. 1,000.
Required difference = 3 units × Rs. 1,000 = Rs. 3,000.
Therefore The correct answer is Rs. 3,000.
Alternate Method
Given: Investment ratio of P : Q : R = 2 : 3 : 5. Total Profit = Rs. 10,000.
Formula Used: Profit share of a partner = (Partner's ratio / Total ratio) × Total Profit
=> Total ratio units = 2 + 3 + 5 = 10 units
=> Value of 10 units = Rs. 10,000
=> Value of 1 unit = 10,000 ÷ 10 = Rs. 1,000
=> Profit share of P = 2 × 1,000 = Rs. 2,000
=> Profit share of R = 5 × 1,000 = Rs. 5,000
=> Difference between R and P = Rs. 5,000 − Rs. 2,000 = Rs. 3,000
Therefore The correct answer is Rs. 3,000.
Additional Information
Basic Partnership Rule
When the time period of investment is the same for all partners, the profit is distributed directly in the ratio of their capitals.
Compound Partnership
When partners invest for different time periods, Profit Ratio = (Capital1 × Time1) : (Capital2 × Time2).
Ratio and Proportion
To find a specific share from a total, multiply the total by (Individual Ratio ÷ Sum of all Ratios).

Q27. Answer: (d) Rs. 138

Shortcut Trick
The effective rate of interest for 3 years at 5% per annum is:
Effective Interest Rate = 3 × 5% = 15%
Simple Interest (SI) = 15% of Rs. 920
=> SI = (15 ÷ 100) × 920 = Rs. 138
Therefore The correct answer is Rs. 138.
Alternate Method
Given:
=> Principal (P) = Rs. 920
=> Rate of Interest (R) = 5% per annum
=> Time (T) = 3 years
Formula Used:
=> Simple Interest (SI) = (P × R × T) ÷ 100
Calculations:
=> SI = (920 × 5 × 3) ÷ 100
=> SI = (920 × 15) ÷ 100
=> SI = 13800 ÷ 100
=> SI = Rs. 138
Therefore The correct answer is Rs. 138.
Additional Information
Simple Interest Formula
Interest is computed only on the original principal. SI = (P × R × T) ÷ 100, where P is the principal, R is the rate per annum, and T is time in years.
Total Amount Formula
The total accumulated amount is the sum of the principal and interest: A = P + SI = P × (1 + (R × T) ÷ 100).
Constant Interest Property
In simple interest, the interest amount remains exactly the same every year as long as the principal and rate of interest do not change.

Q28. Answer: (b) 40 and 48

Shortcut Trick

Check options for Sum = 88 and divisibility by HCF = 8.

For 40 and 48: 40 + 48 = 88 (Matches given Sum).

Check LCM: 40 = 8 × 5 and 48 = 8 × 6.

LCM = 8 × 5 × 6 = 240 (Matches given LCM).

Therefore The correct answer is 40 and 48.

Alternate Method

Given: HCF = 8, LCM = 240, and Sum = 88.

Formula Used: Product of two numbers = HCF × LCM; Numbers = HCF × x and HCF × y (where x, y are co-prime).

=> Let the numbers be 8x and 8y.

=> 8x + 8y = 88 => x + y = 11

=> 8 × x × y = 240 (since LCM = HCF × x × y)

=> xy = 240 ÷ 8 = 30

=> We need two numbers whose sum is 11 and product is 30. By inspection or solving $t^2 - 11t + 30 = 0$, we get t = 5 and t = 6.

=> x = 5 and y = 6.

=> Number 1 = 8 × 5 = 40

=> Number 2 = 8 × 6 = 48

Therefore The correct answer is 40 and 48.

Additional Information

Product Property

For any two numbers a and b, the Product of numbers = HCF(a, b) × LCM(a, b).

Divisibility Rule

The HCF of two or more numbers is always a factor of their LCM and also a factor of their Sum and Difference.

Co-prime Factorization

If HCF is h, numbers can be written as hx and hy, where LCM = h × x × y and gcd(x, y) = 1.

Q29. Answer: (b) 4√3

Shortcut Trick

In an equilateral triangle with side a, the length of the median AD (which is also the altitude) is given by:

AD = (√3 ÷ 2) × a

The centroid G divides the median AD in the ratio 2 : 1. Thus, the segment GD is exactly 1/3 of the median AD:

GD = a ÷ (2√3)

Substituting a = 24 cm:

GD = 24 ÷ (2√3) = 12 ÷ √3 = 4√3 cm

Therefore The correct answer is 4√3 cm.

Alternate Method

Given:

Side of the equilateral triangle ABC (a) = 24 cm

AD is the median and G is the centroid.

Formula Used:

Height/Median of an equilateral triangle of side a = (√3 ÷ 2) × a

The centroid G divides the median AD from vertex to base in the ratio 2 : 1 (AG : GD = 2 : 1).

Therefore, GD = (1 ÷ 3) × AD

Q30. Answer: (c) 177/9 years

Shortcut Trick

The difference between ratio terms remains constant over time.

Present ratio of P : Q = 4 : 5 (difference = 1 unit)

8 years ago ratio of P : Q = 2 : 3 (difference = 1 unit)

Since the difference is already balanced, the change in ratio units = 4 − 2 = 2 units → 8 years.

=> 1 unit = 4 years → Present ages: P = 16 years, Q = 20 years.

Harmonic Mean (HM) = (2 × 16 × 20) ÷ (16 + 20) = 640 ÷ 36 = 160 ÷ 9 = 17(7)/(9) years.

Therefore The correct answer is 17(7)/(9) years.

Alternate Method

Given:

Present ratio of ages of P and Q = 4 : 5

Ratio of their ages 8 years ago = 2 : 3

Formula Used:

Harmonic Mean (HM) of two values a and b = 2ab ÷ (a + b)

Present Ages Representation P (4x)

Q31. Answer: (a) Sulphur dioxide

The correct answer is Sulphur dioxide.

Key Points

• Sulphur dioxide (SO2) is a gaseous non-metal oxide that exhibits acidic properties when dissolved in water.

• The chemical reaction between Sulphur dioxide and water (H2O) results in the formation of sulphurous acid (H2SO3).

• The balanced chemical equation for this process is: SO2 + H2O → H2SO3.

• Sulphurous acid is a weak, unstable dibasic acid that increases the concentration of hydrogen ions in the solution, thereby lowering the pH and making it acidic.

• This chemical interaction is a primary mechanism behind the formation of acid rain, where industrial SO2 emissions react with atmospheric moisture.

Additional Information

• Sulphur trioxide (SO3):

• It reacts violently with water to form sulphuric acid (H2SO4), which is a much stronger acid than sulphurous acid.

• It is the primary precursor for the industrial production of concentrated sulphuric acid via the Contact Process.

• Sulphur hexafluoride (SF6):

• It is a colorless, odorless, and inorganic gas known for being chemically inert and highly stable.

• Due to its excellent dielectric properties, it is widely used as an electrical insulator in high-voltage circuit breakers and transformers.

• Sulphonic acid:

• This refers to a class of organosulfur compounds containing the functional group −SO3H.

• They are fundamentally different from sulphurous acid and are extensively used in the manufacturing of synthetic detergents, dyes, and drugs like sulfa antibiotics.

Q32. Answer: (a) Jute

The correct answer is Jute.

Key Points

• Fibre crops are specifically cultivated for the production of long, thin, and flexible strands used in the manufacturing of textiles, paper, packaging, and industrial materials.

• Jute is a major commercial crop in India and is widely recognized as the Golden Fibre due to its shiny brown color and immense economic value.

• It grows best on alluvial soil found in the floodplains that are renewed every year, requiring a high temperature (25°C to 35°C) and heavy rainfall (150 cm to 250 cm) with high humidity.

• India is the world largest producer of raw jute, with the majority of cultivation occurring in the eastern states including West Bengal, Bihar, Assam, Odisha, and Andhra Pradesh.

• The crop is harvested at the flowering stage, and the fibre is extracted through a process called retting, where the stems are submerged in water to separate the fibres from the woody core.

• Common products derived from Jute include gunny bags, hessian cloth, ropes, twines, carpets, and various handicraft items, making it an eco-friendly alternative to synthetic packaging.

Additional Information

• Other Fibre Crops in India:

• Cotton: Often called the King of Fibres, it is primarily grown in the black soil regions of the Deccan Plateau and is the backbone of the Indian textile industry.

• Natural Silk: Obtained from the cocoons of silkworms through sericulture, primarily in states like Karnataka and Tamil Nadu.

• Hemp: A versatile fibre crop used for making strong ropes, canvas, and textiles.

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• Horticultural/Vegetable Crops (Incorrect Options):

• Cucumber: A member of the Cucurbitaceae family, it is a Zaid crop grown for its edible fruit and high water content.

• Radish and Turnip: These are root vegetables belonging to the Brassicaceae family, cultivated for their underground edible roots during the Rabi season.

Q33. Answer: (a) Slumdog Millionaire

The correct answer is Slumdog Millionaire.

Key Points

• A.R. Rahman (Allah Rakha Rahman) achieved a historic milestone for Indian cinema by winning the Academy Award for Best Original Score for the film Slumdog Millionaire.

• The award was conferred at the 81st Academy Awards held in 2009 at the Kodak Theatre in Los Angeles.

• Directed by Danny Boyle, Slumdog Millionaire told the story of a young man from Dharavi who wins a massive prize on a television game show.

• The soundtrack was praised for its innovative use of Indian folk rhythms blended with modern electronic beats, reflecting the fast-paced life of Mumbai.

• In the same ceremony, Rahman also secured the award for Best Original Song for the track Jai Ho, making him the first Indian to win two Oscars in a single year.

Additional Information

• Other Options and Context:

• Rockstar (2011): A musical drama directed by Imtiaz Ali featuring a highly acclaimed soundtrack by A.R. Rahman. Although it won multiple Filmfare Awards and IIFA Awards, it was not nominated for an Academy Award.

• Dil Se (1998): A film by Mani Ratnam known for Rahman's soulful compositions like Chaiyya Chaiyya. While internationally popular, it predates the period of Rahman's primary Academy recognition.

• Lagaan (2001): Directed by Ashutosh Gowariker, this film was India's third film to be nominated for the Academy Award for Best Foreign Language Film, but it did not win the award.

• Career Honors: A.R. Rahman has also been awarded the Padma Bhushan (2010), India's third-highest civilian honor, and has won two Grammy Awards for his work on the same film.

Q34. Answer: (b) 1960

The correct answer is 1960.

Key Points

• The Constitution (Ninth Amendment) Act, 1960 was enacted by the Parliament of India to give effect to the transfer of certain territories to Pakistan following the Indo-Pakistan Agreement of September 10, 1958.

• The primary objective of this amendment was to resolve border disputes between India and East Pakistan (now Bangladesh) by exchanging certain enclaves and transferring half of the Berubari Union No. 12 to Pakistan.

• This legislative action was necessitated by a landmark advisory opinion of the Supreme Court of India in the Berubari Union case (1960), where the court held that Article 3 of the Constitution does not empower the Union Government to cede Indian territory to a foreign nation.

• The Supreme Court ruled that while Article 3 allows for the internal reorganization of states, any cession of national territory to a foreign power requires a formal constitutional amendment under Article 368.

• The Act modified the First Schedule of the Indian Constitution to reflect the changes in the territorial boundaries of the states of West Bengal, Bihar, Assam, and Punjab.

• The President of India gave his formal assent to this amendment on December 28, 1960, concluding a significant legal and diplomatic chapter in post-independence India.

Additional Information

• Berubari Union Case (1960):

• This was a Presidential reference under Article 143 regarding the implementation of the Nehru-Noon Agreement.

• The court famously observed that the Preamble is not a part of the Constitution, a view that was later reversed in the Kesavananda Bharati Case (1973).

• It established the legal precedent that the sovereign power to cede territory is restricted by the procedural requirements of Article 368.

• Article 3 of the Indian Constitution:

• Empowers the Parliament to form new states, increase or diminish the area of any state, and alter boundaries or names of existing states.

• It is generally used for internal adjustments within the Union of India and does not require the rigorous process of Article 368 for such domestic changes.

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• Article 368:

• Provides the mechanism for the amendment of the Constitution, ensuring that fundamental changes or international territorial transfers undergo a rigorous legislative process involving both houses of Parliament.

Q35. Answer: (b) 18 million

The correct answer is 18 million.

Key Points

• According to the Economic Survey 2024-25, India continues to have the largest transnational population in the world, which serves as a significant source of human capital and economic support.

• As of 2020, the size of the Indian diaspora was estimated at 18 million, based on data provided by the United Nations Department of Economic and Social Affairs (UN DESA) in its International Migration reports.

• The diaspora includes Non-Resident Indians (NRIs) and Persons of Indian Origin (PIOs) who reside across nearly every continent, with high concentrations in the United Arab Emirates, the United States, and Saudi Arabia.

• This massive population base is the primary reason why India remains the top recipient of inward remittances globally, which helps maintain the country's Current Account Balance and foreign exchange reserves.

Additional Information

• Economic Contributions:

• India's remittance inflows reached a milestone of USD 125 billion in 2023, supported by the diverse skill sets of the 18 million migrants ranging from high-tech professionals to semi-skilled workers.

• The World Bank reports highlight that the United States has surpassed the Gulf regions as the single largest source of these remittances for India in recent years.

• Policy and Engagement:

• The Government of India engages with this population through the Ministry of External Affairs and initiatives like the Pravasi Bharatiya Divas, celebrated on January 9 to mark Mahatma Gandhi’s return to India.

• Global rankings in 2020 placed Mexico and Russia significantly behind India, with each having roughly 11 million citizens living abroad.

Q36. Answer: (a) Lord Lytton

The correct answer is Lord Lytton.

Key Points

• Lord Lytton served as the Viceroy of India from 1876 to 1880, a period marked by several controversial and reactionary policies.

• The Indian Arms Act (Act XI of 1878) was enacted to prevent Indians from keeping, bearing, or trafficking in arms without a specific license.

• A primary feature of the act was its racial discrimination; it exempted Europeans, Anglo-Indians, and certain government officials from the requirement of a license, while making it mandatory for native Indians.

• The act categorized the possession of unlicensed weapons by Indians as a criminal offense, punishable by fines or imprisonment.

• This legislation was part of a broader strategy to disarm the Indian population and prevent any potential repeat of the 1857 Uprising.

• Alongside the Arms Act, Lytton also introduced the Vernacular Press Act of 1878 to silence criticism of the British administration in local Indian languages.

• His tenure also witnessed the Royal Titles Act of 1876, which proclaimed Queen Victoria as the Empress of India (Kaiser-i-Hind) at the first Delhi Durbar in 1877.

Additional Information

• Lord Ripon (1880-1884):

• Known for his liberal reforms, he repealed the Vernacular Press Act in 1882.

• He is regarded as the Father of Local Self-Government in India due to his 1882 Resolution.

• The Ilbert Bill controversy occurred during his term, which aimed to allow Indian magistrates to try Europeans.

• Lord Curzon (1899-1905):

• Famous for the Partition of Bengal in 1905, which led to the Swadeshi Movement.

• He established the Archaeological Survey of India (ASI) through the Ancient Monuments Preservation Act of 1904.

• Lord Wellesley (1798-1805):

• He introduced the Subsidiary Alliance system to bring Indian princely states under British control.

• He founded the Fort William College at Calcutta in 1800 to train British civil servants in Indian languages and customs.

Q37. Answer: (c) Non-communicable diseases

The correct answer is Non-communicable diseases.

Key Points

• Non-communicable diseases (NCDs), also known as chronic diseases, are medical conditions that are not transmissible directly from one person to another.

• These diseases generally have a slow progression and a long duration, often requiring long-term management rather than a quick cure.

• Diabetes is a metabolic NCD characterized by high blood sugar levels resulting from the body's inability to produce or use insulin effectively.

• Cancer refers to a large group of diseases that can start in almost any organ or tissue when abnormal cells grow uncontrollably, go beyond their usual boundaries, and spread to other organs.

• Asthma is a chronic condition affecting the respiratory system, characterized by inflammation and narrowing of the bronchial tubes, which leads to difficulty in breathing and wheezing.

• According to the World Health Organization (WHO), NCDs are the leading cause of death globally, often linked to common risk factors such as tobacco use, physical inactivity, unhealthy diets, and harmful use of alcohol.

Additional Information

• Communicable diseases:

• These are infectious diseases caused by pathogens like bacteria, viruses, parasites, or fungi.

• Examples include Tuberculosis, Malaria, and COVID-19, which can spread through air, water, or bodily fluids.

• Deficiency diseases:

• These occur when the body lacks essential nutrients, vitamins, or minerals over a prolonged period.

• Common examples include Scurvy (Vitamin C deficiency) and Goitre (Iodine deficiency).

• Airborne diseases:

• This is a specific category of communicable diseases where microorganisms are transmitted through small droplets or particles suspended in the atmosphere.

Q38. Answer: (d) To protect Delhi from Mongol attacks

The correct answer is To protect Delhi from Mongol attacks.

Key Points

• Siri Fort was built by Sultan Alauddin Khilji, the second ruler of the Khilji Dynasty, around 1303 AD as the second city of Delhi.

• The primary military objective for its construction was to safeguard the Delhi Sultanate from the persistent threat of Mongol invasions originating from the Chagatai Khanate.

• Following a massive Mongol siege led by Targhi in 1303, which highlighted the vulnerability of the existing capital at Lalkot, Alauddin Khilji recognized the need for a heavily fortified garrison town.

• The fort was designed to house a massive permanent standing army and provide a secure defensive perimeter against the swift cavalry tactics of the Mongol forces.

• It featured high walls, circular bastions, and advanced defensive architecture, making it the first city of Delhi built entirely by a Muslim ruler for purely strategic and military purposes.

Additional Information

• Alauddin Khilji:

• He was known for his administrative and military reforms, including the Dagh (branding of horses) and Chehra (descriptive roll of soldiers) systems to combat corruption.

• He adopted the title Sikandar-i-Sani (Alexander the Second), reflecting his ambitions for world conquest and his successful defense against multiple Mongol incursions.

• Hauz-i-Alai:

• To ensure a reliable water supply for the Siri garrison and the city's inhabitants during prolonged sieges, the Sultan excavated a massive reservoir known as Hauz-i-Alai, which is today known as Hauz Khas.

• Strategic Defense:

• The construction of Siri was part of a broader defensive strategy that included the repair of old forts and the construction of new outposts along the North-West Frontier of India to intercept Mongol raiders before they reached the heart of the Sultanate.

Q39. Answer: (c) Satpura Range

The correct answer is Satpura Range.

Key Points

• The Satpura Range is a prominent series of seven hills located in Central India, stretching in a roughly east-west direction

parallel to the Vindhyan Range.

• The Narmada Valley acts as a structural Rift Valley that geographically separates the Vindhyan Range to the north from the Satpura Range to the south.

• The Narmada River, which originates from the Amarkantak Plateau, flows westward through this deep valley between the two mountain ranges before emptying into the Arabian Sea.

• The Satpura Range serves as a critical watershed between the Narmada River basin to its north and the Tapi River basin to its south.

• The highest peak of the Satpura Range is Dhupgarh, reaching an elevation of 1,350 meters, situated near the hill station of Pachmarhi in Madhya Pradesh.

Additional Information

• Vindhyan Range:

• It is a complex and discontinuous chain of mountain ridges that forms the southern edge of the Malwa Plateau and the northern wall of the Narmada Valley.

• The range is primarily composed of Sedimentary Rocks such as Sandstone, Shales, and Limestones, and it marks the traditional boundary between Northern India and the Deccan.

• Aravalli Range:

• Located in northwestern India, it extends from Gujarat through Rajasthan to Haryana and Delhi.

• It is recognized as one of the world's oldest Fold Mountain systems, with Guru Shikhar being its highest peak.

• Western Ghats:

• Also known as Sahyadri, this range runs parallel to the western coast of the Indian peninsula for nearly 1,600 kilometers.

• It is a UNESCO World Heritage Site and is one of the eight hottest Biodiversity Hotspots in the world.

• Eastern Ghats:

• A discontinuous and lower-altitude range of hills along India's eastern coast, eroded by major rivers like the Godavari, Krishna, and Kaveri.

• The range meets the Western Ghats at the Nilgiri Hills in the south.

Q40. Answer: (a) OMR – Detecting shaded marks on paper

The correct answer is OMR - Detecting shaded marks on paper.

Key Points

• Optical Mark Recognition (OMR): This technology is specifically designed to detect the presence or absence of a mark on a specific document location. It is widely utilized for processing Multiple Choice Questions (MCQs) and surveys, where a scanner reflects light onto the paper to identify shaded regions. Hence, OMR matches with Detecting shaded marks on paper.

• Optical Character Recognition (OCR): This device identifies individual letters and symbols from printed or handwritten documents, transforming them into digital, editable text. It does not primarily use magnetic ink. Hence, OCR matches with Converting printed or handwritten text into digital data.

• Magnetic Ink Character Recognition (MICR): This is a specialized technology used by banks to read the MICR code printed at the bottom of checks using magnetic ink. It is not designed for barcode scanning. Hence, MICR matches with Recognizing magnetic ink characters.

• Barcode Reader: This is an optical scanner that interprets the light reflected from a series of black-and-white vertical lines (barcodes) to retrieve product information. It is not used for capturing handwriting. Hence, Barcode Reader matches with Reading barcodes.

Additional Information

• OMR Systems:

• These systems are highly efficient for high-volume data collection and are valued for their 99.9% accuracy in reading standardized forms.

• Common applications include competitive exam OMR sheets, voting ballots, and demographic surveys.

• OCR Technology:

• Modern OCR software utilizes Artificial Intelligence (AI) and Machine Learning (ML) to improve character recognition across different fonts and languages.

• It is vital for the digitization of historical archives and automated data entry in offices.

• MICR Features:

• The MICR line typically contains the check number, 9-digit routing number, and account number.

• It provides a high level of security as the magnetic ink is difficult to forge and can be read even if the check is folded or smudged.

• Barcode Scanning:

• Barcodes follow international standards like UPC (Universal Product Code) and EAN (European Article Number).

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• The reader uses a laser beam or an LED to capture the varying reflectance of the black bars and white spaces.

Q41. Answer: (a) Files that begin with the word “Invoice”

The correct answer is Files that begin with the word 'Invoice'.

Key Points

• In Windows 11 File Explorer, the asterisk (*) is a fundamental wildcard character that represents any number of characters, including zero characters, within a filename or extension.

• When a user appends the asterisk to a string, such as Invoice*, it signals a prefix search, instructing the Windows Search Indexer to locate all files and folders that commence with that specific sequence of letters.

• This search query will effectively return files like Invoice_July.pdf, Invoices.docx, or Invoice1.txt because they all satisfy the condition of starting with the designated term.

• The use of this wildcard is distinct from a suffix search (e.g., *Invoice) or a 'contains' search (e.g., Invoice), as the prefix condition strictly mandates that the word Invoice must appear at the very beginning of the filename.

• In the absence of a wildcard, modern File Explorer searches often default to finding the term as a whole word or a word start anywhere in the name, but the explicit trailing asterisk reinforces the starts-with logic.

Additional Information

• Question Mark (?) Wildcard

• This character acts as a placeholder for exactly one character.

• For instance, a search for Invoice? would find Invoice1 or InvoiceA, but would not return Invoice12.

• Advanced Query Syntax (AQS)

• Microsoft employs AQS to allow users to refine results using specific properties like kind:, size:, or ext:.

• Using Invoice* ext:.pdf would further narrow results to only PDF documents starting with the word Invoice.

• Case Sensitivity

• Windows File Explorer is case-insensitive by design, meaning the search Invoice* will match invoice_report.xlsx as well as INVOICE_REPORT.xlsx.

Q42. Answer: (c) 16 Days of Activism against Gender-Based Violence

The correct answer is 16 Days of Activism against Gender-Based Violence.

Key Points

• The International Day for the Elimination of Violence against Women is observed globally on November 25 every year.

• This day serves as the starting point for the 16 Days of Activism against Gender-Based Violence, a global campaign that runs until December 10, which is Human Rights Day.

• The campaign was originated by activists at the first Women's Global Leadership Institute in 1991 and continues to be coordinated each year by the Center for Women's Global Leadership (CWGL).

• The choice of November 25 commemorates the Mirabal sisters, three political activists from the Dominican Republic who were brutally assassinated in 1960 by order of the country's dictator, Rafael Trujillo.

• The symbolic conclusion of the campaign on December 10 emphasizes that violence against women is a fundamental violation of human rights.

Additional Information

• UNiTE by 2030 to End Violence against Women Campaign:

• Launched in 2008 by the United Nations Secretary-General, this initiative supports the 16 Days of Activism through global advocacy and social mobilization.

• The campaign uses Orange as its signature color, representing a brighter future and a world free from violence against women and girls.

• The United Nations General Assembly officially designated November 25 as the International Day for the Elimination of Violence against Women through Resolution 54/134 in 1999.

• Human Rights Day (December 10):

• This day honors the date the United Nations General Assembly adopted the Universal Declaration of Human Rights (UDHR) in 1948.

• It serves as the terminal date for the activism period to highlight that women's rights are integral, indivisible, and universal human rights.

Q43. Answer: (a) The program started with the launch of Palakkad-Bangalore-Mumbai-Ahmedabad Industrial Corridor in 2010

The correct answer is The program started with the launch of Palakkad-Bangalore-Mumbai-Ahmedabad Industrial Corridor in 2010.

Key Points

• The National Industrial Corridor Development Programme (NICDP) actually began with the conceptualization of the Delhi-Mumbai Industrial Corridor (DMIC) following a Memorandum of Understanding signed between the Government of India and the Government of Japan in December 2006, with project approval occurring in 2007. Hence, statement 1 is incorrect.

• The program is designed to develop Greenfield Industrial Cities as Smart Cities by leveraging Next-Generation Technologies like ICT-enabled infrastructure, SCADA systems, and Integrated Command and Control Centers (ICCC). Hence, statement 2 is correct.

• A primary objective is the provision of Plug and Play infrastructure, ensuring that industrial plots are equipped with all essential utilities like water, power, and connectivity up to the plot level, enabling immediate industrial activity. Hence, statement 3 is correct.

• As a strategic infrastructure initiative, NICDP aims to revolutionize urban and industrial development in India, creating a global manufacturing hub and facilitating planned urbanization. Hence, statement 4 is correct.

Additional Information

• National Industrial Corridor Development and Implementation Trust (NICDIT):

• Function: It is the apex body under the administrative control of the Department for Promotion of Industry and Internal Trade (DPIIT).

• Mandatary: It oversees the coordinated development of all industrial corridors in the country.

• Major Industrial Corridors:

• Amritsar-Kolkata Industrial Corridor (AKIC): Focused on the Eastern Dedicated Freight Corridor.

• Chennai-Bengaluru Industrial Corridor (CBIC): Aims to foster growth in South India, including extensions to Kochi via Palakkad.

• Vizag-Chennai Industrial Corridor (VCIC): India’s first coastal industrial corridor, part of the East Coast Economic Corridor.

Q44. Answer: (a) Completely filled valence shell

The correct answer is Completely filled valence shell.

Key Points

• Noble gases, located in Group 18 of the Periodic Table, are characterized by their extreme lack of chemical reactivity under standard conditions.

• The fundamental reason for this stability is their electronic configuration; they possess a completely filled valence shell, which corresponds to a total of eight electrons (the octet rule) for elements like Neon, Argon, Krypton, Xenon, and Radon.

• Helium, the lightest noble gas, has a duplet configuration ($1s^2$), which is also a fully occupied and highly stable valence shell.

• An atom with a full valence shell is in its lowest energy state, meaning it has no energetic incentive to gain, lose, or share electrons with other atoms to form chemical bonds.

• Because these atoms do not easily form compounds, they exist as monatomic gases and are described as being chemically inert or noble.

Additional Information

• Ionization Energy

• Noble gases have the highest ionization energy in their respective periods because their electrons are held very tightly by the nucleus within a stable shell.

• The statement Low ionization energy is incorrect, as low values would facilitate the removal of electrons, making an element highly reactive like the alkali metals.

• Electronegativity

• Electronegativity is the tendency of an atom to attract a shared pair of electrons; noble gases have zero or negligible electronegativity because their shells are already full.

• The option High electronegativity is incorrect and typically describes halogens like Fluorine.

• Atomic Mass

• While atomic mass increases as one moves down Group 18, it primarily affects physical properties such as boiling point and density rather than chemical inertness.

• Chemical Compounds

• Despite being inert, heavier noble gases like Xenon can react with highly electronegative elements like Oxygen and Fluorine under specific high-energy conditions to form compounds like XeF4 or XeO3.

Q45. Answer: (c) 32-bit microprocessors

The correct answer is 32-bit microprocessors.

Key Points

• In March 2025, the Indian Space Research Organisation (ISRO) achieved a significant milestone in indigenous electronics by developing the Vikram 3201 and Kalpana 3201, which are high-performance 32-bit microprocessors.

• The Vikram 3201 is designed to serve as the primary brain for On-Board Computers (OBC), handling complex flight control laws and navigation algorithms for next-generation satellites and rockets.

• The Kalpana 3201 is a specialized processor variant optimized for payload management and high-speed data processing, named in honor of the late Indian-American astronaut Kalpana Chawla.

• These processors are fabricated using Radiation-Hardened technology, ensuring they can operate reliably in the extreme radiation environment of outer space without malfunctioning.

• This development is a part of the Atmanirbhar Bharat initiative, reducing India's dependence on foreign manufacturers for critical space-grade hardware and ensuring national security in space assets.

Additional Information

• Navigation Satellites

• India utilizes the NavIC (Navigation with Indian Constellation) system, which currently consists of the IRNSS series of satellites providing regional positioning services.

• Space Telescopes

• AstroSat remains India's premier space observatory, designed to observe the universe in multi-wavelength bands including Ultraviolet and X-ray.

• Launch Vehicles

• ISRO's fleet includes the PSLV (Workhorse of ISRO), the GSLV, and the heavy-lift LVM3, which was instrumental in the Chandrayaan-3 mission.

• Technological Evolution

• Before these 32-bit versions, ISRO relied on older 16-bit architectures; the transition to 32-bit microprocessors allows for more complex autonomous operations and faster data throughput in deep-space missions.

Q46. Answer: (b) Opens the Find and Replace dialog box

The correct answer is Opens the Find and Replace dialog box.

Key Points

• In Microsoft Word, the keyboard shortcut Ctrl + H is the dedicated command used to invoke the Find and Replace dialog box, with the focus automatically set on the Replace tab.

• The primary utility of this function is to allow users to search for specific text, formatting, or special characters and substitute them with new content throughout the entire document or a selected portion.

• This feature provides two main execution modes: Replace, which allows for a case-by-case review and substitution, and Replace All, which performs a global substitution across the document in a single action.

• Advanced users utilize the More button within this dialog to apply constraints such as Match case, Find whole words only, and Wildcards, which are essential for precise document editing and data cleaning.

• The shortcut is standardized across the Microsoft Office Suite, including Excel and PowerPoint, ensuring a consistent workflow for managing large volumes of textual data.

Additional Information

• Ctrl + F:

• In modern versions of MS Word, this shortcut opens the Navigation Pane on the left side, allowing users to search for text strings without the immediate option to replace them.

• Ctrl + G:

• This shortcut opens the Go To tab within the same Find and Replace dialog box, enabling rapid navigation to specific Page numbers, Sections, Lines, or Bookmarks.

• F1 Key:

• The standard function key used to trigger the Help window or online support pane in almost all Windows-based applications, providing documentation and troubleshooting tips.

• Highlighting Text:

• There is no single-key Ctrl shortcut to apply highlighting; it is traditionally managed via the Text Highlight Color tool in the Font group of the Home tab or using the Ctrl + Alt + H shortcut in specific later versions of Word.

Q47. Answer: (b) Narmada

The correct answer is Narmada.

Key Points

• The Sardar Sarovar Dam is a terminal gravity dam built on the Narmada River near Navagam in the Narmada district of Gujarat.

• It is the largest structure in the Narmada Valley Project, which is a massive hydraulic engineering project involving the construction of a series of large multipurpose dams.

• The project serves four major Indian states: Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan, providing irrigation, drinking

water, and hydroelectric power.

• The dam has an installed hydroelectric capacity of 1,450 MW and supplies water to drought-prone areas like Kutch and Saurashtra.

• The Narmada River itself is the largest west-flowing river of Peninsular India, originating from the Amarkantak Plateau in Madhya Pradesh and flowing through a rift valley between the Vindhya and Satpura ranges.

• The iconic Statue of Unity, dedicated to Sardar Vallabhbhai Patel, is located on Sadhu Bet island facing this project.

Additional Information

• Tapi River

• Commonly referred to as the twin or handmaid of the Narmada, it flows parallel to it to the south.

• The Ukai Dam, the second largest reservoir in Gujarat, is built across this river.

• Sabarmati River

• One of the major west-flowing rivers that originates in the Aravalli Range of Rajasthan and flows through Ahmedabad and Gandhinagar.

• The Dharoi Dam is a significant project located on this river.

• Mahi River

• This river originates in the Dhar district of Madhya Pradesh and flows into the Gulf of Khambhat.

• It is the only river in India that crosses the Tropic of Cancer twice.

• The Kadana Dam and the Mahi Bajaj Sagar Dam are the primary projects on this river.

Q48. Answer: (a) Hyderabad

The correct answer is Hyderabad.

Key Points

• The National Institute of Rural Development and Panchayati Raj (NIRDPR) is a premier autonomous organization under the Union Ministry of Rural Development, Government of India.

• The head office of this institute is located in Rajendranagar, Hyderabad, in the state of Telangana.

• It is recognized as a center of excellence for training, research, and consultancy in the rural development sector.

• The institute was originally established in 1958 as the National Institute of Community Development (NICD) at Mussoorie and was later shifted to Hyderabad in 1964.

• Its primary objective is to build the capacity of Panchayati Raj Institutions (PRIs), rural development functionaries, and elected representatives through knowledge dissemination.

• The institute also acts as a think-tank for the government, providing research-based policy recommendations to tackle rural poverty and promote sustainable development.

Additional Information

• Institutional Evolution:

• In 1977, the organization was renamed as the National Institute of Rural Development (NIRD).

• The current name, National Institute of Rural Development and Panchayati Raj, was adopted in 2014 to emphasize its dedicated focus on strengthening local self-governance.

• Regional Expansion:

• To address the unique socio-economic and geographical challenges of the eight North Eastern States, the institute established its North Eastern Regional Centre (NERC) in Guwahati, Assam, in 1983.

• Key Functions and Activities:

• It conducts massive open online courses and residential training for IAS officers and State Civil Services officers.

• NIRDPR monitors and evaluates the impact of major national schemes such as MGNREGA, Pradhan Mantri Awas Yojana (PMAY), and the National Rural Livelihoods Mission (NRLM).

• It facilitates South-South Cooperation by providing training to rural development professionals from Asian and African countries.

Q49. Answer: (d) Sri Lanka

The correct answer is Sri Lanka.

Key Points

• The Palk Strait is a narrow water body that acts as a boundary separating the Indian state of Tamil Nadu from the Mannar district and Jaffna District of Sri Lanka.

• Geographically, it connects the Bay of Bengal in the northeast with Palk Bay in the southwest, covering a width of approximately 53 to 80 kilometres.

• The strait is named after Robert Palk, who served as the Governor of Madras Presidency between 1755 and 1763 during the British colonial period.

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• At its southern end, the strait is characterized by a chain of limestone shoals known as Adam's Bridge or Ram Setu, which stretches between Pamban Island (India) and Mannar Island (Sri Lanka).

• Several rivers from the Indian mainland, such as the Vaigai River, drain into this strait, which is known for its shallow waters and rich biodiversity.

Additional Information

• Maldives

• An archipelagic nation located in the Indian Ocean, south-west of India.

• It is separated from the Indian Lakshadweep islands (specifically Minicoy) by the Eight Degree Channel.

• Afghanistan

• A landlocked country that shares its shortest international land border with India in the Ladakh region.

• The boundary line between the two nations is historically known as the Durand Line.

• Myanmar

• A neighbouring country to the east that shares a land border with four Northeastern Indian states: Arunachal Pradesh, Nagaland, Manipur, and Mizoram.

• The maritime boundary between India (Andaman and Nicobar Islands) and Myanmar is situated in the Andaman Sea.

Q50. Answer: (d) National Bank for Agriculture and Rural Development (NABARD)

The correct answer is National Bank for Agriculture and Rural Development (NABARD).

Key Points

• The National Bank for Agriculture and Rural Development (NABARD) is the apex development bank in India, established to provide and regulate credit for the promotion and development of agriculture, small-scale industries, and rural infrastructure.

• It was established on July 12, 1982, to implement the National Bank for Agriculture and Rural Development Act 1981.

• The institution was formed based on the recommendations of the B. Sivaraman Committee (also known as the Committee to Review Arrangements for Institutional Credit for Agriculture and Rural Development).

• NABARD replaced the Agricultural Credit Department (ACD) and Rural Planning and Credit Cell (RPCC) of the Reserve Bank of India, as well as the Agricultural Refinance and Development Corporation (ARDC).

• Its primary functions include policy planning, refinancing for financial institutions, and supervision of Regional Rural Banks (RRBs) and State Cooperative Banks.

Additional Information

• Reserve Bank of India (RBI):

• It is the central bank of India, established on April 1, 1935, under the RBI Act 1934. While it initially managed rural credit, these specialized functions were delegated to NABARD to ensure a focused approach toward rural development.

• State Bank of India (SBI):

• Formed in 1955 following the nationalization of the Imperial Bank of India, it is the largest public sector bank. It provides extensive direct loans to the agricultural sector but does not serve as the primary regulatory or apex body.

• Ministry of Finance:

• This ministry of the Government of India oversees the Department of Financial Services, which has administrative control over NABARD; however, the technical mandate for credit regulation lies with the bank itself.

Q51. Answer: (b) Madhubani paintings

The correct answer is Madhubani paintings.

Key Points

• Madhubani painting, also popularly known as Mithila Art, is a traditional art form that originated in the Mithila region of Bihar and the Terai region of Nepal.

• Historically, this art was practiced by women who decorated the mud walls and floors of their homes with intricate designs during festivals, births, and marriage ceremonies like the Kohbar.

• The paintings are characterized by the use of natural dyes and pigments extracted from leaves, flowers, and minerals, often applied using twigs, brushes, nib-pens, and matchsticks.

• The themes usually revolve around Hindu deities such as Lord Krishna, Rama, Shiva, Durga, and Saraswati, as well as natural elements like the sun, moon, and sacred plants like Tulsi.

• This art form was granted the Geographical Indication (GI) status in 2007, recognizing its unique cultural identity and origin in Bihar.

Additional Information

• Kalamkari paintings:

• Originated in the state of Andhra Pradesh, specifically in Srikalahasti and Machilipatnam.

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• It involves hand-painting or block-printing on cotton textiles using natural dyes and a bamboo pen (kalam).

• Pattachitra paintings:

• This is a traditional cloth-based scroll painting from Odisha and West Bengal.

• It is known for its intricate details and themes centered on the Jagannath cult and Vaishnava sect.

• Warli paintings:

• A form of tribal art created by the Warli tribe in the North Sahyadri Range of Maharashtra.

• It uses basic geometric shapes like circles, triangles, and squares to depict daily life, hunting, and harvesting scenes.

Q52. Answer: (d) Promoting swadeshi through the boycott of foreign goods and local production

The correct answer is Promoting swadeshi through the boycott of foreign goods and local production.

Key Points

• The Extremist phase of the Indian national movement, roughly spanning from 1905 to 1918, shifted the focus from elite constitutional agitation to mass mobilization.

• Swadeshi (self-sufficiency) and Boycott (rejection of foreign goods) were the central strategies used to challenge British colonial rule, especially following the Partition of Bengal in 1905 by Lord Curzon.

• The Boycott was aimed at hurting British economic interests by refusing to use imported products, particularly Manchester cloth and Liverpool salt, while Swadeshi encouraged the growth of indigenous industries like textile mills, soap factories, and tanneries.

• This strategy transformed the nationalist struggle into a mass movement by involving the middle class, students, and women in public protests and picketing of shops.

• The goal of these activities was the attainment of Swaraj (Self-rule), which the Extremists defined as complete independence or self-government, unlike the Moderates who initially sought colonial self-government.

Additional Information

• Lal-Bal-Pal Triad:

• The movement was led by radical leaders Lala Lajpat Rai, Bal Gangadhar Tilak, and Bipin Chandra Pal, along with Aurobindo Ghosh.

• Bal Gangadhar Tilak popularized the slogan, 'Swaraj is my birthright and I shall have it'.

• Contrast with Moderates:

• Moderates (1885–1905) followed the policy of Prayer, Petition, and Protest, believing in the British sense of justice and limiting political participation to the educated elites.

• Extremists rejected British constitutional practices as ineffective and advocated for Passive Resistance, which included boycotting government schools, courts, and titles.

• National Education:

• As part of the Swadeshi strategy, a National Council of Education was set up in 1906 to promote an education system that was 'literary, scientific, and technical' on national lines and under national control.

• Secret Organizations:

• While the Extremists focused on mass political action, more radical groups (Revolutionary Terrorists) like the Anushilan Samiti and Jugantar focused on secret organizations and covert actions to overthrow the British.

Q53. Answer: (a) Sikandar Lodi

The correct answer is Sikandar Lodi.

Key Points

• Sikandar Lodi, born as Nizam Khan, was the second son of Bahlol Lodi and succeeded him to the throne on July 17, 1489.

• He is widely regarded as the most capable and greatest of the three Lodi rulers, presiding over the Delhi Sultanate until his death in 1517.

• During his reign, he expanded the empire by conquering Bihar and Tirhut, and he successfully concluded a friendship treaty with Alauddin Hussain Shah of Bengal.

• He was a strict administrator who introduced the Gazz-i-Sikandari, a standard unit of 32 digits for measuring agricultural land, which remained in use until the Mughal era.

• In 1504, he founded the city of Agra to exercise better control over the rebellious chiefs of Rajputana and shifted the capital from Delhi to Agra in 1506.

Additional Information

• Ibrahim Lodi:

• He was the son of Sikandar Lodi and the last ruler of the Lodi Dynasty, reigning from 1517 to 1526.

• He was defeated and killed by Babur in the First Battle of Panipat in 1526, which led to the establishment of the Mughal Empire in India.

• Alam Shah:

• Known as Ala-ud-din Alam Shah, he was the final monarch of the Sayyid Dynasty.

• He voluntarily abdicated the throne in 1451 and retired to Badaun, allowing Bahlol Lodi to take over the administration of Delhi.

• Muhammad Shah:

• He was the third ruler of the Sayyid Dynasty, ruling from 1434 to 1443.

• His reign was characterized by the internal decay of the Sultanate and the rising influence of the Lodi family.

• Literary Contributions:

• Sikandar Lodi was a learned man and a poet who wrote verses in Persian under the pen name Gulrukhi.

• He encouraged the translation of various Sanskrit works into Persian, including a famous medical treatise titled Farhang-i-Sikandari.

Q54. Answer: (d) Pulakeshin II

The correct answer is Pulakeshin II.

Key Points

• Pulakeshin II (reigned 610−642 CE) was the most illustrious sovereign of the Chalukya dynasty of Vatapi (modern-day Badami in Karnataka).

• He successfully resisted the southward expansion of Harshavardhana, the ruler of Kannauj, who had already established dominance over most of North India (known as Sakalauttarapathenatha).

• The decisive battle took place on the banks of the Narmada River between 618 CE and 634 CE, where the superior elephant corps and strategic positioning of the Chalukyan forces forced Harshavardhana to retreat.

• The primary historical source for this victory is the Aihole Inscription, composed in Sanskrit by the court poet Ravikirti, which poetically notes that Harsha's Harsha (mirth/joy) was lost in the battle.

• After this triumph, Pulakeshin II asserted his hegemony over the Deccan and assumed the titles of Paramesvara and Dakshinapatheshvara (Lord of the South).

• The Chinese traveler Xuanzang (Hiuen Tsang), who visited the courts of both kings, also recorded the failure of Harsha to conquer the kingdom of Mo-ho-la-cha (Maharashtra/Chalukya).

Additional Information

• Dhruva Dharavarsha:

• A prominent ruler of the Rashtrakuta dynasty who reigned in the late 8th century.

• He is famous for taking the Rashtrakuta power to its zenith by defeating the Gurjara-Pratiharas and the Palas during the Tripartite Struggle for Kannauj.

• Vikramaditya I:

• The son of Pulakeshin II who restored the Chalukya empire after it was briefly occupied by the Pallavas.

• He is credited with rebuilding Vatapi and successfully invading the Pallava capital, Kanchipuram.

• Narasimhavarman I:

• A powerful king of the Pallava dynasty, also known as Mamalla.

• He was the chief rival of Pulakeshin II and eventually defeated and killed him in the Battle of Vatapi in 642 CE, assuming the title Vatapikonda.

Q55. Answer: (b) Cambodia and Thailand

The correct answer is Cambodia and Thailand.

Key Points

• The Kuala Lumpur Peace Accord was signed in October 2025 as a landmark diplomatic treaty between the neighboring nations of Cambodia and Thailand to resolve long-standing territorial and maritime disputes.

• The accord was facilitated and hosted in Kuala Lumpur, Malaysia, reflecting the growing role of ASEAN member states in mediating internal regional conflicts and promoting the principle of ASEAN Centrality.

• A primary focus of the agreement was the resolution of the Overlapping Claims Area (OCA) in the Gulf of Thailand, which covers approximately 26,000 square kilometers and is believed to contain significant undersea oil and natural gas reserves.

• The treaty established a Joint Development Area (JDA) framework, allowing both countries to cooperate on energy exploration and resource sharing rather than contesting sovereignty, which had stalled development for over two decades.

• Beyond maritime issues, the accord included provisions for military de-escalation and demilitarization around sensitive land border zones, specifically near the Preah Vihear Temple and other historical sites along the Dangrek Mountains.

• The signing of this accord in October 2025 is viewed as a strategic move to boost energy security and economic stability in Southeast Asia amidst global price volatility.

Additional Information

• Overlapping Claims Area (OCA):

• Location: Situated in the Gulf of Thailand, it has been a point of contention since the 1970s due to conflicting claims of the continental shelf.

• Economic Impact: Experts estimate the area holds up to 11 trillion cubic feet of natural gas and significant quantities of condensate and oil.

• Historical Context: Previous attempts to resolve this, such as the 2001 Memorandum of Understanding (MoU), were frequently suspended due to political shifts in both Bangkok and Phnom Penh.

• Joint Technical Committee (JTC):

• The 2025 accord mandated the activation of a high-level Joint Technical Committee to oversee the technical demarcation of borders and the equitable distribution of revenues from joint ventures.

Q56. Answer: (c) Pankaj Mishra

The correct answer is Pankaj Mishra.

Key Points

• Pankaj Mishra is a globally renowned Indian essayist, novelist, and literary critic who authored the insightful work 'The World After Gaza'.

• The book provides a critical analysis of how the Gaza conflict has fundamentally impacted the geopolitical landscape and international moral order in the 21st century.

• Mishra explores the eroding credibility of Western liberal values and the post-World War II consensus on human rights and international law.

• His writing often focuses on the Global South, post-colonialism, and the historical forces shaping modern Asia and the Middle East.

• The author is also well-known for other significant works such as 'Age of Anger: A History of the Present' and 'From the Ruins of Empire', which received the Windham-Campbell Prize.

Additional Information

• Dr. S Jaishankar:

• Currently serving as the External Affairs Minister of India.

• Author of widely-read books on diplomacy and geostrategy, including 'The India Way: Strategies for an Uncertain World' and 'Why Bharat Matters'.

• Amitabh Kant:

• Served as the CEO of NITI Aayog and was India's G20 Sherpa during its presidency.

• Author of 'Made in India: 75 Years of Business and Enterprise' and 'Incredible India 2.0'.

• Dr. Aishwarya Pandit:

• An academic and author known for her extensive research on Indian political history.

• Authored the book 'Claiming Citizenship and Nation: Muslim Politics and State Structure in North India, 1947–1960'.

Q57. Answer: (b) Chennai

The correct answer is Chennai.

Key Points

• The 14th Edition of the maritime bilateral exercise INDRA 2025 is a significant defense engagement between the Indian Navy and the Russian Navy, held off the coast of Chennai.

• The exercise is conducted along the Coromandel Coast in the Bay of Bengal, falling under the operational jurisdiction of the Eastern Naval Command of the Indian Navy.

• The primary objective of this edition is to bolster interoperability between the two navies and to refine Standard Operating Procedures (SOPs) for maritime security operations and disaster response.

• The exercise is structured into two distinct phases: the Harbour Phase, involving professional interactions, table-top exercises, and planning conferences at the Chennai Port, and the Sea Phase, involving tactical maneuvers.

• Participating assets typically include Guided Missile Stealth Frigates, Destroyers, and Logistics Support Ships, alongside maritime patrol aircraft like the P-8I and Russian Tu-142.

• Specific drills conducted during the sea phase include Surface Firings, Anti-Submarine Warfare (ASW) exercises, and Visit, Board, Search, and Seizure (VBSS) operations to counter piracy and illicit trade.

Additional Information

• Evolution of INDRA Exercise:

• The INDRA series of exercises began in 2003 as a bilateral naval exercise but has evolved into a Tri-Services format in recent years to include army and air force components.

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• It symbolizes the Special and Privileged Strategic Partnership between India and Russia, focusing on regional stability and maritime safety in the Indian Ocean Region (IOR).

• Recent editions have alternated between the Baltic Sea in Russia and the Indian Ocean, emphasizing the global reach and coordination of both maritime forces.

• Strategic Importance of Chennai:

• Chennai serves as a critical logistics and operational hub for the Indian Navy on the eastern seaboard, providing deep-water berthing facilities essential for large naval vessels and international training drills.

• The city is often the focal point for Humanitarian Assistance and Disaster Relief (HADR) training due to its geographical proximity to the cyclone-prone areas of the Bay of Bengal.

Q58. Answer: (c) Article 5 – Citizenship at commencement

The correct answer is Article 5 - Citizenship at commencement.

Key Points

• Article 5 of the Indian Constitution provides for citizenship at the commencement of the Constitution on January 26, 1950, for persons who had their domicile in India and met specific conditions regarding birth or residency. Hence, statement 3 is correct.

• Article 11 confers power upon the Parliament of India to regulate the right of citizenship by law, including its acquisition and termination, rather than defining citizenship by birth directly. Hence, statement 1 is incorrect.

• Article 7 deals with the rights of citizenship of certain migrants to Pakistan who later returned to India, whereas the power of Parliament to regulate citizenship is under Article 11. Hence, statement 2 is incorrect.

• Article 9 states that persons voluntarily acquiring citizenship of a foreign State shall not be citizens of India; it does not define citizenship by registration, which is handled under the Citizenship Act, 1955. Hence, statement 4 is incorrect.

Additional Information

• Part II of the Constitution of India:

• It encompasses Articles 5 to 11, which specifically address the legal status and criteria for Indian citizenship.

• Article 6: Outlines the rights of citizenship for persons who migrated to India from Pakistan before the commencement of the Constitution.

• Article 8: Provides citizenship rights for persons of Indian origin residing outside India for employment or marriage purposes.

• Article 10: Ensures the continuance of the rights of citizenship for any person who is considered a citizen under the preceding articles, subject to any law made by Parliament.

• Citizenship Act, 1955: This legislation provides for the acquisition of citizenship by Birth, Descent, Registration, Naturalization, and Incorporation of territory.

Q59. Answer: (d) Western Rajasthan

The correct answer is Western Rajasthan.

Key Points

• Thorn and scrub vegetation is characteristic of regions that receive less than 70 cm of annual rainfall, where the climate is predominantly arid or semi-arid.

• Western Rajasthan, encompassing the Thar Desert, is the primary region in India where this vegetation thrives due to extreme water scarcity and high temperatures.

• The flora consists of scattered trees and thorny bushes such as Acacia, Palms, Euphorbias, and various types of Cacti.

• Plants in this ecosystem have developed xerophytic adaptations, including long taproots that reach deep into the water table and succulent stems designed for moisture conservation.

• To minimize transpiration, the leaves are typically small, thick, or modified into spines, which also serve as a defense mechanism against herbivores.

Additional Information

• Sundarbans:

• Located in the Ganga-Brahmaputra Delta, this region is famous for Mangrove forests (Tidal forests).

• The dominant species is the Sundari tree, which provides durable timber and thrives in saline swampy conditions.

• Malabar Coast:

• Situated along the Western Ghats, this area receives heavy rainfall (above 250 cm) from the Southwest Monsoon.

• It is home to Tropical Evergreen and Semi-Evergreen forests, featuring species like Rosewood, Mahogany, and Ebony.

• Eastern Himalayas:

• This region exhibits Montane vegetation, where the flora changes according to altitude.

• It ranges from sub-tropical forests at the foothills to alpine meadows and coniferous trees like Silver Fir and Juniper at higher elevations.

Q60. Answer: (a) Ministry of Electronics and Information Technology

The correct answer is Ministry of Electronics and Information Technology.

Key Points

• In April 2024, the Ministry of Electronics and Information Technology (MeitY) officially unveiled the 'I Am Circular' Coffee Table Book during a high-level event focused on environmental sustainability.

• The publication was developed in strategic collaboration with the International Council for Circular Economy (ICCE), a global organization dedicated to promoting circular business models.

• The primary objective of the 'I Am Circular' book is to showcase innovative practices, case studies, and success stories of organizations and individuals who have successfully implemented circular economy principles in India.

• The book highlights the electronics sector's transition toward sustainability, focusing on the management of electronic waste (e-waste) and the recovery of valuable materials from discarded devices.

• This initiative aligns with the Government of India's Mission LiFE (Lifestyle for Environment), which encourages a circular approach to resource consumption and promotes resource efficiency.

• By documenting these efforts, the Ministry of Electronics and Information Technology aims to inspire stakeholders to adopt green manufacturing processes and reduce the carbon footprint of the digital economy.

Additional Information

• International Council for Circular Economy (ICCE):

• It is a specialized think tank and platform that facilitates the exchange of knowledge and expertise regarding circularity across different industries.

• The ICCE works closely with government bodies and private enterprises to help achieve Sustainable Development Goals (SDGs) through policy advocacy and capacity building.

• Circular Economy in Electronics:

• A circular economy aims to move away from the traditional 'take-make-dispose' linear model to a restorative system.

• In the IT and electronics industry, it involves designing products for durability, repairability, and easy recycling to minimize toxic waste.

• India is one of the world's largest producers of e-waste, making the Ministry of Electronics and Information Technology's intervention crucial for environmental protection.

• Ministry Roles:

• The Ministry of Electronics and Information Technology is responsible for the Digital India mission and oversees the E-Waste (Management) Rules, which mandate the Extended Producer Responsibility (EPR) for electronic manufacturers.

Q61. Answer: (c) 5

The correct answer is 5.

Key Points

• Under Article 32 of the Constitution of India, the Supreme Court is empowered to issue five types of writs for the enforcement of Fundamental Rights guaranteed by Part III.

• Habeas Corpus: Literally meaning 'to have the body of', this writ is issued to protect personal liberty against arbitrary detention by the state or private individuals.

• Mandamus: Translating to 'we command', it is a judicial order issued to a public official, lower court, or government body to perform a statutory duty that they have failed or refused to execute.

• Prohibition: This writ is issued by a higher court to a lower court or quasi-judicial body to prevent it from exceeding its jurisdiction or acting contrary to the rules of natural justice.

• Certiorari: Meaning 'to be certified', it is issued to quash an order already passed by an inferior court or tribunal when there is an error of law or a lack of jurisdiction.

• Quo-Warranto: Meaning 'by what authority', the court issues this to enquire into the legality of a person's claim to a public office, ensuring that no one usurps a public position.

Additional Information

• Article 32 and Article 226

• Article 32 is itself a Fundamental Right, which Dr. B.R. Ambedkar famously described as the Heart and Soul of the Constitution.

• The High Courts also possess the power to issue these five writs under Article 226 of the Constitution.

• The writ jurisdiction of the High Court is considered wider than that of the Supreme Court because High Courts can issue writs for both Fundamental Rights and ordinary legal rights.

• While the Supreme Court is the guarantor of Fundamental Rights, its writ jurisdiction is limited to Part III of the Constitution.

• The concept of writs in India is heavily influenced by English Common Law, specifically the Prerogative Writs.

Q62. Answer: (b) Kathak

The correct answer is Kathak.

Key Points

• The term Kathak is derived from the Sanskrit word Katha, meaning 'story', and Kathakars were traditional traveling storytellers who narrated mythological epics through dance, music, and song.

• This classical dance form originated in Northern India, primarily within the regions of Uttar Pradesh and Rajasthan, initially performed in village temples to depict devotional themes.

• During the 15th and 16th centuries, the Bhakti movement significantly influenced the dance, introducing themes of divine love centered around Lord Krishna and Radha.

• Under the Mughal Empire, Kathak shifted from temples to the royal courts, where it integrated Persian and Central Asian aesthetic elements, emphasizing technical virtuosity.

• Key technical features developed during the Mughal period include lightning-fast Chakkars (pirouettes), complex Tatkar (footwork), and the use of the Angarkha (costume).

• The dance is characterized by the use of Ghungroos (bells) and is categorized into major Gharanas or schools, namely Lucknow, Jaipur, and Banaras.

Additional Information

• Kuchipudi:

• Originated in Andhra Pradesh, this dance form combines Lasya and Tandava elements and was traditionally performed by male Brahmins in the village of Kuchelapuram.

• Bharatanatyam:

• Hailing from Tamil Nadu, it is the oldest classical dance of India, rooted in the Sadir Attam tradition of temple Devadasis and based on the principles of the Natya Shastra.

• Mohiniyattam:

• A graceful, feminine dance form from Kerala, it is named after Mohini, the celestial enchantress, and is known for its swaying movements and circular patterns.

Q63. Answer: (a) António Guterres

The correct answer is António Guterres.

Key Points

• The UN80 initiative was announced to commemorate the 80th anniversary of the foundation of the United Nations, which was established on October 24, 1945, following the San Francisco Conference.

• António Guterres, the current and 9th Secretary-General of the United Nations, spearheaded the initiative to reflect on eight decades of international diplomacy and to reform the organization for future challenges.

• The initiative is closely linked to the Summit of the Future (held in September 2024) and the subsequent implementation of the Pact for the Future throughout the landmark year of 2025.

• The primary objectives of UN80 include reaffirming the principles of the UN Charter, accelerating the 2030 Agenda for Sustainable Development, and addressing 21st-century issues such as Artificial Intelligence (AI) governance and climate action.

• The year 2025 also marks the 80th session of the United Nations General Assembly (UNGA 80), where the Secretary-General emphasized the need for a more inclusive and networked multilateralism.

Additional Information

• Dr. Tedros Adhanom Ghebreyesus:

• He is the Director-General of the World Health Organization (WHO), having assumed office in 2017.

• His leadership has focused on Universal Health Coverage (UHC) and managing global health crises like the COVID-19 pandemic.

• Bob Rae:

• He is the Permanent Representative of Canada to the United Nations in New York.

• In 2024, he was elected as the 79th President of the Economic and Social Council (ECOSOC), a principal organ of the UN responsible for economic and social coordination.

• Judge Yuji Iwasawa:

• He is a distinguished Japanese jurist serving as a judge on the International Court of Justice (ICJ) since 2018.

• The ICJ, located at The Hague, is the principal judicial organ of the UN and settles legal disputes between states.

Q64. Answer: (a) Article 32

The correct answer is Article 32.

Key Points

• Article 32 of the Indian Constitution provides the Right to Constitutional Remedies, making it possible for citizens to move the Supreme Court for the enforcement of Fundamental Rights.

• This article is itself a Fundamental Right included in Part III, ensuring that the other rights guaranteed to citizens are not merely paper declarations but are legally enforceable.

• Dr. B.R. Ambedkar, the architect of the Constitution, described Article 32 as the 'Heart and Soul' of the Constitution, asserting that the entire constitutional structure would be meaningless without this provision.

• Under this article, the Supreme Court is empowered to issue five types of Writs: Habeas Corpus (to produce a body), Mandamus (we command), Prohibition (to stay proceedings), Certiorari (to quash orders), and Quo Warranto (by what authority).

• The Supreme Court has Original Jurisdiction under this article, meaning an aggrieved citizen can directly approach the highest court without following the hierarchical appeal process.

• The rights guaranteed by Article 32 cannot be suspended except as provided by the Constitution, such as during a National Emergency under Article 359.

Additional Information

• Article 226:

• Grants High Courts the power to issue writs for the enforcement of Fundamental Rights and for 'any other purpose', which refers to ordinary legal rights.

• While the Supreme Court's jurisdiction is limited to Fundamental Rights, the High Court's jurisdiction under Article 226 is actually broader in scope.

• Article 44:

• Contains the provision for a Uniform Civil Code (UCC) for all citizens throughout the territory of India.

• It is categorized under the Directive Principles of State Policy (DPSP) in Part IV, which are guidelines for the state but are not enforceable by courts.

• Article 300:

• Deals with Suits and Proceedings by or against the Government of India or the State Governments in their corporate capacity.

• Historically related is Article 300A, which was added by the 44th Amendment Act, 1978, to establish the Right to Property as a Constitutional Right instead of a Fundamental Right.

Q65. Answer: (c) input data and instructions

The correct answer is input data and instructions.

Key Points

• Accuracy is a fundamental characteristic of a computer, referring to its ability to perform calculations and process data with 100% precision without making any internal errors.

• The accuracy of a computer depends entirely on the GIGO (Garbage In, Garbage Out) principle. This concept implies that the quality of the output is directly proportional to the quality of the input data and instructions provided by the user.

• Computers are logical machines that execute algorithms exactly as they are written; therefore, if the input data is incorrect or if the program instructions contain logical errors (bugs), the computer will produce a wrong result.

• Unlike humans, computers do not suffer from fatigue, boredom, or lack of concentration, which are common causes of human error. As long as the hardware is functioning correctly, errors in output are almost always traceable back to human mistakes in data entry or programming.

Additional Information

• Resolution of the display screen:

• Refers to the number of pixels (horizontal × vertical) that a screen can display.

• It determines the visual clarity, sharpness, and detail of the image but has no influence on the mathematical or logical accuracy of the computer's processing units.

• Size of the system's RAM:

• Random Access Memory (RAM) is the volatile memory used to store data currently being processed by the CPU.

• Increasing RAM capacity enhances multitasking capabilities and overall system speed, but it does not change the correctness of a calculation.

• Speed of the processor:

• Measured in Gigahertz (GHz), it indicates how many clock cycles a CPU can perform per second.

• A faster processor allows for high-speed execution of tasks but does not improve the inherent precision of the logic applied to the data.

Q66. Answer: (a) DNA

The correct answer is DNA.

Key Points

• Deoxyribonucleic Acid (DNA) is the primary molecule responsible for the long-term storage of genetic information in almost all living organisms, including plants, animals, and bacteria.

• The structure of DNA is a double helix, composed of two strands made of deoxyribose sugar and phosphate groups, famously modeled by James Watson and Francis Crick in 1953.

• Genetic data is stored in the nucleotide sequence of four nitrogenous bases: Adenine (A), Thymine (T), Cytosine (C), and Guanine (G), where A always pairs with T and C always pairs with G via hydrogen bonds.

• In eukaryotic organisms, DNA is primarily housed within the cell nucleus in the form of chromosomes, though small amounts are also found in mitochondria and chloroplasts.

• The molecule is capable of self-replication, a critical process that ensures hereditary information is passed accurately from parent cells to daughter cells during cell division.

Additional Information

• RNA (Ribonucleic Acid):

• Generally single-stranded and contains the sugar ribose and the base Uracil (U) instead of Thymine.

• While it acts as the primary genetic material in some viruses (like retroviruses), its main role in most organisms is protein synthesis (translation).

• Protein:

• Large biomolecules consisting of amino acids that perform diverse cellular functions such as enzymatic catalysis, structural support, and signaling.

• They do not store genetic information but are the physical expression of the code stored in DNA.

• Lipid:

• Diverse group of hydrophobic molecules, including fats and phospholipids, primarily used for energy storage and forming the cell membrane bilayer.

Q67. Answer: (b) Jammu and Kashmir

The correct answer is Jammu and Kashmir.

Key Points

• The Right to Information (RTI) Act, 2005 was enacted by the Parliament of India to provide a practical regime for citizens to access information under the control of public authorities.

• At the time of its enactment and subsequent commencement on October 12, 2005, Section 1(2) of the Act specifically stated that it extended to the whole of India except the State of Jammu and Kashmir.

• This exclusion was a result of the special autonomous status granted to Jammu and Kashmir under Article 370 of the Constitution of India, which required the state government's concurrence for the application of central laws.

• Because the central law did not apply, the state government of Jammu and Kashmir implemented its own version, known as the Jammu and Kashmir Right to Information Act, 2004, which was later replaced by the J&K RTI Act, 2009.

• The act aims to promote transparency and accountability in the working of every public authority, helping to contain corruption and make democracy work for the people in a real sense.

Additional Information

• Legal Evolution and Reorganisation:

• The legal landscape changed significantly with the passage of the Jammu and Kashmir Reorganisation Act, 2019, which led to the abrogation of Article 370 and the reorganization of the state into two Union Territories.

• Effective from October 31, 2019, the central RTI Act, 2005 became applicable to the Union Territory of Jammu and Kashmir and the Union Territory of Ladakh, repealing the state-specific act.

• States like Tripura, West Bengal, and Mizoram were included in the original 2005 implementation as they did not have the constitutional exemption that J&K possessed at that time.

• The RTI Act replaced the previous Freedom of Information Act, 2002, providing a much stronger framework for the exercise of the fundamental right to information under Article 19(1) of the Constitution.

Q68. Answer: (b) 1924

The correct answer is 1924.

Key Points

• The Hindustan Republican Association (HRA) was a revolutionary organization founded in October 1924.

• The founding meeting of the HRA took place in Kanpur, Uttar Pradesh, following the suspension of the Non-Cooperation Movement by Mahatma Gandhi.

• The primary objective of the association was to overthrow the British colonial government through an organized armed revolution and establish the Federal Republic of the United States of India.

• The organization was established by prominent revolutionaries including Sachindra Nath Sanyal, Ram Prasad Bismil, Jogesh

Chandra Chatterjee, and Ashfaqullah Khan.

• The HRA drafted a constitution and a manifesto titled 'The Revolutionary', which outlined their vision for a democratic India based on universal adult suffrage and the abolition of exploitation.

Additional Information

• Evolution of the Organization:

• Kakori Conspiracy (1925): On August 9, 1925, HRA members carried out the famous Kakori train robbery to fund their revolutionary activities, which led to a massive crackdown by the British.

• Formation of HSRA (1928): After the arrest of several HRA leaders, the organization was reorganized as the Hindustan Socialist Republican Association (HSRA) at Feroz Shah Kotla, Delhi, in September 1928.

• Influence of Socialism: Under the influence of Bhagat Singh and Chandrashekhar Azad, the HSRA formally adopted socialism as its core ideology to address social and economic inequalities.

• Key Figures: While Sachindra Nath Sanyal authored the influential book Bandi Jeevan, Chandrashekhar Azad served as the Commander-in-Chief of the reorganized association.

Q69. Answer: (b) Chief Minister

The correct answer is Chief Minister.

Key Points

• According to Article 174(2)(b) of the Constitution of India, the Governor has the power to dissolve the Legislative Assembly (Vidhan Sabha) of a state.

• The Governor is the nominal executive head of the state, while the Chief Minister is the real executive head who leads the Council of Ministers.

• The Governor generally exercises this power of dissolution on the aid and advice of the Council of Ministers headed by the Chief Minister, provided the government maintains a majority in the house.

• While the normal term of the Vidhan Sabha is five years, the Chief Minister can recommend an early dissolution to the Governor to seek a fresh mandate or resolve a political deadlock.

• If a Chief Minister loses the confidence of the house (majority), the Governor may use discretionary powers to explore the formation of an alternative government before deciding on dissolution.

Additional Information

• Election Commission of India:

• An autonomous body established under Article 324 to manage Union and State election processes.

• It does not advise the Governor on dissolution but is responsible for conducting fresh elections once the assembly is dissolved.

• President of India:

• The President can dissolve the Lok Sabha on the advice of the Prime Minister.

• Under Article 356, the President can impose President Rule in a state based on the Governor report, which may lead to assembly dissolution.

• High Court of the State:

• It acts as the highest judicial authority in the state under Article 214.

• It has no constitutional role or authority to advise the Governor regarding the dissolution of the legislature.

Q70. Answer: (c) AYUSH treatment

The correct answer is AYUSH treatment.

Key Points

• On 2 September 2025, the Department of Ex-Servicemen Welfare (DESW), which operates under the Ministry of Defence, signed a Memorandum of Understanding (MoU) with Patanjali Yoggram.

• The primary objective of this agreement is to provide holistic healthcare and AYUSH treatment to the veteran community, focusing on preventive wellness and chronic disease management.

• The initiative is set to benefit nearly six million veterans and their dependents who are registered beneficiaries of the Ex-Servicemen Contributory Health Scheme (ECHS).

• Through this partnership, Patanjali Yoggram will offer specialized services in Ayurveda, Yoga, and Naturopathy, providing a complementary approach to the existing modern medical care available to retired personnel.

• This collaboration signifies a strategic shift towards integrating traditional Indian medicine systems into the Armed Forces medical framework to improve the quality of life for ex-servicemen.

Additional Information

• AYUSH Systems of Medicine:

• Ayurveda: An ancient Indian medical system based on balancing Doshas (Vata, Pitta, and Kapha) through herbal medicine and

diet.

• Yoga and Naturopathy: Focuses on drug-less healing through physical postures, meditation, and hydrotherapy.

• Unani, Siddha, and Homoeopathy: Other recognized components of the AYUSH framework that utilize natural substances and personalized treatment protocols.

• Ex-Servicemen Contributory Health Scheme (ECHS):

• Launched in 2003, it provides cashless medical treatment to pensioners and their families through a network of polyclinics and empanelled hospitals.

• Related Medical Terminologies:

• Oncology treatment: A specialized field focused on cancer care, involving radiotherapy and oncological surgery.

• Allopathic treatment: The modern pharmacological system of medicine that uses synthetic drugs and surgical interventions to treat symptoms.

• Advanced cardiac treatment: High-end medical procedures for heart diseases, including cardiology diagnostics and cardiothoracic surgery.

• Patanjali Yoggram:

• Located in Haridwar, it is a flagship center for integrated healthcare, established by Baba Ramdev and Acharya Balkrishna.

Therefore, the correct option for the type of treatment provided under the MoU is AYUSH treatment.

Q71. Answer: (a) Mother's mother

Family Chart:

Let us first analyze the given relations between the family members:

Therefore, A is the mother of O, who is the mother of D. This makes A the maternal grandmother of D, which is the Mother's mother.

Hence, the correct answer is "Option 1".

Q72. Answer: (d) Son's wife's father's brother

Let us first decode the given symbols and then draw a family tree.

Symbol	÷	#	•	&
Meaning	Son	Wife	Brother	Father
of B				

Given : S + D & R # Y ÷ H

Therefore, S is the brother of D, who is the father of R, and R is the wife of Y (who is the son of H) → S is the Son's wife's father's brother of H.

Hence, the correct answer is 'Option 4'.

Q73. Answer: (a) FXN 52

The logic follows here,

The next cluster-number pair in the series is FXN 52.

Hence, the correct answer is "option 1".

Q74. Answer: (a) LG – SC

The logic follows here,

LG - SC,

QM - XJ,

HP - OM,

RD - YA,

Therefore, the letter-cluster pair that is different from the others is LG - SC.

Hence, the correct answer is 'Option 1'.

Q75. Answer: (a) Three

Seven people, A, B, C, D, E, F and G, are sitting in a row, facing north.

1. F sits third to the left of A and F sits third to the right of D.

2. E sits third to the left of B and B sits to the immediate left of G

The final arrangement of people facing North is:

Hence, the correct answer is " Option 1"

Q76. Answer: (d) 57

The logic follows here,

For JCPV is coded as 51,

• Sum of opposite positional values = 17 + 24 + 11 + 5 = 57

• Code = 57 − 6 = 51

DYSF is coded as 48,

• Sum of opposite positional values = 23 + 2 + 8 + 21 = 54

• Code = 54 − 6 = 48

Similarly, let's find the code for HTOB:

• Sum of opposite positional values = 19 + 7 + 12 + 25 = 63

• Code = 63 − 6 = 57

Hence, the correct answer is "option 4"

Q77. Answer: (d) RQT−UTW

The logic follows here,

For DCF : GFI

For YXA : BAD

Similarly, for the pair RQT : UTW

The pattern is consistent across all pairs where each character is incremented by 3.

Hence, the correct answer is "Option 4"

Q78. Answer: (a) jn

The logic follows here,

Hence, the correct answer is "Option 1"

Q79. Answer: (d) Five

Given: A, B, D, J, O, T and Z are sitting around a circular table facing the center.

1. Only two people sit between A and Z when counted from the left of A.

2. J is an immediate neighbor of Z.

3. Only one person sits between J and O when counted from the left of J.

4. O is not an immediate neighbor of Z.

5. T sits immediately to the left of D

The Final Arrangement is,

Five people sit between B and O when counted from the left of O

Hence, the correct answer is "Option 4"

Q80. Answer: (b) FZO

The logic follows here,

Logic: Alphabetical position − 6 = Position of the next letter.

ICW,

FZO,

NHB,

GAU,

Therefore, the letter-cluster that is different from the others is FZO.

Hence, the correct answer is 'Option 2'.

Q81. Answer: (b) PM - NM

The logic follows here,

NK - PM,

IF - KH,

KH - MJ,

PM - NM,

Therefore, the letter-cluster pair that is different from the others is PM - NM.

Hence, the correct answer is 'Option 2'.

Q82. Answer: (a) Neither conclusion (I) nor (II) follows

The least possible Venn diagram for the given statements is:

(I) Some butters are scales—Doesn't follow

(Their is no direct relation between butters and scales and some butters are scales; it may be possible but not definite. Hence, it is false)

(II) All vegetables are scales—Doesn't follow

(All scales are vegetables but all vegetables are scale is may be possible but not definite. Hence, it is false)

Neither conclusion (I) nor (II) follows.

Hence, the correct answer is "option 1".

Q83. Answer: (a) 102

The logic followed here is:

The pattern is as follows:

• 8 × 2 − 1 = 15

• 15 × 2 − 2 = 28

• 28 × 2 − 3 = 53

• 53 × 2 − 4 = 102

• 102 × 2 − 5 = 199

According to the pattern, the value that should replace the question mark is 102.

Hence, the correct answer is "option 1"

Q84. Answer: (b) I

Given: Seven boxes, G, H, I, L, M, N and O, are kept one over the other, but not necessarily in the same order.

1. No box is kept below L.

2. Only four boxes are kept between M and L.

3. H is kept above M.

Position	Box
7	H
6	M
5	
4	
3	
2	
1	L

1. Only two boxes are kept between O and N.

2. I is kept immediately above G.

3. N is not kept immediately above I.

Final Arrangement:

7	H
6	M
5	O
4	I
3	G
2	N
1	L

Thus, the box kept fourth from the bottom is I.

Hence, the correct answer is "Option 2".

Q85. Answer: (b) S

The logic followed here is,

Letter	C	O	N	T	A	C	T
Change	−1	+1	−1	−1	+1	−1	−1
New Letter	B	P	M	S	B	B	S

The new group of letters formed is: B P M S B B S

Left B P M S B B S Right

The first letter from the right in this group is S.

Hence, the correct answer is "Option 2".

Q86. Answer: (b) P

Given: Seven boxes M, N, O, P, X, Y, and Z, are kept one over the other but not necessarily in the same order

1. Only N is kept above P.
2. Only two boxes are kept between P and X.
3. Only O is kept below Y.

Position	Box
7	N
6	P
5	
4	
3	X
2	Y
1	O

1. Z is not kept immediately above X.
2. Only M and Z are remaining to be placed in positions 4 and 5.

Final Arrangement:

7	N
6	P
5	Z
4	M
3	X
2	Y
1	O

Thus, the box kept second above M is P.

Hence, the correct answer is 'Option 2'.

Q87. Answer: (d) Two

Given: Seven boxes R, A, N, D, O, M and S are kept one over the other but not necessarily in the same order

1. Only five boxes are kept above N.
2. Only three boxes are kept between N and S.
3. O is kept at one of the positions below N.

Position	Box

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7	
6	S
5	
4	
3	
2	N
1	O

1. Only D is kept between S and R.
2. A is kept at one of the positions above S.

Final Arrangement:

7	**A**
6	S
5	D
4	R
3	M
2	N
1	O

Thus, two boxes are kept between R and O.

Hence, the correct answer is 'Option 4'.

Q88. Answer: (c) 33

BODMAS Table:

A	**B**	**C**	**D**
•	−	×	÷

Given: 34 B 45 D 5 A 2 C 4

Replacing the letters with mathematical signs and applying the BODMAS rule:

= 34 − 45 ÷ 5 + 2 × 4

= 34 − 9 + 2 × 4

= 34 + 8 − 9

= 42 − 9

= 33

Hence, the correct answer is "option 3"

Q89. Answer: (b) 14

Given number: 8254316

Digit	**8**	**2**	**5**	**4**	**3**	**1**	**6**
Change	−2	−2	+3	−2	+3	+3	−2
New Digit	6	0	8	2	6	4	4

Number formed : 6 0 8 2 6 4 4

• Third from the left is: 8

• Third from the right is: 6

So, the sum of the digit third from the left and the digit third from the right is:8 + 6 = 14.

Hence, the correct answer is 'Option 2'.

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Q90. Answer: (c) 176

The logic followed here is:

• 47 + 14 = 61

• 61 + 17 = 78

• 78 + 20 = 98

• 98 + 23 = 121

• 121 + 26 = 147

• 147 + 29 = 176

Thus, the missing term in the series is 176.

Hence, the correct answer is 'Option 3';

Q91. Answer: (a) BAKE - AKEB - KEBA

The logic follows here,

For FORK - ORKF - RKFO,

For TUCK - UCKT - CKTU

Applying for the same logic, BAKE - AKEB - KEBA:

The triad BAKE - AKEB - KEBA follows the same pattern.

Hence, the correct answer is "option 1"

Q92. Answer: (c) KON

The logic follows here,

Hence, the correct answer is "option 3"

Q93. Answer: (a) (34, 37, 43)

The logic followed here is:

Logic: Second Number = First Number + 3; Third Number = Second Number + 6

For the first set (5, 8, 14)

=> 5 + 3 = 8

=> 8 + 6 = 14

For the second set (19, 22, 28)

=> 19 + 3 = 22

=> 22 + 6 = 28

Applying the same logic to the set in Option 1

(34, 37, 43)

=> 34 + 3 = 37

=> 37 + 6 = 43

Hence, the correct answer is 'Option 1'.

Q94. Answer: (d) LRD : PLC

The logic follows here,

For 'DKW' related to 'HEV':

For 'EGK' related to 'IAJ':

Applying the same logic 'LRD : PLC',

Hence, the correct answer is 'Option 4'.

Q95. Answer: (a) Three

Given series: (Left) 3 9 5 3 8 4 4 2 9 8 9 4 6 6 5 7 7 2 4 1 3 6 3 (Right)

Required Conditions: Odd - Even - Even

(Left) 3 9 5 3 8 4 4 2 9 8 9 4 6 6 5 7 7 2 4 1 3 6 3 (Right)

384, 9 4 6,7 2 4

Hence, the correct answer is 'Option 1'.

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Q96. Answer: (b) Both conclusions (I) and (II) follow

The least possible Venn diagram for the given statements is:

(I) Some cups are fans - Follows

(All fans are cups. Some cups are fans, and some fans are cups. Hence, it is true)

(II) All desktops are cups - Follows

(All desktop are fans, and all fans are cups. Hence, all desktops are cups)

Both conclusions (I) and (II) follow

Hence, the correct answer is "Option 2"

Q97. Answer: (d) 3 km to the east

1. Anamika starts from Point A and drives 2 km towards the north.
2. She then takes a right turn, drives 5 km, turns right and drives 7 km.
3. She then takes a right turn and drives 8 km.
4. She takes a final right turn, drives 5 km and stops at Point P

The Final Diagram,

Therefore, she needs to drive 3 km to the east.

Hence, the correct answer is "option 4".

Q98. Answer: (d) Three

Given (Left) R D A U F U E Q Y U M U Y G J S P B A J L Q S H (Right)

Required Conditions: Vowel, Consonant, Consonant

The given letter series is:

(Left) R D A U F U E Q Y U M U Y G J S P B A J L Q S H (Right)

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

Hence, the correct answer is "option 4"

Q99. Answer: (a) 880

BODMAS Table:

Original Sign	New Sign
•	–
–	×
×	÷
÷	•

The given equation is:41 − 16 ÷ 271 + 611 × 13 = ?

After replacing the signs and applying BODMAS rule, the new equation becomes:

= 41 × 16 + 271 − 611 ÷ 13

= 41 × 16 + 271 − 47

= 656 + 271 − 47

= 927 − 47

= 880

Hence, the correct answer is "option 1"

Q100. Answer: (a) RUX43

The logic follows here,

The resulting cluster is RUX43.

Hence, the correct answer is "option 1"

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