RRB NTPC (UG) CBT-I Official Paper (Held On 18 Jun, 2026 Shift 1) (Previous Year Paper)

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

Take this paper as a timed mock test

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Scan the QR code or click the link to open it.

2 questions are in Hindi and not printed here. Each one links to the online version, where you can read it.

MATHEMATICS

Directions

Q1. A train A passes a fixed pole in 24 seconds. The same train completely crosses another train B of length 150 m coming from the opposite direction in 20 seconds. Train B's speed is 54 km/h. Find the length and the speed of train A.

(a) 600 m and 135 km/h
(b) 500 m and 135 km/h
(c) 900 m and 135 km/h
(d) 900 m and 134 km/h

Q2. ABCD is a quadrilateral in which AB||DC, and E and F are the mid points of the diagonals AC and BD, respectively. If AB = 21 cm, BC = 33 cm, DC = 11 cm, and AD = 52 cm, then what is the length (in cm) of EF?

(a) 6
(b) 5
(c) 3
(d) 4

Q3. A shopkeeper sells an article for Rs. 1,200 at a 20% profit. At what price (in Rs.) should he sell the article to incur a loss of 10%?

(a) Rs. 980
(b) Rs. 950
(c) Rs. 900
(d) Rs. 875

Q4. Two taps can fill a cistern in 4 hours and 19 hours, respectively. A third tap can empty it in 19 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

Q5. If x is the fourth proportional of 37, 25 and 888, what is the value of x?

(a) 400
(b) 600
(c) 800
(d) 500

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Q6. The price of a book is increased from Rs. 200 to Rs. 220. What is the percentage increase in the price?

(a) 12%
(b) 5%
(c) 8%
(d) 10%

Q7. What least value must be given to n so that the number 5135n2 becomes divisible by 9?

(a) 5
(b) 4
(c) 3
(d) 2

Q8. Three numbers are in the ratio 3 : 2 : 13, and their LCM is 2574. Their HCF is:

(a) 76
(b) 23
(c) 43
(d) 33

Q9. If (3^(-22) + 3^(-19) + 3^(-17) + 3^(-16)) = k(3^(-24)), then find the value of k.

(a) 1000
(b) 900
(c) 3000
(d) 9000

Q10. The sum of two positive numbers is 26 and their product is 144. The positive difference between them is:

(a) 10
(b) 13
(c) 16
(d) 5

Q11. The price of a laptop was initially $1,200. During a sale, the price was first reduced by 20%, and then an additional discount of 15% was applied to the new price. What is the final price of the laptop?

(a) $780
(b) $816
(c) $799
(d) $899

Q12. Two pipes, A and B, can fill a tank in 20 minutes and 30 minutes, respectively. An outlet pipe, C, can empty it in 60 minutes. All three pipes are opened simultaneously. If pipe C is closed after 10 minutes, how much total time will it take to fill the tank?

(a) 14 minutes
(b) 12 minutes
(c) 17 minutes
(d) 15 minutes

Q13. Five years ago, Rahul was twice as old as his brother. If Rahul is 10 years older than his brother, what is Rahul's present age?

(a) 20 years
(b) 15 years
(c) 30 years
(d) 25 years

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Q14. Amit and Raghav invest in a business in the ratio 5 : 7. If the total profit is Rs. 48,000, what is Raghav's share?

(a) Rs. 30,000
(b) Rs. 26,000
(c) Rs. 28,000
(d) Rs. 32,000

Q15. What is the mode of the following data?

53, 46, 55, 53, 40, 48, 53, 47, 41, 54, 43, 55, 54, 51, 43, 42, 44, 47

(a) 55
(b) 46
(c) 48
(d) 53

Q16. If 2^x - 2^(x-1) = 32, then the value of (2x-1)/(2x+3) is:

(a) 11/15
(b) 11/13
(c) 11/12
(d) 11/14

Q17. A sum of money is invested at a simple interest rate of 8% per annum. After 3 years, the simple interest earned is Rs. 1,920. What is the principal invested?

(a) Rs. 6,000
(b) Rs. 8,000
(c) Rs. 9,000
(d) Rs. 7,500

Q18. The L.C.M. of two numbers is 210 and their H.C.F. is 3. If the first number is divided by 3, the quotient is 7 and the remainder is 0. The second number is:

(a) 30
(b) 35
(c) 60
(d) 25

Q19. A daily commuter usually reaches his office on time by driving at a speed of 40 km/hr. One day, due to traffic, he drives at 30 km/hr and reaches 20 minutes late. What is the distance to his office?

(a) 60 km
(b) 30 km
(c) 40 km
(d) 50 km

Q20. A solid cylinder of radius 35 cm and height 50 cm is melted and recast into smaller identical cylinders, each having radius 3.5 cm and height 15 cm. How many complete such smaller cylinders are formed?

(a) 333
(b) 260
(c) 222
(d) 121

Q21. The difference between two numbers is 8. If twice the larger number is 4 more than three times the smaller number, what is the larger number?

(a) 14
(b) 16
(c) 18
(d) 20

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Q22. Which of the expressions given below has the same value as that of $\cos^2(\theta) + \sin^2(\theta)$?

(a) $\text{cosec}^2(\theta) + \sec^2(\theta)$
(b) $1 + \tan^2(\theta) + (1 - \sec^2(\theta))$
(c) $1 + \tan^2(\theta) - (1 - \sec^2(\theta))$
(d) $\text{cosec}^2(\theta) + \cot^2(\theta)$

Q23. A person spends 75% of his income. If his income increases by 20% and his expenditure increases by 10%, what is the percentage change in his savings?

(a) 50% increase
(b) 25% increase
(c) 40% increase
(d) 60% increase

Q24. In an educational institute, the ratio of male students to female students is 4 : 3. The ratio of the same female students to teaching staff is 8 : 1. Find the ratio of total students (male + female) to teaching staff.

(a) 27 : 1
(b) 21 : 2
(c) 56 : 3
(d) 66 : 7

Q25. Three classes have 60, 40, and 50 students respectively. Their average marks are 65, 72, and 60. What is the average mark of all 150 students combined?

(a) 70
(b) 65.2
(c) 60
(d) 67

Q26. The 7-digit number 77A444B is divisible by 24. What is the maximum value of (A + B)?

(a) 13
(b) 12
(c) 15
(d) 16

Q27. A dishonest shopkeeper claims to sell 1 kg of rice at the cost price per kg. He actually uses a weight of 1200 g while purchasing rice, and a weight of 840 g while selling rice. What is the overall percentage profit made by the shopkeeper?

(Round off the result to two decimal places.)

(a) 42.86%
(b) 43.44%
(c) 41.78%
(d) 40.33%

Q28. A cylindrical pipe has an external radius of 8 cm and an internal radius of 7 cm. If its length is 20 cm, what is the volume of material used in the pipe? (Use $\pi = 3.14$)

(a) 320 cubic cm
(b) 201 cubic cm
(c) 192 cubic cm
(d) 942 cubic cm

Q29. What sum (in Rs.) will earn a simple interest of Rs. 1,320 in 4 years at 12% per year rate of interest?

(a) 2,750
(b) 1,375
(c) 5,500
(d) 633.6

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Q30. The price of a pen is Rs. 47. A scheme offers a deal: "Buy 4 and get 50% off on 1." Find the effective price per pen.

(a) Rs. 39.30
(b) Rs. 40.30
(c) Rs. 42.30
(d) Rs. 38.30

GENERAL AWARENESS

Q31. How does the Vidhan Parishad elect its chairman?

(a) Nominated by the Governor
(b) Appointed by the President
(c) Elected by members of the Lok Sabha
(d) Elected by members of the Vidhan Parishad

Q32. Which factor led to the Mysore rebellion of 1830–31 against the restored Wodeyar administration?

(a) Expansion of irrigation that reduced the cost of agricultural dues.
(b) Protectionist policies designed to shield peasants from levies.
(c) Increased revenue pressure that ultimately burdened cultivators.
(d) Reduction in policing that strengthened the power of local chiefs.

Q33. Which of the following factors does NOT promote globalisation?

(a) Subsidies and protectionism in domestic markets
(b) Foreign Direct Investment (FDI)
(c) Removal of trade barriers
(d) Privatization of state-owned enterprises

Q34. Annalena Baerbock, who served as the President of the 80th session of the UN General Assembly in 2025, belongs to which country?

(a) Denmark
(b) Czech Republic
(c) Germany
(d) Austria

Q35. What is the title of the book, released in April 2025 in New Delhi, that compiles Prime Minister Narendra Modi's speeches on culture?

(a) Bharat Ki Sanskritik Yatra
(b) Sanskriti Ka Panchva Adhyay
(c) Modi on Culture and Heritage
(d) Sanskriti Ke Shilpkar

Q36. This question is in Hindi. Read it online.

Q37. In June 2025, which major summit was hosted for the first time by the Netherlands in The Hague (24–25 June)?

(a) G7 Summit
(b) NATO Summit
(c) EU-27 Summit
(d) ASEAN Summit

Q38. Oxidation in a redox reaction involves which of the following?

(a) Electrons gained
(b) Protons gained
(c) Protons lost
(d) Electrons lost

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Q39. This question is in Hindi. Read it online.

Q40. Which of the following does NOT influence the horizontal distribution of air pressure?

(a) Earth's rotation
(b) Presence of water vapour
(c) Ocean salinity
(d) Air temperature

Q41. During group project file sharing in the CSE classroom, LAN connects which devices directly?

(a) Printers connected via Bluetooth pairing
(b) Satellite phones for remote areas only
(c) Global internet servers across continents
(d) Local computers within the same building

Q42. India has secured which rank in the Asia Power Index 2025?

(a) Fourth
(b) Third
(c) Second
(d) First

Q43. The Rigveda, the oldest of the Vedas, mainly consists of which of the following?

(a) Epic narratives
(b) Ritual manuals
(c) Philosophical essays
(d) Hymns

Q44. Which of the following coastal plains contains irregular, indented coastlines with natural harbours?

(a) East Coastal Plain
(b) Kathiawar Plain
(c) Konkan Region
(d) Rann of Kutch

Q45. In August 2025, which mission did PM Modi announce to stop enemy defence infiltrations and boost India's attack strength?

(a) Mission Trishul
(b) Project Kusha
(c) Sudarshan Chakra Mission
(d) Agni-V Shield Mission

Q46. How did the Rangarajan Group recommend updating the poverty line in the future?

(a) By using the Fisher Index with data from NSSO
(b) By removing the concept of poverty line altogether
(c) By relying on the National Accounts Statistics
(d) By using a relative poverty measure compared to an absolute measure

Q47. Which of the following was NOT a key objective of the demonetisation initiative implemented in November 2016?

(a) Curbing corruption and black money
(b) Reducing counterfeit currency and terror financing
(c) Promoting digital payments and a cashless economy
(d) Increasing reliance on cash transactions

Q48. Which statement is True or False regarding a computer's characteristics?

(i) Accuracy guarantees zero errors in output, even with flawed input.
(ii) No IQ means a computer cannot perform tasks without explicit instructions from the user or programmer.

(a) (i) False, (ii) True

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(b) (i) True, (ii) True
(c) (i) True, (ii) False
(d) (i) False, (ii) False

Q49. Which of the following texts is considered the earliest Vedic composition depicting the life of early Vedic people?
(a) Samaveda
(b) Yajurveda
(c) Atharvaveda
(d) Rigveda

Q50. What was the theme of World Environmental Health Day 2025 observed on 26 September 2025?
(a) Protecting Our Planet
(b) Water for All
(c) Clean Air, Healthy People
(d) Plastic-Free Future

Q51. Which of the following traditions are the two major streams of Indian classical music?
(a) Tribal Folk and Bhakti
(b) Hindustani and Carnatic
(c) Hindustani and Western Classical
(d) Carnatic and Rajasthani Folk

Q52. Which of the following was a unique feature of Arya Samaj meetings, as seen during Dayanand Saraswati's time?
(a) They involved animal sacrifices
(b) Only Brahmins could attend
(c) Women participated equally
(d) They were held only in temples

Q53. India's fourth Asia Cup win in men's hockey (2025) ended a drought of how many years?
(a) 12 years
(b) 5 years
(c) 8 years
(d) 10 years

Q54. The phrase "internal disturbance" in the Emergency provisions of the Constitution of India was replaced with which term?
(a) Civil unrest
(b) National instability
(c) Internal security threat
(d) Armed rebellion

Q55. The overall Labour Force Participation Rate (LFPR) for persons aged 15 years and above increased to what percentage in October 2025?
(a) 55.4%
(b) 54.2%
(c) 56.1%
(d) 55.0%

Q56. How do antacids reduce pain during indigestion?
(a) Increasing acid production
(b) Reducing food intake
(c) Thickening stomach walls
(d) Neutralising excess stomach acid

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Q57. Who is known for popularising the Santoor, an Indian classical instrument, globally?

(a) Pandit Shivkumar Sharma
(b) Pandit Ravi Shankar
(c) Ustad Amjad Ali Khan
(d) Pandit Hariprasad Chaurasia

Q58. Which of the following statements is true regarding the Marine West Coast Climate (Cfb) as per Koeppen's scheme of classification of climate?

(a) It has a pronounced dry season in summer.
(b) It receives less than 20 cm of rainfall annually.
(c) It is found in the interiors of continents far from the coast.
(d) It experiences small daily and annual temperature ranges due to oceanic influence.

Q59. The Paika Rebellion (1817), considered one of the earliest anti-colonial uprisings, took place in which region?

(a) Bengal
(b) Maharashtra
(c) Assam
(d) Odisha

Q60. Which of the following Amendments to the Constitution of India allows both the centre and states to levy the Goods and Services Tax (GST)?

(a) 74th Amendment, 1992
(b) 101st Amendment, 2016
(c) 80th Amendment, 2000
(d) 67th Amendment, 1990

Q61. A user wants to quickly access a folder named Reports which is frequently used, but it is deeply nested within the following path: C:\Users\Public\Documents\Projects\2020_Q2\Reports. Which feature of the Windows File Explorer offers the most efficient way to create a one-click shortcut to this folder within the file explorer window itself?

(a) Creating a new library and including the folder
(b) Adding the folder to the Quick Access section
(c) Mapping the folder as a new Network Drive
(d) Pinning the folder to the Start Menu

Q62. Metro trains in India are built and operated mainly in partnership with which Ministry of the Government of India?

(a) Ministry of Railways
(b) Ministry of Civil Aviation
(c) Ministry of Road Transport
(d) Ministry of Urban Development

Q63. The phenotype short in pea plants is expressed by which allele combination?

(a) tT
(b) TT
(c) tt
(d) Tt

Q64. Elections to Panchayats and Municipalities are managed by which body according to the Constitution?

(a) District Magistrates
(b) Central Election Commission
(c) State Election Commissions
(d) Lok Sabha Secretariat

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Q65. Which organization is responsible for the development and regulation of navigation through rivers and canals in India?

(a) Central Water Commission
(b) Inland Waterways Authority of India
(c) Shipping Corporation of India
(d) National Highway Authority of India

Q66. Under the Fifth Schedule of the Indian Constitution, which States are excluded from the definition of State?

(a) Assam, Manipur, Meghalaya
(b) Assam, Meghalaya, Tripura, Mizoram
(c) Assam, Meghalaya, Tripura, Nagaland
(d) Assam, Mizoram, Arunachal Pradesh, Sikkim

Q67. What demographic shift characterizes Brazil's transition since the 1980s?

(a) High births with low longevity
(b) Rising urban mortality
(c) Falling birth and death rates
(d) Stable fertility with immigration

Q68. Which of the following was a characteristic feature of Harappan street planning?

(a) Elevated stone causeways replacing ordinary streets
(b) Broad circular roads radiating out from a central square
(c) Streets intersecting at right angles forming a criss-cross pattern
(d) Narrow zig-zag streets designed to control traffic flow

Q69. The quantity represented by the unit volt per ampere corresponds to which electrical unit?

(a) Coulomb
(b) Joule
(c) Watt
(d) Ohm

Q70. Which of the following shortcut keys opens File Explorer directly in MS Windows?

(a) Shift + E
(b) Windows logo key + E
(c) Alt + E
(d) Ctrl + E

GENERAL INTELLIGENCE AND REASONING

Q71. 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.

NPS : KMP

DOQ : ALN

(a) SEL : OAI
(b) EHL : CFI
(c) DHG : BEC
(d) HDP : EAM

Q72. In a certain code language,

A = B means 'A is the son of B',

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

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

A * B means 'A is the father of B'.

How is W related to G if 'W = F $ K @ L * G'?

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

Q73. Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

VXW−UWV

WYX−VXW

(a) BCA−ZBA
(b) BDC−ACB
(c) BDC−ZCA
(d) BCA−ACB

Q74. If 'A' stands for '÷', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

220 C 56 A 14 D 17 B 12 =?

(a) 36
(b) 30
(c) 20
(d) 24

Q75. Refer to the following series and answer the question. (Counting to be done from left to right only.) (All numbers are single-digit numbers only.)

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

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

(a) 4
(b) 3
(c) 2
(d) 5

Q76. Refer to the following letter series and answer the question. (Counting to be done from left to right only.)

(Left) I G I H C Y A O Z L K E P D J C O P T I R G (Right)

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

(a) 3
(b) 5
(c) 6
(d) 4

Q77. What should come in place of the '?' in the given series?

51 78 132 213 321 ?

(a) 456
(b) 462
(c) 450
(d) 448

Q78. In a certain code language, 'salt elbow care' is coded as ' zh pv nf' and 'night care jar' is coded as 'ab po zh'. How is 'care' coded in the given language?

(a) ab
(b) nf
(c) zh
(d) pv

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Q79. Refer to the given series and answer the question that follows. All numbers are single-digit numbers only.

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

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

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

Q80. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GCH 10, DZE 21, AWB 32, XTY 43, ?

(a) KPT 56
(b) UQB 56
(c) UQV 54
(d) LFY 58

Q81. What will come in place of the question mark (?) in the following equation, if '+' and '−' are interchanged and '×' and '÷' are interchanged?

39 – 15 ÷ 3 + 124 × 4 = ?

(a) 52
(b) 53
(c) 59
(d) 50

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

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/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.)

(15, 12, 37)

(25, 15, 50)

(a) (2, 8, 20)
(b) (23, 5, 40)
(c) (18, 17, 42)
(d) (24, 10, 40)

Q83. What should come in place of the question mark (?) in the given series based on the English alphabetical order?

LJL MKM NLN OMO ?

(a) PNP
(b) PQS
(c) PMO
(d) POO

Q84. Seven people F, G, H, L, M, O and Q are sitting in a row facing north. Only two people sit between H and Q. Only H sits to the right of G. Only three people sit between G and F. L sits at some place to the left of O, but at some place to the right of M.

How many people sit between M and O?

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

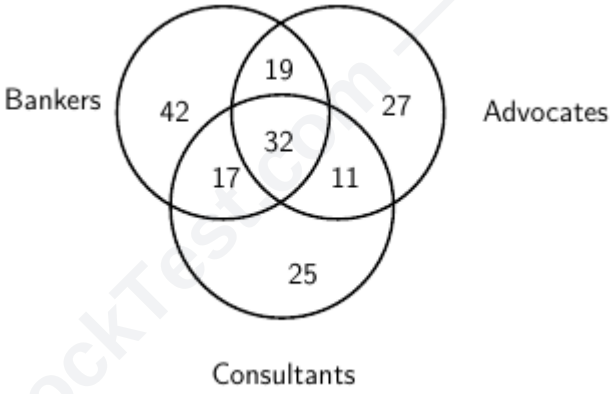
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Q85. In a certain code language, 'FISH' is coded as '1963' and 'HITS' is coded as '6983'. What is the code for 'T' in the given code language?

(a) 6
(b) 3
(c) 8
(d) 9

Q86. Study the given diagram carefully and answer the question. The numbers in different sections indicate the number of persons. (NOTE: You have to take the given data to be true even if it seems to be at variance from commonly known facts.)

How many such Consultants are there who are Bankers as well as Advocates?



(a) 32
(b) 11
(c) 25
(d) 17

Q87. Based on the English alphabetical order, three of the following four 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 man out is not based on the number of consonants/vowels or their position in the letter cluster.)

(a) ZWX
(b) PNN
(c) FCD
(d) KHI

Q88. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only two boxes are kept between G and B. Only D is kept above C. No box is kept below B. F is kept at some place below A but at some place above E. How many boxes are kept between D and E?

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

Q89. 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: Some doors are petals. Some flowers are petals.

Conclusion (I): Some flowers are doors.

Conclusion (II): All petals are flowers.

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

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

211, 219, 235, 259, 291, ?

(a) 330
(b) 331
(c) 341
(d) 321

Q91. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which 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) PS - OR
(b) FI - EH
(c) LO - KN
(d) KN - JL

Q92. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. Only G is kept above E. Only C is kept between E and A. Only F is kept below B. How many boxes are kept between C and F?

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

Q93. Mr. Yorly starts from Point A and drives 29 km towards East. He then takes a right turn, drives 16 km, turns right and drives 39 km. He then takes a right turn and drives 9 km. He then takes a right turn, drives 6 km, turns left and drives 3 km. He takes a final right turn, drives 4 km and stops at Point P. How far (shortest distance) and towards which direction should he drive in order to reach Point A again? (All turns are 90 degrees turns only unless specified.)

(a) 8 km to the East
(b) 4 km to the North
(c) 6 km to the South
(d) 7 km to the West

Q94. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. D is kept third from the bottom. C is kept above A but below D. Only two boxes are kept between G and F. E is kept above F but below B. How many boxes are kept between E and D?

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

Q95. DIOR is related to AEJL in a certain way based on the English alphabetical order. In the same way, RSUT is related to OOPN. To which of the following options is IGFB related, following the same logic?

(a) FCVA
(b) FAVC
(c) FCAV
(d) FVCA

Q96. A, B, D, J, O, T and Z are sitting around a circular table facing the center. Only four people sit between B and D when counted from the right of B. O and T are immediate neighbors of J. Exactly four people sit between A and Z when counted from the left of A. Z is not an immediate neighbor of O or D. How many people sit between D and Z when counted from the left of D?

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

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Q97. In a certain code language,

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

A – B means 'A is the brother of B',

A x B means 'A is the father of B' and

A ÷ B means 'A is the mother of B'.

Based on the above, how is M related to R if 'M x N ÷ O – P + Q – R'?

(a) Mother's father
(b) Brother
(c) Father
(d) Father's father

Q98. Each of the digits in the number 73912685 is arranged in ascending order from left to right. The position(s) of how many digits will remain unchanged as compared to that in the original number?

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

Q99. What should come in place of '?' in the given series based on the English alphabetical order?

BMS EPV HSY KVB ?

(a) NYE
(b) NXE
(c) NYD
(d) OYE

Q100. 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 man out is not based on the number of consonants/vowels or their position in the letter cluster.)

(a) QF – MB
(b) HL – FD
(c) GT – CP
(d) NV – JR

ANSWER KEY

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

SOLUTIONS

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Q1. Answer: (c) 900 m and 135 km/h

Shortcut Trick

Let the speed of Train A be S_A. Length L_A = S_A × 24.

Speed of Train B = 54 × (5/18) = 15 m/s.

When crossing Train B in opposite direction: (L_A + 150) = (S_A + 15) × 20.

Substitute L_A: 24S_A + 150 = 20S_A + 300 => 4S_A = 150.

S_A = 37.5 m/s = 37.5 × (18/5) = 135 km/h.

L_A = 37.5 × 24 = 900 m.

Therefore The correct answer is 900 m and 135 km/h.

Alternate Method

Given:

Time to pass fixed pole = 24 sec

Time to cross Train B = 20 sec

Length of Train B = 150 m

Speed of Train B = 54 km/h

Formula Used:

Distance = Speed × Time

Relative Speed (Opposite) = S1 + S2

Calculations:

=> Let Speed of Train A = v m/s and Length of Train A = L m.

=> From first condition: L = v × 24 → (i)

=> Speed of Train B in m/s = 54 × (5/18) = 15 m/s.

=> From second condition (crossing in opposite direction):

=> Total Distance = L + 150

=> Relative Speed = v + 15

=> (L + 150) = (v + 15) × 20 → (ii)

=> Substituting (i) in (ii): 24v + 150 = 20v + 300

=> 4v = 150 => v = 37.5 m/s

=> Speed of Train A in km/h = 37.5 × (18/5) = 135 km/h.

=> Length of Train A = 37.5 × 24 = 900 m.

Therefore The correct answer is 900 m and 135 km/h.

Additional Information

Relative Speed Concept

For objects moving in the same direction, Relative Speed = S1 − S2. For opposite directions, Relative Speed = S1 + S2.

Unit Conversion

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

Train Crossing a Pole vs Train

When a train crosses a pole/man, distance = length of train. When it crosses another train/platform, distance = sum of both lengths.

Q2. Answer: (b) 5

Shortcut Trick

In a trapezium (where AB || DC), the length of the segment EF joining the midpoints of the diagonals is half the difference of the parallel sides.

Length of EF = 1/2 × |AB − DC|

=> EF = 1/2 × |21 − 11|

=> EF = 1/2 × 10 = 5 cm

Therefore The correct answer is 5 cm.

Alternate Method

Given: AB = 21 cm, DC = 11 cm (Parallel sides), E and F are midpoints of AC and BD.

Formula Used: Length of segment joining midpoints of diagonals = (1/2) × (Difference of parallel sides).

Calculations:

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=> Parallel side 1 (AB) = 21 cm

=> Parallel side 2 (DC) = 11 cm

=> Difference of parallel sides = 21 − 11 = 10 cm

=> Length of segment EF = (1/2) × 10

=> EF = 5 cm

Therefore The correct answer is 5 cm.

Additional Information

Median of a Trapezium

The segment joining the midpoints of the non-parallel sides is called the median, and its length is the average of the parallel sides: (AB + DC) ÷ 2.

Midpoint Segment Property

In any quadrilateral, the segment joining the midpoints of the diagonals lies on the median segment joining the midpoints of the non-parallel sides.

Isosceles Trapezium

In an isosceles trapezium, the non-parallel sides (AD and BC) are equal, and the diagonals (AC and BD) are also equal in length.

Q3. Answer: (c) Rs. 900

Shortcut Trick

Profit of 20% means Selling Price is 120% of Cost Price (CP).

Given 120% = Rs. 1,200 => 1% = Rs. 10.

For a Loss of 10%, the required Selling Price is (100 − 10)% = 90%.

Required Price = 90% × 10 = Rs. 900.

Therefore The correct answer is Rs. 900.

Alternate Method

Given:

Initial Selling Price (SP1) = Rs. 1,200

Initial Profit% = 20%

Required Loss% = 10%

Formula Used:

Cost Price (CP) = [SP ÷ (100 + Profit%)] × 100

New Selling Price (SP2) = CP × [(100 − Loss%) ÷ 100]

Calculations:

=> Cost Price (CP) = [1,200 ÷ (100 + 20)] × 100

=> CP = [1,200 ÷ 120] × 100

=> CP = 10 × 100 = Rs. 1,000

=> New Selling Price (SP2) = 1,000 × [(100 − 10) ÷ 100]

=> SP2 = 1,000 × (90 ÷ 100)

=> SP2 = 1,000 × 0.9 = Rs. 900

Therefore The correct answer is Rs. 900.

Additional Information

Profit and Loss Percentage

Profit % = (Profit ÷ CP) × 100 and Loss % = (Loss ÷ CP) × 100. Both are always calculated on the Cost Price unless specified otherwise.

Marked Price and Discount

Marked Price (MP) is the label price. Discount is calculated on MP: Selling Price (SP) = MP − Discount.

Successive Profit/Loss

If an article is sold at a% profit and then b% profit, the Effective Profit % = [a + b + (a × b)/100]%.

Q4. Answer: (d) 1

Shortcut Trick

The filling rate of the second tap (19 hr) and the emptying rate of the third tap (19 hr) are identical.

When opened together, they neutralize each other's effect completely.

Net filling depends only on the first tap which fills the full cistern in 4 hours.

Time to fill one-fourth of the cistern = 4 hr × (1/4) = 1 hr.

Therefore The correct answer is 1 hr.

Alternate Method

Given:

Time taken by Tap A (filling) = 4 hr

Time taken by Tap B (filling) = 19 hr

Time taken by Tap C (emptying) = 19 hr

Formula Used:

Efficiency = Total Work ÷ Time Taken

Time = Required Work ÷ Combined Efficiency

Tap	Time (hr)	Total Work (LCM)	Efficiency
A (Fill)	4	76 units	19
B (Fill)	19	4	
C (Empty)	19	−4	

Calculations:

=> Total Efficiency of (A + B + C) = 19 + 4 − 4 = 19 units/hr

=> Required Work = 1/4 of total capacity = 76 ÷ 4 = 19 units

=> Time Taken = Required Work ÷ Total Efficiency

=> Time = 19 ÷ 19 = 1 hr

Therefore The correct answer is 1 hr.

Additional Information

Inlet and Outlet Pipes

Inlet pipes fill the tank (positive efficiency), while outlet/leakage pipes empty the tank (negative efficiency).

Net Efficiency

If multiple pipes are open, the net efficiency is the algebraic sum of their individual efficiencies: E_(net) = E1 + E2 − E3.

Fractional Work

The time taken to fill 1/n part of the tank is simply the time taken to fill the full tank divided by n.

Q5. Answer: (b) 600

Shortcut Trick

To find the fourth proportional (x) of three numbers a, b, and c, use the direct formula: x = (b × c) ÷ a.

Here, a = 37, b = 25, and c = 888.

x = (25 × 888) ÷ 37

x = 25 × 24 = 600.

Therefore The correct answer is 600.

Alternate Method

Given: The numbers 37, 25, and 888 are the first three terms of a proportion, and x is the fourth proportional.

Formula Used: If four numbers a, b, c, d are in proportion (a : b :: c : d), then the product of extremes equals the product of means (a × d = b × c).

=> 37 ÷ 25 = 888 ÷ x

=> 37 × x = 25 × 888

=> x = (25 × 888) ÷ 37

=> x = 22200 ÷ 37

=> x = 600

Therefore The correct answer is 600.

Additional Information

Fourth Proportional

For four non-zero quantities a, b, c, d, if a : b = c : d, then d is the fourth proportional to a, b, c.

Third Proportional

If a : b = b : c, then c is the third proportional to a and b, calculated as c = b^2 ÷ a.

Mean Proportional

The mean proportional (or geometric mean) between a and b is the value x such that a : x = x : b, which is x = √(a × b).

Q6. Answer: (d) 10%

Shortcut Trick

Actual Increase = Rs. 220 − Rs. 200 = Rs. 20

Percentage Increase = (Increase ÷ Original Price) × 100

Percentage Increase = (20 ÷ 200) × 100 = 10%

Therefore The correct answer is 10%.

Alternate Method

Given:

Initial Price of the book = Rs. 200

Final Price of the book = Rs. 220

Formula Used:

Percentage Increase = [(Final Value − Initial Value) ÷ Initial Value] × 100

Calculations:

=> Price Increase = Rs. 220 − Rs. 200 = Rs. 20

=> Percentage Increase = (20 ÷ 200) × 100

=> Percentage Increase = (1 ÷ 10) × 100

=> Percentage Increase = 10%

Therefore The correct answer is 10%.

Additional Information

Percentage Change Formula

The formula for percentage change is [(New Value − Old Value) ÷ Old Value] × 100. If the result is positive, it is an increase; if negative, it is a decrease.

Fraction to Percentage

To convert any fraction into a percentage, multiply it by 100 and add the % symbol. For example, 1/5 × 100 = 20%.

Percentage Base Change

If a value increases from A to B, the base is A. If it decreases from B back to A, the base for calculation becomes B.

Q7. Answer: (d) 2

Shortcut Trick

Divisibility rule of 9 states that the sum of the digits must be divisible by 9.

Sum of digits of 5135n2 = 5 + 1 + 3 + 5 + n + 2 = 16 + n

The next higher multiple of 9 after 16 is 18.

=> 16 + n = 18 => n = 2

Therefore The correct answer is 2.

Alternate Method

Given:

The number 5135n2 is completely divisible by 9.

Formula/Property Used:

A number is divisible by 9 if and only if the sum of its digits is a multiple of 9.

Calculation:

=> Sum of digits of the number = 5 + 1 + 3 + 5 + n + 2

=> Sum of digits = 16 + n

=> Since the number is divisible by 9, (16 + n) must be equal to 18, 27, 36, etc.

=> For the least value of n (where n is a single digit, 0 ≤ n ≤ 9):

=> 16 + n = 18

=> n = 18 − 16

=> n = 2

Therefore The correct answer is 2.

Additional Information

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Divisibility Rule of 3

A number is completely divisible by 3 if the sum of its digits is a multiple of 3.

Divisibility Rule of 11

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

Divisibility Rule of 8

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

Q8. Answer: (d) 33

Shortcut Trick

The given ratio of three numbers is 3 : 2 : 13.

Since the numbers in the ratio (3, 2, and 13) are all prime numbers, their LCM is simply the product of these numbers multiplied by their HCF.

HCF = LCM ÷ (Product of Ratio parts)

HCF = 2574 ÷ (3 × 2 × 13) = 2574 ÷ 78

HCF = 33

Therefore The correct answer is 33.

Alternate Method

Given: Ratio of numbers = 3 : 2 : 13 | LCM = 2574

Formula Used: LCM of (ax, bx, cx) = x × LCM(a, b, c), where x is the HCF.

=> Let the three numbers be 3x, 2x, and 13x, where x is the HCF.

=> LCM(3x, 2x, 13x) = x × LCM(3, 2, 13)

=> Since 3, 2, and 13 are co-prime, their LCM = 3 × 2 × 13 = 78

=> Total LCM = 78x

=> 78x = 2574

=> x = 2574 ÷ 78

=> x = 33

Therefore The correct answer is 33.

Additional Information

Relationship for Two Numbers

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

Numbers are called co-prime if their Highest Common Factor (HCF) is 1. The LCM of co-prime numbers is always their product.

HCF and LCM of Fractions

HCF = (HCF of Numerators) ÷ (LCM of Denominators) and LCM = (LCM of Numerators) ÷ (HCF of Denominators).

Q9. Answer: (d) 9000

Given:

Equation: 3^(−22) + 3^(−19) + 3^(−17) + 3^(−16) = k × 3^(−24)

Formula used:

The exponent rule for division: a^m ÷ aⁿ = a^(m − n)

Calculations:

k × 3^(−24) = 3^(−22) + 3^(−19) + 3^(−17) + 3^(−16)

=> k = (3^(−22) + 3^(−19) + 3^(−17) + 3^(−16)) ÷ 3^(−24)

=> k = 3^((−22 − (−24))) + 3^((−19 − (−24))) + 3^((−17 − (−24))) + 3^((−16 − (−24)))

=> k = 3² + 3^5 + 3^7 + 3^8

=> k = 9 + 243 + 2187 + 6561

=> k = 9000

Therefore The correct answer is option (4).

Q10. Answer: (a) 10

Shortcut Trick

Find two Factors of the product 144 that add up to the sum 26.

List factors: 18 × 8 = 144

Check sum: 18 + 8 = 26 (Matches given sum)
Required Positive Difference = 18 − 8 = 10
Therefore The correct answer is 10.
Alternate Method
Given: Sum (a + b) = 26 and Product (ab) = 144
Formula Used: $(a - b)^2 = (a + b)^2 - 4ab$
=> $(a - b)^2 = (26)^2 - 4 \times 144$
=> $(a - b)^2 = 676 - 576$
=> $(a - b)^2 = 100$
=> $a - b = \sqrt{100}$
=> $a - b = 10$
Therefore The correct answer is 10.
Additional Information
Quadratic Equation Construction
If sum S and product P of two numbers are known, the numbers are roots of $x^2 - Sx + P = 0$.
Algebraic Identities
Useful relation: $(a + b)^2 - (a - b)^2 = 4ab$.
Finding Individual Numbers
Once sum (S) and difference (D) are found, the numbers are (S+D)÷2 and (S−D)÷2.

Q11. Answer: (b) $816

Shortcut Trick
Apply the successive multiplying factor for the discounts.
Final Price = Initial Price × (100 − d1)% × (100 − d2)%
Final Price = 1200 × 80% × 85%
Final Price = 1200 × 0.8 × 0.85 = 816
Therefore The correct answer is 816.
Alternate Method
Given:
Initial price of the laptop = 1200
First discount percentage = 20%
Second discount percentage = 15%
Calculations:
=> Amount of first discount = 20% of 1200 = (20/100) × 1200 = 240
=> Price after first discount = 1200 − 240 = 960
=> Amount of second discount = 15% of 960 = (15/100) × 960 = 144
=> Final price of the laptop = 960 − 144 = 816
Therefore The correct answer is 816.
Additional Information
Single Equivalent Discount Formula
For two successive discounts of a% and b%, the single effective discount is calculated as (a + b − (a × b)/100)%.
Relationship between MP and SP
Selling Price (SP) = Marked Price (MP) × (100 − Discount%)/100. Discounts are always applied to the Marked Price.
Successive Percentage Change
Final Value = Initial Value × (1 ± r1/100) × (1 ± r2/100), where r represents the percentage increase (+) or decrease (−).

Q12. Answer: (a) 14 minutes

Shortcut Trick
Total capacity (LCM of 20, 30, 60) = 60 units
Efficiency: A = 3, B = 2, C = −1 (outlet)
Work done in 10 minutes (A+B+C) = (3 + 2 − 1) × 10 = 40 units
Time taken by A+B to fill the remaining work (20 units) = 20 ÷ 5 = 4 minutes

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Total time = 10 + 4 = 14 minutes
Therefore The correct answer is 14 minutes.
Alternate Method
Given:
Time for pipe A = 20 minutes
Time for pipe B = 30 minutes
Time for outlet pipe C = 60 minutes
Formula used:
Total work = Efficiency × Time

Pipe	Time (minutes)	Total Work (LCM)	Efficiency
Pipe A	20	60 units	3
Pipe B	30	2	
Pipe C	60	−1	

Calculation:
=> Initially, all three pipes (A, B, and C) are opened together for 10 minutes.
=> Part filled in 10 minutes = (3 + 2 − 1) × 10 = 4 × 10 = 40 units
=> Remaining part of the tank = 60 − 40 = 20 units
=> Now Pipe C is closed, so only A and B will work.
=> Combined efficiency of A and B = 3 + 2 = 5 units/minute
=> Time taken to fill the remaining part = 20 ÷ 5 = 4 minutes
=> Total time taken to fill the tank = 10 minutes + 4 minutes = 14 minutes
Therefore The correct answer is 14 minutes.
Additional Information
Efficiency of an outlet pipe (Negative Efficiency)
The efficiency of a pipe that empties a tank is always considered negative (−) because it reduces the total filled volume.
Combined Efficiency
When multiple pipes work together, their total efficiency is the algebraic sum of their individual efficiencies.
Relationship between time and efficiency
For the same amount of work, time and efficiency are inversely proportional to each other: Time prop. to 1/Efficiency.

Q13. Answer: (d) 25 years

Shortcut Trick
The age difference between two people always remains constant (10 years).
5 years ago, the ratio of Rahul to Brother was 2 : 1.
Difference in ratio = 2 − 1 = 1 unit → 10 years.
Rahul's age 5 years ago = 2 units = 2 × 10 = 20 years.
Rahul's present age = 20 + 5 = 25 years.
Therefore The correct answer is 25 years.
Alternate Method
Given:
Age difference = 10 years
Condition 5 years ago: Rahul = 2 × Brother
Let Brother's present age be x years.
Then, Rahul's present age = x + 10 years.
=> 5 years ago, Brother's age = x − 5
=> 5 years ago, Rahul's age = (x + 10) − 5 = x + 5
According to the question:
=> x + 5 = 2 × (x − 5)
=> x + 5 = 2x − 10
=> 2x − x = 10 + 5

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=> x = 15 years (Brother's present age)

=> Rahul's present age = 15 + 10 = 25 years.

Therefore The correct answer is 25 years.

Additional Information

Age Difference Invariance

The numerical difference between the ages of two individuals remains the same at any point in time (past, present, or future).

Ratio Method for Ages

If the ratio of ages changes over time, calculate the value of 1 unit by equating the constant difference to the difference in ratio parts.

Time Transition

To find age 'n' years ago, subtract 'n' from the present age. To find age 'n' years hence, add 'n' to the present age.

Q14. Answer: (c) Rs. 28,000

Shortcut Trick

Ratio of investment for Amit and Raghav = 5 : 7

Total ratio units = 5 + 7 = 12 units

12 units → Rs. 48,000 (total profit)

1 unit → Rs. 4,000

Raghav's share = 7 units = 7 × Rs. 4,000 = Rs. 28,000

Therefore The correct answer is Rs. 28,000.

Alternate Method

Given:

Investment ratio (Amit : Raghav) = 5 : 7

Total profit = Rs. 48,000

Formula Used:

Individual profit share = (Individual ratio part ÷ Total ratio parts) × Total profit

Calculations:

=> Total ratio parts = 5 + 7 = 12

=> Raghav's share = (7 ÷ 12) × 48,000

=> Raghav's share = 7 × 4,000

=> Raghav's share = Rs. 28,000

Therefore The correct answer is Rs. 28,000.

Additional Information

Partnership Profit Rule

When the investment time is the same for all partners, the profit is distributed strictly in the ratio of their capital investments.

Compound Partnership

If partners invest for different time periods, the profit ratio is (C1 × T1) : (C2 × T2), where C is capital and T is time.

Ratio to Value Conversion

To find an individual share from a total value V and ratio a:b, the share of the first person is [a ÷ (a + b)] × V.

Q15. Answer: (d) 53

Shortcut Trick

The Mode is defined as the value that appears most frequently in a dataset.

Scan the data for repetitions: 53 appears 3 times (at positions 1, 4, and 7).

Other values like 55, 54, 47, and 43 appear only 2 times each.

Since 53 has the maximum frequency, it is the mode.

Therefore The correct answer is 53.

Alternate Method

Given Data: 53, 46, 55, 53, 40, 48, 53, 47, 41, 54, 43, 55, 54, 51, 43, 42, 44, 47

To find the Mode, we construct a frequency table for the repeating values:

=> Frequency of 43: 2

=> Frequency of 47: 2

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=> Frequency of 53: 3

=> Frequency of 54: 2

=> Frequency of 55: 2

=> Frequency of other values (40, 41, 42, 44, 46, 48, 51): 1 each

=> The value with the highest frequency (3) is 53.

Therefore The correct answer is 53.

Additional Information

Mean

The arithmetic average calculated as the sum of all observations divided by the total number of observations (Sum ÷ n).

Median

The middle-most value when the data is arranged in ascending or descending order. For even n, it is the average of the two middle terms.

Empirical Relationship

For a moderately skewed distribution, the relationship between measures of central tendency is: Mode = 3 × Median − 2 × Mean.

Types of Mode

A dataset can be unimodal (one mode), bimodal (two modes), trimodal (three modes), or multimodal.

Q16. Answer: (a) 11/15

Given:

Equation: 2^x − 2^(x−1) = 32

Formula used:

a^m − a^(m−n) = a^(m−n)(aⁿ − 1)

Calculations:

2^x − 2^(x−1) = 32

=> 2^(x−1)(2¹ − 1) = 32

=> 2^(x−1)(2 − 1) = 32

=> 2^(x−1)(1) = 32

=> 2^(x−1) = 2^5

=> x − 1 = 5

=> x = 6

Now, finding the value of (2x − 1) / (2x + 3) by substituting x = 6:

=> (2 × 6 − 1) / (2 × 6 + 3)

=> (12 − 1) / (12 + 3)

=> 11 / 15

Therefore The correct answer is option (1).

Q17. Answer: (b) Rs. 8,000

Shortcut Trick

Total Interest Percentage = Rate × Time = 8% × 3 = 24%.

Given, 24% of the Principal = Rs. 1,920.

Principal (100%) = (1,920 ÷ 24) × 100 = 80 × 100 = Rs. 8,000.

Therefore The correct answer is Rs. 8,000.

Alternate Method

Given: Simple Interest (SI) = Rs. 1,920, Rate (R) = 8% p.a., Time (T) = 3 years.

Formula Used: SI = (P × R × T) ÷ 100

=> 1,920 = (P × 8 × 3) ÷ 100

=> 1,920 = (P × 24) ÷ 100

=> P × 24 = 1,920 × 100

=> P = (1,920 × 100) ÷ 24

=> P = 80 × 100

=> P = 8,000

Therefore The correct answer is Rs. 8,000.

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Additional Information

Simple Interest Principle

Simple Interest is always calculated on the original Principal amount for every time period, unlike compound interest where interest is added back.

Total Amount Formula

The total Amount (A) received at the end of the term is the sum of the Principal and the interest earned: A = P + SI.

Rate and Time Calculations

To find the Rate (R), use R = (SI × 100) ÷ (P × T). To find the Time (T), use T = (SI × 100) ÷ (P × R).

Q18. Answer: (a) 30

Shortcut Trick

First Number = 3 × 7 = 21

Second Number = (LCM × HCF) ÷ First Number

Second Number = (210 × 3) ÷ 21 = 10 × 3 = 30

Therefore The correct answer is 30.

Alternate Method

Given:

L.C.M. = 210

H.C.F. = 3

For the first number: Divisor = 3, Quotient = 7, Remainder = 0

Formula Used:

1. Dividend = (Divisor × Quotient) + Remainder

2. Product of two numbers = L.C.M. × H.C.F.

Calculations:

=> First number = (3 × 7) + 0

=> First number = 21

=> Let the second number be x.

=> 21 × x = 210 × 3

=> 21 × x = 630

=> x = 630 ÷ 21

=> x = 30

Therefore The correct answer is 30.

Additional Information

Fundamental Property of LCM & HCF

For any two positive integers a and b, HCF(a, b) × LCM(a, b) = a × b. This property only applies to exactly two numbers.

HCF as a Factor of LCM

The HCF of a set of numbers is always a factor of the LCM of those same numbers.

HCF and LCM of Fractions

HCF of fractions = (HCF of Numerators) ÷ (LCM of Denominators) and LCM of fractions = (LCM of Numerators) ÷ (HCF of Denominators).

Q19. Answer: (c) 40 km

Shortcut Trick

Ratio of Speed = 40 : 30 = 4 : 3

Since Distance is constant, Time Ratio = Inverse of Speed Ratio = 3 : 4

Difference in time units = 4 − 3 = 1 unit → 20 minutes

Original time (3 units) = 3 × 20 = 60 minutes = 1 hour

Distance = Usual Speed × Usual Time = 40 km/hr × 1 hr = 40 km

Therefore The correct answer is 40 km.

Alternate Method

Given:

Usual Speed (S1) = 40 km/hr

New Speed (S2) = 30 km/hr

Time Delay (Δt) = 20 minutes = 20/60 hour = 1/3 hour

Formula Used:

Distance (D) = [(S1 × S2) ÷ (S1 − S2)] × Δt

Calculations:

=> D = [(40 × 30) ÷ (40 − 30)] × (1/3)

=> D = [1200 ÷ 10] × (1/3)

=> D = 120 × (1/3)

=> D = 40 km

Therefore The correct answer is 40 km.

Additional Information

Average Speed Formula

When a person covers two equal distances at speeds x and y, the Average Speed = (2 × x × y) ÷ (x + y).

Speed Conversion

To convert speed from km/hr to m/s, multiply by 5/18. To convert from m/s to km/hr, multiply by 18/5.

Relative Speed

If two objects move in the same direction at speeds u and v, relative speed = u − v. In opposite directions, relative speed = u + v.

Q20. Answer: (a) 333

Shortcut Trick

Number of smaller cylinders (n) = (Radius_(large) / Radius_(small))² × (Height_(large) / Height_(small))

n = (35 / 3.5)² × (50 / 15) = 10² × (10 / 3)

n = 100 × 3.333 ≈ 333.33

Since we need the number of complete cylinders, we take the integer part.

Therefore The correct answer is 333 cylinders.

Alternate Method

Given:

Radius of large cylinder (R) = 35 cm

Height of large cylinder (H) = 50 cm

Radius of small cylinder (r) = 3.5 cm

Height of small cylinder (h) = 15 cm

Formula Used:

Volume of a cylinder = πr²h

Calculations:

=> Volume of large cylinder (V_L) = π × 35 × 35 × 50

=> Volume of one small cylinder (V_s) = π × 3.5 × 3.5 × 15

=> Let 'n' be the number of smaller cylinders formed.

=> n × V_s = V_L

=> n = (π × 35 × 35 × 50) ÷ (π × 3.5 × 3.5 × 15)

=> n = (35/3.5) × (35/3.5) × (50/15)

=> n = 10 × 10 × (10/3)

=> n = 1000 / 3 = 333.33...

=> Complete cylinders = 333

Therefore The correct answer is 333 cylinders.

Additional Information

Volume of Cylinder

The volume of a solid cylinder is calculated as πr²h, where r is the radius of the circular base and h is the vertical height.

Conservation of Volume

When one solid object is melted and recast into other objects, the total volume remains constant: Initial Volume = Total Volume of New Objects.

Surface Area of Cylinder

Curved Surface Area = 2πrh and Total Surface Area = 2πr(r + h).

Complete Objects Calculation

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When calculating the number of complete objects, always round down the decimal result to the nearest whole number (Floor value).

Q21. Answer: (d) 20

Shortcut Trick

Test the options for the larger number.

If the larger number is 20, then the smaller number is 20 − 8 = 12.

Condition: Twice the larger number = 2 × 20 = 40.

Condition: Three times the smaller number + 4 = (3 × 12) + 4 = 36 + 4 = 40.

Since both conditions match (40 = 40), the larger number is 20.

Therefore The correct answer is 20.

Alternate Method

Given:

Difference between two numbers = 8

Let the larger number be x and the smaller number be y.

Formula Used:

Linear equations in two variables: x − y = d and ax + by = c.

Calculations:

=> x − y = 8

=> y = x − 8

=> 2x = 3y + 4

=> 2x = 3(x − 8) + 4

=> 2x = 3x − 24 + 4

=> 2x = 3x − 20

=> 3x − 2x = 20

=> x = 20

Therefore The correct answer is 20.

Additional Information

Linear Equation Formulation

Word problems are solved by translating phrases like 'twice' as 2×, 'more than' as +, and 'difference' as subtraction.

Substitution Method

Expressing one variable in terms of another (e.g., y = x − 8) and substituting it into the second equation helps reduce variables.

Verification of Results

Always verify the calculated values in both original conditions to ensure accuracy in algebraic solutions.

Q22. Answer: (b) 1 + tan²(θ) + (1- sec²(θ))

Shortcut Trick

The standard Trigonometric Identity is $\cos^2\theta + \sin^2\theta = 1$.

Another fundamental identity is $1 + \tan^2\theta = \sec^2\theta$, which implies $1 + \tan^2\theta - \sec^2\theta = 0$.

By substituting this into the expression: $(1 + \tan^2\theta) + 1 - \sec^2\theta \Rightarrow \sec^2\theta + 1 - \sec^2\theta = 1$.

Since both values equal 1, the expression matches the given condition.

Therefore The correct answer is $1 + \tan^2(\theta) + (1- \sec^2(\theta))$.

Alternate Method

Given: Primary value = $\cos^2\theta + \sin^2\theta$

Formula Used:

1. Pythagorean Identity: $\sin^2\theta + \cos^2\theta = 1$

2. Secant Identity: $\sec^2\theta - \tan^2\theta = 1 \Rightarrow \tan^2\theta - \sec^2\theta = -1$

Calculations:

=> Target value = $\cos^2\theta + \sin^2\theta = 1$

=> Evaluating the expression: $1 + \tan^2\theta + (1 - \sec^2\theta)$

=> Rearranging terms: $(1 + \tan^2\theta) + 1 - \sec^2\theta$

=> Substitute $(1 + \tan^2\theta) = \sec^2\theta$

=> Result = $\sec^2\theta + 1 - \sec^2\theta$

=> Result = 1

=> Since 1 = 1, the values are identical.

Therefore The correct answer is $1 + \tan^2(\theta) + (1 - \sec^2(\theta))$.

Additional Information

Fundamental Pythagorean Identities

The three main identities are $\sin^2\theta + \cos^2\theta = 1$, $1 + \tan^2\theta = \sec^2\theta$, and $1 + \cot^2\theta = \text{cosec}^2\theta$.

Reciprocal Relations

Key relations: $\sin\theta = 1/\text{cosec}\theta$, $\cos\theta = 1/\sec\theta$, and $\tan\theta = 1/\cot\theta$.

Ratio Identities

$\tan\theta$ is the ratio of $\sin\theta$ to $\cos\theta$ ($\tan\theta = \sin\theta/\cos\theta$), while $\cot\theta$ is the inverse ($\cot\theta = \cos\theta/\sin\theta$).

Q23. Answer: (a) 50% increase

Shortcut Trick

Ratio of Expenditure : Savings = 75 : 25 = 3 : 1 (Total = 4 units)

Apply the weighted average rule for percentage increases:

(Total Units × % Income Increase) = (Exp Units × % Exp Increase) + (Sav Units × % Sav Increase)

(4 × 20) = (3 × 10) + (1 × x)

80 = 30 + x => x = 50%

Therefore The correct answer is 50% increase.

Alternate Method

Given: Initial spending = 75% of income. Income increases by 20%, Expenditure by 10%.

Let Initial Income = Rs. 100

=> Initial Expenditure = 75% of 100 = Rs. 75

=> Initial Savings = Income − Expenditure = 100 − 75 = Rs. 25

=> New Income = 100 + (20% of 100) = Rs. 120

=> New Expenditure = 75 + (10% of 75) = 75 + 7.5 = Rs. 82.5

=> New Savings = New Income − New Expenditure = 120 − 82.5 = Rs. 37.5

=> Change in Savings = 37.5 − 25 = Rs. 12.5

=> Percentage Change = (12.5 ÷ 25) × 100 = 50%

Therefore The correct answer is 50% increase.

Additional Information

Income-Expenditure Formula

Income = Expenditure + Savings. Any increase in income must be balanced by the sum of increases in expenditure and savings.

Weighted Average Method

If components A and B form total T, then % change in T = (A/T × % change in A) + (B/T × % change in B).

Percentage Change

Percentage Increase/Decrease = [(New Value − Old Value) ÷ Old Value] × 100.

Q24. Answer: (c) 56 : 3

Shortcut Trick

Equate the common term Female students using LCM of 3 and 8, which is 24.

New Ratio Male : Female = 32 : 24 (multiplied by 8).

New Ratio Female : Staff = 24 : 3 (multiplied by 3).

Combined Ratio Male : Female : Staff = 32 : 24 : 3.

Total students : Staff = (32 + 24) : 3 = 56 : 3.

Therefore The correct answer is 56 : 3.

Alternate Method

Given: Ratio of Male to Female students = 4 : 3

Ratio of Female students to Teaching staff = 8 : 1

=> Let Male students (M) = 4x and Female students (F) = 3x.

=> From the second ratio, F : T = 8 : 1, so Teaching staff (T) = F ÷ 8.

=> Total Students = M + F = 4x + 3x = 7x.

=> T = 3x ÷ 8 = 3x/8.

=> Ratio of Total Students to Teaching Staff = 7x : (3x/8).

=> Multiply both sides by 8 to clear the fraction: (7 × 8) : 3 = 56 : 3.

Therefore The correct answer is 56 : 3.

Additional Information

Compound Ratio

When two or more ratios are multiplied together (a/b × c/d), the result (ac : bd) is called the compound ratio.

Balancing Ratios

To merge ratios A : B and B : C, find the LCM of the common term B and adjust both ratios accordingly to create a unified A : B : C sequence.

Invertendo Property

If a : b = c : d, then b : a = d : c. This is useful when the denominator or second term of the ratio needs to be compared or simplified.

Q25. Answer: (b) 65.2

Shortcut Trick

Ratio of students in three classes = 60 : 40 : 50 = 6 : 4 : 5.

Assume an average marks of 60.

Net deviation = (6 × (65 − 60)) + (4 × (72 − 60)) + (5 × (60 − 60)) = 30 + 48 + 0 = 78.

Average deviation = 78 ÷ (6 + 4 + 5) = 78 ÷ 15 = 5.2.

Combined average = Assumed Average + Average deviation = 60 + 5.2 = 65.2.

Therefore The correct answer is 65.2.

Alternate Method

Given:

Class 1: 60 students, Average = 65

Class 2: 40 students, Average = 72

Class 3: 50 students, Average = 60

Formula Used:

Combined Average = (n1a1 + n2a2 + n3a3) ÷ (n1 + n2 + n3)

Calculations:

=> Total marks for Class 1 = 60 × 65 = 3900

=> Total marks for Class 2 = 40 × 72 = 2880

=> Total marks for Class 3 = 50 × 60 = 3000

=> Sum of all marks = 3900 + 2880 + 3000 = 9780

=> Total number of students = 60 + 40 + 50 = 150

=> Combined Average = 9780 ÷ 150

=> Combined Average = 978 ÷ 15 = 65.2

Therefore The correct answer is 65.2.

Additional Information

Weighted Average

It is an average where each quantity is given a specific weight according to its importance or size. Formula: Average = (Σ w_ix_i) ÷ Σ w_i.

Average Property

If each value in a data set is increased or decreased by a constant k, the new average also increases or decreases by k.

Net Deviation Rule

The sum of deviations of all observations from their arithmetic mean is always zero.

Q26. Answer: (d) 16

Shortcut Trick

A number divisible by 24 must be divisible by both 3 and 8.

For divisibility by 8, last three digits 44B must be divisible by 8 => B = 0 or 8.

For divisibility by 3, the sum of digits (26 + A + B) must be divisible by 3.

To maximize A + B, we take the largest possible value B = 8.

Now, 26 + A + 8 = 34 + A must be divisible by 3 => largest digit A = 8.

Therefore The correct answer is 16.

Alternate Method

Given: The 7-digit number is 77A444B and it is divisible by 24.

Formula: If a number is divisible by 24, it must satisfy the divisibility rules for its co-prime factors 3 and 8.

=> Divisibility by 8: The last three digits 44B must be divisible by 8.

=> 440 + B ÷ 8 => Since 440 is divisible by 8 (55 × 8), B must be 0 or 8.

=> Divisibility by 3: The sum of digits 7 + 7 + A + 4 + 4 + 4 + B must be divisible by 3.

=> 26 + A + B must be a multiple of 3.

=> To find the maximum value of (A + B), let us test B = 8 (the maximum possible value for B).

=> Sum = 26 + A + 8 = 34 + A.

=> For 34 + A to be divisible by 3, possible values for A are 2, 5, 8.

=> To maximize the expression, we take A = 8.

=> Maximum (A + B) = 8 + 8 = 16.

Therefore The correct answer is 16.

Additional Information

Divisibility Rule of 8

A number is divisible by 8 if its last three digits are divisible by 8 or if the last three digits are all zeros.

Divisibility Rule of 3

A number is divisible by 3 if the sum of all its individual digits is a multiple of 3.

Composite Divisibility

To check divisibility by a composite number like 24, check divisibility by its co-prime factors (3 and 8 in this case).

Q27. Answer: (a) 42.86%

Shortcut Trick

Net Profit Ratio = (Weight actually received while buying / Standard weight) × (Standard weight / Weight actually given while selling)

Net Ratio = (1200 / 1000) × (1000 / 840) = 1200 : 840

Simplified Profit Ratio (SP : CP) = 10 : 7

Profit % = (Profit / CP) × 100 = (10 − 7) / 7 × 100 = 3/7 × 100

Profit % = 42.857...% ≈ 42.86%

Therefore The correct answer is 42.86%.

Alternate Method

Given:

Weight obtained by dishonest shopkeeper while purchasing = 1200 g (instead of 1000 g)

Weight given by shopkeeper while selling = 840 g (instead of 1000 g)

Let the Cost Price (CP) of 1 g of rice be Rs. 1.

While purchasing, he pays for 1000 g but gets 1200 g.

=> Actual CP for 1200 g = Rs. 1000

=> CP of 1 g = 1000 / 1200 = Rs. 5/6

While selling, he charges for 1000 g (at CP) but gives only 840 g.

=> Selling Price (SP) of 840 g = Rs. 1000

=> SP of 1 g = 1000 / 840 = Rs. 25/21

Overall percentage profit:

=> Profit = SP − CP = (25/21) − (5/6)

=> Profit = (50 − 35) / 42 = 15/42 = 5/14

=> Profit % = (Profit / CP) × 100

=> Profit % = (5/14) / (5/6) × 100

=> Profit % = (5/14) × (6/5) × 100 = 6/14 × 100 = 3/7 × 100

=> Profit % = 42.857...%

Therefore The correct answer is 42.86%.

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Additional Information

Dishonest Dealer Formula

When a dealer sells at cost price but uses a false weight, Profit % = [Error / (True Value − Error)] × 100.

Combined Cheating (Buying and Selling)

If a dealer cheats by x% while buying and y% while selling, the net gain ratio is [(100+x)/100] × [100/(100−y)].

Successive Percentage Change

For successive profits of a% and b%, the effective profit is [a + b + (a × b)/100]%, though the ratio method is safer for weight errors.

Q28. Answer: (d) 942 cubic cm

Shortcut Trick

Volume of material in a pipe = π × h × (R + r) × (R − r)

Given: R = 8 cm, r = 7 cm, h = 20 cm, π = 3.14

Volume = 3.14 × 20 × (8 + 7) × (8 − 7)

Volume = 3.14 × 20 × 15 × 1 = 3.14 × 300 = 942

Therefore The correct answer is 942 cubic cm.

Alternate Method

Given:

External radius (R) = 8 cm

Internal radius (r) = 7 cm

Length of the pipe (h) = 20 cm

Formula Used:

Volume of cylindrical pipe = $\pi R^2h - \pi r^2h = \pi h(R^2 - r^2)$

Calculations:

=> Volume = $3.14 \times 20 \times (8^2 - 7^2)$

=> Volume = 3.14 × 20 × (64 − 49)

=> Volume = 3.14 × 20 × 15

=> Volume = 3.14 × 300

=> Volume = 942 cubic cm

Therefore The correct answer is 942 cubic cm.

Additional Information

Total Surface Area (TSA) of Hollow Cylinder

TSA = External CSA + Internal CSA + 2 × Area of Base Rings = $2\pi Rh + 2\pi rh + 2\pi(R^2 - r^2)$.

Curved Surface Area (CSA)

For a solid cylinder, CSA = $2\pi rh$. For a hollow pipe, the total curved area is the sum of the inner and outer curved surfaces.

Volume of a Solid Cylinder

The volume of a solid cylinder is calculated as $V = \pi r^2h$, where r is the radius and h is the vertical height.

Q29. Answer: (a) 2,750

Shortcut Trick

The Effective Interest Rate for 4 years at 12% is: 12% × 4 = 48%.

Since 48% of the Principal equals the Simple Interest of Rs. 1,320.

Principal (100%) = (1,320 ÷ 48) × 100 = 27.5 × 100 = 2,750.

Therefore The correct answer is Rs. 2,750.

Alternate Method

Given:

Simple Interest (SI) = Rs. 1,320

Rate of Interest (R) = 12% per annum

Time Period (T) = 4 years

Formula Used:

Simple Interest (SI) = (P × R × T) ÷ 100

Calculations:

=> 1,320 = (P × 12 × 4) ÷ 100

=> 1,320 = (P × 48) ÷ 100

=> P × 48 = 1,320 × 100

=> P = 132,000 ÷ 48

=> P = 2,750

Therefore The correct answer is Rs. 2,750.

Additional Information

Total Amount in Simple Interest

The total Amount (A) is the sum of the Principal and the Simple Interest: A = P + SI = P × [1 + (R × T) ÷ 100].

Constant Interest Property

In Simple Interest, the interest earned remains the same every year because it is always calculated on the original Principal only.

Rate and Time Calculation

To find the Rate (R): R = (SI × 100) ÷ (P × T). To find the Time (T): T = (SI × 100) ÷ (P × R).

Q30. Answer: (c) Rs. 42.30

Shortcut Trick

Total number of pens = 4 + 1 = 5

Total cost = (4 × 47) + (50% of 47)

Total cost = 188 + 23.5 = Rs. 211.5

Effective price = 211.5 ÷ 5 = Rs. 42.30

Therefore The correct answer is Rs. 42.30.

Alternate Method

Given:

Price of one pen = Rs. 47

Scheme: Buy 4 pens and get a 50% discount on 1 extra pen.

Formula:

Effective price = Total payment / Total number of items

Calculation:

=> Cost of 4 pens = 4 × 47 = Rs. 188

=> Discount on the 5th pen = 50% of 47 = 47 × (50/100) = Rs. 23.50

=> Discounted price of the 5th pen = 47 − 23.50 = Rs. 23.50

=> Total amount paid for 5 pens = 188 + 23.50 = Rs. 211.50

=> Effective price per pen = 211.50 ÷ 5

=> Effective price per pen = Rs. 42.30

Therefore The correct answer is Rs. 42.30.

Additional Information

Effective Discount %

To find the effective discount in such schemes: (Total Discount / Total Marked Price) × 100. In this question, Discount = Rs. 23.5 and Total Marked Price = 5 × 47 = Rs. 235. Effective Discount % = (23.5 / 235) × 100 = 10%.

Buy X Get Y Free

If the scheme were 'Buy 4 Get 1 Free', then the Effective Discount % would be [1 / (4 + 1)] × 100 = 20%.

Marked Price and Selling Price

Selling Price (SP) = Marked Price (MP) − Discount. Here, Rs. 42.30 is the effective selling price of each pen.

Q31. Answer: (d) Elected by members of the Vidhan Parishad

The correct answer is Elected by members of the Vidhan Parishad.

Key Points

• According to Article 182 of the Constitution of India, the Legislative Council (Vidhan Parishad) of every state that has such a council must choose two of its members to serve as the Chairman and Deputy Chairman.

• The Chairman is elected by the members of the Vidhan Parishad from among themselves through a process of internal voting, ensuring the independence of the legislature from the executive branch.

• The tenure of the Chairman is co-terminus with their membership in the council; they must vacate the office if they cease to be a member of the Vidhan Parishad.

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• Unlike the Rajya Sabha at the Union level, where the Vice-President of India acts as the Ex-officio Chairman, the Vidhan Parishad does not have an ex-officio presiding officer; the leader must be an elected or nominated member of that specific house.

• The Chairman can be removed from office by a resolution passed by a majority of all the then members of the Council, provided a 14-day notice has been given.

Additional Information

• Nominated by the Governor: This is incorrect because the Governor only nominates 1/6th of the total members of the Vidhan Parishad from fields like Literature, Science, Art, Cooperative Movement, and Social Service. The Governor does not select the presiding officer.

• Appointed by the President: The President of India is the head of the Union Executive and has no constitutional role in the election or appointment of the presiding officers of a State Legislature.

• Elected by members of the Lok Sabha: The Lok Sabha is the lower house of Parliament and is entirely separate from the State Legislative Council. Members of Parliament (MPs) do not participate in the internal elections of the State Vidhan Parishad.

• Powers of the Chairman:

• The Chairman presides over the sittings of the Council and maintains order and decorum for the conduct of business.

• They have the power to exercise a casting vote in the case of a tie, although they normally do not vote in the first instance.

• The Chairman determines the disqualification of a member of the Council on the grounds of defection under the Tenth Schedule of the Constitution.

Q32. Answer: (c) Increased revenue pressure that ultimately burdened cultivators.

The correct answer is Increased revenue pressure that ultimately burdened cultivators.

Key Points

• The Mysore Rebellion of 1830-31, famously known as the Nagar Rebellion, was a significant peasant uprising against the administration of Mummadi Krishnaraja Wodeyar III.

• After the Fourth Anglo-Mysore War in 1799, the British restored the Wodeyar Dynasty, but the state was bound by a Subsidiary Alliance treaty requiring a massive annual tribute of 7 lakh Pagodas to the British East India Company.

• To meet these heavy financial demands, the administration utilized the Sharat system, a corrupt revenue-farming practice where the right to collect land revenue was auctioned to the highest bidders, known as Amildars.

• These Amildars frequently engaged in extortion and used coercive methods to squeeze maximum revenue from the Ryots (cultivators) to ensure their own profits after paying the state share.

• The financial distress was further aggravated by administrative mismanagement and the lavish lifestyle of the court, leading to an unbearable tax burden on the rural population, which eventually ignited the revolt in the Nagar province.

Additional Information

• Mummadi Krishnaraja Wodeyar III:

• He was the ruler of Mysore from 1799 to 1868, though the rebellion led to his effective loss of administrative power.

• In 1831, citing maladministration and the failure to maintain internal peace, Governor-General Lord William Bentinck invoked the treaty terms to take over the state administration.

• British Commission Rule (1831-1881):

• Following the rebellion, Mysore was placed under the governance of British Commissioners, most notably Mark Cubbon, who served from 1834 to 1861.

• This period saw the introduction of systematic land surveys, judicial reforms, and the abolition of the Sharat system to stabilize the economy.

• The kingdom was finally returned to the Wodeyar family in 1881 during an event known as the Rendition of Mysore.

Q33. Answer: (a) Subsidies and protectionism in domestic markets

The correct answer is Subsidies and protectionism in domestic markets.

Key Points

• Globalisation is the process of rapid integration or interconnection between countries, driven by the free flow of capital, goods, services, and technology across international borders.

• Protectionism involves government actions and policies that restrict or restrain international trade, often with the intent of protecting local businesses and jobs from foreign competition.

• Subsidies provided to domestic industries act as a barrier because they artificially lower production costs, making it difficult for foreign entities to compete on a level playing field, thus hindering the liberalization of trade.

• Techniques such as import tariffs, quotas, and non-tariff barriers are fundamental tools of protectionism that decrease the volume of international trade and slow down the pace of economic integration.

• While the World Trade Organization (WTO) aims to reduce these barriers to promote global trade, domestic subsidies (especially in agriculture and manufacturing) remain a major point of contention in international trade negotiations as they obstruct the

globalisation process.

Additional Information

• Foreign Direct Investment (FDI):

• It refers to an investment made by a company or individual from one country into business interests located in another country.

• FDI promotes globalisation by bringing in foreign capital, modern technology, and global best practices into the host nation.

• Removal of Trade Barriers:

• This process, known as Trade Liberalization, involves the reduction of customs duties and the elimination of licensing requirements.

• It was a core component of India's New Economic Policy (1991), which aimed to make the Indian economy more competitive globally.

• Privatization:

• It involves the transfer of ownership from the public sector (government) to the private sector.

• Privatization often leads to increased efficiency and opens up state-monopolized sectors to global investors and market forces.

Q34. Answer: (c) Germany

The correct answer is Germany.

Key Points

• Annalena Baerbock is a prominent German politician who has served as the Federal Minister for Foreign Affairs of Germany since December 2021, representing the Alliance 90/The Greens party.

• The United Nations General Assembly (UNGA) presidency rotates annually among five geographic groups: African, Asia-Pacific, Eastern European, Latin American and Caribbean, and Western European and Others Group (WEOG).

• The 80th session of the UN General Assembly, scheduled to commence in September 2025, is the turn for the Western European and Others Group (WEOG) to hold the presidency.

• As a representative of Germany, which is a leading member of the WEOG, Annalena Baerbock was designated for this role to steer global discussions on multilateralism and international cooperation.

• Her tenure emphasizes Germany's commitment to the UN Charter, focusing on climate diplomacy, feminist foreign policy, and global security architectures during the 2025-2026 term.

Additional Information

• Germany and the United Nations:

• Germany became a full member of the United Nations on September 18, 1973.

• It is currently the fourth-largest contributor to the UN regular budget and the peacekeeping budget, underscoring its significant influence in global governance.

• The country frequently serves as a non-permanent member of the UN Security Council (most recently in 2019-2020).

• UNGA Presidency Functions:

• The President is responsible for opening and closing meetings, directing discussions, and ensuring adherence to the Rules of Procedure.

• The position is prestigious and carries the responsibility of facilitating high-level thematic debates on issues like Sustainable Development Goals (SDGs).

Q35. Answer: (b) Sanskriti Ka Panchva Adhyay

The correct answer is Sanskriti Ka Panchva Adhyay.

Key Points

• The book titled Sanskriti Ka Panchva Adhyay (The Fifth Chapter of Culture) was released in April 2025 in New Delhi, serving as a significant documentation of India’s contemporary cultural journey.

• The publication is a curated compilation of various speeches delivered by Prime Minister Narendra Modi, focusing on the themes of cultural resurgence, national heritage, and the restoration of civilizational pride.

• The title is strategically chosen as a tribute to the legendary literary work Sanskriti Ke Char Adhyay (Four Chapters of Culture) authored by the renowned Rashtrakavi Ramdhari Singh 'Dinkar' in 1956.

• The book encapsulates the vision of Vikas Bhi, Virasat Bhi (Development along with Heritage), highlighting key initiatives such as the Kashi Vishwanath Dham, Mahakal Lok, and the construction of the Shree Ram Janmabhoomi Mandir.

• It serves as a thematic continuation of India’s cultural history, positioning the current era’s efforts in decolonizing the Indian mindset as the vital Fifth Chapter of the nation's evolution.

Additional Information

• Contextual Significance:

• Ramdhari Singh 'Dinkar': His original four chapters explored the synthesis of Indian culture through the Vedic era, Buddhist

influence, Islamic contact, and British impact.

• Fifth Chapter Concept: PM Modi's speeches emphasize a fifth phase characterized by Aatmanirbhar Bharat and the global projection of Indian Soft Power through Yoga, Ayurveda, and the G20 Presidency.

• Cultural Diplomacy: The book highlights the successful repatriation of over 200 ancient idols and artifacts from foreign countries to their original locations in India.

• Panch Pran: A core theme involves the Prime Minister's Panch Pran (Five Pledges), particularly the goal to remove any trace of colonial slavery and take pride in our roots.

Q36. Answer: (d)

The solution is in Hindi. Read it online.

Q37. Answer: (b) NATO Summit

The correct answer is NATO Summit.

Key Points

• The 2025 NATO Summit is officially scheduled to be held in The Hague, Netherlands, from June 24 to June 26, 2025.

• This event represents a historic milestone as it is the first time the Netherlands will host a formal summit of the North Atlantic Treaty Organization since the alliance was founded in 1949.

• The summit will take place at the World Forum in The Hague, a city globally recognized as the International City of Peace and Justice.

• Leaders from the 32 NATO member states will gather to discuss critical security issues, including the alliance's long-term deterrence and defense posture, as well as ongoing geopolitical conflicts.

• The hosting of the summit in the Netherlands highlights the country's strategic role within the transatlantic alliance and its commitment to international security cooperation.

Additional Information

• NATO (North Atlantic Treaty Organization):

• Founded by the Washington Treaty on April 4, 1949, to provide collective security against the Soviet Union.

• The principle of collective defense is enshrined in Article 5, stating that an attack against one member is an attack against all.

• The organization is headquartered in Brussels, Belgium, with Mark Rutte (former Dutch Prime Minister) designated to serve as the Secretary General starting in late 2024.

• G7 Summit:

• An annual meeting of the leaders of the world's most advanced economies, including Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.

• The 51st G7 summit in 2025 is scheduled to be hosted by Canada, not the Netherlands.

• ASEAN Summit:

• A biannual meeting of the Association of Southeast Asian Nations, focusing on economic, political, and security issues in the Southeast Asian region.

• Since the Netherlands is a European nation and not a member of this regional bloc, it does not host the primary ASEAN Summit.

Q38. Answer: (d) Electrons lost

The correct answer is Electrons lost.

Key Points

• Oxidation is a fundamental chemical process in Redox reactions defined as the loss of one or more electrons by a chemical species (atom, ion, or molecule).

• When a substance undergoes oxidation, its oxidation state or oxidation number increases, indicating a higher state of positive charge or a lower state of negative charge.

• In a chemical equation, oxidation is represented as a half-reaction where electrons appear on the product side, such as Zn → Zn^(2+) + 2e^−, where Zinc is oxidized.

• The species that undergoes oxidation acts as a reducing agent because it provides the electrons that reduce another substance in the reaction.

• The concept originally meant the addition of oxygen to a compound, but the modern electronic theory of valency expanded it to include any reaction involving the transfer of electrons.

Additional Information

• Electrons gained:

• This process is called Reduction, which always occurs simultaneously with oxidation in redox systems.

• It leads to a decrease in the oxidation number of the atom or ion.

• Common mnemonics used to remember these processes are OIL RIG (Oxidation Is Loss, Reduction Is Gain) and LEO says

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GER (Loss of Electrons is Oxidation, Gain of Electrons is Reduction).

• Protons Gained and Lost:

• Transfer of protons (H^+ ions) is the defining characteristic of Bronsted-Lowry acid-base reactions.

• Unlike electrons, protons are located in the atomic nucleus; their gain or loss would result in nuclear transmutations or changes in the identity of the element, which does not happen in standard chemical redox reactions.

Q39. Answer: (d)

The solution is in Hindi. Read it online.

Q40. Answer: (c) Ocean salinity

The correct answer is Ocean salinity.

Key Points

• Air Temperature is the most significant factor affecting horizontal pressure distribution; when air is heated, it expands, becomes less dense, and rises, creating Low Pressure areas, whereas cold air contracts and creates High Pressure.

• The Presence of water vapour influences pressure because moist air is lighter than dry air; since the molecular weight of water vapour is less than that of nitrogen and oxygen, humid air exerts less pressure than dry air.

• Earth's Rotation acts as a dynamic factor that redistributes air through the Coriolis Force, leading to the formation of distinct pressure belts such as the Sub-tropical Highs and Sub-polar Lows.

• Ocean Salinity refers to the concentration of dissolved salts in seawater, which determines ocean water density and thermohaline circulation, but it has no direct physical impact on the horizontal weight or distribution of the atmosphere.

Additional Information

• Atmospheric Pressure is the force per unit area exerted by the weight of the air column above a location, measured using a Barometer in units like Millibars (mb) or Pascals.

• Isobars: These are lines on a map connecting places with equal air pressure at sea level; the spacing of isobars indicates the pressure gradient.

• Altitude: Pressure decreases rapidly with height because the air becomes thinner and the density of the atmosphere decreases as we move away from the Earth's surface.

• Coriolis Effect: This force, caused by the Earth's rotation, deflects winds to the right in the Northern Hemisphere and to the left in the Southern Hemisphere, influencing global pressure patterns.

• Horizontal Distribution: This refers to the variation of pressure across latitudes, resulting in the Equatorial Low, Horse Latitudes, and Polar Highs.

Q41. Answer: (d) Local computers within the same building

The correct answer is Local computers within the same building.

Key Points

• A Local Area Network (LAN) is a computer network that interconnects computers within a limited geographic area such as a residence, school, CSE classroom, or office building.

• The primary purpose of a LAN in an educational setting is to facilitate high-speed resource sharing, including files, hardware peripherals like printers, and centralized database access among a group of users.

• LANs offer significantly higher data transfer speeds (often ranging from 1 Gbps to 10 Gbps) and lower latency compared to Wide Area Networks, which is critical for real-time collaborative group projects.

• The physical connection in a LAN is typically established using Ethernet cables (Twisted Pair) or wireless access points (WLAN), ensuring that all connected nodes remain within the same physical infrastructure.

• In a CSE classroom scenario, the network allows for the direct transfer of data packets between local workstations without the need for external routing over the public internet.

Additional Information

• Personal Area Network (PAN):

• Uses technologies like Bluetooth for short-range pairing, typically limited to a range of 10 meters for personal devices.

• Wide Area Network (WAN):

• Spans large distances, such as continents or the entire globe, connecting global internet servers through fiber optics or leased lines.

• Satellite Communication:

• Designed for remote areas where terrestrial cables cannot reach; it involves transmitting signals to orbiting satellites, which is not standard for local classroom file sharing due to high propagation delay.

• Metropolitan Area Network (MAN):

• Covers a larger area than a LAN, such as an entire city or a large university campus, typically interconnecting multiple LANs.

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Q42. Answer: (b) Third

The correct answer is Third.

Key Points

• India has achieved its highest-ever ranking by securing the 3rd position in the Asia Power Index 2025, signifying its emergence as a Major Power in the Indo-Pacific region.

• The index, published annually by the Lowy Institute (an Australian think tank), evaluates the relative power of 27 countries and territories based on their ability to shape their external environment.

• India's comprehensive power score reached 40.0 out of 100, surpassing the critical threshold of 40 points required to be classified as a Major Power for the first time in the index's history.

• By securing the third spot, India has officially overtaken Japan, which held the position for several years but has now slipped to the 4th rank due to demographic and economic challenges.

• India's rise is primarily attributed to its post-pandemic economic recovery, strong GDP growth, and significant improvements in military capability and future resources.

• The assessment utilizes 131 indicators across eight thematic measures, including economic capability, military capability, resilience, future resources, economic relationships, defense networks, diplomatic influence, and cultural influence.

Additional Information

• Top Rankings in the 2025 Index:

• United States: Retains the 1st position with a score of 80.5, maintaining its status as the dominant Superpower in Asia.

• China: Holds the 2nd position with a score of 73.7, remaining the only other nation classified as a Superpower.

• Russia: Ranked 5th with a score of 32.1, showing a slight recovery in influence through strategic partnerships.

• Lowy Institute:

• Headquartered in Sydney, Australia, it is an independent, non-partisan international policy think tank founded in 2003.

• The Asia Power Index was first launched in 2018 to provide a data-driven map of the distribution of power in the region.

• India's Strengths and Weaknesses:

• Strengths: India ranks 3rd in Economic Capability and Future Resources, driven by its massive workforce and infrastructure development.

• Weaknesses: Its weakest area remains Defense Networks, where it ranks 11th, indicating a need for deeper regional security integration.

Q43. Answer: (d) Hymns

The correct answer is Hymns.

Key Points

• The Rigveda is the oldest of the four Vedas, composed roughly between 1500 BCE and 1200 BCE during the Early Vedic Period.

• It primarily consists of 1,028 hymns, known as Suktas (meaning 'well-said'), which are addressed to various deities.

• The text is organized into 10 books called Mandalas, where Mandalas 2 to 7 are considered the oldest and are known as Family Books.

• The hymns are dedicated to personified natural forces and deities, including Agni (the god of fire), Indra (the god of rain and thunder), Varuna (the god of cosmic order), and Soma (a sacred drink and its deity).

• The primary function of these hymns was their recitation during sacrificial rituals (Yajnas) to invoke the gods and seek blessings for prosperity, health, and victory in battle.

Additional Information

• Epic narratives:

• Refer to Itihasa, which includes monumental works like the Mahabharata and Ramayana, focusing on the history and legends of ancient heroes.

• Ritual manuals:

• These are primarily the Brahmanas and the Yajurveda, which contain detailed instructions and prose explanations on how to perform Vedic sacrifices.

• Philosophical essays:

• Known as the Upanishads, these texts form the final part of the Vedas (Vedanta) and deal with the nature of Brahman (ultimate reality) and Atman (the individual soul).

• The Rigveda also contains the famous Gayatri Mantra, dedicated to the solar deity Savitr, and the Purusha Sukta, which provides an early conceptualization of the social order.

Q44. Answer: (c) Konkan Region

The correct answer is Konkan Region.

Key Points

• The Konkan Region constitutes the northern part of the Western Coastal Plain of India, stretching from the Damanganga River in the north to Goa in the south, covering approximately 720 kilometers.

• Geologically, the Konkan coast is an example of a submerged coastline, which occurred due to the tectonic subsidence of the land beneath the Arabian Sea.

• This submergence has resulted in a highly irregular and indented coastline characterized by numerous creeks, estuaries, and rocky headlands.

• The indented topography allows the sea to penetrate deep inland, creating naturally protected, deep-water natural harbours that are shielded from heavy wave action.

• The Mumbai Port, which is India's largest natural port, and Marmagao Port are prime examples of maritime hubs developed due to these specific geographical features.

• Unlike the eastern coast, the Konkan plain is narrow (averaging 50−80 km) and receives heavy rainfall from the Southwest Monsoon, causing short, fast-flowing rivers to erode the landscape further.

Additional Information

• East Coastal Plain:

• This region is characterized as an emergent coastline, which makes the shoreline relatively straight, smooth, and regular.

• It is dominated by the massive deltas of the Mahanadi, Godavari, Krishna, and Kaveri rivers, which lead to shallow offshore waters and fewer natural deep-water ports.

• Kathiawar Plain:

• Located in the state of Gujarat, it lies south of the Kutch peninsula and is bounded by the Gulf of Kachchh and the Gulf of Khambhat.

• While it contains some inlets, it is geomorphologically distinct from the Konkan and is often associated with the Gujarat Coastal Plains.

• Rann of Kutch:

• This is a vast seasonal salt marsh located in the Thar Desert bio-geographic region of Gujarat.

• It is not a traditional coastal plain with harbours but a low-lying area that remains flooded during the Monsoon and dries into a saline crust during the summer.

Q45. Answer: (c) Sudarshan Chakra Mission

The correct answer is Sudarshan Chakra Mission.

Key Points

• The Sudarshan Chakra Mission was officially announced by Prime Minister Narendra Modi during his Independence Day address on August 15, 2025, from the ramparts of the Red Fort.

• The primary objective of this mission is to establish a robust, multi-layered security framework designed to neutralize enemy infiltrations through the integration of AI-powered surveillance and automated border response systems.

• It aims to significantly augment India's offensive attack strength by inducting indigenous hypersonic missiles and unmanned combat aerial vehicles (UCAVs) into the active arsenal of the Indian Armed Forces.

• The mission emphasizes the Tri-Services integration, ensuring seamless coordination between the Army, Navy, and Air Force to create a unified theatre command capable of rapid precision strikes.

• This initiative is a critical component of the Atmanirbhar Bharat roadmap, targeting 100% indigenization in critical electronic warfare and cyber-defence technologies by the end of the decade.

Additional Information

• Project Kusha:

• This is an ambitious program by the DRDO to develop a Long-Range Surface-to-Air Missile (LR-SAM) system.

• It is designed to detect and intercept enemy stealth fighters, cruise missiles, and drones at a range of up to 350 km, providing a protective dome similar to the S-400 system.

• Agni-V Shield Mission:

• This refers to the strategic deployment and modernization of India's Intercontinental Ballistic Missile (ICBM), Agni-V.

• With a strike range exceeding 5,000 km, it utilizes MIRV (Multiple Independently Targetable Re-entry Vehicle) technology to ensure credible nuclear deterrence.

• Mission Trishul:

• Historically, Trishul refers to a short-range surface-to-air missile developed as part of the Integrated Guided Missile Development Programme (IGMDP).

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• It is primarily utilized for low-level point defence against incoming anti-ship missiles or low-flying aircraft.

Therefore, the correct answer is Option 3.

Q46. Answer: (a) By using the Fisher Index with data from NSSO

The correct answer is By using the Fisher Index with data from NSSO.

Key Points

• The Rangarajan Committee, officially known as the Expert Group to Review the Methodology for Measurement of Poverty, was constituted in 2012 and submitted its report in 2014.

• To ensure the poverty line remains relevant over time, the group recommended updating it using the Fisher Index, which is the geometric mean of the Laspeyres and Paasche price indices.

• This recommendation aimed to address the substitution bias inherent in single-index methods, providing a more balanced reflection of price changes across the consumption basket.

• The primary data source identified for this update is the National Sample Survey Office (NSSO), specifically its quinquennial Consumer Expenditure Surveys.

• The group also transitioned the data collection methodology to the Modified Mixed Recall Period (MMRP), which tracks expenditure over 7 days, 30 days, and 365 days for different commodity groups to improve data reliability.

Additional Information

• Fisher Index Calculation:

• The formula is expressed as $P_F = \sqrt{(P_L \times P_P)}$, where P_L is the Laspeyres price index and P_P is the Paasche price index.

• It is considered an ideal index in economics because it satisfies both the time reversal test and the factor reversal test.

• Role of NSSO:

• The NSSO (now part of the National Statistical Office) conducts nationwide surveys on socio-economic indicators.

• Its Consumer Expenditure Survey is the fundamental tool for estimating the poverty ratio in India, measuring Monthly Per Capita Expenditure (MPCE).

• Rangarajan vs. Tendulkar Committee:

• The Tendulkar Committee (2009) had moved away from calorie-based anchoring, but the Rangarajan Committee reintroduced a normative food basket alongside expenditures on education, clothing, and house rent.

• Rangarajan's methodology resulted in a higher poverty line: Rs 972 for rural areas and Rs 1407 for urban areas (at 2011-12 prices).

Q47. Answer: (d) Increasing reliance on cash transactions

The correct answer is Increasing reliance on cash transactions.

Key Points

• On November 8, 2016, the Government of India announced the demonetisation of all 500 and 1000 INR banknotes of the Mahatma Gandhi Series, stripping them of their status as legal tender.

• A primary objective of this move was curbing corruption and black money by forcing individuals with unaccounted wealth to deposit it into the formal banking system, thereby making it taxable and traceable.

• The initiative aimed at reducing counterfeit currency that was being used to destabilize the economy and terror financing, which relied heavily on high-value physical cash for clandestine operations.

• The government intended to drive formalization of the economy by promoting digital payments and encouraging a transition toward a cashless or less-cash economy.

• Tools such as the Unified Payments Interface (UPI) and the BHIM app were significantly pushed to reduce the physical handling of currency.

• Since the overarching goal was to lower the currency-to-GDP ratio and increase transparency through electronic trails, increasing reliance on cash transactions was the exact opposite of what the policy sought to achieve.

Additional Information

• Black Money and Corruption:

• Refers to income earned through illegal means or legal income not reported for taxation.

• Demonetisation sought to bring this shadow economy into the light by requiring the surrender of old notes at banks under the RBI Act, 1934.

• Counterfeit Currency and National Security:

• Fake Indian Currency Notes (FICN) were often used by anti-national elements to fund insurgencies.

• The introduction of new 500 and 2000 INR notes included enhanced security features like intaglio printing and latent images to prevent future forgery.

• Digital Payments and Cashless Economy:

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• The push for a digital India included the expansion of Point of Sale (PoS) terminals and the adoption of Aadhaar Enabled Payment Systems (AePS).

• This shift was designed to reduce the high cost of printing, transporting, and managing physical currency notes by the Reserve Bank of India.

Q48. Answer: (a) (i) False, (ii) True

The correct answer is (i) False, (ii) True.

Key Points

• Accuracy in computing refers to the degree of precision with which calculations are performed. While a computer is capable of performing millions of calculations with 100% accuracy, it follows the GIGO (Garbage In, Garbage Out) principle. This means if the Input Data provided by the user is incorrect or flawed, the resulting output will also be incorrect. A computer cannot automatically correct human errors in data entry or logic. Hence, statement (i) is incorrect.

• The characteristic of No IQ (Intelligence Quotient) signifies that a computer is a machine with no Independent Thinking or decision-making power. It lacks the Intuition and Wisdom possessed by humans. Every task a computer executes is the result of a pre-defined set of Instructions or Algorithms provided by a Programmer or user. Without these instructions, the Hardware remains idle. Hence, statement (ii) is correct.

Additional Information

• Other fundamental Characteristics of Computers include:

• Speed: Computers can process data at incredible rates, often measured in MIPS (Millions of Instructions Per Second) or BIPS (Billions of Instructions Per Second).

• Diligence: Unlike humans, a computer does not suffer from Fatigue, lack of concentration, or Boredom. It can perform repetitive tasks for long durations with the same level of Reliability.

• Versatility: A computer is capable of performing various types of tasks simultaneously, from complex Scientific Calculations to Multimedia playback and Database Management.

• Storage: Computers have the capacity to store vast amounts of data in Secondary Storage devices like Hard Disk Drives (HDD) and Solid State Drives (SSD) for future retrieval.

Q49. Answer: (d) Rigveda

The correct answer is Rigveda.

Key Points

• The Rigveda is the most ancient of the four Vedas and is recognized as the earliest specimen of Indo-European literature, composed between approximately 1500 BCE and 1000 BCE.

• It consists of 1,028 hymns (known as Suktas) that are organized into 10 Mandalas (books), of which Mandalas 2 through 7 are considered the oldest and are called Family Books.

• This text is the primary source for understanding the Early Vedic Period, offering detailed accounts of a pastoral and tribal society settled in the Sapta-Sindhu (Land of Seven Rivers) region.

• It depicts the religious life of the era, focusing on the invocation of natural deities such as Indra (the most prominent god), Agni (the fire god), and Varuna (protector of cosmic order).

• The Rigveda highlights the importance of the Rajan (tribal chief) and assemblies like the Sabha and Samiti, providing a blueprint of early Aryan socio-political structures.

Additional Information

• Samaveda:

• Commonly referred to as the Veda of Melodies, it is a liturgical collection of 1,549 verses, most of which are taken from the Rigveda.

• It was compiled to be sung by the Udgatar priests and is considered the origin of Indian classical music and rhythm.

• Yajurveda:

• Known as the Veda of Rituals, it contains prose mantras and instructions for performing Yajnas (sacrifices).

• It is categorized into two branches: the Shukla Yajurveda (White), which contains only verses, and the Krishna Yajurveda (Black), which includes explanatory prose.

• Atharvaveda:

• Chronologically the last of the four Vedas, it deals with the secular and magical aspects of life, containing spells, charms, and incantations.

• It provides significant information on ancient medicine and healing, forming the historical basis for Ayurveda.

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Q50. Answer: (c) Clean Air, Healthy People

The correct answer is Clean Air, Healthy People.

Key Points

• World Environmental Health Day is observed annually on September 26 to increase global awareness regarding the health of our environment and its impact on human well-being.

• The theme for the year 2025, Clean Air, Healthy People, underscores the critical importance of air quality as a fundamental determinant of public health.

• The observance was officially established in 2011 by the International Federation of Environmental Health (IFEH) during a world congress held in Bali, Indonesia.

• This theme focuses on the mitigation of ambient (outdoor) and household (indoor) air pollution, which are leading causes of non-communicable diseases globally.

• By promoting Clean Air, the initiative targets the reduction of harmful pollutants like Fine Particulate Matter (PM2.5), Nitrogen Dioxide (NO2), and Carbon Monoxide (CO).

• The 2025 campaign encourages governments and organizations to implement stricter Air Quality Standards and transition toward renewable energy to protect vulnerable populations.

Additional Information

• International Federation of Environmental Health (IFEH):

• Founded in 1986, it is an organization whose members are national associations of environmental health practitioners.

• It works closely with the World Health Organization (WHO) to address environmental risks that contribute to nearly 25 percent of all global deaths.

• Health Implications of Air Quality:

• Poor air quality is a major risk factor for ischemic heart disease, stroke, chronic obstructive pulmonary disease (COPD), and lung cancer.

• The theme aligns with the United Nations Sustainable Development Goals (SDGs), specifically Goal 3 (Good Health and Well-being) and Goal 11 (Sustainable Cities and Communities).

• In addition to health, improving air quality helps in the fight against climate change by reducing short-lived climate pollutants (SLCPs).

Q51. Answer: (b) Hindustani and Carnatic

The correct answer is Hindustani and Carnatic.

Key Points

• Indian classical music is globally recognized for its two primary branches: the Hindustani tradition of North India and the Carnatic tradition of South India.

• Both systems are fundamentally based on the twin pillars of Raga (the melodic structure) and Tala (the rhythmic cycle), and they share the basic scale of seven notes known as Sapta Swara (Sa, Re, Ga, Ma, Pa, Dha, Ni).

• The Hindustani system was significantly influenced by Persian and Islamic musical elements during the medieval period, leading to the development of various Gharanas or schools of music such as Gwalior, Agra, and Kirana.

• The Carnatic system remained largely independent of foreign influences, maintaining a more traditional and composition-heavy approach rooted in the Temple culture of Southern India.

• Ancient texts like the Natya Shastra by Bharata Muni (circa 200 BCE – 200 CE) and the Sangeeta Ratnakara by Sarngadeva (13th century) serve as the common theoretical foundation for both streams.

Additional Information

• Hindustani Music

• Focuses heavily on improvisation and the specific emotional mood associated with the time of day or season.

• Key vocal forms include Dhrupad, Khyal, Thumri, and Tappa.

• Standard instruments include the Sitar, Sarod, Bansuri, and Tabla.

• Carnatic Music

• Highly structured and revolves around the Melakarta system, which classifies 72 parent ragas.

• The Trinity of Carnatic Music—Tyagaraja, Muthuswami Dikshitar, and Syama Sastri—is credited with the golden age of this tradition in the 18th century.

• Common instruments include the Saraswati Veena, Violin, Mridangam, and Ghatam.

• Distinction from Other Traditions

• Tribal Folk and Bhakti traditions are categorized as regional or devotional music rather than formal classical systems with codified theory.

• Western Classical Music is a distinct system based on Harmony and Polyphony, contrasting with the purely Melodic nature of

Indian classical music.

Q52. Answer: (c) Women participated equally

The correct answer is Women participated equally.

Key Points

• Swami Dayanand Saraswati founded the Arya Samaj on April 7, 1875, in Bombay, with the primary objective of reforming Hinduism by returning to the original teachings of the Vedas.

• A hallmark of Arya Samaj meetings was the gender equality displayed in religious and social spheres, which was a radical departure from the orthodox practices of the 19th century.

• Unlike contemporary religious gatherings where women were often sidelined, Arya Samaj promoted the equal participation of women in the performance of Havan (sacred fire rituals) and the recitation of Vedic mantras.

• Dayanand Saraswati argued that the Vedas did not prohibit women from spiritual learning; consequently, women in the Arya Samaj were encouraged to undergo the Upanayana (sacred thread ceremony) and study scriptures.

• The movement actively worked toward the abolition of child marriage and the promotion of widow remarriage, further integrating women into the core administrative and spiritual functions of the Samaj.

Additional Information

• Animal Sacrifices

• The Arya Samaj strictly prohibited animal sacrifices (Bali), characterizing them as a distortion of Vedic rituals introduced by later Puranic influences.

• They practiced Homa or Yajna using only pure substances like Ghee and medicinal herbs, emphasizing environmental purification and symbolic self-sacrifice.

• Caste and Social Structure

• The movement rejected the birth-based caste system and the exclusive religious authority of Brahmins.

• Membership and the right to perform rituals were based on Guna (qualities) and Karma (actions), allowing individuals from all social backgrounds to lead prayers.

• Idol Worship and Venues

• Since the Arya Samaj rejected Murti Puja (idol worship) as un-Vedic, their meetings were not confined to traditional temples.

• Gatherings typically took place in Arya Samaj Mandirs, which served as simple community halls for Satsangs, or in open public spaces to reach a wider audience.

Q53. Answer: (c) 8 years

The correct answer is 8 years.

Key Points

• The Men's Hockey Asia Cup is a premier quadrennial tournament organized by the Asian Hockey Federation (AHF) to determine the top national team in Asia.

• India secured its fourth title in the 2025 edition, equaling the success of other dominant teams in the region like South Korea.

• Before the 2025 triumph, India's most recent title victory occurred in 2017, held in Dhaka, Bangladesh, where they defeated Malaysia 2-1 in the final.

• Between the 2017 and 2025 victories, India participated in the 2022 edition held in Jakarta, Indonesia, where they finished with a bronze medal after defeating Japan, while South Korea claimed the gold.

• The duration between the third title in 2017 and the fourth title in 2025 is exactly 8 years, marking the end of a nearly decade-long drought for the continental trophy.

• India's previous championship wins were recorded in the years 2003, 2007, and 2017.

Additional Information

• Historical Context of Asia Cup:

• The tournament was first introduced in 1982 and was hosted by Karachi, Pakistan.

• Pakistan won the first three consecutive editions in 1982, 1985, and 1989.

• South Korea holds the record for the most titles, having won the championship five times (1994, 1999, 2009, 2013, and 2022).

• India's maiden title in 2003 was achieved under the captaincy of Dhanraj Pillay, defeating arch-rivals Pakistan in Kuala Lumpur.

• The Asia Cup serves as a crucial qualification event for the FIH Hockey World Cup, granting the winners and top finishers a direct berth to the global event.

Q54. Answer: (d) Armed rebellion

The correct answer is Armed rebellion.

Key Points

• Under Article 352 of the Constitution of India, the President can declare a National Emergency when the security of the country or any part thereof is threatened by war, external aggression, or armed rebellion.

• Originally, the Constitution used the expression internal disturbance as the third ground for proclaiming an emergency.

• The term internal disturbance was considered too vague and carried a broad connotation, which led to the proclamation of the National Emergency in June 1975 by the Indira Gandhi government.

• To prevent future misuse of this provision, the 44th Constitutional Amendment Act, 1978, replaced the phrase internal disturbance with armed rebellion.

• This amendment ensured that a National Emergency could no longer be declared on the grounds of mere political instability or civil unrest unless it involved an actual violent revolt against the state.

Additional Information

• Article 352 (National Emergency):

• Can be proclaimed for the whole of India or only a part of it.

• Requires a written recommendation from the Union Cabinet to the President before the proclamation.

• Must be approved by both Houses of Parliament within one month by a special majority.

• Other Emergency Provisions:

• Article 356: Deals with President's Rule in a state due to the failure of constitutional machinery.

• Article 360: Deals with Financial Emergency if the financial stability of India is threatened.

• 44th Amendment Act safeguards:

• It restricted the power of the executive and provided that the Fundamental Rights under Articles 20 and 21 cannot be suspended even during an emergency.

Q55. Answer: (a) 55.4%

The correct answer is 55.4%.

Key Points

• According to the Periodic Labour Force Survey (PLFS) Monthly Bulletin released by the Ministry of Statistics and Programme Implementation (MoSPI), the overall Labour Force Participation Rate (LFPR) for persons aged 15 years and above reached 55.4% in October 2025.

• This figure represents a six-month high, indicating a strengthening labour market as it rose steadily from 54.2% recorded in June 2025.

• The LFPR in rural areas showed a robust increase, climbing from 56.1% in June 2025 to 57.8% in October 2025.

• In urban areas, the participation rate was recorded at 50.5% for the same month.

• A significant factor contributing to the overall growth was the consistent rise in female labour force participation, which reached 34.2% in October, up from 32.0% in June 2025.

• The data highlights that the LFPR has seen an upward momentum for four successive months leading up to October 2025.

Additional Information

• Key Labour Market Indicators (October 2025):

• Worker Population Ratio (WPR): The overall WPR for persons aged 15+ improved to 52.5% in October, reflecting higher labour absorption since June 2025.

• Unemployment Rate (UR): Despite the increase in the number of people entering the workforce, the Unemployment Rate remained steady at 5.2%, the same as in September 2025.

• Current Weekly Status (CWS): The survey utilizes the CWS approach, where a person's activity status is determined based on the seven days preceding the date of the survey.

• Sampling and Methodology: The revamped PLFS methodology, implemented in January 2025, now provides high-frequency monthly bulletins covering a national sample of approximately 3,74,164 persons across rural and urban sectors.

Q56. Answer: (d) Neutralising excess stomach acid

The correct answer is Neutralising excess stomach acid.

Key Points

• The human stomach naturally produces Hydrochloric acid (HCl) to facilitate the digestion of food and destroy harmful bacteria.

• Indigestion, or hyperacidity, occurs when the gastric glands secrete an excessive amount of HCl, leading to irritation, pain, and a burning sensation in the chest or abdomen.

• Antacids are medicinal compounds that are basic (alkaline) in nature, designed specifically to counteract this acidity.

• When an antacid is ingested, it undergoes a neutralization reaction with the excess Hydrochloric acid present in the stomach.

• The chemical interaction between the acid and the base results in the formation of salt and water, effectively raising the pH level of the stomach contents toward a neutral state.

• By reducing the corrosive nature of the gastric juices, antacids provide immediate symptomatic relief from the pain and discomfort associated with acid reflux and peptic distress.

Additional Information

• Common Chemical Constituents of Antacids:

• Magnesium Hydroxide: Frequently referred to as Milk of Magnesia, it is a mild base with a pH of approximately 10.5, making it highly effective for neutralizing acids.

• Sodium Bicarbonate: Known as Baking Soda, it reacts rapidly with HCl to release Carbon dioxide (CO_2), providing quick relief.

• Aluminum Hydroxide: Often used in combination with magnesium salts to balance potential digestive side effects like constipation or laxation.

• Calcium Carbonate: A potent antacid that also serves as a calcium supplement, reacting with acid to form calcium chloride, water, and CO_2.

• The fundamental chemical principle applied here is Acid + Base → Salt + Water, which is a cornerstone of Arrhenius acid-base theory.

• While antacids treat the symptoms by neutralizing acid, they do not prevent the overproduction of acid at its source, unlike H_2 blockers or proton pump inhibitors.

Q57. Answer: (a) Pandit Shivkumar Sharma

The correct answer is Pandit Shivkumar Sharma.

Key Points

• Pandit Shivkumar Sharma was a legendary Indian classical musician and composer who is universally credited with bringing the Santoor, a traditional folk instrument from Jammu and Kashmir, onto the global classical music stage.

• Before his intervention, the Santoor was primarily used in Sufiana Mausiqi; however, he modified its design, string arrangement, and playing technique to sustain notes and render the intricate nuances of Hindustani classical raga.

• His mastery of the instrument led to its widespread recognition, and he became the first musician to play Indian classical music on the Santoor, earning international acclaim for his innovative style and melodic brilliance.

• He was a recipient of prestigious national honors, including the Sangeet Natak Akademi Award in 1986, the Padma Shri in 1991, and the Padma Vibhushan in 2001.

• He famously collaborated with flute maestro Pandit Hariprasad Chaurasia under the professional name Shiv-Hari, composing timeless music for several landmark Indian films such as Silsila, Chandni, and Lamhe.

Additional Information

• Pandit Ravi Shankar

• He was an iconic Sitar virtuoso and composer who became the most well-known exponent of Indian classical music in the 20th century and was awarded the Bharat Ratna in 1999.

• Ustad Amjad Ali Khan

• He is a world-famous Sarod player of the Senia Bangash Gharana, known for his lyrical and fast-paced playing style and global cultural influence.

• Pandit Hariprasad Chaurasia

• He is an internationally acclaimed Bansuri (bamboo flute) player in the Hindustani classical tradition, credited with elevating the flute to the status of a solo concert instrument.

Q58. Answer: (d) It experiences small daily and annual temperature ranges due to oceanic influence.

The correct answer is It experiences small daily and annual temperature ranges due to oceanic influence..

Key Points

• The Marine West Coast Climate, designated as Cfb in the Koeppen climate classification, is found on the western margins of continents in the mid-latitudes, generally between 40° and 60° North and South latitudes.

• The f in the classification indicates that the climate is humid year-round with no distinct dry season, contrary to the Mediterranean climate which has a dry summer. Hence, statement 1 is incorrect.

• This climate type is characterized by moderate to high annual precipitation, usually ranging from 50 cm to over 250 cm, caused by consistent cyclonic activity and orographic lifting. Hence, statement 2 is incorrect.

• Cfb regions are located along windward coastal areas where they are directly exposed to the Westerlies; they are not found in the deep interiors of continents. Hence, statement 3 is incorrect.

• Due to the maritime influence, the high specific heat of the adjacent ocean regulates air temperatures, resulting in mild winters and cool to warm summers. This geographic positioning ensures that the annual and diurnal temperature ranges remain relatively small compared to continental climates. Hence, statement 4 is correct.

Additional Information

• The Cfb climate is most extensively found in Northwestern Europe, including the United Kingdom and France, as well as the

Pacific Northwest of North America, New Zealand, and Southeastern Australia.

• Vegetation: These regions typically support temperate deciduous forests and dense coniferous forests due to the reliable moisture and lack of extreme temperature stress.

• Westerlies: These prevailing winds carry moisture-laden air from the oceans onto the land, maintaining high relative humidity and frequent cloud cover throughout the year.

• Temperature Profile: The mean temperature of the warmest month is below 22°C, while at least four months must have mean temperatures above 10°C to qualify for the b subtype.

Q59. Answer: (d) Odisha

The correct answer is Odisha.

Key Points

• The Paika Rebellion, also known as the Paika Bidroha, was a fierce armed uprising against the British East India Company that broke out in Odisha in 1817.

• The Paikas were the traditional landed militia of Odisha, who rendered military and policing services to the Gajapati rulers of Khurda in exchange for rent-free agricultural lands known as Nish-kar Jagirs.

• The rebellion was primarily triggered by the British conquest of Odisha in 1803, which led to the deposition of the Raja of Khurda and the subsequent resumption of the Paikas hereditary lands by the colonial administration.

• The movement was led by Bakshi Jagabandhu Bidyadhar, the former military commander of the Khurda forces, who galvanized the Paikas and the tribal Kandhas to revolt against the oppressive land revenue system.

• Economic grievances including the skyrocketing price of salt due to the British monopoly and the abolition of the traditional Cowrie currency system intensified the local resentment.

• The uprising spread across regions like Puri, Pipli, and Cuttack, and although the British officially suppressed it by 1818, guerrilla resistance continued until 1825.

Additional Information

• Bengal:

• It was the central administrative hub of the British East India Company and witnessed the Sanyasi Rebellion (1763−1800) and the Chuar Uprising, but it was not the location of the Paika revolt.

• Maharashtra:

• This region saw significant anti-colonial resistance such as the Bhil Uprising (1818) and the Ramosi Rebellion (1822) led by Chittur Singh against the British revenue policies.

• Assam:

• Resistance in this region included the Ahom Revolt of 1828 led by Gomdhar Konwar and the Phulaguri Dhawa (1861), which was the first peasant uprising in Assam.

Q60. Answer: (b) 101st Amendment, 2016

The correct answer is 101st Amendment, 2016.

Key Points

• The 101st Constitutional Amendment Act, 2016, was the landmark legislation that facilitated the implementation of the Goods and Services Tax (GST) across India, effective from July 1, 2017.

• It introduced Article 246A, which provides a special provision giving both the Parliament and the State Legislatures the concurrent power to make laws with respect to goods and services tax.

• Before this amendment, the Union Government had the exclusive power to tax services and the manufacture of goods (excise), while State Governments had the exclusive power to tax the sale of goods (VAT/Sales Tax).

• The amendment established a dual GST structure, allowing the Centre to levy Central GST (CGST) and States to levy State GST (SGST) on a common taxable base.

• It also led to the insertion of Article 279A, which mandated the creation of the GST Council, a federal body chaired by the Union Finance Minister to oversee tax rates, exemptions, and thresholds.

Additional Information

• 74th Amendment, 1992:

• This amendment provided constitutional status to Urban Local Bodies (Municipalities).

• It added Part IXA and the Twelfth Schedule to the Indian Constitution, specifying 18 functional responsibilities for urban governance.

• 80th Amendment, 2000:

• This amendment concerned the devolution of taxes between the Centre and the States.

• It implemented the recommendations of the 10th Finance Commission, creating an alternative scheme for sharing the net proceeds of Union taxes and duties with the States.

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• 67th Amendment, 1990:

• This was a state-specific amendment related to the extension of President's Rule in Punjab.

• It amended Article 356 to allow the extension of the emergency period in Punjab due to prevailing internal disturbances.

Q61. Answer: (b) Adding the folder to the Quick Access section

The correct answer is Adding the folder to the Quick Access section.

Key Points

• Quick Access is a specialized feature in the Windows File Explorer (introduced in Windows 10) that functions as a persistent list of frequently used and manually pinned folders.

• The Quick Access section is located at the top of the Navigation Pane on the left side of the explorer window, making it globally accessible regardless of the user's current directory.

• To create a shortcut for the Reports folder, the user simply needs to navigate to its location once, right-click the folder, and select Pin to Quick Access.

• This method provides the most efficient one-click access because the folder remains visible in the sidebar even when the user is browsing different drives or deeply nested subdirectories.

• It eliminates the need to navigate through the complex path C:\Users\Public\Documents\Projects\2020_Q2\ every time the folder is needed.

Additional Information

• Creating a new library:

• Libraries are virtual containers used to aggregate content from different locations into one view, but they require more navigation steps (opening the Libraries node) than the immediately visible Quick Access links.

• Mapping the folder as a new Network Drive:

• This process assigns a drive letter (like Z:) to a folder, which is typically used for Shared Folders on a network or server rather than local folders, making it an overly complex solution for this scenario.

• Pinning the folder to the Start Menu:

• While this provides a shortcut on the Windows Start screen, it does not reside within the File Explorer window itself, forcing the user to leave their current file management environment to access the folder.

Q62. Answer: (d) Ministry of Urban Development

The correct answer is Ministry of Urban Development.

Key Points

• Metro rail systems in India are categorized under Urban Transport, which falls under the administrative and financial jurisdiction of the Ministry of Urban Development (reorganized as the Ministry of Housing and Urban Affairs in 2017).

• Most metro projects are implemented through a 50:50 Joint Venture model, where the Government of India (via the Ministry of Urban Development) and the respective State Government share the equity and funding requirements.

• The Metro Railways (Construction of Works) Act, 1978 and the Metro Railways (Operation and Maintenance) Act, 2002 provide the legal framework under which this Ministry oversees the development and regulation of these systems.

• While the Ministry of Railways provides technical expertise, Safety Certification through the Commissioner of Railway Safety (CRS), and Standardization through the RDSO, the primary ownership and operational partnership lie with the Urban Development Ministry.

• The Ministry is responsible for framing the Metro Rail Policy (2017), which mandates Private Participation and ensures the financial viability of various metro projects across major Indian cities.

• Therefore, Option 4 is the correct answer.

Additional Information

• Ministry of Railways:

• Responsible for the National Rail Network, including passenger and freight trains.

• Operates the Kolkata Metro, which is the only metro system in India directly owned and managed by the Indian Railways as a Zonal Railway.

• Ministry of Road Transport and Highways (MoRTH):

• Primarily focuses on National Highways, road safety, and transport logistics.

• While it manages Inter-state connectivity, it does not govern the development of fixed-rail metro systems within cities.

• Ministry of Civil Aviation:

• Governs Air Transport, airports, and civil aviation safety through the DGCA.

• Has no jurisdictional role in the planning or operation of urban metro rail networks.

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Q63. Answer: (c) tt

The correct answer is tt.

Key Points

• In Mendelian genetics, the trait for stem height in pea plants (Pisum sativum) is governed by a single gene that exists in two alternative forms called alleles.

• The allele for tallness (represented by the uppercase letter T) is dominant, meaning it expresses itself even if only one copy is present in the genotype.

• The allele for shortness or dwarfism (represented by the lowercase letter t) is recessive, meaning its expression is masked by the presence of a dominant allele.

• According to the Law of Dominance, a recessive phenotype like 'short' can only be physically expressed when the organism is homozygous recessive, meaning it carries two copies of the recessive allele.

• If the plant has the allele combination tt, there is no dominant T allele to inhibit the dwarf trait, resulting in a short phenotype.

Additional Information

• Genotypic Combinations for Height:

• TT (Homozygous Dominant): This combination results in a tall phenotype because both alleles code for tallness.

• Tt or tT (Heterozygous): These combinations result in a tall phenotype because the dominant T allele masks the recessive t allele.

• tt (Homozygous Recessive): This is the only combination that results in the short phenotype.

• Important Genetic Concepts:

• Phenotype: The observable physical characteristics of an organism (e.g., tall or short).

• Genotype: The actual genetic makeup or set of alleles (e.g., TT, Tt, or tt).

• Monohybrid Cross: When two heterozygous (Tt) pea plants are crossed, the offspring typically exhibit a phenotypic ratio of 3:1 (three tall plants for every one short plant) and a genotypic ratio of 1:2:1 (TT:Tt:tt).

Q64. Answer: (c) State Election Commissions

The correct answer is State Election Commissions.

Key Points

• The management and conduct of elections to local self-government bodies in India, specifically the Panchayats and Municipalities, are the constitutional responsibility of the State Election Commissions.

• Under the 73rd Constitutional Amendment Act, 1992, a new Part IX was added to the Constitution, which introduced Article 243K. This article mandates that the superintendence, direction, and control of the preparation of electoral rolls and the conduct of all elections to the Panchayats shall be vested in a State Election Commission.

• Following this, the 74th Constitutional Amendment Act, 1992, inserted Part IXA, dealing with Municipalities. Article 243ZA of this part specifies that the same State Election Commission referred to in Article 243K shall also manage elections to the Municipalities.

• The State Election Commission is headed by a State Election Commissioner, who is appointed by the Governor of the respective state. To ensure independence, the Commissioner cannot be removed from office except in a manner and on grounds similar to those of a Judge of a High Court.

• While the Election Commission of India (ECI) handles national and state-level legislative elections, it has no jurisdiction over the elections of local bodies, which fall strictly under the functional domain of the state-level body.

Additional Information

• Central Election Commission (Election Commission of India):

• Established under Article 324 of the Constitution, it is a permanent and independent body.

• It is responsible for conducting elections to the Lok Sabha, Rajya Sabha, State Legislative Assemblies, State Legislative Councils, and the offices of the President and Vice President.

• District Magistrates:

• While the District Magistrate (often designated as the District Election Officer) plays a vital role in executing election procedures on the ground, they act under the overall supervision and guidelines of the State Election Commission for local polls.

• Lok Sabha Secretariat:

• This is an independent body that functions under the guidance of the Speaker of the Lok Sabha. It provides administrative support and procedural advice to the Lower House of Parliament but does not have any role in the conduct or management of elections.

Q65. Answer: (b) Inland Waterways Authority of India

The correct answer is Inland Waterways Authority of India.

Key Points

• The Inland Waterways Authority of India (IWAI) was established on 27 October 1986 under the Inland Waterways Authority of India Act, 1985 for the development and regulation of inland waterways for shipping and navigation.

• The organization functions as a statutory body under the Ministry of Ports, Shipping and Waterways (formerly the Ministry of Shipping), with its headquarters located in Noida, Uttar Pradesh.

• Its primary mandate includes the development and maintenance of National Waterways (NWs) by creating necessary infrastructure such as terminals, jetties, and providing navigational aids like river charts and night navigation facilities.

• The National Waterways Act, 2016 significantly expanded its scope by declaring 111 waterways as National Waterways, aimed at promoting fuel-efficient and environment-friendly transport.

• IWAI also undertakes projects for dredging to maintain the required depth for large vessels and facilitates hydrographic surveys to ensure safe passage through major rivers like the Ganga, Brahmaputra, and Indus.

Additional Information

• Central Water Commission (CWC):

• A premier technical organization in the field of water resources operating under the Ministry of Jal Shakti.

• Responsible for flood control, irrigation, drinking water supply, and hydro-power development across India.

• Shipping Corporation of India (SCI):

• A Navratna Public Sector Undertaking that manages and operates a large fleet of ships for international and coastal maritime trade.

• Focuses on ocean-going transport, including tankers, bulk carriers, and passenger vessels, rather than inland river regulation.

• National Highways Authority of India (NHAI):

• An autonomous agency of the Government of India under the Ministry of Road Transport and Highways.

• Responsible for the development, maintenance, and management of the National Highways network in the country.

Q66. Answer: (b) Assam, Meghalaya, Tripura, Mizoram

The correct answer is Assam, Meghalaya, Tripura, Mizoram.

Key Points

• The Fifth Schedule of the Constitution of India provides special provisions for the administration and control of Scheduled Areas and Scheduled Tribes across various states.

• Under Paragraph 1 of the Fifth Schedule, the term State is specifically defined to exclude the four North-Eastern states of Assam, Meghalaya, Tripura, and Mizoram.

• This exclusion is because these four states are governed by the Sixth Schedule of the Constitution, which addresses the administration of Tribal Areas through Autonomous District Councils.

• While the Fifth Schedule relies on Tribes Advisory Councils and the executive power of the Governor to regulate land and money lending, the Sixth Schedule grants greater legislative and judicial autonomy to tribal regions.

• The President of India has the authority to declare an area as a Scheduled Area, and currently, this applies to ten states including Andhra Pradesh, Jharkhand, Chhattisgarh, and Odisha.

Additional Information

• Sixth Schedule States

• Assam, Meghalaya, Tripura, and Mizoram: These states are protected under Article 244(2) and Article 275(1) to preserve the social, cultural, and linguistic identity of tribal communities.

• They feature Autonomous Districts which can make laws on land, forest, inheritance, and marriage with the Governor‘s assent.

• Other Special Status States

• Nagaland: Though a tribal state, it is governed by Article 371A, which protects Naga customary laws and is not part of the Sixth Schedule.

• Manipur: It is governed under Article 371C, providing for a committee of the Legislative Assembly consisting of members from the Hill Areas.

• Arunachal Pradesh: Governed by Article 371H, where the Governor has special responsibility regarding law and order, but it is not excluded from the Fifth Schedule definition in the same category as the four AMTM states.

Q67. Answer: (c) Falling birth and death rates

The correct answer is Falling birth and death rates.

Key Points

• Since the 1980s, Brazil has undergone a rapid demographic transition, shifting from a period of high natural increase to a more stabilized population structure.

• The Total Fertility Rate (TFR) in Brazil experienced a sharp decline, falling from approximately 4.4 children per woman in 1980 to

around 1.7 by 2020, which is significantly below the replacement level of 2.1.

• Simultaneously, the crude death rate continued to decline as a result of expanded public health initiatives, improved sanitation, and better access to medical technology following the 1988 Constitution.

• The decline in infant mortality was particularly noteworthy, dropping from over 60 deaths per 1,000 live births in the early 1980s to less than 15 in recent years, contributing to higher life expectancy.

• Increased urbanization (with over 80% of the population living in cities) and the socio-economic empowerment of women are cited as primary drivers for the reduction in birth rates during this period.

Additional Information

• Demographic Transition Model (DTM):

• Brazil moved through Stage 3 of the DTM in the late 20th century, where birth rates fall rapidly while death rates slowly level off.

• The country is currently transitioning toward Stage 4, where both birth and death rates are low, leading to a stagnant or aging population profile.

• Misconceptions in Other Options:

• Longevity: Contrary to the low longevity mention, Brazil saw life expectancy rise from 62 years in 1980 to over 76 years by 2019.

• Mortality Trends: There has been no trend of rising urban mortality; rather, infectious disease deaths plummeted, even as chronic diseases became more prevalent.

• Immigration: While Brazil has a history of immigration, its modern demographic shift is defined by natural growth changes rather than external migration flows.

Q68. Answer: (c) Streets intersecting at right angles forming a criss-cross pattern

The correct answer is Streets intersecting at right angles forming a criss-cross pattern.

Key Points

• The Indus Valley Civilization (Harappan Civilization) is celebrated for its highly advanced and systematic urban planning, which was a unique feature among ancient societies.

• Major cities like Harappa and Mohenjo-daro were laid out using a gridiron pattern, where the primary streets ran North-South and East-West.

• The streets were designed to intersect at right angles (90 degrees), creating a distinct criss-cross pattern that divided the residential areas into neat rectangular or square blocks.

• Main roads were remarkably wide, with some measuring approximately 10 meters (about 33 feet) in width, allowing for the easy passage of bullock carts and heavy traffic.

• This architectural discipline extended to the smaller lanes, which were also straight and planned to ensure that every house had access to the main drainage network.

Additional Information

• Urban Infrastructure and Sanitation:

• The Harappans implemented an elaborate drainage system where drains were covered with bricks or stone slabs and equipped with cesspits for regular cleaning.

• Houses were built with burnt bricks of a uniform 4:2:1 ratio, a technological feat not widely seen in other contemporary civilizations like Mesopotamia.

• City Zoning:

• Most Harappan settlements were divided into two main sections: the Citadel (located on a raised western platform for administrative and religious buildings) and the Lower Town (the eastern residential area).

• The Citadel often contained important structures like the Great Bath in Mohenjo-daro and large Granaries for storing agricultural surplus.

• Other Notable Features:

• The presence of lampposts at regular intervals suggests that the Harappans may have had a system for street lighting.

• In cities like Lothal, the planning also included a massive dockyard, indicating the civilization's prowess in maritime trade and hydraulic engineering.

Q69. Answer: (d) Ohm

The correct answer is Ohm.

Key Points

• According to Ohm's Law, the Electric Current (I) flowing through a conductor is directly proportional to the Potential Difference (V) applied across its ends, provided physical conditions like Temperature remain constant.

• The mathematical expression for this relationship is $V = I \times R$, where R represents the Electrical Resistance of the conductor.

• To find the unit of Resistance, the formula is rearranged as $R = V / I$. This defines Resistance as the ratio of Potential Difference to Current.

• The SI unit of Potential Difference is the Volt (V), and the SI unit of Electric Current is the Ampere (A). Therefore, the unit for resistance is Volt per Ampere.

• The Volt per Ampere is internationally recognized and named as the Ohm (symbol: Ω), named after the German physicist Georg Simon Ohm. One Ohm is the resistance of a conductor such that a Potential Difference of one Volt causes a Current of one Ampere to flow through it.

Additional Information

• Coulomb:

• It is the SI unit of Electric Charge.

• One Coulomb is defined as the quantity of electricity transported in one Second by a current of one Ampere (1 C = 1 A × 1 s).

• Joule:

• It is the SI unit of Work and Energy.

• In electrical contexts, one Joule is the work done to move a charge of one Coulomb through a potential difference of one Volt (1 J = 1 V × 1 C).

• Watt:

• It is the SI unit of Power, representing the rate of energy consumption or transfer.

• Electrical power is calculated as P = V × I, meaning one Watt is equivalent to one Volt-Ampere or one Joule per second.

Q70. Answer: (b) Windows logo key + E

The correct answer is Windows logo key + E.

Key Points

• In the Microsoft Windows operating system, keyboard shortcuts are pre-defined combinations of keys that provide an alternative way to do something that you would typically do with a mouse.

• The Windows logo key + E is the dedicated system-wide shortcut used to instantly launch File Explorer (previously known as Windows Explorer).

• File Explorer is the graphical user interface (GUI) application that allows users to navigate, access, and manage files stored on hard disk drives (HDD), solid-state drives (SSD), and external storage devices.

• This shortcut is standardized across modern versions of the OS, including Windows 7, Windows 8, Windows 10, and Windows 11, making it a critical tool for operating system efficiency.

• When pressed, it usually opens the Quick Access or This PC view by default, depending on the user's system configuration settings.

Additional Information

• Functional breakdown of other key combinations:

• Alt + E: Historically used in many software applications to open the Edit menu in the Menu Bar.

• Ctrl + E: Commonly used within File Explorer to focus the Search Box; in web browsers like Microsoft Edge or Google Chrome, it activates the search query in the Address Bar.

• Shift + E: Generally used to type the uppercase letter E when Caps Lock is disabled, or as a modifier in specific gaming or design software.

• Other essential Windows logo key shortcuts:

• Windows logo key + D: Used to Show/Hide the Desktop by minimizing all open windows.

• Windows logo key + L: Used to immediately Lock the PC or switch accounts.

• Windows logo key + R: Opens the Run dialog box for executing commands or opening programs.

• Windows logo key + I: Opens the system Settings menu.

Q71. Answer: (d) HDP : EAM

The logic follows here,

This follows the same pattern as

For NPS : KMP,

For DOQ : ALN,

Applying for the same logic,

For HDP : EAM,

Hence, the correct answer is "Option 4"

Q72. Answer: (a) Mother's sister's son

Given:

Let us first decode the given symbols and then draw a family tree.

Symbol	=	$	@	•
Meaning	Son	Sister	Wife	Father

Given : 'W = F $ K @ L * G'

From the diagram, K is the wife of L and L is the father of G, so K is the mother of G. F is the sister of K, making F the maternal aunt of G. Since W is the son of F, W is the Mother's sister's son of G.

Hence, the correct answer is 'Option 1'.

Q73. Answer: (b) BDC−ACB

The Logic followed here is:

For VXW is related to UWV,

For WYX is related to VXW,

Applying the same logic

For BDC is related to ACB,

Hence, the correct answer is "option 2"

Q74. Answer: (c) 20

The logic followed here is.

BODMAS Table:

Letter Mappings:

A	B	C	D
÷	×	•	–

Replace the letters with their signs,follow the BODMAS order of operations:

= 220 + 56 ÷ 14 − 17 × 12

= 220 + 4 − 17 × 12

= 220 + 4 − 204

= 224 − 204

= 20

Hence, the correct answer is "option 3"

Q75. Answer: (b) 3

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

Required Conditions: Odd Number - Odd Number - Even Number

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

Therefore, there are exactly 3 such odd numbers in the series.

Hence, the correct answer is 'Option 2'.

Q76. Answer: (d) 4

The logic follows here,

Required condition: Consonant - Consonant - Vowel

(Left) I G I H C Y A O Z L K E P D J C O P T I R G (Right)

There are exactly 4 such consonants which is immediately preceded by a consonant and also immediately followed by a vowel

Hence, the correct answer is "option 4"

Q77. Answer: (a) 456

The logic followed here is:

• 51 + 27 = 78

• 78 + 54 = 132

• 132 + 81 = 213

• 213 + 108 = 321

• 321 + 135 = 456

Thus, the missing term in the series is 456.

Hence, the correct answer is 'Option 1';

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Q78. Answer: (c) zh

The logic follows here,

Therefore, the code for care is zh.

Hence, the correct answer is "option 3"

Q79. Answer: (a) None

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

Required Conditions: Even - Even - Even

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

No, such even digits are there, each of which is immediately preceded by an even digit and also immediately followed by an even digit

Hence, the correct answer is 'Option 1'.

Q80. Answer: (c) UQV 54

The logic follows here,

Combining the patterns, the cluster that replaces the question mark is UQV 54.

Hence, the correct answer is "option 3"

Q81. Answer: (b) 53

BODMAS Table:

'+' and '−' are interchanged and '×' and '÷' are interchanged

Given Equation: 39 − 15 ÷ 3 + 124 × 4

After interchanging: 39 + 15 × 3 − 124 ÷ 4, using the BODMAS rule:

= 39 + 15 × 3 − 124 ÷ 4

= 39 + 15 × 3 − 31

= 39 + 45 − 31

= 84 − 31

= 53

Hence, the correct answer is "option 2"

Q82. Answer: (a) (2, 8, 20)

The logic followed here is:

Logic: Third Number = (First Number + Second Number) + 10

For the first set (15, 12, 37)

=> (15 + 12) + 10

=> 27 + 10 = 37.

For the second set (25, 15, 50)

=> (25 + 15) + 10

=> 40 + 10 = 50.

Applying the same logic to the options:

(2, 8, 20)

=> (2 + 8) + 10

=> 10 + 10 = 20.

Hence, the correct answer is 'Option 1'.

Q83. Answer: (a) PNP

The logic followed here is.

Combining the results from each letter position, the next term in the series is PNP.

Hence, the correct answer is "option 1"

Q84. Answer: (c) Three

Given: Seven people, F, G, H, L, M, O, and Q, are sitting in a row facing north.

1. Only two people sit between H and Q.

2. Only H sits to the right of G.

3. Only three people sit between G and F.
4. L sits at some place to the left of O, but at some place to the right of M.
The Final Arrangement is,
Number of people sit between M and O is 3
Hence, the correct answer is "Option 3"

Q85. Answer: (c) 8

The logic follows here.
Thus, the code for the letter T is 8.
Hence, the correct answer is "option 3"

Q86. Answer: (a) 32

The shaded part shows, such Consultants are there who are Bankers as well as Advocates
Thus, there are 32 consultants who are bankers as well as advocates.
Hence, the correct answer is "option 1"

Q87. Answer: (b) PNN

The logic followed here is,
Logic: 1st Letter − 3 = 2nd Letter; 2nd Letter + 1 = 3rd Letter.
For ZWX,
For PNN,
For FCD,
For KHI,
Therefore, the letter cluster that does not belong to the group is PNN.
Hence, the correct answer is 'Option 2'.

Q88. Answer: (c) 4

Given: Seven boxes A, B, C, D, E, F, and G are kept one over the other but not necessarily in the same order.
1. Only two boxes are kept between G and B.
2. Only D is kept above C.
3. No box is kept below B.
4. F is kept at some place below A but at some place above E.
The Final Arrangement is,

1	D
2	C
3	A
4	G
5	F
6	E
7	B

Four boxes are kept between D and E.
Hence, the correct answer is " Option 3"

Q89. Answer: (b) Neither conclusion (I) nor (II) follows

The least possible Venn diagram for the given statements is:
(I) Some flowers are doors - Doesn't follow
(There is no direct relation between flowers and doors; maybe it is possible but not definite. Hence, it is false)
(II) All petals are flowers - Doesn't follow (Some petals are flowers, and some flowers are petals. Hence, it is false)
Neither conclusion (I) nor (II) follows.
Hence, the correct answer is "Option 2"

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Q90. Answer: (b) 331

The logic followed here is:

• 211 + 8 = 219

• 219 + 16 = 235

• 235 + 24 = 259

• 259 + 32 = 291

• 291 + 40 = 331

Thus, the missing term in the series is 331.

Hence, the correct answer is 'Option 2';

Q91. Answer: (d) KN - JL

The logic follows here,

PS − OR,

FI − EH,

LO − KN,

KN − JL,

Therefore, the letter-cluster pair that is different from the others is KN − JL.

Hence, the correct answer is 'Option 4'.

Q92. Answer: (b) 3

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order

1. Only G is kept above E.

2. Only C is kept between E and A.

Position	Box
7	G
6	E
5	C
4	A
3	
2	
1	

1. Only F is kept below B.

2. The remaining box D is kept at the 3rd position.

Final Arrangement:

7	G
6	E
5	C
4	A
3	D
2	B
1	F

Thus, there are 3 boxes kept between C and F.

Hence, the correct answer is 'Option 2'.

Q93. Answer: (b) 4 km to the North

Given:

• Mr. Yorly starts from Point A and drives 29 km towards East. He then takes a right turn, drives 16 km, turns right and drives 39

km.

• He then takes a right turn and drives 9 km.

• He then takes a right turn, drives 6 km, turns left and drives 3 km.

• He takes a final right turn, drives 4 km and stops at Point P

The correct answer is 4 km to the North.

Hence, the correct answer is " Option 2"

Q94. Answer: (b) One

Given: Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order

1. D is kept at the third position from the bottom.

2. C is kept above A but below D.

Position	Box
7	
6	
5	
4	
3	D
2	C
1	A

1. Only two boxes are kept between G and F.

2. E is kept above F but below B.

Final Arrangement:

7	G
6	B
5	E
4	F
3	D
2	C
1	A

Thus, there is one box kept between E and D.

Hence, the correct answer is 'Option 2'.

Q95. Answer: (c) FCAV

The logic followed in this pattern is based on a decreasing sequence of numerical subtraction from the positional values of the English alphabet.

For 'DIOR' related to 'AEJL':

For 'RSUT' related to 'OOPN':

Applying the same logic to 'IGFB':

Thus, IGFB is related to FCAV.

Hence, the correct answer is 'Option 3'.

Q96. Answer: (c) Three

Gievn: A, B, D, J, O, T and Z are sitting around a circular table facing the center.

1. Only four people sit between B and D when counted from the right of B.

2. O and T are immediate neighbors of J.

3. Exactly four people sit between A and Z when counted from the left of A.

4. Z is not an immediate neighbor of O or D

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The Final Arrangement is,

There are exactly three people sits between them.

Hence, the correct answer is "Option 3"

Q97. Answer: (a) Mother's father

The family tree diagram is,

Symbol	•	–	×	÷
Meaning	Sister	Brother	Father	Mother

Given expression: M × N ÷ O − P + Q − R

From the family tree, it is clear that M is the father of N, and N is the mother of R (along with O, P, and Q). Therefore, M is the father of R's mother.

Hence, M is the Mother's father of R.

Hence, the correct answer is 'Option 1'.

Q98. Answer: (b) One

Given original number: 73912685

Given Number	7	3	9	1	2	6	8	5
Ascending Order	1	2	3	5	6	7	8	9

By comparing the two sequences, we can see that:

• 7th digit: 8 remains 8 (Unchanged)

• Therefore, the number of digits whose position remains unchanged is 1.

Hence, the correct answer is 'Option 2'.

Q99. Answer: (a) NYE

The Logic followed here is.

The term that comes in place of the question mark is NYE.

Hence, the correct answer is "option 1"

Q100. Answer: (b) HL – FD

The logic follows here,

For QF − MB,

For GT − CP,

For NV − JR,

For HL − FD,

Therefore, the letter-cluster pair that is different from the others is HL − FD.

Hence, the correct answer is 'Option 2'.

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