RRB NTPC (Graduate) CBT-I Official Paper (Held On: 19 Mar, 2026 Shift 1) (Previous Year Paper)

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

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Q1. A shopkeeper fixes the marked price of an item 100% above its cost price. What percentage of discount on marked price should be allowed to gain 2%?

(a) 48%
(b) 50%
(c) 47%
(d) 49%

Q2. Which Buddhist text, from the 1st century BCE, records the dialogues of the Buddha?

(a) Jataka Tales
(b) Vinaya Pitaka
(c) Abhidhamma Pitaka
(d) Sutta Pitaka

Q3. A geological survey team has established three research stations forming a triangular monitoring zone. The stations are located at coordinates P(2,5), Q(8,1), and R(4,9) on a coordinate grid where each unit represents 1 kilometer. What is the area of the triangular monitoring zone?

(a) 16 square kilometers
(b) 10 square kilometers
(c) 12 square kilometers
(d) 14 square kilometers

Q4.

What is the value of $(7x + 6y)$, if mean of the following distribution is 50?

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	6	19	x	5	9	50

(a) 170
(b) 200
(c) 182
(d) 190

Q5. Which of the following is an example of System Software?

(a) Windows
(b) Paint
(c) MS Word
(d) Power Point

Q6. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

MPL 79 KNJ 87 ILH 95 GJF 103 ?

(a) EJP 110
(b) EIC 111
(c) EHD 111

(d) EGC 110

Q7. By how much was the rupee devalued in July 1991?

(a) 10 per cent
(b) 25 per cent
(c) 18 per cent
(d) 30 per cent

Q8. At time t=0, a body of mass 1 Kg starts to fall freely from rest from a height of 100 m. Compared to the kinetic energy at 3 seconds, the kinetic energy at 4 seconds _____.

(a) Is not determinable
(b) Is larger
(c) Remains same
(d) Is smaller

Q9. Which of the following letter-number clusters will replace the question mark "?" in the given series to make it logically complete?

AIW 8, YGU 14, WES 20, UCQ 26, ?

(a) RZN 32
(b) TAN 33
(c) SAO 32
(d) SZM 32

Q10. Subrata gets double the amount in 8 years when invested at compound interest, compounded annually. In how many years will the amount become eight times itself?

(a) 32
(b) 24
(c) 64
(d) 16

Q11. Based on the 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) MIL
(b) QMO
(c) OKM
(d) SOQ

Q12. A shopkeeper purchased 52 dozens of articles at the rate of Rs. 400 per dozen. He sold each one of them at the rate of Rs. 58. What percentage profit did he make?

(a) 73%
(b) 75%
(c) 74%
(d) 71%

Q13. Pandit Jawaharlal Nehru described which of the following as the "temple(s) of modern India"?

(a) Hospitals
(b) Dams
(c) Schools
(d) Parliament

Q14. There are 46 members in group A, 15 members in group B and 11 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are Rs. 496, Rs. 106 and Rs. 406, respectively. The overall average amount (in Rs.) spent per member is:

(a) 401
(b) 399

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(c) 396
(d) 403

Q15. Which of the following are Plantation crops respectively in Assam and Karnataka?
(a) Rice and wheat
(b) Barley and ragi
(c) Tea and coffee
(d) Sugarcane and mustard

Q16. When did the Legal Services Authorities Act come into force?
(a) 15 August 1947
(b) 1 April 1988
(c) 9 November 1995
(d) 26 January 1950

Q17. Refer to the following number and symbol series and answer the question that follows. Counting to be done from left to right only. All numbers are single-digit numbers only.
(Left) % 1 7 3 < $ 3 7 4 ^ < & # 5 < 3 ^ % > \ & (Right)
How many such symbols are there, each of which is immediately preceded by a number and also immediately followed by a number?
(a) One
(b) None
(c) Three
(d) Two

Q18. Which region is known as the “Ring of Fire” due to frequent volcanic activity?
(a) East African Rift
(b) Mid Atlantic Ridge
(c) Pacific Ocean Rim
(d) Indian Ocean Floor

Q19. The common root of the equations $x^2 - 21x + 110 = 0$ and $110 + x - x^2 = 0$, is:
(a) 11
(b) 10
(c) -10
(d) -11

Q20. The 'Kudankulam Nuclear Power Plant' is located in which state?
(a) Andhra Pradesh
(b) Tamil Nadu
(c) Kerala
(d) Karnataka

Q21. Which famous Indian classical singer was awarded the Bharat Ratna in 1998 for her contribution to Carnatic music?
(a) Aruna Sairam
(b) M. S. Subbulakshmi
(c) Kishori Amonkar
(d) Shubha Mudgal

Q22. Evaluate: (-9) - (-56) ÷ (-14) + (-4) × 8
(a) -48
(b) -47
(c) -45
(d) -44

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Q23. The volume of a cylindrical tank is 1584 cubic meters. If the height of the tank is 14 m, then find the diameter of the tank.

$$\left(\text{Use } \pi = \frac{22}{7}\right)$$

(a) 12 m
(b) 18 m
(c) 9 m
(d) 6 m

Q24. Bamboo exhibits a specific type of leaf venation and root structure. What are the characteristics of these features?
(a) Parallel Venation and Fibrous Root
(b) Reticulate Venation and Fibrous Root
(c) Parallel Venation and Tap Root
(d) Reticulate Venation and Tap Root

Q25. According to the United Nations World Population Prospects (2019), which region is projected to contribute most significantly to global population growth by 2050, thereby affecting future population density trends?
(a) Eastern Southeastern Asia
(b) Europe North America
(c) Sub Saharan Africa
(d) Latin America and the Caribbean

Q26. What will come in place of '?' in the following equation, if '+' and '-' are interchanged and '×' and '÷' are interchanged?

95 ÷ 5 + 378 × 3 - 161 = ?

(a) 680
(b) 620
(c) 510
(d) 590

Q27. Select the triad which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

CLUB-CUBL-ULCB

HANG-HNGA-NAHG

(a) NEST-ETNS-TNSE
(b) EARN-ARNE-ENRA
(c) BALD-DLAB-LADB
(d) MASK-MSKA-SAMK

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Q28. Seven people, B, C, O, P, Q, R and S, are sitting in a straight line, facing north. Q sits second from the left end of the line. Only two people sit between Q and R. C sits immediately to the right of S. O sits immediately to the left of B. Only one person sits between R and S. How many people sit between P and O?

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

Q29. A school employs trained and untrained teachers in the ratio 5 : 3. The salaries of a trained and an untrained teachers are in the ratio 4 : 1. If the total salary paid to all teachers in a month is Rs. 4,60,000, how much total salary is paid to the untrained teachers?

(a) Rs. 75,000
(b) Rs. 45,000
(c) Rs. 60,000
(d) Rs. 1,20,000

Q30. Which of the following is equivalent to the expression 1.2/0.3 + 2.4/0.6

(a) 5
(b) 6
(c) 4
(d) 8

Q31. In a certain code language, ‘LITE’ is coded as ‘3492’ and ‘TIME’ is coded as ‘3954’. What is the code for ‘M’ in the given code language?10866

(a) 3
(b) 9
(c) 4
(d) 5

Q32. In a park, there is a flagpole. A person standing 30 m away from the flagpole observes that the angle of elevation of the top of the flagpole is 30°. Determine the height (in metres) of the flagpole.

(a)

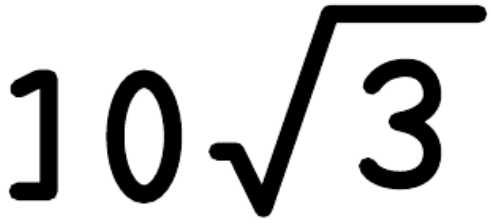


(b)

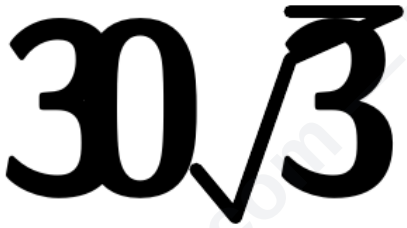


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(c)



(d)



Q33. Below are given two sets of numbers. In each set of numbers, a certain mathematical operation on the first number results in the second number. Similarly, certain mathematical operations on the second number result in the third number and so on. Which of the given options follows the same set of operations as in question?

(NOTE – A two/three-digit number cannot be broken into individual digits for operations, e.g., if 37 is followed by 10, the operation cannot be 3+7 as a two-digit number cannot be broken into individual digits.)

12 – 26 – 46 – 70; 20 – 34 – 54 – 78

(a) 34 – 48 – 78 – 102
(b) 28 – 42 – 52 – 76
(c) 15 – 30 – 50 – 74
(d) 25 – 39 – 59 – 83

Q34. Which indigenous CAR T-cell therapy, launched in 2025, marked a historic milestone in India's cancer treatment and biotechnology ecosystem?

(a) OncoShakti indigenous gene-based cancer therapy
(b) NexCAR19 indigenous CAR T-cell therapy
(c) IndiGene CAR T-cell oncology therapy
(d) BharatCAR advanced cellular immunotherapy

Q35. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

All gorillas are monkeys. Some monkeys are baboons. All baboons are chimpanzees.

Conclusions:

(I) All chimpanzees are monkeys.

(II) Some chimpanzees are gorillas.

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

Q36. Which component of System Software is directly responsible for managing the flow of data between the Central Processing Unit (CPU) and a peripheral device like a printer or a mouse?

(a) Device Driver
(b) Utility Software
(c) Operating System Kernel
(d) Application Programming Interface (API)

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Q37. Which Indian nationalist leader emerged as a prominent figure of the extremist phase of the freedom movement, emphasizing direct action and mass mobilisation?

(a) Gopal Krishna Gokhale
(b) Surendranath Banerjee
(c) Bal Gangadhar Tilak
(d) Dadabhai Naoroji

Q38. Which defensive strategy assigns each defender to guard a specific offensive player based on size and ability in a basketball game?

(a) Zone defence
(b) Full court press
(c) Combined defence
(d) Man to man defence

Q39. The 101st Constitutional Amendment Act of 2016 was related to which of the following?

(a) Exchanging enclaves and making other territorial adjustments between India and Bangladesh
(b) Introducing the Goods and Services Tax (GST) in India
(c) Introducing the National Judicial Appointments Commission (NJAC)
(d) Appointing a Minister in charge of tribal welfare in the states of Chhattisgarh and Jharkhand

Q40. If $x + y + z = 10$, $x^2 + y^2 + z^2 = 38$, $5xyz = 150$ and $(xy + yz + zx) = 31$ then what is the value of $2(x^3 + y^3 + z^3)$.

(a) 160
(b) 520
(c) 260
(d) 320

Q41. In 2025, which multilateral development bank signed five loan agreements with India, including a US$ 650 million loan to support the Pradhan Mantri Surya Ghar: Muft Bijli Yojana?

(a) Asian Infrastructure Investment Bank (AIIB)
(b) Asian Development Bank (ADB)
(c) World Bank
(d) New Development Bank (NDB)

Q42. The distance between two points on a map is 4 cm. The scale of the map is 1 : 829483. The actual distance between the two points (in km) is:

(Round off your answer to two decimal places.)

(a) 33.63
(b) 33.18
(c) 38.85
(d) 30.25

Q43. Below are given two sets of numbers. In each set of numbers, a certain mathematical operation on the first number results in the second number. Similarly, a certain mathematical operation on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the question?

(NOTE – A two/three-digit number cannot be broken into individual digits for operations. E.g. if 37 is followed by 10, the operation cannot be 3+7 as a two-digit number cannot be broken into individual digits.)

5 – 20 – 60 – 120

8 – 32 – 96 – 192

(a) 10 – 40 – 120 – 240
(b) 12 – 48 – 144 – 248
(c) 24 – 48 – 96 – 120
(d) 60 – 240 – 80 – 160

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Q44. Girish scored 441 marks in an examination and was 75 marks short of 30% of maximum marks. In the same examination, his friend scored 688 marks. What is the percentage of marks scored by his friend?

(a) 44%
(b) 42%
(c) 40%
(d) 38%

Q45. In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Harsh, Ketan, Mayank, Rohit, and Sidharth, each have different height. Who is the shortest?

(I) Mayank is taller than Harsh but shorter than Ketan.

(II) Rohit is taller than Harsh but shorter than Mayank.

(a) Data in Statement II alone is sufficient to answer the question while data in Statement I is not
(b) Both statements I and II together are NOT sufficient to answer the question
(c) Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
(d) Data in Statement I alone is sufficient to answer the question while data in Statement II is not

Q46. The number of ordered pair of positive integral solutions (a, b) such that the HCF of a and b is 28 and a + b = 868 is

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

Q47. If ‘A’ stands for ‘÷’, ‘B’ stands for ‘×’, ‘C’ stands for ‘+’ and ‘D’ stands for ‘−’, then what will come in place of the question mark (?) in the following equation?

19 D 54 A 6 C 4 B 2 = ?

(a) 17
(b) 18
(c) 16
(d) 14

Q48. Which mountain ranges traverse the Trans-Himalayan zone in India?

(a) Himalayas, Aravalli, Vindhya
(b) Western Ghats, Eastern Ghats, Satpura
(c) Zanskar, Ladakh, Karakoram
(d) Himalayas, Satpura, Karakoram

Q49. Which of the following Articles of the Constitution of India relates to the tenure of the Governor, including serving at the discretion of the President and the method of stepping down from office?

(a) Article 156
(b) Article 158
(c) Article 157
(d) Article 155

Q50. By how much (approximately) was the area of Sariska Wildlife Sanctuary expanded in its 2025 update?

(a) ~44,000 hectares
(b) ~60,000 hectares
(c) ~25,000 hectares
(d) ~10,000 hectares

Q51. What does the term 'Sovereign' in the Indian Constitution's Preamble signify for India?

(a) Policy of non-alignment
(b) Power to appoint President
(c) Religious freedom for all citizens

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(d) Independence from external control

Q52. During a sale 35% of the goods are sold at 22% profit, 40% of the remaining goods are sold at 37% profit and the still remaining goods are sold at a loss of 38%. If there is an overall profit of x%, then what is the value of x?

(a) 5.4
(b) 10.8
(c) 6.8
(d) 2.5

Q53. Seven people F, G, H, I, U, V, and W are sitting around a circular table facing the centre of the table. G sits third to the right of U. Only three people sit between F and H when counted from the right of H. G sits to the immediate right of H. V sits to the immediate right of W. Who sits second to the right of I?

(a) G
(b) U
(c) W
(d) F

Q54. Each of seven people, E, F, G, H, J, K and L, has an exam on a different day of a week, starting from Monday and ending on Sunday of the same week. Only three people have exams between L and J. Only three people have exams between H and K. E has exam on some day before J and on some day after F. Only G has exam before K. How many people have exams before L?

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

Q55. On 10 November 2025, the Pan American Health Organization (PAHO) stated that the Region of the Americas no longer retained its status of being free from endemic transmission of which of the following diseases?

(a) Measles
(b) Cholera
(c) Polio
(d) Yellow fever

Q56. A, B and C together can complete a certain work in 36 days. B and C together can complete the same work in 48 days. B is 75% more efficient than A. A, B and C work together for 15 days. B alone will complete the remaining work in:

(a) 51 days
(b) 44 days
(c) 53 days
(d) 48 days

Q57. In a certain code language,

A@ B means ‘A is the son of B’

A % B means ‘A is the brother of B’

A + B means ‘A is the wife of B’

A & B means ‘ A is the father of B’

Based on the above, how is T related to K if ‘T@S%G+H&K’?

(a) Mother's father
(b) Mother's brother
(c) Son
(d) Mother's brother's son

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Q58. The Senkaku Islands, recently in the news after a China Coast Guard "rights enforcement patrol," are administered by which country?

(a) Taiwan
(b) China
(c) South Korea
(d) Japan

Q59. The 'Prayaga prashasti' also known as the 'Allahabad pillar' is composed in praise of which of the following rulers?

(a) Rudradaman
(b) Samudragupta
(c) Asoka
(d) Chandragupta II

Q60. _____ is primarily used to focus parallel rays of light.

(a) Cylindrical lens
(b) Bifocal lens
(c) Convex lens
(d) Concave lens

Q61. What is the median if the mode of distribution is 48 and the mean is 72?

(a) 54
(b) 62
(c) 60
(d) 64

Q62. The Supreme Court's order dated 29 December 2025 was passed in a suo motu matter titled "In Re: Definition of ____ Hills and Ranges and Ancillary Issues." Which hill range is being referred to?

(a) Satpura Range
(b) Aravalli Hills and Ranges
(c) Shivalik Hills
(d) Vindhya Range

Q63. PQRS is a cyclic trapezium with PS parallel to QR. If angle P = 85°, then the other three angles are:2108

(a) angle Q = 95°, angle R = 95°, angle S = 85°
(b) angle Q = 85°, angle R = 85°, angle S = 95°
(c) angle Q = 95°, angle R = 85°, angle S = 95°
(d) angle Q = 85°, angle R = 95°, angle S = 95°

Q64. Through which Constitutional Amendment were the Fundamental Duties incorporated into the Constitution?

(a) 97th Amendment, 2011
(b) 52nd Amendment, 1985
(c) 42nd Amendment, 1976
(d) 61st Amendment, 1989

Q65. In quadrilateral ABCD, the bisectors of angle A and B meet at O and angle AOB = 41°, then find angle C + angle D is:

(a) 41°
(b) 98°
(c) 49°
(d) 82°

Q66. Which of the following statements is not correct?

(a) Article 282 empowers both the Centre and the states to make any grants for any public purpose, even if it is not within their respective legislative competence.
(b) A state legislature can not impose tax on the consumption or sale of electricity.

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(c) A state legislature is prohibited from imposing a tax on the supply of goods or services or both where such supply takes place outside the state and where such supply takes place in the course of import or export.

(d) A state legislature can impose taxes on professions, trades, callings and employments.

Q67. What was the role of guilds (shrenis) in post-Gupta India?

(a) Regulated trade and crafts

(b) Administration

(c) Religious reforms

(d) Military service

Q68. Who shared the 'Best Actor in a Comedy Series' award at the Filmfare OTT Awards in December 2025?

(a) Jaideep Ahlawat and Vikramaditya Motwane

(b) Vinay Pathak and Rahul Bhatt

(c) Barun Sobti and Sparsh Shrivastava

(d) Sanya Malhotra and Monika Panwar

Q69. What should come in place of '?' in the given series?

35 37 40 45 52 ?

(a) 66

(b) 62

(c) 63

(d) 65

Q70. What is the average of 7, 9 and 11?

(a) 9

(b) 7

(c) 8

(d) 10

Q71. Select the pair which follows the same pattern as that followed by the two set of pairs given below. Both pairs follow the same pattern.

DRU : BWS

ZBQ : XGO16311

(a) HKD : DNZ

(b) VLM : TQK

(c) BCG : WGB

(d) CLU : AOS

Q72. Behramji Merwanji Malabari, a Parsi social reformer, is credited for his efforts with the legislative enactment related to which of the following social evils?

(a) Female infanticide

(b) Untouchability

(c) Child marriage

(d) Widow burning or sati

Q73. Which of the following gasses is NOT classified as a noble gas?

(a) Helium

(b) Oxygen

(c) Argon

(d) Neon

Q74. Which shortcut opens the Properties of the selected item?

(a) Alt+Enter

(b) Alt+Shift

(c) Alt+E

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(d) Alt+Ctrl

Q75. 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 its 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.)

(9, 17, 7)

(6, 12, 5)

(a) (9, 17, 5)
(b) (2, 5, 3)
(c) (4, 9, 4)
(d) (6, 12, 4)

Q76. Which stitched sailing vessel of the Indian Navy, which was scheduled for its maiden overseas voyage in December 2025 from Porbandar to Muscat, aims to revive India's ancient maritime legacy?

(a) INSV Mhadei
(b) INSV Tarangini
(c) INSV Kaundinya
(d) INSV Shardul

Q77. A boat moves at a speed of 7 km/h in still water. The boat goes 40 km downstream and then 40 km upstream. It is observed that the total time taken for this journey is 560 minutes less than the time it would take if the speed of the stream were 2 km/h faster. What is the initial speed (in km/h) of the stream?

(a) 4
(b) 4.5
(c) 3
(d) 3.5

Q78. What should come in place of '?' in the given series?

23 26 32 41 53 ?

(a) 70
(b) 66
(c) 68
(d) 72

Q79. Solve the following system of linear equations:

$-p + 2q - 3r = -9$

$p - 3q + r = 6$

$2p - 5q + 5r = 17$

(a) $p = 1, q = -1, r = 2$
(b) $p = -1, q = 3, r = 2$
(c) $p = 1, q = 1, r = -2$
(d) $p = -1, q = -1, r = 3$

Q80. In a business, A, B, and C invest in the ratio 3 : 5 : 4. Out of the total profit, B gives Rs. 15,000 to A such that A's share of the profit becomes equal to C's share. What is the total profit (in Rs.) of the business?

(a) 1,80,000
(b) 2,40,000
(c) 1,50,000
(d) 1,20,000

Q81. Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of :: is the same as that on the right side of :: ?

: KQM :: OUQ : %

(a) = LRM, % = NTP

(b) = LRN, % = NTP
(c) = LRN, % = NSP
(d) = LRN, % = NTO

Q82. A and B complete a work in 21 days. If A alone can do it in 28 days, then B alone can do three-fourth of the same work in _____days.
(a) 35
(b) 56
(c) 63
(d) 49

Q83. The widespread use of which architectural features distinguishes Mughal architecture from earlier trabeate temple construction?
(a) Corbelled roofs and stepped pyramids
(b) Wooden beams and flat ceilings
(c) Arches and domes
(d) Circular codes and railings

Q84. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)7216
(a) MO–PR
(b) JL–MO
(c) GI–JL
(d) BD–FH

Q85. Each of P, Q, R, S, T, U and V has an exam on a different day of a week starting from Monday and ending on Sunday of the same week. V has an exam on Thursday. T has an exam on one of the days after P and on one of the days before U. Q has an exam on one of the days after R but on one of the days before S. R has an exam on one of the days after V. Who has an exam on Sunday?
(a) R
(b) P
(c) S
(d) V

Q86. In what duration (in years) will Rs. 8,400 fetch a simple interest of Rs. 840 at 4% per annum rate of interest?
(a) 1.5
(b) 2.5
(c) 3.5
(d) 5

Q87. The ratio of the salaries of A and B is 4 : 5. If A's salary is increased by 20% and B's salary is decreased by 10%, what is the new ratio of their salaries?
(a) 14 : 13
(b) 13 : 12
(c) 15 : 14
(d) 16 : 15

Q88. Data stored on a hard disk must be transferred to which memory unit before the CPU can access it?
(a) BIOS memory
(b) CD-ROM storage
(c) Primary memory
(d) Secondary memory

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Q89. Read the given statements and conclusions carefully. You have to take the given statements to be true even if they seem to be at variance from commonly known facts. You have to decide which conclusion/s logically follow/s from the given statements.

Statements:

All hands are legs. Some hands are ears. Some ears are arms.

Conclusions:

(I) Some legs are ears.

(II) Some hands are arms.

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

Q90. Refer to the following number and symbol series and answer the question that follows. All numbers are single-digit numbers only.

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

If all the symbols are dropped from the series, which of the following will be sixth from the right?

(a) 3
(b) 5
(c) 7
(d) 9

Q91. In a certain code language, ‘NICE’ is coded as ‘8246’ and ‘COST’ is coded as ‘3851’.

What is the code for 'C’ in the given code language?

(a) 8
(b) 4
(c) 5
(d) 3

Q92. Find the value of m, satisfying equation:

$$\left(\frac{17}{4}\right)^{9} \times \left(\frac{4}{17}\right)^{8} \times \left(\frac{17}{4}\right)^{15} = \left(\frac{4}{17}\right)^{5m+15}$$

(a)

$$-\frac{32}{5}$$

(b) -31/5
(c)

$$-\frac{39}{5}$$

(d)

$$-\frac{40}{5}$$

Q93. In the fiscal year 2024-25, the total remittances sent home by Indians overseas set a new record of:

(a) 135.46 billion dollars
(b) 156.10 billion dollars
(c) 122.57 billion dollars
(d) 126.76 billion dollars

Q94. Refer to the following letter, number, symbol series and answer the question.

(Left) 5 C £ T R 6 B $ D © 9 6 * 9 # Z 7 2 R $ O K (Right)

If all the symbols are dropped from the series, which of the following will be fourth from the left?11508

(a) D
(b) R
(c) 6
(d) B

Q95. Who among the following introduced the Blue Water Policy to strengthen Portuguese naval power in the Indian Ocean?

(a) Afonso de Albuquerque
(b) Bartholomew Diaz
(c) Francisco De Almeida
(d) Nuno da Cunha

Q96. If a boat travels with a speed of 12 km/hr in still water and the speed of stream is 3 km/hr, what would be the time taken (in hours) by boat to go 60 km downstream?

(a) 6
(b) 4
(c) 5
(d) 9

Q97. A, B, C, D, E and F live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it is numbered 2 and so on, till the topmost floor, which is numbered 6. The product of the floors on which D and B live is 15. A lives immediately above F. The sum of the floors on which C and B live is 7. What is the sum of the floors on which B and F live?

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

Q98. Golu starts from Point A and drives 53 km towards West. He then takes a left turn, drives 50 km, turns left and drives 54 km. He then takes a left turn and drives 60 km. He takes a final left turn, drives 1 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-degree turns only, unless specified.)

(a) 12 km to the North
(b) 11 km to the North
(c) 8 km to the South
(d) 10 km to the South

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Q99. Which of the following is a direct consequence of increased particulate matter (PM2.5) in urban air?

(a) Ocean acidification
(b) Stratospheric ozone depletion
(c) Respiratory health issues
(d) Increased soil fertility

Q100. A is the wife of D. D has a daughter named X and a son named M. M is married to Y. How is Y related to A?

(a) Daughter's son
(b) Father
(c) Son's wife
(d) Son's son

ANSWER KEY

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

SOLUTIONS

Q1. Answer: (d) 49%

Shortcut Trick
=> CP = 100
=> MP = 200 (100% above)
=> Required SP for 2% profit = 102
=> Discount% = (200 − 102) ÷ 200 × 100
=> = 98 ÷ 200 × 100 = 49%
Therefore Answer = 49%
Alternate Method
Given:
=> Marked price is 100% above CP
=> Profit = 2%
Assume:
=> CP = 100
Calculation:
=> MP = 100 + 100 = 200
=> SP for 2% profit = 100 + 2 = 102
=> Discount = MP − SP = 200 − 102 = 98
=> Discount% = (98 ÷ 200) × 100
=> = 49%
Therefore Final Answer: 49%
Additional Information

1. Marked Price: MP = CP + Markup%
2. Profit Formula: SP = CP × (1 + Profit%)
3. Discount Formula: Discount% = (MP − SP) ÷ MP × 100
4. Shortcut: Assume CP = 100 for fast calculation

Q2. Answer: (d) Sutta Pitaka

The correct answer is Sutta Pitaka.

Key Points

• The Sutta Pitaka is one of the three divisions of the Tripitaka, which is the standard collection of scriptures in the Theravada Buddhist tradition. It contains more than 10,000 suttas (teachings) attributed to the Gautama Buddha or his close disciples.

• It primarily records the dialogues and discourses of the Buddha, which were delivered to various audiences, including monks, laypeople, and followers of other religious traditions. These teachings were preserved through oral tradition before being committed to writing in the 1st century BCE in Sri Lanka.

• The Sutta Pitaka is divided into five collections, known as Nikayas: Digha Nikaya (Long Discourses), Majjhima Nikaya (Middle-length Discourses), Samyutta Nikaya (Connected Discourses), Anguttara Nikaya (Numerical Discourses), and Khuddaka Nikaya (Minor Collection).

• The Vinaya Pitaka, another part of the Tripitaka, focuses on the code of discipline and rules for the monastic community (Sangha). It provides guidelines for the behavior of monks and nuns but does not primarily record the dialogues of the Buddha.

• The Abhidhamma Pitaka is the third division, which contains a systematic and philosophical analysis of the Buddha's teachings. It deals with the ultimate reality, consciousness, and mental factors rather than narrative dialogues.

• The Jataka Tales are stories concerning the previous births of Gautama Buddha. While they are part of the Khuddaka Nikaya within the Sutta Pitaka, they are specifically fables and legends rather than the direct doctrinal dialogues recorded in the main body of the Sutta Pitaka.

Additional Information

• Language and Origin: The Tripitaka is written in Pali, an Indo-Aryan language. The Pali Canon is considered the most complete and oldest surviving version of the Buddhist canon. The writing of these texts took place during the reign of King Vattagamani Abhaya of Sri Lanka in the 1st century BCE to ensure the purity of the doctrine was maintained.

• Significance of Sutta Pitaka: This text is the most popular and accessible part of the Tripitaka because it uses similes, parables, and direct dialogues to explain complex spiritual concepts like The Four Noble Truths and the Eightfold Path.

• Digha Nikaya: This collection includes 34 long suttas, including the Mahaparinibbana Sutta, which records the final days and death of the Buddha.

• Khuddaka Nikaya: This is the most diverse collection and includes famous works like the Dhammapada (a collection of 423 verses), the Theragatha (verses of elder monks), and the Therigatha (verses of elder nuns).

• The Concept of Tripitaka: The term Tripitaka literally translates to "Three Baskets". This refers to the traditional method of storing the palm-leaf manuscripts in three separate baskets according to their content: discipline, sermons, and philosophy.

Important Points

• First Buddhist Council: Shortly after the Buddha's death (around 483 BCE), the First Council was held at Rajgriha. It was here that Ananda, the Buddha's closest disciple, recited the Sutta Pitaka, while Upali recited the Vinaya Pitaka to preserve the teachings.

• Fourth Buddhist Council (Sri Lanka): It was during this council in the 1st century BCE that the Pali Canon was finally transcribed onto palm leaves at Alu Vihara. This was a landmark event in Buddhist history as it transitioned the tradition from oral to written.

• Geographical Spread: While Buddhism originated in India, these Pali texts became the foundation for Theravada Buddhism in countries like Sri Lanka, Myanmar, Thailand, Cambodia, and Laos.

Q3. Answer: (a) 16 square kilometers

Shortcut Trick

Shift origin to P(2, 5) by subtracting (2, 5) from all coordinates.

New coordinates: P′(0, 0), Q′(8−2, 1−5) = (6, −4), R′(4−2, 9−5) = (2, 4).

Area = 1/2 |x1y2 − x2y1| = 1/2 |(6 × 4) − (−4 × 2)|.

Area = 1/2 |24 + 8| = 16 sq. km.

Therefore The correct answer is 16 square kilometers.

Alternate Method

Given vertices: P(x1, y1) = (2, 5), Q(x2, y2) = (8, 1), and R(x3, y3) = (4, 9).

Formula for Area = 1/2 |x1(y2 − y3) + x2(y3 − y1) + x3(y1 − y2)|

P (2, 5) Q (8, 1) R (4, 9) Monitoring Zone

=> Area = 1/2 |2(1 − 9) + 8(9 − 5) + 4(5 − 1)|

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=> Area = 1/2 |2(−8) + 8(4) + 4(4)|
=> Area = 1/2 |−16 + 32 + 16|
=> Area = 1/2 |32|
=> Area = 16 sq. km.
Therefore The correct answer is 16 square kilometers.
Additional Information
Shoelace Formula
The area can also be calculated using 1/2 |(x1y2 + x2y3 + x3y1) − (y1x2 + y2x3 + y3x1)|, which is useful for any polygon.
Centroid of a Triangle
The coordinates of the centroid G are given by ((x1+x2+x3)/3, (y1+y2+y3)/3).
Distance Formula
The distance between any two points (x1, y1) and (x2, y2) is given by d = √((x2−x1)² + (y2−y1)²).

Q4. Answer: (d) 190

Shortcut Trick
=> Mean = 50 → take assumed mean = 50
=> Mid values: 10, 30, 50, 70, 90
=> Deviations from 50: −40, −20, 0, +20, +40
=> Sum(f×d) = 6(−40) + 19(−20) + x(0) + 5(20) + y(40) = 0
=> −240 −380 + 100 + 40y = 0 → −520 + 40y = 0 → y = 13
=> Total: 6+19+x+5+13 = 59 → x = 16
=> 7x + 6y = 7(16) + 6(13) = 112 + 78 = 190
Therefore Answer = 190
Alternate Method
Given:
=> Classes: 0-20, 20-40, 40-60, 60-80, 80-100
=> Frequencies: 6, 19, x, 5, y
=> Total = 59, Mean = 50
Step 1: Mid values
=> 10, 30, 50, 70, 90
Step 2: Mean formula
=> Mean = (Σfm) ÷ Σf
=> 50 = [6×10 + 19×30 + x×50 + 5×70 + y×90] ÷ 59
Step 3: Simplify
=> 50×59 = 60 + 570 + 50x + 350 + 90y
=> 2950 = 980 + 50x + 90y
=> 50x + 90y = 1970
=> Divide by 10 → 5x + 9y = 197 ...(1)
Step 4: Total frequency
=> 6 + 19 + x + 5 + y = 59
=> x + y = 29 ...(2)
Step 5: Solve
=> From (2): x = 29 − y
=> Put in (1): 5(29 − y) + 9y = 197
=> 145 − 5y + 9y = 197
=> 145 + 4y = 197 → 4y = 52 → y = 13
=> x = 29 − 13 = 16
=> Required: 7x + 6y = 7(16) + 6(13) = 190
Therefore Final Answer: 190
Additional Information
1. Mean Formula: Mean = Σ(fm) ÷ Σf
2. Assumed Mean Method: Use deviations to simplify calculation

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3. Mid Value: (Lower + Upper) ÷ 2

4. Shortcut: If mean equals mid value → Σfd = 0

Q5. Answer: (a) Windows

The correct answer is Windows.

Key Points

• System Software refers to the programs that are dedicated to managing the computer itself, such as the Operating System, file management utilities, and disk operating systems. It serves as the interface between the hardware and the user applications.

• Windows is a series of operating systems developed by Microsoft. The first version was released in 1985. It is responsible for managing the CPU, memory, and storage, and providing a Graphical User Interface (GUI) for users. Since it manages the hardware and provides a platform for other software to run, it is classified as system software. Hence, statement 1 is correct.

• Paint (or Microsoft Paint) is a simple raster graphics editor that has been included with all versions of Microsoft Windows. It is used for basic image manipulation and drawing. Because it is designed to perform a specific task for the user rather than managing the system, it is classified as Application Software. Hence, statement 2 is incorrect.

• MS Word is a word processing software developed by Microsoft and was first released in 1983. It is a part of the Microsoft Office Suite and is used for creating, editing, and formatting text documents. As its primary function is to assist users in productivity tasks, it is an application software. Hence, statement 3 is incorrect.

• Power Point is a presentation program, also part of the Microsoft Office Suite, launched in 1987. It allows users to create slide-based presentations for business or educational purposes. Like MS Word and Paint, it is designed for end-user tasks and is therefore application software. Hence, statement 4 is incorrect.

Additional Information

• Types of System Software:

• Operating Systems (OS): Software that communicates with the hardware and allows other programs to run. Examples include Linux, Unix, macOS, and Android.

• Device Drivers: Special programs that allow the operating system to communicate with specific hardware devices like printers, scanners, and video cards.

• Firmware: Permanent software programmed into a Read-Only Memory (ROM). An example is the BIOS (Basic Input/Output System).

• Utility Software: Programs designed to help analyze, configure, optimize, or maintain a computer, such as antivirus software, disk defragmenters, and compression tools.

• Features of System Software:

• It is written in low-level languages like Assembly or C to interact directly with hardware.

• It is generally fast and difficult to design compared to application software.

• It runs in the background and is essential for the booting process of the computer.

• Microsoft Windows History:

• The most widely used versions include Windows XP (2001), Windows 7 (2009), Windows 10 (2015), and the latest Windows 11, which was released in October 2021.

• It uses NTFS (New Technology File System) for organizing data on hard drives.

Important Points

• Difference between System and Application Software:

• Purpose: System software manages system resources, while application software performs specific tasks for users (like browsing the web with Google Chrome or calculating data in Excel).

• Dependency: Application software cannot run without system software, but system software can run independently of application software.

• Programming: System software uses complex logic and machine-level instructions, whereas application software is often written in high-level languages like Java, Python, or C++.

• Language Translators: These are also considered system software. They include Compilers, Interpreters, and Assemblers, which convert source code into machine code that the CPU can execute.

Q6. Answer: (c) EHD 111

The logic followed here is:

So, 'EHD 111' will replace the question mark in the given series.

Hence, the correct answer is "Option 3"

Q7. Answer: (c) 18 per cent

The correct answer is 18 per cent.

Key Points

• The Indian Rupee was devalued in July 1991 as a response to a severe Balance of Payments (BoP) crisis that threatened the nation's economic stability.

• The devaluation was carried out in two distinct steps by the Reserve Bank of India (RBI) under the leadership of Governor S. Venkitaramanan and Finance Minister Dr. Manmohan Singh.

• On July 1, 1991, the RBI announced a downward adjustment of the rupee's value by approximately 9 per cent against major international currencies like the US Dollar and Pound Sterling.

• Shortly after, on July 3, 1991, a second round of devaluation was implemented, reducing the value by another 10 to 11 per cent.

• The cumulative effect of these two adjustments resulted in a total devaluation of approximately 18 per cent to 19 per cent.

• The primary goal of this move was to make Indian exports cheaper and more competitive in the global market while making imports more expensive to curb the outflow of foreign exchange.

Additional Information

• Context of the 1991 Crisis: India faced a monumental economic crisis in 1991 due to high fiscal deficits, rising inflation, and the impact of the Gulf War (1990-91), which led to a surge in crude oil prices.

• Foreign Exchange Reserves: By June 1991, India’s forex reserves had depleted to about $1.2 billion, which was barely sufficient to pay for three weeks of essential imports.

• Gold Pledging: To avoid defaulting on international debt obligations, the Government of India had to pledge its gold reserves. Approximately 47 tonnes of gold were shipped to the Bank of England and 20 tonnes to the Union Bank of Switzerland to secure emergency loans.

• LPG Reforms: The devaluation was a precursor to the broader New Economic Policy of 1991, which introduced Liberalization, Privatization, and Globalization (LPG) to open up the Indian economy.

• Historical Devaluations: India has experienced major currency devaluations previously in 1949 (linked to the British Pound) and in 1966, when the rupee was devalued by 36.5 per cent under the Indira Gandhi administration.

Important Points

• Devaluation vs. Depreciation: Devaluation is a deliberate downward adjustment of a country's currency value by the government or central bank in a fixed exchange rate system. In contrast, depreciation occurs due to market forces of supply and demand.

• Exchange Rate Management: Following the 1991 crisis, India moved toward a more flexible system. In 1992, the Liberalized Exchange Rate Management System (LERMS) was introduced, eventually leading to a market-determined exchange rate for the current account in 1993.

• Impact on Trade: While devaluation helps in boosting exports, it also increases the burden of external debt and the cost of imported raw materials and fuel, contributing to imported inflation.

• Policy Shift: The July 1991 devaluation signaled the end of the "License Raj" and the beginning of market-oriented reforms led by Prime Minister P.V. Narasimha Rao.

Q8. Answer: (b) Is larger

The correct answer is Is larger.

Key Points

• The body has a mass of 1 Kg and starts from a height of 100 m at time t = 0. Since it starts from rest, the initial velocity (u) is 0 m/s.

• According to the first equation of motion, $v = u + gt$, where g is the acceleration due to gravity (approximately 9.8 m/s^2 or 10 m/s^2). As time (t) increases, the final velocity (v) of the falling body increases linearly.

• At 3 seconds, the velocity is $v = 0 + (9.8 \times 3) = 29.4$ m/s. At 4 seconds, the velocity is $v = 0 + (9.8 \times 4) = 39.2$ m/s.

• The Kinetic Energy (KE) of an object is calculated using the formula $KE = \frac{1}{2} mv^2$. This means that Kinetic Energy is directly proportional to the square of the velocity.

• Because the velocity at 4 seconds is greater than the velocity at 3 seconds, the square of the velocity will also be higher, resulting in a larger kinetic energy at the 4-second mark compared to the 3-second mark. Hence, the statement that kinetic energy is larger is correct.

Additional Information

• Concept of Free Fall:

• Free fall occurs when an object falls solely under the influence of gravity. In this state, the acceleration is constant at 9.8 m/s^2 near the Earth's surface.

• The weight of the object does not affect the rate of acceleration in a vacuum, but the force of gravity acting on a 1 Kg mass is approximately 9.8 Newtons.

• Law of Conservation of Energy:

• As the body falls from 100 m, its Potential Energy (PE = mgh) is converted into Kinetic Energy.

• At the maximum height of 100 m, the Potential Energy is at its peak (1 Kg × 9.8 m/s² × 100 m = 980 Joules), and Kinetic Energy is zero.

• Just before hitting the ground, all Potential Energy is transformed into Kinetic Energy, assuming no air resistance.

• Calculation of Distance Traveled:

• To ensure the body hasn't hit the ground by 4 seconds, we use $s = ut + ½ gt^2$.

• At 4 seconds, $s = 0 + ½ (9.8) (4)^2 = 4.9 × 16 = 78.4$ m. Since 78.4 m is less than the initial height of 100 m, the body is still in motion.

• Factors Affecting Kinetic Energy:

• The Kinetic Energy depends on two main variables: mass and speed. If the mass is doubled, the KE doubles. If the speed is doubled, the KE increases four times.

• In this scenario, since the mass remains 1 Kg, the change in energy is solely due to the increasing speed over time.

Important Points

• Numerical Values: The Kinetic Energy at 3 seconds is $½ × 1 × (29.4)^2 = 432.18$ Joules. The Kinetic Energy at 4 seconds is $½ × 1 × (39.2)^2 = 768.32$ Joules.

• Acceleration due to Gravity (g): This value varies slightly depending on the location on Earth (higher at the poles and lower at the equator), but 9.8 m/s² is the standard data used for physics calculations.

• Units: Energy is measured in Joules (J), mass in Kilograms (Kg), and velocity in meters per second (m/s) in the SI system.

Q9. Answer: (c) SAO 32

The logic followed here is:

So, 'SAO 32' will replace the question mark in the given series.

Hence, the correct answer is "Option 3"

Q10. Answer: (b) 24

Shortcut Trick

=> Amount doubles in 8 years => Growth factor = 2

=> 8 times = 2^3

=> Time for 8 times = 3 × 8 = 24 years

Therefore Answer = 24 years

Alternate Method

Given:

=> Amount doubles in 8 years

Concept:

=> A = P(1 + r)^t

Step 1:

=> 2P = P(1 + r)^8

=> (1 + r)^8 = 2

Step 2:

=> For 8 times:

=> 8P = P(1 + r)^t

=> $(1 + r)^t = 8 = 2^3$

Step 3:

=> $(1 + r)^t = [(1 + r)^8]^3$

=> => t = 8 × 3 = 24 years

Therefore Final Answer: 24 years

Additional Information

1. Compound Interest: A = P(1 + r)^t

2. Doubling Concept: If amount doubles → growth factor = 2

3. Exponential Growth: Multiples follow powers (2, 4, 8 = 2^3)

4. Shortcut: Time multiplies with power

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Q11. Answer: (a) MIL

The logic followed here is based on the alphabetical position pattern between the corresponding letters in each cluster:

Option 1: MIL

Option 2: QMO

Option 3: OKM

Option 4: SOQ

Thus, MIL does not follow this pattern.

Hence, the odd one out is Option 1.

Q12. Answer: (c) 74%

Shortcut Trick

=> 1 dozen = 12 articles

=> CP per article = 400 ÷ 12

=> SP per article = 58

=> Profit% = [(58 − 400/12) ÷ (400/12)] × 100

=> = [(696 − 400)/400] × 100 = 296/400 × 100 = 74%

Therefore Answer = 74%

Alternate Method

Given:

=> Dozens = 52

=> CP per dozen = 400

=> SP per article = 58

Calculation:

=> Total articles = 52 × 12 = 624

=> Total CP = 52 × 400 = 20800

=> Total SP = 624 × 58 = 36192

=> Profit = 36192 − 20800 = 15392

=> Profit% = (15392 ÷ 20800) × 100

=> = 74%

Therefore Final Answer: 74%

Additional Information

1. Unit Conversion: 1 dozen = 12 units

2. Profit Formula: Profit% = (Profit ÷ CP) × 100

3. Per Unit Method: Compare CP and SP per article

4. Shortcut: Multiply SP to match denominator for fast calc

Q13. Answer: (b) Dams

The correct answer is Dams.

Key Points

• Pandit Jawaharlal Nehru, the first Prime Minister of India, famously referred to Dams as the “temples of modern India” during the inauguration of the Bhakra-Nangal Dam in July 1954.

• He believed that these multi-purpose river valley projects would be the foundation for the economic prosperity of the country by integrating agricultural development with rapid industrialization.

• The term "temple" was used metaphorically to signify that these engineering marvels were the new centers of worship for a nation seeking self-reliance and modernity after centuries of colonial rule.

• Nehru envisioned that Dams would solve multiple problems simultaneously, including irrigation for farmers, flood control, and the generation of hydroelectric power for burgeoning industries.

• The Bhakra-Nangal project, located in Himachal Pradesh on the Sutlej River, served as a symbol of national pride and scientific progress during the early years of independence.

Additional Information

• Major Dam Projects in India:

• The Hirakud Dam, built across the Mahanadi River in Odisha, was another significant project started during the First Five-Year Plan. It holds the record for being the longest earthen dam in the world.

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• The Damodar Valley Corporation (DVC), established in 1948, was the first multipurpose river valley project of independent India, inspired by the Tennessee Valley Authority (TVA) in the United States.

• The Tehri Dam in Uttarakhand, located on the Bhagirathi River, is currently the highest dam in India, standing at a height of 260.5 meters.

• First Five-Year Plan (1951–1956):

• This plan focused heavily on the primary sector, specifically agriculture and irrigation, to address food shortages.

• Large-scale investments were made in Dams and irrigation canals to ensure that India could become self-sufficient in food grains.

• Industrialization and Infrastructure:

• While Nehru emphasized Dams, his vision of modern India also included Heavy Industries. During the Second Five-Year Plan (1956–1961), major Steel Plants were set up in Bhilai (Chhattisgarh), Rourkela (Odisha), and Durgapur (West Bengal) with foreign collaboration.

• These plants, along with scientific research institutes, were also considered part of the broader infrastructure intended to modernize the Indian economy.

Important Points

• Scientific Temper: Jawaharlal Nehru promoted a "scientific temper", encouraging Indians to move away from superstition and embrace technology and rationality. The Indian Institutes of Technology (IITs), the first of which was established at Kharagpur in 1951, were key to this vision.

• Role of Other Options:

• Hospitals and Schools: Although Nehru recognized education and health as pillars of social development, they were not the specific subjects of the "temples of modern India" quote in the context of the 1954 speech. Hence, these options are incorrect.

• Parliament: As the seat of democracy, the Parliament of India was central to Nehru's political philosophy, but it was not the specific infrastructure he labeled as the temple of modernity in his developmental discourse. Hence, this option is incorrect.

• Evolution of Perspective: In later decades, the construction of Big Dams faced significant opposition from social activists like Medha Patkar (associated with the Narmada Bachao Andolan) due to the displacement of tribal populations and environmental degradation, leading to a shift in how these "temples" are viewed today.

Q14. Answer: (a) 401

Shortcut Trick

=> Use weighted average directly

=> Total members = 46 + 15 + 11 = 72

=> Total amount = 46×496 + 15×106 + 11×406

=> = 22816 + 1590 + 4466 = 28872

=> Average = 28872 ÷ 72 = 401

Therefore Answer = 401

Alternate Method

Given:

=> Group A: 46 members, avg = 496

=> Group B: 15 members, avg = 106

=> Group C: 11 members, avg = 406

Formula:

=> Overall average = (Total expenditure) ÷ (Total members)

Calculation:

=> Total members = 46 + 15 + 11 = 72

=> Total expenditure = 46×496 + 15×106 + 11×406

=> = 22816 + 1590 + 4466 = 28872

=> Average = 28872 ÷ 72 = 401

Therefore Final Answer: 401

Additional Information

1. Weighted Average: (Σ f×x) ÷ Σ f

2. Total Value: Average × Number of items

3. Shortcut: Multiply each avg with its group size

4. Use Case: When groups have different sizes

Q15. Answer: (c) Tea and coffee

The correct answer is Tea and coffee.

Key Points

• Plantation crops are those that are grown on a large scale in a contiguous area, owned and managed by an individual or a company. These include crops like tea, coffee, rubber, cocoa, coconut, areca nut, oil palm, and cashew.

• Assam is globally recognized as the largest tea-producing region in the world by contiguous area. It contributes approximately 50% of India's total tea production. The Brahmaputra Valley and Barak Valley are the primary locations for these plantations.

• Karnataka is the leading producer of coffee in India, accounting for nearly 71% of the country's total output. The major coffee-growing districts in the state are Kodagu (Coorg), Chikmagalur, and Hassan.

• While rice and wheat are major food crops, they are categorized as cereal crops or staple crops rather than plantation crops. Hence, statement 1 is incorrect.

• Barley and ragi are coarse cereals (millets), with Karnataka being a major producer of ragi, but they do not fall under the commercial "plantation" category. Hence, statement 2 is incorrect.

• Tea and coffee are the definitive plantation crops for Assam and Karnataka respectively. Hence, statement 3 is correct.

• Sugarcane is a cash crop and mustard is an oilseed; neither is typically classified as a plantation crop in the context of these specific states. Hence, statement 4 is incorrect.

Additional Information

• Tea (Camellia sinensis):

• It is a beverage crop that requires a tropical and sub-tropical climate with deep, fertile, well-drained soil rich in humus and organic matter.

• Tea bushes require warm and moist frost-free climates all through the year. Frequent showers evenly distributed over the year ensure continuous growth of tender leaves.

• India is the second-largest producer of tea in the world after China as of recent global agricultural data.

• Coffee (Coffea):

• Coffee cultivation in India was reportedly started by Baba Budan, a 17th-century Sufi saint, who brought seven magic beans from Yemen and planted them in the Chandragiri Hills of Karnataka.

• India primarily produces two types of coffee: Arabica (known for its delicate flavor) and Robusta (known for its strong flavor and higher caffeine content).

• Coffee plantations require a hot and humid climate with temperatures between 15°C and 28°C and rainfall between 150 to 250 cm.

• Economic Impact: These crops are highly export-oriented and act as significant foreign exchange earners for the Indian economy. They also provide large-scale employment, especially for women in rural sectors.

Important Points

• Characteristics of Plantation Farming: It involves high capital investment, modern scientific methods of cultivation, monoculture (growing a single crop over a large area), and is usually linked with a well-developed network of transport and processing industries.

• Geographical Locations:

• Apart from Assam, tea is also grown in West Bengal (Darjeeling and Jalpaiguri districts), Tamil Nadu, and Kerala.

• Apart from Karnataka, coffee is also grown in Kerala (Wayanad) and Tamil Nadu (Nilgiris).

• Soil Requirements: Tea thrives in slightly acidic soil (pH 4.5 to 5.5), whereas Coffee prefers rich, friable loam with good sub-soil drainage.

• Major Organizations: The Tea Board of India (headquartered in Kolkata) and the Coffee Board of India (headquartered in Bengaluru) are the statutory bodies responsible for the development of these industries.

Q16. Answer: (c) 9 November 1995

The correct answer is 9 November 1995.

Key Points

• The Legal Services Authorities Act was enacted by the Parliament of India in 1987, but it officially came into force on 9 November 1995.

• The primary objective of this Act is to provide free and competent legal services to the weaker sections of society to ensure that opportunities for securing justice are not denied to any citizen by reason of economic or other disabilities.

• It was established to give a statutory base to legal aid programs in India on a uniform pattern throughout the country, following the mandate of Article 39A of the Constitution of India.

• The Act led to the constitution of the National Legal Services Authority (NALSA) at the central level to monitor and evaluate the implementation of legal aid programs.

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• Since the Act commenced on this specific date, 9 November is celebrated annually as National Legal Services Day across the nation to create awareness about the availability of free legal aid.

Additional Information

• Constitutional Provision: Article 39A was inserted by the 42nd Amendment Act, 1976, which directs the State to provide free legal aid by suitable legislation or schemes.

• Institutional Hierarchy: The Act provides for a three-tier structure: the National Legal Services Authority (NALSA) at the top, the State Legal Services Authority (SLSA) headed by the Chief Justice of the High Court, and the District Legal Services Authority (DLSA) headed by the District Judge.

• Eligibility Criteria: Under Section 12 of the Act, specific categories of people are eligible for free legal services, including women and children, members of Scheduled Castes (SC) and Scheduled Tribes (ST), industrial workmen, victims of mass disasters, and individuals with an annual income below a specified limit.

• Functions: The authorities are responsible for organizing Lok Adalats, promoting legal literacy, and providing legal counseling to ensure the rule of law reaches the grassroots level.

Important Points

• Lok Adalats: One of the most significant features of the Legal Services Authorities Act, 1987, is the statutory status granted to Lok Adalats. An award made by a Lok Adalat is deemed to be a decree of a civil court and is final and binding on all parties.

• Nature of Aid: Legal aid includes the payment of court fees, expenses for witnesses, preparation of pleadings, and providing the services of advocates in legal proceedings.

• National Legal Services Day: The year 1995 marked a turning point in the Indian judicial system as the first National Legal Services Day was observed, emphasizing the Right to Justice for all.

• Patron-in-Chief: The Chief Justice of India serves as the Patron-in-Chief of NALSA, while the second senior-most judge of the Supreme Court serves as the Executive Chairman.

Q17. Answer: (a) One

Given: (Left) % 1 7 3 < $ 3 7 4 ^ < & # 5 < 3 ^ % > \ & (Right)

Now,

We need to find symbols which are immediately preceded by a number and also immediately followed by a number.

So, needed pattern is: Number – Symbol – Number

(Left) % 1 7 3 < $ 3 7 4 ^ < & # 5 < 3 ^ % > \ & (Right)

Only One symbols satisfy the condition.

Hence, the correct answer is Option 1.

Q18. Answer: (c) Pacific Ocean Rim

The correct answer is Pacific Ocean Rim.

Key Points

• The Ring of Fire, also scientifically known as the Circum-Pacific Belt, is a major area in the basin of the Pacific Ocean where many earthquakes and volcanic eruptions occur.

• It is a horseshoe-shaped belt that stretches for about 40,000 kilometers (25,000 miles).

• This region is associated with a nearly continuous series of oceanic trenches, volcanic arcs, and volcanic belts as well as plate movements.

• It contains over 450 volcanoes, which accounts for approximately 75% of the world's active and dormant volcanoes.

• Roughly 90% of the world's earthquakes and 81% of the world's largest earthquakes occur along the Ring of Fire.

• The geological activity is a result of plate tectonics, specifically the movement, collision, and destruction of lithospheric plates under and around the Pacific Ocean.

Additional Information

• East African Rift:

• This is an active continental rift zone in East Africa.

• It began developing around the onset of the Miocene era, approximately 22-25 million years ago.

• It represents a divergent plate boundary where the African Plate is in the process of splitting into two tectonic plates, called the Somali Plate and the Nubian Plate.

• Mid Atlantic Ridge:

• This is a mid-ocean ridge located along the floor of the Atlantic Ocean.

• It is part of the longest mountain range in the world and marks a divergent plate boundary.

• In the North Atlantic, it separates the Eurasian and North American plates, whereas in the South Atlantic, it separates the African and South American plates.

• Indian Ocean Floor:

• The Indian Ocean floor is characterized by several major features like the Ninety East Ridge and the Central Indian Ridge.

• While it has seismic activity, it does not possess the concentrated, continuous "ring" of subduction zones that defines the Pacific Ring of Fire.

• Notable Volcanoes in the Ring of Fire:

• Mount Fuji: Located in Japan, it is an active stratovolcano that last erupted in 1707.

• Mount Saint Helens: An active volcano located in Washington State, USA, famous for its major eruption in 1980.

• Krakatoa: An island volcano in Indonesia known for its catastrophic eruption in 1883.

Important Points

• Subduction Zones: Most of the volcanic activity in the Ring of Fire occurs at convergent boundaries where tectonic plates collide and one is forced under another into the mantle.

• Deep Trenches: The region hosts the Mariana Trench, which includes the Challenger Deep, the deepest known point in the Earth's oceans at approximately 10,935 meters.

• Countries Involved: The Ring of Fire affects countries including Chile, Mexico, the United States, Canada, Russia, Japan, the Philippines, Indonesia, New Zealand, and Antarctica.

• Tectonic Plates: The major plates responsible for the activity include the Pacific Plate, Philippine Plate, Juan de Fuca Plate, Cocos Plate, and Nazca Plate.

Q19. Answer: (a) 11

Shortcut Trick

=> Second equation: $110 + x - x^2 = 0 \Rightarrow x^2 - x - 110 = 0$

=> Roots: $x = 11, -10$

=> First equation: $x^2 - 21x + 110 = 0 \Rightarrow (x - 10)(x - 11) = 0$

=> Roots: $x = 10, 11$

=> Common root = 11

Therefore Answer = 11

Alternate Method

Given Equations:

=> $x^2 - 21x + 110 = 0$

=> $110 + x - x^2 = 0$

Step 1: Simplify second equation

=> $110 + x - x^2 = 0$

=> $x^2 - x - 110 = 0$

Step 2: Solve both equations

=> $x^2 - 21x + 110 = 0$

=> $= (x - 10)(x - 11)$

=> Roots = 10, 11

=> $x^2 - x - 110 = 0$

=> $= (x - 11)(x + 10)$

=> Roots = 11, −10

Step 3: Common root

=> Common value = 11

Therefore Final Answer: 11

Additional Information

1. Quadratic Roots: $ax^2 + bx + c = 0$
2. Factorization: Split middle term for quick solving
3. Common Root: Value satisfying both equations
4. Shortcut: Convert both equations to standard form

Q20. Answer: (b) Tamil Nadu

The correct answer is Tamil Nadu.

Key Points

• Kudankulam Nuclear Power Plant (KKNPP) is located in the Tirunelveli district of the southern state of Tamil Nadu. This makes

the option Tamil Nadu the correct answer.

• The project was established through an Inter-Governmental Agreement signed between India and the former USSR (now Russia) in November 1988. However, the actual construction began much later in March 2002.

• It is the highest capacity nuclear power station in India, intended to have a total capacity of 6000 MW upon completion. Currently, it operates with VVER-1000 reactors, which are Pressurized Water Reactors (PWR) of Russian design.

• The first unit was synchronized with the southern power grid in 2013, and the second unit became operational in 2016. Each of these units has a capacity of 1000 MW.

• The plant is a significant milestone in India-Russia strategic cooperation in the field of peaceful use of nuclear energy.

Additional Information

• Andhra Pradesh: This state does not currently host the Kudankulam plant. However, it is the proposed site for the Kovvada Nuclear Power Project in the Srikakulam district, which is planned to be developed in collaboration with the United States. Hence, this option is incorrect.

• Kerala: As of now, there are no operational nuclear power plants in the state of Kerala. The state primarily relies on hydroelectric and thermal power. Hence, this option is incorrect.

• Karnataka: This state is home to the Kaiga Generating Station, located in the Uttara Kannada district. It has been operational since 2000 and uses Pressurized Heavy Water Reactors (PHWR). Hence, this option is incorrect.

• Other Nuclear Plants in India:

• Tarapur Atomic Power Station: Located in Maharashtra, it is the first commercial nuclear power station built in India (1969).

• Rajasthan Atomic Power Station (RAPS): Located at Rawatbhata in Rajasthan.

• Narora Atomic Power Station: Located in Bulandshahr district, Uttar Pradesh.

• Kakrapar Atomic Power Station: Located near Vyara in Gujarat.

• Madras Atomic Power Station (MAPS): Located at Kalpakkam in Tamil Nadu, which is another plant in the same state as Kudankulam.

Important Points

• Operator: All nuclear power plants in India are operated by the Nuclear Power Corporation of India Limited (NPCIL), a Public Sector Undertaking (PSU) under the Department of Atomic Energy (DAE).

• Safety Features: KKNPP is equipped with advanced safety systems, including "passive" safety features that do not require an active power supply or operator intervention to shut down the reactor in case of emergencies.

• Three-Stage Nuclear Power Programme: India’s nuclear strategy was formulated by Dr. Homi J. Bhabha in the 1950s. It aims to utilize India's vast Thorium reserves.

• Stage 1: Pressurized Heavy Water Reactors (PHWR).

• Stage 2: Fast Breeder Reactors (FBR).

• Stage 3: Thorium-based Reactors.

• Current Status: As of 2024, India has 24 nuclear reactors in operation across 7 nuclear power plants, with a total installed capacity of over 8000 MW.

Q21. Answer: (b) M. S. Subbulakshmi

The correct answer is M. S. Subbulakshmi.

Key Points

• M. S. Subbulakshmi (Madurai Shanmukhavadivu Subbulakshmi) was a legendary Indian Carnatic singer born on September 16, 1916, in Madurai, Tamil Nadu.

• She made history in 1998 by becoming the first musician to be ever honored with the Bharat Ratna, which is India's highest civilian award.

• She was a leading exponent of Carnatic music, a system of music commonly associated with South India, and was often referred to as the "Queen of Music" by Pandit Jawaharlal Nehru.

• In 1966, she became the first Indian musician to perform at the United Nations General Assembly, representing India on a global cultural platform.

• She was also the first Indian musician to receive the Ramon Magsaysay Award in 1974, an honor often regarded as Asia's Nobel Prize, for her "public service" through her music.

Additional Information

• Aruna Sairam:

• She is a distinguished Carnatic vocalist and collaborator known for her global performances and contribution to South Indian classical music.

• She was awarded the Padma Shri, the fourth-highest civilian award in India, in the year 2009.

• In 2018, she was honored with the Sangita Kalanidhi award by the Music Academy.

• Kishori Amonkar:
• She was a pre-eminent Indian classical vocalist belonging to the Jaipur-Atrauli gharana of Hindustani music.
• Unlike Subbulakshmi, her expertise was in the Hindustani tradition of North India rather than Carnatic music.
• She received the Padma Bhushan in 1987 and the Padma Vibhushan in 2002.
• Shubha Mudgal:
• She is a well-known Indian singer of Hindustani classical music, specializing in genres like Khayal, Thumri, and Dadra.
• She was awarded the Padma Shri in 2000 for her contributions to the field of arts.
• She is also known for her work in Indian pop and fusion music.
Important Points
• Other Major Awards of M. S. Subbulakshmi:
• She was awarded the Padma Bhushan in 1954 and the Padma Vibhushan in 1975.
• She received the Sangeet Natak Akademi Award in 1956 and the Sangeeta Kalanidhi in 1968.
• Contribution to Cinema:
• In her early years, she acted in several films, most notably Meera (1945), where she played the role of the Bhakti saint Meera Bai, gaining national recognition for her devotional singing.
• Philanthropy:
• A significant portion of the royalty and earnings from her concerts and recordings was donated to various charitable causes and social welfare institutions across India.

Q22. Answer: (c) -45

Shortcut Trick
=> Solve ÷ and × first
=> (−56) ÷ (−14) = 4
=> (−4) × 8 = −32
=> Now: −9 − 4 − 32
=> = −45
Therefore Answer = −45
Alternate Method
Given Expression:
=> (−9) − (−56) ÷ (−14) + (−4) × 8
Step 1: Division
=> (−56) ÷ (−14) = 4
Step 2: Multiplication
=> (−4) × 8 = −32
Step 3: Substitute
=> = −9 − 4 + (−32)
Step 4: Simplify
=> = −9 − 4 − 32
=> = −45
Therefore Final Answer: −45
Additional Information
1. BODMAS Rule: Division and multiplication before addition/subtraction
2. Sign Rule: (− ÷ −) = +, (− × +) = −
3. Simplification Tip: Solve stepwise to avoid sign errors
4. Shortcut: Combine negative terms together

Q23. Answer: (a) 12 m

Shortcut Trick
=> Volume = $\pi r^2 h$
=> 1584 = (22/7) × r^2 × 14
=> (22/7)×14 = 44 => 1584 = 44r^2
=> r^2 = 1584 ÷ 44 = 36 => r = 6
=> Diameter = 2r = 12 m

Therefore Answer = 12 m

Alternate Method

Given:

=> Volume = 1584 m^3

=> Height = 14 m

=> $\pi = 22/7$

Formula:

=> Volume = $\pi r^2 h$

14 m Diameter

Calculation:

=> $1584 = (22/7) \times r^2 \times 14$

=> $1584 = 44r^2$

=> $r^2 = 1584 \div 44 = 36$

=> r = 6 m

=> Diameter = 2r = 12 m

Therefore Final Answer: 12 m

Additional Information

1. Cylinder Volume: $\pi r^2 h$
2. Diameter: d = 2r
3. Value of π: 22/7 (approximation)
4. Shortcut: Simplify constants first

Q24. Answer: (a) Parallel Venation and Fibrous Root

The correct answer is Parallel Venation and Fibrous Root.

Key Points

• Bamboo belongs to the Poaceae family, which is commonly known as the grass family. As it is a monocotyledon (monocot), it naturally exhibits characteristics common to this group, such as Parallel Venation in its leaves and a Fibrous Root system. Hence, the statement regarding Parallel Venation and Fibrous Root is correct.

• Parallel Venation is a feature where the veins (vascular bundles) in the leaf run parallel to each other from the base to the tip of the leaf blade. This is a defining trait of monocots like bamboo, wheat, and maize. Hence, the option involving parallel venation is correct.

• A Fibrous Root system consists of a cluster of thin, branching roots that grow from the base of the stem. Unlike a taproot, there is no single dominant root; instead, all roots are of similar size and length. This system provides a large surface area for nutrient absorption and helps prevent soil erosion. Hence, the option involving fibrous roots is correct.

• In contrast, Reticulate Venation and Tap Root systems are primary characteristics of dicotyledonous (dicot) plants. Reticulate venation forms a net-like pattern on the leaf, while a taproot system features one thick main root (primary root) that grows deep into the soil. Hence, options involving reticulate venation or tap roots are incorrect for bamboo.

Additional Information

• Characteristics of Bamboo:

• Growth Rate: Bamboo is known as one of the fastest-growing plants in the world. Some species can grow up to 35 inches (91 cm) in a single 24-hour period.

• Lifespan and Flowering: Many bamboo species have a unique flowering cycle. They flower gregariously (all individuals of a species flower at once) after long intervals, ranging from 60 to 130 years. After flowering and producing seeds, the plant usually dies.

• Distribution: It is found in diverse climates, from tropical regions to cold mountains. It is native to every continent except Europe and Antarctica. India is the second-richest country in terms of bamboo genetic resources, after China.

• Uses: Bamboo is used extensively in construction (scaffolding), paper production, textiles (bamboo fiber), and as a food source (bamboo shoots).

• Leaf Venation Comparison:

• Parallel Venation: Observed in Monocots. Examples include Rice, Banana, Grass, and Sugarcane.

• Reticulate Venation: Observed in Dicots. Examples include Mango, Hibiscus, Peepal, and Neem.

• Root System Comparison:

• Fibrous Roots: Found in plants that lack a persistent primary root. They are shallow and widespread. Common in Onion, Coconut, and Maize.

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• Taproots: These grow vertically downwards. They are excellent for storing food and reaching deep water tables. Common in Carrot, Radish, and Mustard.

Important Points

• The Indian Forest Act, 1927: In 2017, the Indian Government amended the Indian Forest Act to remove bamboo from the definition of a 'tree' when grown in non-forest areas. This allows people to cultivate and transport bamboo without needing a permit, boosting the bamboo economy and farmers' income.

• World Bamboo Day: It is celebrated annually on September 18 to raise awareness about the environmental and economic benefits of bamboo.

• Rhizomes: Bamboo spreads primarily through rhizomes, which are underground horizontal stems. There are two main types: Clumping (pachymorph) and Running (leptomorph). This allows bamboo to colonize areas rapidly without relying solely on seeds.

Q25. Answer: (c) Sub Saharan Africa

The correct answer is Sub Saharan Africa.

Key Points

• According to the United Nations World Population Prospects (2019), Sub-Saharan Africa is the region projected to contribute most significantly to global population growth. It is expected that more than half of the global population growth between 2019 and 2050 will occur in this region.

• The population of Sub-Saharan Africa is projected to double by 2050, growing by 99% compared to 2019 levels. This rapid growth is primarily driven by high fertility rates and a relatively young age structure.

• The report identifies nine countries that will account for more than half of the projected growth of the global population between 2019 and 2050. These include India, Nigeria, Pakistan, the Democratic Republic of the Congo, Ethiopia, the United Republic of Tanzania, Indonesia, Egypt, and the United States of America. Noticeably, several of these are in the African continent.

• In contrast, regions like Eastern and Southeastern Asia are seeing a significant slowdown in growth. While currently home to a large population, fertility rates in countries like China and Japan have fallen significantly, leading to projections of population aging and potential decline. Hence, this option is incorrect regarding "most significant contribution to growth."

• Europe and North America are experiencing very slow growth, with much of the increase attributed to international migration rather than natural increase. Many European countries are expected to see a population decrease by 2050 due to low fertility rates (below 2.1 births per woman). Hence, this option is incorrect.

• Latin America and the Caribbean have experienced a rapid decline in fertility over the past few decades. By 2050, the population of this region is expected to grow, but at a much slower pace than Africa, and it is projected to peak around 2058 before declining. Hence, this option is incorrect.

Additional Information

• Global Population Projections: The world’s population is projected to increase from 7.7 billion in 2019 to 8.5 billion in 2030, 9.7 billion in 2050, and 10.9 billion by 2100.

• Central and Southern Asia: This is the second-largest contributor to growth, with India projected to surpass China as the world’s most populous country around 2027.

• Aging Global Population: The 2019 report highlights that the 65+ age group is the fastest-growing segment. By 2050, one in six people in the world will be over age 65, up from one in eleven in 2019.

• Life Expectancy: Global average life expectancy increased from 64.2 years in 1990 to 72.6 years in 2019 and is expected to reach 77.1 years by 2050. However, Least Developed Countries (LDCs) still lag behind the global average by about 7 years.

• Migration Impact: For many high-income countries, the influx of migrants has become the sole driver of population growth as deaths outpace births. Between 2010 and 2020, fourteen countries saw a net inflow of more than one million migrants.

Important Points

• Total Fertility Rate (TFR): The global TFR fell from 3.2 births per woman in 1990 to 2.5 in 2019. It is projected to decline further to 2.2 by 2050. A TFR of 2.1 is generally needed for replacement-level fertility.

• Demographic Dividend: Many parts of Sub-Saharan Africa and Southern Asia have a high proportion of working-age individuals (25-64 years). This provides an opportunity for accelerated economic growth, provided there are investments in education and health.

• Sustainable Development Goals (SDGs): The rapid population growth in Sub-Saharan Africa poses challenges for achieving SDGs related to poverty, hunger, health, and education, necessitating robust international cooperation and policy intervention.

Q26. Answer: (c) 510

BODMAS Table:

Given equation: 95 ÷ 5 + 378 × 3 − 161 = ?

Now, interchanging the signs: ↔ − and × ↔ ÷

95 × 5 − 378 ÷ 3 + 161

=> 95 × 5 − (378 ÷ 3) + 161

=> 475 − 126 + 161
=> 349 + 161
=> 510
Hence, the correct answer is "Option 3".

Q27. Answer: (d) MASK-MSKA-SAMK

The logic followed here is:
Given:
CLUB → CUBL → ULCB
HANG → HNGA → NAHG
Now, Checking the given options:
Option 1) NEST → ETNS → TNSE
Option 2) EARN → ARNE → ENRA
Option 3) BALD → DLAB → LADB
Option 4) MASK → MSKA → SAMK
Hence, the correct answer is Option 4.

Q28. Answer: (d) Four

Given: Seven people B, C, O, P, Q, R and S are sitting in a straight line facing north.
Q sits second from the left end.
Only two people sit between Q and R.
Only one person sits between R and S.
C sits immediately to the right of S.
O sits immediately to the left of B.
Now, people between P and O: 4 people
Hence, the correct answer is "Option 4".

Q29. Answer: (c) Rs. 60,000

Shortcut Trick
=> Teachers ratio = 5 : 3, Salary ratio = 4 : 1
=> Total salary ratio = (5×4) : (3×1) = 20 : 3
=> Total parts = 23
=> Untrained share = (3/23) × 460000
=> = 60000
Therefore Answer = 60000
Alternate Method
Given:
=> Trained : Untrained teachers = 5 : 3
=> Salary ratio (per teacher) = 4 : 1
=> Total salary = 460000
=> Let number of teachers be 5x and 3x
=> Salary per teacher be 4y and y
Formula:
=> Total salary = Number × Salary per person
Calculation:
=> Trained total = 5x × 4y = 20xy
=> Untrained total = 3x × y = 3xy
=> Ratio = 20 : 3
=> Total parts = 23
=> 1 part = 460000 ÷ 23 = 20000
=> Untrained salary = 3 × 20000 = 60000
Therefore Final Answer: 60000
Additional Information

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1. Combined Ratio: Multiply number ratio with salary ratio
2. Total Salary: Sum of all individual salaries
3. Shortcut: Direct weighted ratio method saves time
4. Unit Method: Always find value of one part first

Q30. Answer: (d) 8

Shortcut Trick
=> 1.2 ÷ 0.3 = 12 ÷ 3 = 4
=> 2.4 ÷ 0.6 = 24 ÷ 6 = 4
=> Total = 4 + 4 = 8
Therefore Answer = 8
Alternate Method
Given:
=> Expression = 1.2 ÷ 0.3 + 2.4 ÷ 0.6
Formula:
=> a ÷ b = (a × 10) ÷ (b × 10) to remove decimals
Calculation:
=> 1.2 ÷ 0.3 = 12 ÷ 3 = 4
=> 2.4 ÷ 0.6 = 24 ÷ 6 = 4
=> Total = 4 + 4 = 8
Therefore Final Answer: 8
Additional Information
1. Decimal Division: Multiply both numerator and denominator by 10
2. Shortcut: Convert decimals to integers for faster division
3. BODMAS: Solve division before addition
4. Tip: Keep numbers simple to avoid errors

Q31. Answer: (d) 5

Given:
'LITE' is coded as '3492'
'TIME' is coded as '3954'
So, M = 5
Hence, the correct answer is Option 4.

Q32. Answer: (c) [figure]

Shortcut Trick
Use tan 30° = 1/√3
=> Height = 30 × 1/√3 = 30/√3
=> = 10√3
Therefore Answer = 10√3 m
Alternate Method
Given:
=> Distance from pole = 30 m
=> Angle of elevation = 30°
Formula:
=> tan θ = Opposite ÷ Adjacent
Calculations:
=> tan 30° = h/30
=> 1/√3 = h/30
=> h = 30/√3
=> h = 10√3 m
Final Answer: 10√3 m
Additional Information

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1. tan 30°: 1/√3
2. Height Formula: Height = Distance × tan θ
3. Right Triangle: Angle of elevation forms a right triangle
4. Exam Tip: Memorize standard trig values

Q33. Answer: (d) 25 – 39 – 59 – 83

The logic followed here is:

Logic: Each step increases by a fixed pattern of +14, +20, +24 alternately.

For, 12 – 26 – 46 – 70

=> 12 + 14 = 26

=> 26 + 20 = 46

=> 46 + 24 = 70

For, 20 – 34 – 54 – 78

=> 20 + 14 = 34

=> 34 + 20 = 54

=> 54 + 24 = 78

Now, checking the options using the same pattern:

Option 1) 34 – 48 – 78 – 102

=> 34 + 14 = 48

=> 48 + 30 ≠ 78

Option 2) 28 – 42 – 52 – 76

=> 28 + 14 = 42

=> 42 + 10 ≠ 52

Option 3) 15 – 30 – 50 – 74

=> 15 + 15 ≠ 30

Option 4) 25 – 39 – 59 – 83

=> 25 + 14 = 39

=> 39 + 20 = 59

=> 59 + 24 = 83

Hence, the correct answer is Option 4.

Q34. Answer: (b) NexCAR19 indigenous CAR T-cell therapy

The correct answer is NexCAR19 indigenous CAR T-cell therapy.

Key Points

• NexCAR19 is India’s first indigenous CAR T-cell therapy, representing a major breakthrough in the biotechnology and oncology sector. It was developed through a collaborative effort between IIT Bombay, Tata Memorial Centre, and the industry partner ImmunoAdoptive Cell Therapy (ImmunoACT).

• The therapy is designed to treat specific types of blood cancers, particularly relapsed or refractory B-cell lymphomas and leukemias. By utilizing the patient's own immune system, it offers a personalized approach to medicine, often referred to as a “living drug.”

• The Central Drugs Standard Control Organisation (CDSCO) granted commercial approval for NexCAR19 in October 2023, and it was formally dedicated to the nation by the President of India, Droupadi Murmu, in April 2024. The milestone reached in 2025 signifies its widespread clinical application and integration into India’s public health infrastructure.

• Mechanistically, NexCAR19 involves genetically modifying a patient’s T-cells to express a Chimeric Antigen Receptor (CAR) that specifically targets the CD19 protein found on the surface of cancerous B-cells. This precision allows the immune system to identify and eliminate malignant cells with high efficiency.

• One of the most significant features of this indigenous therapy is its affordability. While similar treatments in the United States or Europe can cost between Rs. 3 crore to Rs. 4 crore, NexCAR19 is available in India at approximately one-tenth of that cost (around Rs. 30-40 lakh), making life-saving treatment accessible to a larger population.

Additional Information

• CAR T-cell Therapy Process: The process begins with Leukapheresis, where T-cells are extracted from the patient's blood. These cells are then sent to a manufacturing facility where they are genetically engineered using a viral vector to recognize cancer cells. Once multiplied into billions, they are infused back into the patient.

• Institutional Support: The development of NexCAR19 was supported by the Department of Biotechnology (DBT) and the Biotechnology Industry Research Assistance Council (BIRAC) through the National Biopharma Mission (NBM). This highlights the

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success of the “Make in India” initiative in the high-tech medical field.

• Clinical Trials: The clinical trials for NexCAR19 were conducted at the ACTREC (Advanced Centre for Treatment, Research and Education in Cancer), Tata Memorial Centre in Mumbai. The results showed a high rate of remission and a favorable safety profile, specifically lower incidences of Cytokine Release Syndrome (CRS) compared to global counterparts.

• Global Context: Before NexCAR19, India was entirely dependent on foreign technology or clinical trial participation for CAR-T therapies. With this launch, India joins an elite group of countries (like the USA and China) possessing advanced gene-therapy capabilities.

• Future Scope: While the current version targets CD19, researchers are working on expanding the technology to treat solid tumors (like breast or lung cancer) and other hematological malignancies, further solidifying India's position in the global biotech ecosystem.

Important Points

• Patient Age and Eligibility: NexCAR19 is currently approved for adult patients (typically 18 years and above) who have not responded to standard chemotherapy or bone marrow transplants. It serves as a last-line therapy for refractory cases.

• Infrastructure: The therapy requires specialized tertiary care hospitals with oncology departments capable of managing potential immunological side effects. Hospitals in cities like Mumbai, Delhi, and Bengaluru were among the first to offer this treatment.

• Economic Impact: By reducing the cost of advanced immunotherapy, India is poised to become a hub for medical tourism in the field of biocellular therapies, attracting patients from South Asia, Africa, and the Middle East.

Q35. Answer: (a) Neither conclusion (I) nor (II) follows.

Given Statements:

All gorillas are monkeys.

Some monkeys are baboons.

All baboons are chimpanzees.

The least possible Venn diagram for the given statement is:

Conclusions:

I. All chimpanzees are monkeys - False (Only some monkeys are baboons and baboons are chimpanzees, but there is no statement that all chimpanzees are monkeys).

II. Some chimpanzees are gorillas - False (Gorillas are only inside monkeys, and there is no necessary overlap between chimpanzees and gorillas).

So, neither conclusion (I) nor (II) follows.

Hence, the correct answer is "Option 1".

Q36. Answer: (a) Device Driver

The correct answer is Device Driver.

Key Points

• A Device Driver is a specialized type of System Software that acts as a translator or a communication interface between the Operating System (OS) and specific Hardware components. It ensures that the Central Processing Unit (CPU) can communicate effectively with Peripheral Devices.

• The primary function of a driver is to manage the flow of data and convert high-level commands from the OS into low-level instructions that the Hardware (such as a Printer, Mouse, Keyboard, or Graphics Card) can execute. Hence, the statement regarding Device Drivers is correct.

• Without a Device Driver, the computer would not be able to send or receive data from a device correctly because every hardware manufacturer has unique Specifications and Protocols.

• Drivers typically run in Kernel Mode, which gives them direct access to the Hardware and the internal data structures of the Operating System to ensure high-speed data transfer.

• Modern Operating Systems like Windows, Linux, and macOS come with generic drivers, but specific hardware often requires Proprietary Drivers provided by the manufacturer for full functionality.

Additional Information

• Utility Software:

• This refers to System Software designed to help analyze, configure, optimize, or maintain a computer.

• Examples include Antivirus, Disk Defragmenters, Backup Software, and File Compression tools.

• Unlike drivers, they do not directly manage Hardware communication for data flow but rather maintain the System Integrity. Hence, this option is incorrect.

• Operating System Kernel:

• The Kernel is the core part of an Operating System that manages System Resources, including Memory Management, Process Scheduling, and CPU Time.

• While the kernel uses drivers to talk to hardware, it is not the specific component dedicated to a single peripheral's data flow. Hence, this option is incorrect.

• Application Programming Interface (API):

• An API is a set of definitions and protocols for building and integrating Application Software.

• It allows different software programs to communicate with each other (e.g., a weather app getting data from a server), but it does not deal with Hardware-level data flow management. Hence, this option is incorrect.

Important Points

• Plug and Play (PnP): This is a technology that allows the Operating System to detect a new Hardware device and automatically install the necessary Device Driver without manual user intervention.

• Virtual Device Drivers: These are used in Virtualization to allow a Virtual Machine to communicate with the physical hardware of the host computer.

• Driver Updates: Keeping drivers updated is crucial for Cybersecurity and Performance, as manufacturers often release patches for Bugs and compatibility issues with Yearly OS Updates.

• Firmware: Often confused with drivers, Firmware is a type of software etched directly into a hardware's Read-Only Memory (ROM), providing the most basic level of control for the device.

Q37. Answer: (c) Bal Gangadhar Tilak

The correct answer is Bal Gangadhar Tilak.

Key Points

• Bal Gangadhar Tilak (1856–1920) was a central figure in the extremist phase of the Indian National Movement. Unlike the moderates, he advocated for direct action, self-reliance, and mass mobilisation to achieve political goals.

• He is widely known for his powerful slogan, "Swaraj is my birthright and I shall have it," which became a rallying cry for the Indian independence struggle.

• Tilak transformed traditional religious festivals into political tools to reach the masses; he initiated the Ganpati Festival in 1893 and the Shivaji Festival in 1895 to build a sense of national identity and unity.

• He was a prominent member of the radical trio known as Lal-Bal-Pal, consisting of Lala Lajpat Rai, Bal Gangadhar Tilak, and Bipin Chandra Pal, who spearheaded the Swadeshi Movement and the boycott of British goods.

• Due to his radical approach and ability to stir public sentiment against colonial rule, the British authorities described him as the "Father of Indian Unrest."

Additional Information

• Gopal Krishna Gokhale: A leading Moderate leader and the founder of the Servants of India Society in 1905. He focused on constitutional reforms and was the political mentor to Mahatma Gandhi. This leader belonged to the moderate phase, so this statement is not the correct answer.

• Dadabhai Naoroji: Known as the "Grand Old Man of India," he was the first Indian to be elected to the British House of Commons. He authored Poverty and Un-British Rule in India and proposed the Drain of Wealth Theory. He was a moderate, making this option incorrect.

• Surendranath Banerjee: Often referred to as the "Indian Burke," he founded the Indian National Association in 1876 and later merged it with the Indian National Congress. He was a moderate who advocated for administrative reforms. This statement is not correct in the context of extremist leadership.

• The Surat Split (1907): This was a historic event where the Indian National Congress divided into two groups—the Moderates and the Extremists—during the session held in Surat, Gujarat, due to differences in ideology and methods of agitation.

Important Points

• Tilak utilized journalism to spread nationalistic ideas through his two newspapers: Kesari (published in Marathi) and The Mahratta (published in English).

• In 1908, he was arrested and sentenced to six years of imprisonment in Mandalay, Burma (now Myanmar), on charges of sedition for his writings in Kesari. While in prison, he wrote the famous philosophical work Gita Rahasya.

• In 1916, along with Annie Besant, he launched the All India Home Rule League to demand Home Rule or self-government for India within the British Empire.

• He also played a crucial role in the Lucknow Pact of 1916, which brought about a temporary alliance between the Indian National Congress and the Muslim League.

Q38. Answer: (d) Man to man defence

The correct answer is Man to man defence.

Key Points

• Man to man defence is a tactical strategy in basketball where each defender is assigned to guard and follow a specific offensive player throughout the game.

• The primary function of this strategy is to create individual accountability, where the defender is responsible for the actions and scoring of their direct opponent.

• Assignments are typically made based on size, speed, agility, and skill level; for example, a Point Guard usually guards the opposing Point Guard, while a Center guards the opposing Center to ensure a physical match.

• It is highly effective for on-ball pressure and is the standard defensive system used in professional leagues like the National Basketball Association (NBA) and FIBA.

• Within this system, defenders must maintain a defensive stance and use peripheral vision to keep track of both their player and the basketball.

Additional Information

• Zone Defence:

• Unlike man-to-man, in a Zone defence, players are responsible for guarding a specific area or zone on the court rather than an individual.

• Common variations include the 2-3 zone (used to protect the paint and rebound) and the 3-2 zone (used to stop outside shooters).

• This strategy is often used to hide weaker individual defenders or to slow down a fast-paced offensive team.

• Full Court Press:

• This is an aggressive defensive strategy where the defending team applies pressure over the entire 94-foot length of the court.

• It is often deployed after a made basket or free throw to force turnovers, 8-second violations, or to speed up the tempo of the game.

• It requires high stamina and athleticism from the players involved.

• Combined Defence:

• Also known as Junk Defence or Hybrid Defence, this system blends elements of both man-to-man and zone strategies.

• Examples include the Box-and-One (four players in a zone, one playing man-to-man on the star player) and the Triangle-and-Two.

• These are typically used as specialized tactics to neutralize one or two elite scorers on the opposing team.

Important Points

• Switching: A critical component of modern man-to-man defense where two defenders exchange offensive assignments, usually during a pick-and-roll or screen play.

• Mismatches: A situation in man-to-man defense where an offensive player has a distinct advantage over their defender, such as a 7-foot Center being guarded by a 6-foot Guard.

• Help Defense: Even in man-to-man systems, defenders must provide "help" if an offensive player beats their direct defender, moving toward the basket to prevent an easy score.

• Defensive Three-Second Rule: In the NBA, a defender cannot stay in the key (paint) for more than three seconds unless they are actively guarding an opponent within arm's reach.

Q39. Answer: (b) Introducing the Goods and Services Tax (GST) in India

The correct answer is Introducing the Goods and Services Tax (GST) in India.

Key Points

• The 101st Constitutional Amendment Act of 2016 is a landmark legislation that introduced the Goods and Services Tax (GST) in India. This comprehensive indirect tax replaced multiple taxes levied by the Central and State Governments.

• The primary objective of this amendment was to create a unified common market by removing the cascading effect of taxes (tax on tax) and simplifying the overall indirect tax structure of the country.

• The GST was officially launched in India on the midnight of July 1, 2017, following the notification of the 101st Amendment Act on September 8, 2016.

• The amendment introduced new articles into the Constitution of India, most notably Article 246A, which grants concurrent powers to both the Parliament and the State Legislatures to make laws with respect to Goods and Services Tax.

• It also led to the insertion of Article 279A, which provides for the constitution of the GST Council, a joint forum of the Centre and the States responsible for making recommendations on tax rates, exemptions, and administrative procedures.

Additional Information

• 100th Constitutional Amendment Act (2015): This act gave effect to the Land Boundary Agreement (LBA) of 1974 and its Protocol of 2011 between India and Bangladesh. It involved the exchanging of enclaves and territorial adjustments between the two countries to resolve a long-standing border dispute.

• 99th Constitutional Amendment Act (2014): This amendment aimed to establish the National Judicial Appointments Commission (NJAC) to replace the existing collegium system for the appointment of judges to the Supreme Court and High Courts. However, the Supreme Court of India struck down this amendment as unconstitutional in 2015, restoring the collegium system.

• 94th Constitutional Amendment Act (2006): This amendment revised Article 164 to provide for a Minister in charge of tribal

welfare in the states of Chhattisgarh and Jharkhand. This requirement previously applied to Bihar, but since the newly formed states had a large tribal population, the provision was extended to them while exempting Bihar.

• Structure of GST: The GST system in India is dual in nature, consisting of Central GST (CGST) collected by the Union, State GST (SGST) collected by the States, and Integrated GST (IGST) collected by the Central Government on inter-state supplies and imports.

Important Points

• Article 269A: Inserted by the 101st Amendment, this article governs the levy and collection of GST in the course of inter-state trade or commerce. It mandates that such taxes shall be collected by the Government of India and apportioned between the Union and the States based on the recommendations of the GST Council.

• Destination-Based Tax: Unlike previous origin-based taxes, GST is a destination-based consumption tax. This means the tax revenue accrues to the State where the goods or services are finally consumed, rather than the State where they were produced.

• Compensation to States: To address potential revenue losses for States during the initial years of GST implementation, the GST (Compensation to States) Act, 2017 was enacted, ensuring compensation for a period of five years.

• Special Category States: Under the GST regime, certain states like Arunachal Pradesh, Assam, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Himachal Pradesh, and Uttarakhand are designated as Special Category States with different threshold limits for registration.

Q40. Answer: (d) 320

Shortcut Trick

Use identity:

$x^3 + y^3 + z^3 - 3xyz = (x+y+z)(x^2 + y^2 + z^2 - xy - yz - zx)$

=> = 10(38 − 31) = 70

=> $x^3 + y^3 + z^3 = 70 + 3xyz$

=> 5xyz = 150 => xyz = 30

=> = 70 + 90 = 160

=> Required = 2 × 160 = 320

Therefore Answer = 320

Alternate Method

Given:

=> x + y + z = 10

=> $x^2 + y^2 + z^2 = 38$

=> xy + yz + zx = 31

=> 5xyz = 150 => xyz = 30

Formula:

=> $x^3 + y^3 + z^3 - 3xyz = (x+y+z)(x^2 + y^2 + z^2 - xy - yz - zx)$

Calculations:

=> RHS = 10(38 − 31) = 10 × 7 = 70

=> $x^3 + y^3 + z^3 - 3(30) = 70$

=> $x^3 + y^3 + z^3 - 90 = 70$

=> $x^3 + y^3 + z^3 = 160$

=> Required = $2(x^3 + y^3 + z^3)$

=> = 2 × 160 = 320

Final Answer: 320

Additional Information

1. Key Identity: $x^3+y^3+z^3 - 3xyz$
2. Important Step: Always check coefficient of xyz carefully (here 5xyz)
3. Shortcut Tip: Compute xyz first before substituting
4. Exam Trap: Many students wrongly take xyz = 150 instead of 30

Q41. Answer: (b) Asian Development Bank (ADB)

The correct answer is Asian Development Bank (ADB).

Key Points

• In 2025, the Asian Development Bank (ADB) signed five loan agreements with India totaling over US$ 2.2 billion.

• The specific loans include:

• Solar Power: US$ 650 million for the Pradhan Mantri Surya Ghar: Muft Bijli Yojana to help 10 million households install rooftop solar panels.
• Job Training: US$ 846 million to modernise 650 Industrial Training Institutes (ITIs) across 12 states.
• Healthcare: US$ 398.8 million to upgrade medical colleges and hospitals in Assam (Guwahati, Dibrugarh, and Silchar).
• Transport: US$ 240 million to expand the Chennai Metro Rail network.
• Tourism & Farming: US$ 77 million to develop ecotourism and agriculture livelihoods in Meghalaya.

Additional Information

• Pradhan Mantri Surya Ghar: Muft Bijli Yojana:
• Launched in February 2024 by Prime Minister Narendra Modi with a total outlay of Rs. 75,021 crore.
• The scheme aims to provide 300 units of free electricity every month to 1 crore (10 million) households across India.
• It encourages sustainable energy adoption and reduces the financial burden of electricity bills on low-income and middle-income families.
• Beneficiaries can receive subsidies directly into their bank accounts for installing solar panels on their rooftops.
• World Bank (WB):
• An international financial institution established in 1944 following the Bretton Woods Conference.
• Headquartered in Washington, D.C., USA, it consists of 189 member countries.
• Current President of the World Bank Group is Ajay Banga, who assumed office in 2023.
• The World Bank provides loans, grants, and technical assistance to developing countries for infrastructure, education, and environmental projects.
• Asian Development Bank (ADB):
• Founded in 1966, it is headquartered in Manila, Philippines.
• It focuses on social and economic development in Asia and the Pacific region.
• While it frequently lends to India, it was not the primary signatory for the specific US$ 650 million solar loan in early 2025.
• Asian Infrastructure Investment Bank (AIIB):
• A multilateral development bank that started operations in 2016, headquartered in Beijing, China.
• It prioritizes infrastructure investment and other productive sectors in Asia and beyond.
• New Development Bank (NDB):
• Formerly referred to as the BRICS Development Bank, established by Brazil, Russia, India, China, and South Africa in 2014.
• It is headquartered in Shanghai, China, and supports public or private projects through loans and equity participation.

Important Points

• The World Bank funding is crucial for India to achieve its Net Zero Emissions target by 2070.
• The US$ 650 million loan is a part of the Distributed Energy and Agriculture Rejuvenation project, which integrates rooftop solar with agricultural needs.
• Other agreements signed in the 2025 cycle included support for Sikkim's fiscal management and India's green hydrogen mission.
• The Department of Economic Affairs (DEA) under the Ministry of Finance represents the Government of India in these high-level loan negotiations.

Q42. Answer: (b) 33.18

Shortcut Trick

Scale: 1 cm = 829483 cm

=> 4 cm = 4 × 829483 = 3317932 cm

=> Convert to km: divide by 100000

=> = 33.17932 km ≈ 33.18 km

Therefore Answer = 33.18 km

Alternate Method

Given:

=> Map distance = 4 cm

=> Scale = 1 : 829483

Formula:

=> Actual distance = Map distance × Scale

Calculations:

=> Actual distance = 4 × 829483 = 3317932 cm

=> Convert cm to km:
=> 1 km = 100000 cm
=> Distance = 3317932 ÷ 100000 = 33.17932 km
=> Rounded = 33.18 km
Final Answer: 33.18 km
Additional Information
1. Scale Concept: 1 : n means 1 cm on map = n cm in reality
2. Unit Conversion: 1 km = 100000 cm
3. Shortcut: Multiply first, then convert units
4. Exam Tip: Always round only at final step

Q43. Answer: (a) 10 – 40 – 120 – 240

The logic followed here is:
Logic: Each number is multiplied by a fixed factor of ×4 to obtain the next number.
For, 5 – 20 – 60 – 120
=> 5 × 4 = 20
=> 20 × 3 = 60
=> 60 × 2 = 120
For, 8 – 32 – 96 – 192
=> 8 × 4 = 32
=> 32 × 3 = 96
=> 96 × 2 = 192
Now, checking the options using the same pattern:
Option 1) 10 – 40 – 120 – 240
=> 10 × 4 = 40
=> 40 × 3 = 120
=> 120 × 2 = 240
Option 2) 12 – 48 – 144 – 248
=> 12 × 4 = 48
=> 48 × 3 = 144
=> 144 × 2 = 288 ≠ 248
Option 3) 24 – 48 – 96 – 120
=> 24 × 2 = 48
Option 4) 60 – 240 – 80 – 160
=> 60 × 4 = 240
=> 240 → 80 (÷3)
=> 80 → 160 (×2)
Hence, the correct answer is Option 1.

Q44. Answer: (c) 40%

Shortcut Trick
441 is 75 less than 30% => 30% = 441 + 75 = 516
=> 10% = 172 => 100% = 1720
=> Friend % = (688/1720)×100 = 40%
Therefore Answer = 40%
Alternate Method
Given:
=> Girish marks = 441
=> He is 75 less than 30% of maximum
Let: Maximum marks = M
Equation:
=> 30% of M − 75 = 441

=> 0.30M = 441 + 75 = 516
=> M = 516 / 0.30 = 1720
Friend's Percentage:
=> = (688 / 1720) × 100
=> = 40%
Final Answer: 40%
Additional Information
1. Reverse Percentage: Add deficit first, then convert
2. Key Step: Always find total marks first
3. Shortcut: Use 10% method for quick calculation
4. Exam Tip: Translate "short of" carefully

Q45. Answer: (b) Both statements I and II together are NOT sufficient to answer the question

Given Statements:
I. Mayank is taller than Harsh but shorter than Ketan.
II. Rohit is taller than Harsh but shorter than Mayank.
Conclusions:
I. Who is the shortest among Harsh, Ketan, Mayank, Rohit, and Sidharth
→ Not Determined (From Statement I, we get Ketan > Mayank > Harsh, but Rohit and Sidharth are not placed).
II. Who is the shortest among Harsh, Ketan, Mayank, Rohit, and Sidharth
→ Not Determined (From Statement II, we get Mayank > Rohit > Harsh, but Ketan and Sidharth are not placed).
So, Statement I alone is not sufficient and Statement II alone is not sufficient.
Even together, Sidharth's position is unknown, so the shortest cannot be identified.
Hence, the correct answer is "Option 2".

Q46. Answer: (d) 30

Shortcut Trick
HCF = 28 => a = 28x, b = 28y with HCF(x,y)=1
=> 28(x + y) = 868 => x + y = 31
=> Number of coprime pairs with sum n = φ(n)
=> φ(31) = 30 (since 31 is prime)
Therefore Answer = 30
Alternate Method
Given:
=> HCF(a,b) = 28
=> a + b = 868
Approach:
=> Let a = 28x, b = 28y where HCF(x,y) = 1
Calculations:
=> 28x + 28y = 868
=> 28(x + y) = 868
=> x + y = 31
=> Now count coprime pairs (x,y) such that sum = 31
=> Since 31 is prime, all pairs (x,y) with sum 31 are coprime
=> Number of positive solutions = 31 − 1 = 30
Final Answer: 30
Additional Information
1. HCF Transformation: If HCF(a,b)=k, write a=kx, b=ky with gcd(x,y)=1
2. Coprime Pairs Count: Number of coprime pairs with sum n = φ(n)
3. Euler Totient: φ(p) = p − 1 if p is prime
4. Exam Tip: Always reduce equation using HCF substitution first

Q47. Answer: (b) 18

BODMAS Table:

Given equation: 19 D 54 A 6 C 4 B 2 = ?

Now, replacing the symbols with their meanings: A = ÷, B = ×, C = +, D = −

=> 19 − 54 ÷ 6 + 4 × 2

=> 19 − (54 ÷ 6) + (4 × 2)

=> 19 − 9 + 8

=> 10 + 8

=> 18

Hence, the correct answer is "Option 2".

Q48. Answer: (c) Zanskar, Ladakh, Karakoram

The correct answer is Zanskar, Ladakh, Karakoram.

Key Points

• The Trans-Himalayas represent the northernmost part of the Himalayan mountain system in India, located north of the Great Himalayas (Himadri).

• The Karakoram Range is known as the "Backbone of High Asia." It is the northernmost range of the Trans-Himalayan zone and contains K2 (Mount Godwin-Austen), which is the second-highest peak in the world with an elevation of 8,611 meters.

• The Ladakh Range lies to the south of the Karakoram Range and north of the Indus River. It is a major part of the Union Territory of Ladakh and is considered the eastern extension of the Kailash Range.

• The Zanskar Range is situated south of the Ladakh Range and acts as a boundary between the Ladakh region and the Zanskar valley. It separates the Indus Valley from the Valley of Kashmir.

• These three ranges—Karakoram, Ladakh, and Zanskar—are the primary mountain chains that define the Trans-Himalayan physiographic division in India.

Additional Information

• Geological Origin: The Trans-Himalayas were formed during the Cretaceous and Tertiary periods. They are primarily composed of granite and volcanic rocks, unlike the Main Himalayas which are largely sedimentary.

• Climate and Rain Shadow: This region lies in the rain shadow area of the Great Himalayas. As a result, it receives very little annual precipitation, making it a cold desert. The location causes extremely arid conditions.

• Major Glaciers: The Karakoram Range houses some of the longest glaciers outside the polar regions, including the Siachen Glacier (approx 76 km), Hispar Glacier, and Baltoro Glacier.

• Rivers: The Indus River flows between the Ladakh and Zanskar ranges in a north-westerly direction before entering Pakistan. The Shyok River, a tributary of the Indus, flows between the Karakoram and Ladakh ranges.

• Other Options Analysis:

• Aravalli and Vindhya are located in Central and Western India, not in the Himalayas.

• Western Ghats and Eastern Ghats are coastal ranges in Southern India.

• Satpura is a range in Central India, mainly in Madhya Pradesh and Maharashtra.

Important Points

• Mount Rakaposhi: Located in the Ladakh Range, it is famous for having the steepest gradient (slope) in the world.

• Kailash Range: An extension of the Ladakh Range located in Tibet, it is the source of major rivers like the Indus, Brahmaputra, and Sutlej.

• High Altitude Passes: This zone features several high-altitude passes such as Khardung La (often cited as one of the highest motorable roads), Karakoram Pass, and Fotula Pass.

• Biodiversity: Despite the arid climate, the region is home to rare fauna like the Snow Leopard, Tibetan Gazelle, and Kiang (wild ass).

• Strategic Significance: The Karakoram Range serves as a geopolitical boundary between India, China, and Pakistan, making it a highly sensitive national security zone.

Q49. Answer: (a) Article 156

The correct answer is Article 156.

Key Points

• Article 156 of the Constitution of India specifically deals with the Term of office of Governor. It clarifies that the Governor is not elected but is a constitutional appointee who serves at the pleasure of the President.

• Under Article 156(1), the Governor shall hold office during the pleasure of the President. This means that the President can remove a Governor from office at any time without providing a specific reason, although this power is exercised on the advice of

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the Council of Ministers.

• According to Article 156(2), the Governor may, by writing under his hand addressed to the President, resign his office. This provides the method for the Governor to step down voluntarily before the completion of the term.

• Article 156(3) states that subject to the foregoing provisions, a Governor shall hold office for a term of 5 years from the date on which he enters upon his office. However, he continues to hold office until his successor enters upon his office, even if the five-year term has expired.

Additional Information

• Article 155: Appointment of Governor

• The Governor of a State is appointed by the President by warrant under his hand and seal.

• Unlike the President, the Governor is not indirectly elected by an electoral college; the office is a nomination by the Central Government.

• Article 157: Qualifications for Appointment

• To be eligible for the post of Governor, a person must be a citizen of India.

• The individual must have completed the age of 35 years.

• By convention, the person should not belong to the state where he is appointed, and the Chief Minister of the concerned state is often consulted.

• Article 158: Conditions of Governor's Office

• The Governor shall not be a member of either House of Parliament or of a House of the Legislature of any State.

• The Governor shall not hold any other office of profit.

• The Governor is entitled to the use of his official residence (Raj Bhavan) without payment of rent and receives such emoluments, allowances, and privileges as may be determined by Parliament.

• Article 159: Oath or Affirmation

• Every Governor and every person discharging the functions of the Governor must take an oath before entering office.

• The oath is administered in the presence of the Chief Justice of the High Court exercising jurisdiction in relation to the State, or, in his absence, the senior-most Judge of that Court available.

Important Points

• The Governor acts as the nominal executive head (De Jure head) of the state, similar to the President at the Union level.

• The Governor performs a dual role: as the constitutional head of the State and as a representative/agent of the Central Government.

• The 7th Constitutional Amendment Act of 1956 facilitated the appointment of the same person as a Governor for two or more states.

• The executive power of the State is vested in the Governor and is exercised by him either directly or through officers subordinate to him in accordance with the Constitution as per Article 154.

Q50. Answer: (a) ~44,000 hectares

The correct answer is ~44,000 hectares.

Key Points

• In November 2025, the Sariska Wildlife Sanctuary was expanded by approximately 44,000 hectares (440 sq km).

• Total Size: The sanctuary grew from about 54,400 hectares to nearly 98,800 hectares.

• Land Type: The expansion added roughly 92,500 hectares of forest land and 6,200 hectares of revenue land.

• Core Area: The Critical Tiger Habitat (core zone) was also increased by about 43 sq km to better protect tiger breeding grounds.

• Buffer Zone: The surrounding buffer zone was reduced by about 42 sq km to resolve overlaps with roads and villages.

• Goal: The update aligns the sanctuary's official borders with the Tiger Reserve to improve wildlife protection and management.

Additional Information

• Sariska Tiger Reserve:

• Location: It is situated in the Alwar district of Rajasthan and is nestled within the Aravalli Hills range.

• History: It was declared a wildlife sanctuary in 1955 and later became a Tiger Reserve in 1978-79 under the Project Tiger initiative.

• Global Milestone: In 2008, Sariska became the first tiger reserve in the world to successfully carry out the relocation of tigers (reintroduced from Ranthambore Tiger Reserve) after the local population had been wiped out by poaching.

• Flora: The vegetation consists of dry deciduous forests, with the Dhok tree (Anogeissus pendula) being the dominant species.

• Geographical Importance:

• The reserve is rich in mineral resources like copper, though mining in and around the core area has been a subject of legal contention in the Supreme Court of India to protect the ecology.

• It also houses historical monuments such as the Kankanwadi Fort, where the Mughal Emperor Aurangzeb once imprisoned his brother Dara Shikoh.

Important Points

• Conservation Status: The sanctuary is categorized under the IUCN Category II. The 2025 expansion is critical because the tiger density in the core area had reached a saturation point, necessitating more territory for younger tigers to establish their own range.

• Eco-Sensitive Zone (ESZ): Along with the physical expansion of 60,000 hectares, the government has revised the ESZ notifications to act as a "shock absorber" for the protected area, regulating industrial and commercial activities within 1 to 10 kilometers of the boundary.

• Faunal Diversity: Apart from Bengal Tigers, the sanctuary is home to leopards, jungle cats, caracals, striped hyenas, golden jackals, and the four-horned antelope (Chousingha).

• Project Tiger: Administered by the National Tiger Conservation Authority (NTCA), this central scheme provides the funding and regulatory oversight for the maintenance of the reserve's infrastructure and anti-poaching squads.

Q51. Answer: (d) Independence from external control

The correct answer is Independence from external control.

Key Points

• The term Sovereign, as mentioned in the Preamble of the Indian Constitution, implies that India is an independent state. It signifies that India is neither a dependency nor a dominion of any other nation. Hence, the statement regarding independence from external control is correct.

• Being a sovereign state, India has the absolute authority to conduct its own internal and external affairs without the interference of any foreign power or authority. This authority is vested in the people of India and exercised through their elected representatives.

• The sovereignty of India also empowers the Parliament to acquire a foreign territory or cede a part of its own territory in favor of a foreign state, subject to the provisions of the Constitution.

• While India is a member of international organizations like the United Nations (UN) and the Commonwealth of Nations, these memberships do not constitute a limitation on her sovereignty. India’s decision to remain in the Commonwealth in 1949 was a voluntary agreement and does not affect her status as a sovereign republic.

• The policy of Non-Alignment is a choice made by the sovereign government of India in its foreign policy, but the term 'Sovereign' itself specifically defines the legal and political independence of the state rather than a specific policy. Hence, the statement regarding the policy of non-alignment is incorrect.

• The power to appoint or elect a President is a feature of being a Republic, where the head of state is not a hereditary monarch. Hence, the statement regarding the power to appoint the President is incorrect.

• The provision of Religious freedom is specifically associated with the term Secular in the Preamble and protected under Articles 25 to 28. Hence, the statement regarding religious freedom for all citizens is incorrect.

Additional Information

• The Preamble: It is based on the Objectives Resolution, drafted and moved by Pandit Jawaharlal Nehru on 13 December 1946, and adopted by the Constituent Assembly on 22 January 1947.

• 42nd Amendment Act: The Preamble has been amended only once in 1976 by the 42nd Constitutional Amendment Act, which added three new words: Socialist, Secular, and Integrity.

• Internal Sovereignty: This refers to the supreme power of the state to make and enforce laws over all persons and associations within its geographical boundaries.

• External Sovereignty: This means the state is legally independent of any foreign control and has the right to enter into treaties and international agreements.

• Democratic Republic: India is a Democratic Republic because the Constitution establishes a form of government that derives its power from the will of the people (Democracy) and has an elected head of state (Republic) who serves for a fixed term of 5 years.

Important Points

• Constitutional Status: In the Berubari Union case (1960), the Supreme Court initially stated that the Preamble is not a part of the Constitution. However, this was overturned in the landmark Kesavananda Bharati case (1973), where the Court held that the Preamble is an integral part of the Constitution and reflects its basic structure.

• Source of Authority: The Preamble states that the Constitution derives its authority from the People of India, as indicated by the opening phrase, "We, the People of India".

• Key Dates: The Constitution was adopted on 26 November 1949, and it came into full force on 26 January 1950, marking India’s transition to a Sovereign Democratic Republic.

• Legal Precedence: Sovereignty ensures that the laws passed by the Indian Parliament are supreme within the country and are not subject to the veto of any external legislature or government.

Q52. Answer: (d) 2.5

Shortcut Trick

Assume total goods = 100 units

=> 35 sold @22% profit

=> Remaining = 65 => 40% of 65 = 26 sold @37% profit

=> Remaining = 39 sold @38% loss

=> Net % = (35×22 + 26×37 − 39×38) ÷ 100

=> = (770 + 962 − 1482) ÷ 100 = 250/100 = 2.5%

Therefore Answer = 2.5%

Alternate Method

Given:

=> 35% goods sold at 22% profit

=> 40% of remaining at 37% profit

=> Remaining at 38% loss

Formula:

=> Overall % = (Total profit ÷ Total cost) × 100

Calculations:

=> Assume total goods = 100 units

=> First part: 35 units => profit = 35 × 22 = 770

=> Remaining = 65 units

=> Second part: 40% of 65 = 26 units

=> Profit = 26 × 37 = 962

=> Remaining = 65 − 26 = 39 units

=> Loss = 39 × 38 = 1482

=> Net profit = 770 + 962 − 1482 = 250

=> Overall % = (250 ÷ 10000) × 100 = 2.5%

Final Answer: 2.5%

Additional Information

1. Assumption Method: Assume total = 100 to simplify percentage problems
2. Sequential Percentage: Always apply on remaining quantity
3. Profit/Loss: Profit positive, Loss negative in calculation
4. Exam Tip: Convert everything into units first, then apply %

Q53. Answer: (a) G

Given: F, G, H, I, U, V, and W are sitting around a circular table facing the centre.

G sits third to the right of U.

G sits to the immediate right of H.

Only three people sit between F and H when counted from the right of H.

V sits to the immediate right of W.

Now, Second to the right of I = G

Hence, the correct answer is Option 1.

Q54. Answer: (b) Two

Given:

Seven people E, F, G, H, J, K and L have exams from Monday to Sunday (each on different days).

Only three people have exams between L and J.

Only three people have exams between H and K.

E has exam before J and after F.

Only G has exam before K.

Position	Day	Person
1	Monday	G

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2	Tuesday	K
3	Wednesday	L
4	Thursday	F
5	Friday	E
6	Saturday	H
7	Sunday	J

Now, people before L (Wednesday) are: G and K => 2 people

Hence, the correct answer is Option 2.

Q55. Answer: (a) Measles

The correct answer is Measles.

Key Points

• The Region of the Americas was the first in the world to be declared free of endemic Measles in September 2016, following a 22-year effort involving mass vaccination against measles, mumps, and rubella (MMR).

• Endemic transmission is defined as the continuous circulation of the virus in a geographical area for 12 months or more; when this occurs, the "measles-free" certification is revoked by the Pan American Health Organization (PAHO).

• On 10 November 2025, reports indicated that the region failed to retain this status due to sustained outbreaks in specific countries where vaccination coverage dropped below the necessary 95% threshold required for herd immunity.

• Measles is a highly contagious viral disease caused by a virus in the paramyxovirus family, typically passed through direct contact and airborne droplets.

• The resurgence of the disease in the Americas is largely attributed to vaccine hesitancy, gaps in public health infrastructure, and the migration of unprotected populations across borders.

Additional Information

• Measles Characteristics:

• It primarily affects children but can be severe in unvaccinated adults and immunocompromised individuals.

• Key symptoms include a high fever, cough, runny nose (coryza), and a characteristic maculopapular rash that begins on the face and spreads downwards.

• The incubation period usually lasts 10 to 12 days from exposure to the onset of fever.

• Polio (Poliomyelitis):

• The Americas was certified Polio-free in 1994. It is a crippling disease caused by the poliovirus, which invades the nervous system.

• While the wild virus is eliminated in the region, vaccine-derived poliovirus (VDPV) remains a surveillance priority for PAHO.

• Cholera:

• It is an acute diarrheal infection caused by the bacterium Vibrio cholerae.

• In the Americas, Haiti has faced significant outbreaks, most notably in 2010 and 2022, linked to poor water and sanitation (WASH) conditions.

• Yellow Fever:

• This is an acute viral hemorrhagic disease transmitted by infected mosquitoes such as Aedes aegypti.

• It is endemic in tropical areas of Central and South America; however, it is preventable through a single dose of the Yellow Fever vaccine, which provides life-long immunity.

Important Points

• PAHO (Pan American Health Organization): Founded in 1902, it is the world’s oldest international public health agency and serves as the Regional Office for the Americas of the World Health Organization (WHO).

• Eradication vs. Elimination: Elimination refers to the reduction to zero of the incidence of a specified disease in a defined geographical area, whereas eradication (like Smallpox in 1980) is the permanent reduction to zero of the worldwide incidence.

• Sustainable Development Goals (SDG): Re-establishing Measles control is vital for SDG 3, which focuses on "Good Health and Well-being" and aims to end epidemics of communicable diseases by 2030.

Q56. Answer: (d) 48 days

Shortcut Trick

Total work = LCM(36,48) = 144 units

=> A+B+C = 144/36 = 4 units/day

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=> B+C = 144/48 = 3 units/day

=> A = 1 unit/day

=> B = 1.75 units/day => C = 3 − 1.75 = 1.25

=> Work in 15 days = 15 × 4 = 60 => Remaining = 84

=> Time by B = 84 ÷ 1.75 = 48 days

Therefore Answer = 48 days

Alternate Method

Given:

=> A+B+C = 36 days

=> B+C = 48 days

=> B is 75% more efficient than A

Formula:

=> Efficiency = Work/Time

Calculations:

=> Total work = 144 units

=> (A+B+C) efficiency = 144 ÷ 36 = 4 units/day

=> (B+C) efficiency = 144 ÷ 48 = 3 units/day

=> A efficiency = 4 − 3 = 1 unit/day

=> B = 1.75A = 1.75 units/day

=> C = 3 − 1.75 = 1.25 units/day

=> Work done in 15 days = 15 × 4 = 60

=> Remaining = 144 − 60 = 84

=> Time by B alone = 84 ÷ 1.75 = 48 days

Final Answer: 48 days

Additional Information

1. Efficiency Concept: Efficiency is inversely proportional to time
2. LCM Method: Assume total work as LCM of given days
3. Ratio Conversion: 75% more => multiply by 1.75
4. Exam Tip: Find individual efficiency first, then compute remaining work

Q57. Answer: (d) Mother's brother's son

Family Chart:

Decoding the Symbols:

Symbol	@	%	•	&
Meaning	Son	Brother	Wife	Father

Given: T @ S % G + H & K

It means: T is the son of S, S is the brother of G, G is the wife of H, H is the father of K.

So, T is related to K as Mother’s brother’s son

Hence, the correct answer is "Option 4".

Q58. Answer: (d) Japan

The correct answer is Japan.

Key Points

• The Senkaku Islands are a group of uninhabited islands located in the East China Sea, currently administered by Japan as part of Ishigaki City in Okinawa Prefecture.

• The islands have been the subject of a long-standing territorial dispute between Japan, the People’s Republic of China (PRC), and the Republic of China (Taiwan).

• The China Coast Guard frequently conducts what it terms "rights enforcement patrols" in the waters surrounding the islands to assert China’s claim, which often leads to diplomatic friction with Japan.

• The dispute gained significant international attention in September 2012, when the Government of Japan purchased three of the privately-owned islands (Uotsuri Jima, Kita-Kojima, and Minami-Kojima) to nationalize them.

• The Japanese government maintains that the islands are an inherent part of Japan in terms of history and international law, and

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there exists no issue of territorial sovereignty to be resolved.

Additional Information

• Geographical Location and Features:

• The islands are situated approximately 170 kilometers northeast of Taiwan, 330 kilometers east of mainland China, and about 410 kilometers west of Okinawa Island.

• The group consists of five uninhabited islands and three barren rocks, covering a total area of about 7 square kilometers.

• Historical Context:

• Japan incorporated the islands into its territory in January 1895 during the Sino-Japanese War, after conducting surveys that allegedly showed the islands were terra nullius (land belonging to no one).

• Following World War II, the islands were placed under United States administration as part of the Ryukyu Islands under the 1951 Treaty of San Francisco.

• In 1972, the islands were returned to Japanese control under the Okinawa Reversion Agreement.

• Economic and Strategic Importance:

• The islands are strategically located near key shipping lanes and are surrounded by rich fishing grounds.

• Interest in the islands spiked after a 1969 report by the United Nations Economic Commission for Asia and the Far East (ECAFE) suggested that the continental shelf between Taiwan and Japan might contain one of the most prolific oil and gas reservoirs in the world.

• Claims by Other Nations:

• China refers to the islands as the Diaoyu Islands, asserting that they have been part of its territory since the Ming Dynasty (1368–1644) as naval defense outposts.

• Taiwan claims them as the Tiaoyutai Islands, considering them part of Toucheng Township in Yilan County.

Important Points

• US-Japan Security Treaty:

• The United States has repeatedly affirmed that the Senkaku Islands fall under Article 5 of the 1960 US-Japan Security Treaty.

• This means the US is committed to defending Japan in the event of an armed attack within the territories under Japanese administration, which includes these islands.

• Recent Developments:

• In recent years, China passed a Coast Guard Law in 2021 that allows its maritime forces to use weapons against foreign ships in waters claimed by China, further escalating tensions in the East China Sea.

• The Japan Coast Guard has increased its presence and established a dedicated unit to patrol the waters around the Senkakus to prevent incursions.

Q59. Answer: (b) Samudragupta

The correct answer is Samudragupta.

Key Points

• The Prayaga Prashasti, also popularly known as the Allahabad Pillar Inscription, is one of the most important historical sources for the Gupta Empire. It was composed by Harisena, who was the court poet (Saba-kavi) and Sandhivigrahika (Minister for Peace and War) of the ruler Samudragupta.

• The inscription is composed in Sanskrit language and follows the Champu Kavya style, which is a literary mixture of both prose and verse. It provides a detailed account of the military conquests, personality, and the vast empire of Samudragupta, who reigned from approximately 335 to 375 AD.

• The Prashasti (meaning "in praise of") describes Samudragupta as a great warrior and a patron of arts. It lists the different categories of rulers he defeated, including nine kings of Aryavarta (Northern India) and twelve kings of Dakshinapatha (Southern India). Hence, the statement that it is in praise of Samudragupta is correct.

• The pillar originally stood at Kausambi and was later moved to the Allahabad Fort by the Mughal Emperor Akbar. It is unique because it contains inscriptions from three different periods: the Mauryan period (Ashoka), the Gupta period (Samudragupta), and the Mughal period (Jahangir).

• The inscription identifies Samudragupta with titles such as Kaviraja (King of Poets) and highlights his musical talents, specifically his proficiency in playing the Veena, as also depicted on some of his gold coins.

Additional Information

• Asoka:

• The Allahabad Pillar originally belonged to the Mauryan Emperor Ashoka. It contains six of his Pillar Edicts.

• Ashoka's inscriptions on this pillar promote Dhamma and social harmony. There is also a "Schism Edict" intended for the Buddhist monastic order.

• He was the first ruler in India to communicate with his subjects through inscriptions on stone surfaces.

• Rudradaman:

• Rudradaman I was a famous ruler of the Western Kshatrapas (Saka) dynasty who ruled around 130–150 AD.

• He is best known for the Junagadh Rock Inscription in Gujarat, which is the first major long inscription in chaste Sanskrit.

• This inscription records the repair of the Sudarshana Lake, which was originally built during the reign of Chandragupta Maurya.

• Chandragupta II:

• Commonly known as Vikramaditya, he was the son of Samudragupta and extended the Gupta empire to its peak through matrimonial alliances and conquests.

• He is associated with the Mehrauli Iron Pillar inscription located in Delhi, which mentions a king named "Chandra."

• His court was famous for the Navaratnas (nine gems), including the great poet Kalidasa and the astronomer Varahamihira.

• Samudragupta's Conquests:

• According to the Prayaga Prashasti, his policy toward the kings of Dakshinapatha was "Grahana-Moksha-Anugraha" (capturing, liberating, and then reinstating them as tributaries).

• Historian V.A. Smith referred to him as the "Napoleon of India" due to his undefeated military record and extensive territorial expansions across the Indian subcontinent.

Important Points

• Epigraphy and Paleography: The study of these inscriptions is known as Epigraphy. The script used in the Prayaga Prashasti is a later version of Brahmi, often referred to as the Gupta Script.

• Genealogy: The inscription is significant because it provides a genealogy (Vamshavali) of the Gupta rulers, mentioning Srigupta (founder), Ghatotkacha, and Chandragupta I.

• Jahangir's Inscription: Much later, in 1605 AD, the Mughal Emperor Jahangir added his own inscription in Persian on the same pillar, carved by the famous calligrapher Abdulla Mushkin Qalam.

Q60. Answer: (c) Convex lens

The correct answer is Convex lens.

Key Points

• A Convex lens is structurally thicker at the center than at the edges. It is fundamentally known as a converging lens because of its ability to bring light together.

• When parallel rays of light (usually from a distant source like the sun) pass through a convex lens, they undergo refraction and converge at a single point called the Principal Focus. Hence, the statement that it is used to focus parallel rays is correct.

• The distance from the optical center of the lens to this focal point is defined as the focal length. The nature of the image formed by this lens depends on the position of the object relative to the focal point.

• If an object is placed at infinity, the image is formed at the focus, and it is real, inverted, and highly diminished.

• The power of a convex lens is always expressed as a positive numerical value in Dioptres, signifying its converging nature.

Additional Information

• Concave Lens:

• Unlike the convex lens, a concave lens is thinner at the middle and thicker at the periphery.

• It is known as a diverging lens because it spreads out parallel rays of light.

• It is primarily used in spectacles to correct Myopia (short-sightedness) and in flashlights to spread light over a wider area.

• Bifocal Lens:

• A bifocal lens contains two distinct optical powers, typically with a concave part at the top for distance and a convex part at the bottom for near vision.

• These were famously invented by Benjamin Franklin in the 18th century.

• They are used to treat Presbyopia, an age-related condition where the eye's natural lens loses flexibility, making it hard to focus on nearby objects.

• Cylindrical Lens:

• A cylindrical lens has different radii of curvature in the horizontal and vertical planes.

• Instead of focusing light to a single point, it focuses light into a line.

• Its primary application is the correction of Astigmatism, a visual defect caused by an irregular cornea or lens curvature.

• Applications of Convex Lenses:

• They are the core component of Microscopes and Telescopes used to magnify tiny or distant objects.

• The human eye contains a natural organic convex lens that focuses light onto the retina.

• They are used in projectors and camera lenses to form real images on screens or film.

Important Points

• Lens Formula: The relationship between the object distance (u), image distance (v), and focal length (f) is given by the formula

1/f = 1/v - 1/u.

• Magnification: For a lens, magnification (m) is the ratio of the height of the image to the height of the object, or v/u. If m is negative, the image is real and inverted; if positive, it is virtual and erect.

• Hypermetropia: This is a vision condition (long-sightedness) where nearby objects appear blurry. It is corrected using a convex lens of appropriate power to help the eye focus light correctly on the retina.

• Sign Convention: According to the Cartesian sign convention, the focal length of a convex lens is positive (+), while the focal length of a concave lens is negative (-).

Q61. Answer: (d) 64

Shortcut Trick

Use relation: Mode = 3Median − 2Mean

=> 48 = 3M − 2(72)

=> 48 = 3M − 144

=> 3M = 192

=> M = 64

Therefore Answer = 64

Alternate Method

Given:

=> Mode = 48

=> Mean = 72

Formula:

=> Mode = 3Median − 2Mean

Calculations:

=> 48 = 3Median − 2 × 72

=> 48 = 3Median − 144

=> 3Median = 192

=> Median = 192 ÷ 3 = 64

Final Answer: 64

Additional Information

1. Empirical Relation: Mode = 3Median − 2Mean

2. Rearranged Form: Median = (Mode + 2Mean) ÷ 3

3. Applicability: Works for moderately skewed distributions

4. Exam Tip: Memorize formula for quick solving

Q62. Answer: (b) Aravalli Hills and Ranges

The correct answer is Aravalli Hills and Ranges.

Key Points

• The Supreme Court of India, in its order dated 29 December 2025 (following landmark deliberations in 2024), addressed the suo motu matter titled "In Re: Definition of Aravalli Hills and Ranges and Ancillary Issues" to bring clarity to the legal protection of the mountain range.

• The primary objective of this legal intervention is to establish a uniform definition for what constitutes a "hill" and "range" within the Aravalli ecosystem across the states of Rajasthan, Haryana, Gujarat, and the Union Territory of Delhi.

• The court observed that the lack of a precise definition has historically allowed illegal mining and unauthorized construction activities, leading to the "disappearance" of several hillocks in the Aravalli region.

• The order emphasizes that the Aravalli Hills serve as a critical ecological barrier against the eastward expansion of the Thar Desert, and any further degradation would pose a threat to the national capital region (NCR) and surrounding areas.

• The Supreme Court directed state governments to use satellite imagery and ground-truthing to identify all areas that fall under the new definition of Aravalli, ensuring they are protected under forest conservation laws.

Additional Information

• Geological Age and Origin: The Aravalli Range is considered one of the oldest fold mountain systems in the world, dating back to the Proterozoic era (approximately 1.8 billion years ago). Unlike the Himalayas, which are young fold mountains, the Aravallis are residual mountains that have weathered over eons.

• Geographical Extent: The range stretches approximately 670 kilometers (430 miles) in a northeast-to-southwest direction. It begins near Ahmedabad in Gujarat, passes through Rajasthan and Haryana, and terminates at the Raisina Hill in Delhi.

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• Highest Peak: The highest point of the range is Guru Shikhar, located in Mount Abu, Rajasthan, standing at an elevation of 1,722 meters (5,650 feet) above sea level.

• Ecological Importance: The Aravallis act as the "lungs" for the NCR and help in groundwater recharge for water-stressed regions. They host diverse flora and fauna, including the leopard, striped hyena, and various species of migratory birds.

• Rivers and Drainage: Several important rivers originate from or are fed by the Aravalli drainage system, including the Banas, Luni, Sahibi, and Sabalmati rivers.

Important Points

• Mining Bans: The Supreme Court has imposed several bans on mining in the Aravallis, most notably in the Aravalli districts of Haryana (like Gurugram and Faridabad) and parts of Rajasthan, to prevent irreversible environmental damage.

• Desertification Control: One of the most significant functions of the Aravalli Hills is preventing wind erosion and stopping the sand dunes of the Thar Desert from encroaching upon the fertile Indo-Gangetic plains.

• Legal Precedents: The case is an extension of the famous T.N. Godavarman Thirumulpad vs. Union of India (1996) case, which redefined "forest" in India to include all areas recorded as such in government records, regardless of ownership.

• Urbanization Threats: Rapid urbanization and real estate development in cities like Gurugram have led to the clearing of Aravalli forests, prompting the judiciary to mandate the protection of these ecologically sensitive zones (ESZ).

Q63. Answer: (a) angle Q = 95°, angle R = 95°, angle S = 85°

Shortcut Trick

Cyclic quadrilateral => opposite angles = 180°

=> angle R = 180 − 85 = 95°

Trapezium (PS || QR) => consecutive angles supplementary

=> angle Q = 180 − 85 = 95°

=> angle S = 180 − 95 = 85°

Therefore Answer = 95°, 95°, 85°

Alternate Method

Given:

=> PQRS is cyclic trapezium

=> PS || QR

=> angle P = 85°

Concept Used:

=> Opposite angles in cyclic quadrilateral = 180°

=> Interior angles on same side of transversal = 180°

Calculations:

=> angle R = 180 − 85 = 95°

=> Since PS || QR:

=> angle P + angle Q = 180° => 85 + angle Q = 180

=> angle Q = 95°

=> Opposite angles:

=> angle Q + angle S = 180°

=> 95 + angle S = 180

=> angle S = 85°

Final Answer: angle Q = 95°, angle R = 95°, angle S = 85°

Additional Information

1. Cyclic Quadrilateral: Opposite angles sum = 180°

2. Trapezium Property: Adjacent angles on same leg are supplementary

3. Parallel Lines: Co-interior angles sum to 180°

4. Exam Tip: Use both cyclic and parallel properties together

Q64. Answer: (c) 42nd Amendment, 1976

The correct answer is 42nd Amendment, 1976.

Key Points

• The Fundamental Duties of citizens were incorporated into the Constitution of India by the 42nd Constitutional Amendment Act, 1976. This amendment is widely regarded as one of the most comprehensive changes to the Constitution. Hence, the correct option is 42nd Amendment, 1976.

• These duties were included based on the recommendations of the Sardar Swaran Singh Committee, which suggested that steps be taken to ensure that the individual did not overlook his duties while in the enjoyment of his Fundamental Rights.

• Originally, the 42nd Amendment introduced 10 Fundamental Duties. They are listed in Part IV-A of the Constitution under Article 51A.

• The concept of Fundamental Duties was borrowed from the Constitution of the USSR (now Russia), as the original Constitution of India only contained Fundamental Rights and not duties.

• The 42nd Amendment was enacted during the Internal Emergency (1975–1977) under the government led by Indira Gandhi.

Additional Information

• 97th Amendment, 2011:

• This amendment focused on the Co-operative Societies in India. It gave them a Constitutional status and protection.

• It inserted Article 43B in the Directive Principles of State Policy regarding the promotion of cooperative societies and added Part IX-B to the Constitution.

• 52nd Amendment, 1985:

• This amendment is famously known as the Anti-Defection Law. It was passed to prevent political defections motivated by the lure of office or other similar considerations.

• It added the 10th Schedule to the Constitution, providing for the disqualification of members of Parliament and State Legislatures on the ground of defection.

• 61st Amendment, 1989:

• This amendment reduced the voting age for elections to the Lok Sabha and the Legislative Assemblies of States.

• The age was lowered from 21 years to 18 years to encourage greater participation of the youth in the democratic process of the country.

• 86th Amendment, 2002:

• This is a crucial amendment that added the 11th Fundamental Duty to the list under Article 51A.

• It mandates that a parent or guardian must provide opportunities for education to his child or ward between the age of 6 and 14 years.

Important Points

• Nature of Duties: Unlike Fundamental Rights, the Fundamental Duties are non-justiciable, meaning they cannot be enforced by a writ or legal process in court. However, they are used by courts to determine the constitutionality of any law.

• Mini-Constitution: The 42nd Amendment is often called the Mini-Constitution because it attempted to alter the basic structure of the document and brought massive changes to the Preamble, Seventh Schedule, and many other articles.

• Verma Committee (1999): This committee identified the existence of legal provisions for the implementation of some of the Fundamental Duties, such as the Prevention of Insults to National Honour Act (1971) and the Wildlife Protection Act (1972).

• List of Duties: Some of the key duties include abiding by the Constitution, cherishing the ideals of the freedom struggle, upholding the sovereignty of India, and promoting harmony and the spirit of common brotherhood among all the people of India.

Q65. Answer: (d) 82°

Shortcut Trick

For adjacent angle bisectors:

=> angle AOB = 180 − (A + B)/2

=> 41 = 180 − (A + B)/2

=> (A + B)/2 = 139 => A + B = 278

=> C + D = 360 − 278 = 82°

Therefore Answer = 82°

Alternate Method

Given:

=> Quadrilateral ABCD

=> Bisectors of angle A and angle B meet at O

=> angle AOB = 41°

Formula:

=> angle AOB = 180 − (A + B)/2

Diagram:

A B C D O

Calculations:

=> 41 = 180 − (A + B)/2

=> (A + B)/2 = 139

=> A + B = 278

=> A + B + C + D = 360

=> C + D = 360 − 278 = 82°

Final Answer: 82°

Additional Information

1. Angle Sum: Quadrilateral angles sum = 360°
2. Bisector Angle Formula: Between adjacent bisectors = 180 − (sum)/2
3. Key Insight: Use A+B first, then subtract from 360
4. Exam Tip: Memorize this direct formula for speed

Q66. Answer: (b) A state legislature can not impose tax on the consumption or sale of electricity.

The correct answer is A state legislature can not impose tax on the consumption or sale of electricity.

Key Points

• Article 287 of the Constitution of India specifically prohibits a State Legislature from imposing a tax on the consumption or sale of electricity that is consumed by the Government of India or sold to the Government of India for consumption by that Government, or consumed in the construction, maintenance, or operation of any Railway. However, under Entry 53 of the State List (List II) of the Seventh Schedule, states have the power to levy taxes on the consumption or sale of electricity for other purposes and consumers. Since the statement categorically claims a state cannot impose such a tax at all, it is inaccurate. Hence, statement 2 is not correct.

• Article 282 of the Constitution provides for Discretionary Grants. It empowers both the Union (Centre) and the States to make grants for any public purpose, even if that purpose does not fall within their respective legislative domains as defined in the Seventh Schedule. This allows for flexibility in funding various welfare and development schemes. Hence, statement 1 is correct.

• Article 286 imposes restrictions on the state's power to levy taxes on the sale or purchase of goods. Following the 101st Amendment Act, 2016, this article prohibits State Legislatures from imposing a tax on the supply of goods or services where such supply takes place outside the state or in the course of import into or export out of the territory of India. This ensures a unified national market under the Goods and Services Tax (GST) regime. Hence, statement 3 is correct.

• Article 276 grants the State Legislatures the power to levy taxes on professions, trades, callings, and employments. Although these are technically taxes on income (which is a Union subject), the Constitution specifically permits states to collect this. The total amount payable by any one person to the State or any Municipality or District Board by way of such tax is currently capped at Rs. 2,500 per annum. Hence, statement 4 is correct.

Additional Information

• Centre-State Financial Relations: These are primarily governed by Articles 268 to 293 in Part XII of the Constitution of India. The financial powers are distributed between the Union and the States through the Three Lists of the Seventh Schedule.

• GST Council: Established under Article 279A, the GST Council is a joint forum of the Centre and the States. It makes recommendations on issues like tax rates, exemptions, and floor prices for Goods and Services Tax, which has significantly altered the taxing powers of the states since its implementation on 1 July 2017.

• Finance Commission: Under Article 280, the President of India constitutes a Finance Commission every 5 years. Its primary function is to recommend the distribution of net proceeds of taxes between the Union and the States and the principles governing grants-in-aid to the states out of the Consolidated Fund of India.

• Residuary Power of Taxation: The Parliament has the exclusive power to levy taxes on any matter not specifically mentioned in the State List or Concurrent List. This is known as the Residuary Power of Taxation under Article 248 and Entry 97 of the Union List.

• Borrowing Powers: Under Article 292, the Union Government can borrow upon the security of the Consolidated Fund of India within limits fixed by Parliament. Under Article 293, States can borrow within India upon the security of the Consolidated Fund of the State, but they must obtain the Centre's consent if any part of a previous loan from the Centre is still outstanding.

Important Points

• Article 288 provides for exemption from taxation by States in respect of water or electricity in certain cases, particularly when it relates to inter-state river valleys or projects authorized by Parliament.

• The Professional Tax limit was increased from Rs. 250 to Rs. 2,500 by the 60th Amendment Act, 1988 to help states increase their revenue resources.

• Surcharge and Cess: Under Article 271, the Parliament can levy a surcharge on certain taxes and duties for the purposes of the Union. The proceeds of such surcharges go exclusively to the Centre and are not shared with the States.

Q67. Answer: (a) Regulated trade and crafts

The correct answer is Regulated trade and crafts.

Key Points

• The term Shrenis refers to the guilds or professional associations of merchants, artisans, and craftspersons that were highly organized during the Gupta and post-Gupta periods in India.

• Their primary function was the regulation of trade and crafts, which included setting standards for quality, fixing prices of manufactured goods, and ensuring fair competition among members. Hence, the option "Regulated trade and crafts" is correct.

• The Shrenis acted as autonomous bodies with their own set of rules and regulations, known as Sreni-dharma, which were recognized and respected by the King and the State administration.

• These guilds also served as banks, accepting fixed deposits from the public and providing loans to traders and entrepreneurs, often using the interest earned for charitable purposes or maintaining religious institutions.

• They played a significant role in urban administration; in many post-Gupta cities, the head of the guild (Nagarsherthi or Sarthavaha) held a prominent position in the local council or Adhisthana Adhikarana.

Additional Information

• Structure and Membership: Membership in a Shreni was usually hereditary, ensuring that technical skills and craft secrets were passed down through generations. Each guild was headed by a chief called the Jetthaka or Pamukha.

• Geographic Reach: While many guilds were local, some like the Manigramam and Nanadesi merchant guilds of South India operated on an international scale, conducting maritime trade with Southeast Asia and the Roman Empire.

• Judicial Powers: The guilds possessed quasi-judicial powers over their members, settling disputes related to contracts, wages, and working conditions, which reduced the burden on the royal courts.

• Social Philanthropy: Shrenis were known for their donations to Buddhist monasteries and Hindu temples. A famous example is the Silk Weavers' Guild of Lata, which migrated to Dashapura (modern Mandsaur) and built a magnificent Sun Temple in the 5th century AD.

• Economic Impact: By standardizing currency, weights, and measures in their respective domains, the guilds facilitated a stable commercial environment during the transition from the classical to the early medieval period.

Important Points

• Relationship with the State: The Narada Smriti and Brihaspati Smriti, legal texts from this era, emphasize that the King should maintain the usages of the guilds and should only interfere if the Shreni laws clashed with public interest or morality.

• Decline in Later Period: The influence of guilds began to wane in the later medieval period due to the rise of feudalism and the shift toward a more agrarian-based economy where land grants became the primary form of wealth.

• Apprenticeship: The guilds managed a formal training system where an apprentice (Shishya) lived with a Master (Acharya) to learn the craft, reflecting a highly organized vocational education system in Ancient India.

• Guild Seals: Excavations at sites like Basarh (ancient Vaishali) have unearthed numerous terracotta seals belonging to guilds of bankers (Sreshthin), traders (Sarthavaha), and artisans (Kulika), proving their administrative complexity.

Q68. Answer: (c) Barun Sobti and Sparsh Shrivastava

The correct answer is Barun Sobti and Sparsh Shrivastava.

Key Points

• The Filmfare OTT Awards 2024 (often referred to in the context of the 2024-2025 award cycle) celebrated the best performances and content on streaming platforms in India. In a notable moment, the Best Actor in a Comedy Series (Male) award was shared by two talented actors.

• Barun Sobti won the prestigious Black Lady trophy for his exceptional performance in the SonyLIV original series titled Raat Jawaan Hai. His portrayal of a young father navigating the challenges of parenthood alongside his friends was highly acclaimed by critics.

• Sparsh Shrivastava shared the honor for his work in the same category. While Sparsh gained immense fame for the film Laapataa Ladies, his contributions to the comedy genre on digital platforms led to this joint recognition at the December 2024/2025 ceremony.

• The event took place in Mumbai and highlighted the growing influence of Over-The-Top (OTT) platforms like Netflix, Amazon Prime Video, and Disney+ Hotstar in the Indian entertainment ecosystem.

• This joint win signifies the high level of competition in the Comedy genre, which has seen a resurgence with relatable, slice-of-life storytelling on digital screens.

Additional Information

• Filmfare OTT Awards:

• The Filmfare OTT Awards were first introduced in 2020 to honor artistic and technical excellence in the Hindi-language streaming industry.

• The categories are divided into Web Originals (Films) and Web Series, covering genres like Drama, Comedy, and Thriller.

• Barun Sobti:

• A prominent Indian actor, Barun Sobti gained initial fame through television before successfully transitioning to OTT.

• Apart from Raat Jawaan Hai, he is well-known for his roles in critically acclaimed series like Asur and Kohrra, the latter of which

earned him several nominations and awards in the Drama category.

• Sparsh Shrivastava:

• Sparsh Shrivastava is a rising star in the Indian film industry, who first made a mark as a child actor in Balika Vadhu.

• His performance in Laapataa Ladies (released in 2024) became a cultural phenomenon, leading to his recognition as one of the most versatile young actors in the Comedy and Social Drama space.

• Significance of the 2024-25 Awards:

• The December awards saw a sweep by projects that focused on realistic narratives. Shows like Kota Factory Season 3 and Panchayat Season 3 were also major contenders in the Comedy category.

• The recognition of shared awards highlights the Filmfare jury's acknowledgment of multiple outstanding performances that are difficult to rank over one another.

Important Points

• The Filmfare OTT Awards ceremony is distinct from the traditional Filmfare Awards (for theatrical releases), which have been held annually since 1954.

• The Comedy category has become increasingly important as platforms invest in regional and authentic Indian humor, moving away from slapstick to situational comedy.

• Raat Jawaan Hai, the series for which Barun Sobti won, was directed by Sumeet Vyas, himself a pioneer of the Indian web series revolution.

• Winners are selected through a combination of jury votes and, in some categories, audience polls conducted via the Filmfare website.

Q69. Answer: (c) 63

The logic followed here is:

thus, "63" will replace the question mark in the given series.

Hence, the correct option is "Option 3".

Q70. Answer: (a) 9

Shortcut Trick

Numbers are equally spaced

=> Average = middle number

=> = 9

Therefore Answer = 9

Alternate Method

Given:

=> Numbers = 7, 9, 11

Formula:

=> Average = (Sum of numbers) ÷ Count

Calculations:

=> Sum = 7 + 9 + 11 = 27

=> Count = 3

=> Average = 27 ÷ 3 = 9

Final Answer: 9

Additional Information

1. Average Formula: Sum ÷ Number of terms

2. Equally Spaced Numbers: Average = middle value

3. Arithmetic Mean: Central value of dataset

4. Exam Tip: Use middle number shortcut when equally spaced

Q71. Answer: (b) VLM : TQK

The logic followed here is:.

For, DRU → BWS

For, ZBQ → XGO

Now, checking options:

Option 1) HKD → DNZ

Option 2) VLM → TQK

Option 3) BCG → WGB

Option 4) CLU → AOS

Hence, the correct answer is Option 2.

Q72. Answer: (c) Child marriage

The correct answer is Child marriage.

Key Points

• Behramji Merwanji Malabari (1853–1912) was a prominent Parsi social reformer, journalist, and poet who dedicated his life to the protection of women's rights and the removal of social evils in India.

• His most significant contribution was his relentless crusade against the practice of child marriage and the enforced widowhood of Hindu girls. Hence, the statement regarding child marriage is correct.

• In 1884, he published his famous "Notes on Infant Marriage and Enforced Widowhood," which he circulated among both British officials and Indian leaders to garner support for legislative intervention.

• His advocacy was instrumental in the enactment of the Age of Consent Act, 1891. This legislation raised the minimum age of consent for sexual intercourse for girls (both married and unmarried) from 10 years to 12 years.

• Malabari also founded the Seva Sadan in 1908 along with his friend Diwan Dayaram Gidumal. This organization focused on the welfare of the socially discarded and exploited women, providing them with education and medical facilities.

Additional Information

• Journalism and Influence:

• Malabari was the editor of the Indian Spectator, a weekly newspaper through which he voiced his reformist ideas. He also took over the management of the Voice of India, which was started by Dadabhai Naoroji in London.

• He used his editorial platforms to bridge the gap between British policy and Indian social needs, advocating for gradual but firm legislative reforms.

• Other Social Evils mentioned in options:

• Widow burning or Sati: This was primarily addressed by Raja Ram Mohan Roy. His efforts led to the Sati Regulation Act of 1829, passed by the then Governor-General Lord William Bentinck.

• Female infanticide: Legislative measures against this practice were introduced much earlier through the Bengal Regulation Acts of 1795 and 1804, and later the Female Infanticide Prevention Act, 1870.

• Untouchability: Movements against untouchability gained significant momentum later under the leadership of Mahatma Gandhi and Dr. B.R. Ambedkar in the 20th century.

• Geographic and Cultural Context:

• Malabari was born in Baroda (now Vadodara, Gujarat) and spent much of his working life in Bombay (now Mumbai).

• Despite being a Parsi, he focused heavily on the internal social reforms of the Hindu community, which earned him both high praise and intense criticism from conservative sectors.

Important Points

• Controversy over the Age of Consent Act: The 1891 Act faced severe opposition from conservative nationalists like Bal Gangadhar Tilak, who argued that the British government should not interfere with Hindu religious and social customs.

• Global Advocacy: Malabari traveled to London in 1890 to lobby the British Parliament and public opinion to support the Age of Consent bill, showing his commitment to international pressure for social change.

• Legacy: He is remembered as a mediator between the East and the West, emphasizing that social reform must precede or at least accompany political independence to build a healthy nation.

• The Age of Consent Act was a precursor to the Child Marriage Restraint Act of 1929 (popularly known as the Sarda Act), which eventually fixed the marriageable age for girls at 14 and boys at 18.

Q73. Answer: (b) Oxygen

The correct answer is Oxygen.

Key Points

• Noble gases are a group of chemical elements that make up Group 18 of the periodic table. These elements are known for being extremely stable and having low chemical reactivity.

• The group consists of seven elements: Helium (He), Neon (Ne), Argon (Ar), Krypton (Kr), Xenon (Xe), Radon (Rn), and Oganesson (Og).

• Oxygen (O) belongs to Group 16 (the chalcogens) and is a highly reactive nonmetal. It is not a noble gas because it lacks a complete valence shell in its atomic state. Hence, the statement that Oxygen is a noble gas is incorrect.

• Helium is the first element in the noble gas group. It has a closed-shell configuration with 2 electrons. Hence, the statement that Helium is a noble gas is correct.

• Argon is the third noble gas and is the most abundant noble gas in Earth's atmosphere. Hence, the statement that Argon is a

noble gas is correct.

• Neon is the second noble gas, known for its use in advertising signs due to its bright reddish-orange glow. Hence, the statement that Neon is a noble gas is correct.

Additional Information

• Oxygen (O):

• It has the atomic number 8 and is the third most abundant element in the universe by mass.

• In the Earth's atmosphere, it exists as a diatomic gas (O2) and constitutes about 20.95% of the air.

• It is essential for aerobic respiration and combustion processes.

• Helium (He):

• It has the atomic number 2 and possesses the lowest boiling point (4.22 K) among all elements.

• It is used in cryogenics, MRI scanners, and as a lifting gas for weather balloons because it is non-flammable and lighter than air.

• Argon (Ar):

• With atomic number 18, it makes up approximately 0.93% of the atmosphere.

• It is used in incandescent light bulbs to protect the tungsten filament from oxidation and as a shielding gas in arc welding.

• Neon (Ne):

• It has the atomic number 10. While rare on Earth, it is the fifth most abundant element in the universe.

• Its primary application is in high-voltage discharge tubes and helium-neon lasers.

Important Points

• The noble gases were historically referred to as inert gases, but this term is no longer strictly accurate as some of them (specifically Xenon and Krypton) can form chemical compounds under extreme conditions.

• Sir William Ramsay, a British chemist, was instrumental in the discovery of Helium, Neon, Argon, Krypton, and Xenon between 1894 and 1898, earning the Nobel Prize in Chemistry in 1904.

• All noble gases are monatomic, colorless, odorless, and tasteless under standard temperature and pressure (STP).

• Radon (Rn) is a radioactive noble gas that is a decay product of Uranium and Radium; it is a significant concern for indoor air quality in certain geographical locations.

Q74. Answer: (a) Alt+Enter

The correct answer is Alt+Enter.

Key Points

• The keyboard shortcut Alt+Enter is specifically designed in the Microsoft Windows environment to open the Properties window for a selected item, such as a file, folder, or shortcut icon.

• When this shortcut is executed, a dialog box appears that displays critical metadata about the item, including its file type, size, location, creation date, and modification date.

• It also allows users to modify file attributes like Read-only or Hidden and manage Security permissions for different user profiles on the operating system.

• This shortcut is a much faster alternative to the traditional method of right-clicking an object with a mouse and navigating to the bottom of the context menu to click "Properties."

• In addition to file management, in certain software applications and video games, pressing Alt+Enter is a common command to toggle between windowed mode and full-screen mode.

Additional Information

• Alt+Shift: This key combination is frequently used in Windows systems to switch between different keyboard layouts or input languages that the user has installed. It does not interact with the properties of a file.

• Alt+E: This is a standard ribbon shortcut or menu shortcut in various applications. For instance, in many older programs or browsers, it opens the Edit menu. In Microsoft Excel, it can be part of a sequence to access specific editing tools.

• Alt+Ctrl: These are two modifier keys that are rarely used alone; they usually function in combination with a letter or function key. For example, Ctrl+Alt+Delete is a famous security sequence used to access the Task Manager, lock the PC, or sign out.

• Shortcuts for Efficiency: Using keyboard shortcuts significantly improves productivity and workflow efficiency by reducing the reliance on peripheral devices like the mouse for routine administrative tasks.

• Important Points

• Contextual Usage: It is important to note that the function of Alt+Enter can change depending on the active application. In Microsoft Excel, for instance, pressing Alt+Enter while typing inside a cell creates a line break (carriage return) within that specific cell, allowing for multi-line text.

• Accessibility: Shortcuts like these are vital for accessibility, enabling users with motor impairments who may find it difficult to use a mouse to navigate the Graphical User Interface (GUI) effectively.

• Standardization: Most of these shortcuts have remained standardized across various versions of Windows, from Windows 95 up

to the current Windows 11, ensuring a consistent user experience over several decades.

• File Explorer: Within the Windows File Explorer, other useful shortcuts include Alt+P to toggle the Preview Pane and Alt+D to move the focus to the Address Bar.

Q75. Answer: (c) (4, 9, 4)

The logic followed here is:

Logic: third number = (second number − first number) + 1

For, (9, 17, 7)

=> 17 − 9 = 8

=> 8 − 1 = 7

For, (6, 12, 5)

=> 12 − 6 = 6

=> 6 − 1 = 5

Now, checking the options using the same pattern:

Option 1) (9, 17, 5)

=> 17 − 9 = 8

=> 8 − 1 = 7 ≠ 5

Option 2) (2, 5, 3)

=> 5 − 2 = 3

=> 3 − 1 = 2 ≠ 3

Option 3) (4, 9, 4)

=> 9 − 4 = 5

=> 5 − 1 = 4

Option 4) (6, 12, 4)

=> 12 − 6 = 6

=> 6 − 1 = 5 ≠ 4

Hence, the correct answer is Option 3.

Q76. Answer: (c) INSV Kaundinya

The correct answer is INSV Kaundinya.

Key Points

• The Indian Navy recently launched a unique stitched sailing vessel named INSV Kaundinya, which is a centerpiece of the project to revive India's ancient maritime legacy and traditional shipbuilding skills.

• The vessel was launched on October 15, 2024, at Hodi Innovations in Goa. This project is a prestigious collaboration between the Ministry of Culture, the Indian Navy, and the Indian National Trust for Art and Cultural Heritage (INTACH).

• INSV Kaundinya is scheduled to embark on its maiden overseas voyage in December 2025. The journey will start from Porbandar in Gujarat, India, and terminate at Muscat in Oman.

• The ship is built using the ancient stitched technique (known locally as tanka), which involves joining teak wood planks with coir ropes instead of modern metal nails or bolts. This technique was widely used in India for over 2,000 years before the colonial era.

• The primary objective of this project is to showcase the maritime prowess of ancient Indian sailors and to reconstruct the historic trade routes across the Indian Ocean and the Arabian Sea.

• The voyage also aligns with the Project Mausam initiative of the Government of India, which focuses on reconnecting and re-establishing communication between countries of the Indian Ocean world.

Additional Information

• Ancient Shipbuilding Techniques: The stitched ship construction relies on traditional materials such as coir (coconut fiber), fish oil, and vegetable resins to seal the gaps between planks. This method provides the vessel with significant flexibility and durability against the impact of waves and sandbars.

• INSV Mhadei and INSV Tarini: These are modern fiberglass sloops of the Indian Navy. While INSV Mhadei was used by Commander Dilip Donde for India's first solo circumnavigation in 2009-2010, INSV Tarini was used for the famous Navika Sagar Parikrama expedition by an all-woman crew in 2017. They differ from INSV Kaundinya as they are built with modern composite materials. Hence, these options are incorrect.

• INSV Tarangini: This is a Tall Ship sail training vessel for the Indian Navy, commissioned in 1997. It is primarily used for training cadets and has participated in several World Sails. Hence, this option is incorrect.

• INSV Shardul: The Shardul class refers to Amphibious Warfare Ships (LST-L) of the Indian Navy. These are large motorized vessels used for transporting tanks, trucks, and troops, rather than being small stitched sailing craft. Hence, this option is

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incorrect.

• Craftsmanship: The construction of INSV Kaundinya was made possible by the Mappila shipbuilders from Beypore, Kerala, who are among the few remaining craftsmen in the world possessing the knowledge of this millennia-old art.

Important Points

• Vessel Specifications: The ship has a length of approximately 13.15 meters and a width of 5.04 meters, with a displacement of nearly 30 tonnes. It features a unique triangular sail design typical of ancient Indian Ocean vessels.

• Historical Context: The name Kaundinya is inspired by the legendary Indian merchant and sage Kaundinya, who is credited in ancient chronicles with travelling to South East Asia and influencing the early Funan civilization.

• Scientific Significance: The December 2025 voyage will be closely monitored to collect data on traditional navigation, monsoon winds, and the structural integrity of ancient ship designs in modern sea conditions.

• Partnerships: The project is supported by the National Maritime Heritage Complex (NMHC) at Lothal, which is being developed as a major center for showcasing India's 5,000-year-old maritime history.

Q77. Answer: (c) 3

Shortcut Trick

=> Try x = 3 (small integer check)

=> Speeds: 10, 4 → Time = 40/10 + 40/4 = 4 + 10 = 14 hr

=> New speeds: 12, 2 → Time = 40/12 + 40/2 = 3.33 + 20 = 23.33 hr

=> Difference = 9.33 hr = 28/3 hr Yes

Therefore Answer = 3

Alternate Method

Given:

Speed in still water = 7

Distance = 40

Let speed of stream = x

Time difference = 28/3

Formula:

Time = Distance ÷ Speed

Downstream speed = 7 + x

Upstream speed = 7 − x

Calculation:

=> Time1 = 40 ÷ (7 + x) + 40 ÷ (7 − x)

=> Time2 = 40 ÷ (9 + x) + 40 ÷ (5 − x)

=> Time2 − Time1 = 28/3

=> [40 ÷ (9 + x) + 40 ÷ (5 − x)] − [40 ÷ (7 + x) + 40 ÷ (7 − x)] = 28/3

=> 40[(1 ÷ (9 + x) − 1 ÷ (7 + x)) + (1 ÷ (5 − x) − 1 ÷ (7 − x))] = 28/3

=> 40[((7 + x − 9 − x) ÷ ((9 + x)(7 + x))) + ((7 − x − 5 + x) ÷ ((5 − x)(7 − x)))] = 28/3

=> 40[(−2 ÷ ((9 + x)(7 + x))) + (2 ÷ ((5 − x)(7 − x)))] = 28/3

=> 80[(1 ÷ ((5 − x)(7 − x)) − 1 ÷ ((9 + x)(7 + x)))] = 28/3

=> Substitute x = 3

=> LHS = 80[(1 ÷ (2 × 4)) − (1 ÷ (12 × 10))]

=> = 80[(1 ÷ 8) − (1 ÷ 120)]

=> = 80[(15 ÷ 120 − 1 ÷ 120)]

=> = 80 × (14 ÷ 120)

=> = 80 × 7 ÷ 60

=> = 560 ÷ 60

=> = 28/3

=> RHS = 28/3

=> LHS = RHS

Therefore Final Answer: 3

Additional Information

1. Downstream Speed: u + v

2. Upstream Speed: u − v

3. Time Formula: Time = Distance ÷ Speed

4. Exam Tip: Try values when equation becomes complex

Q78. Answer: (c) 68

The logic followed here is:

thus, "68" will replace the question mark in the given series.

Hence, the correct option is "Option 3".

Q79. Answer: (a) p = 1, q = −1, r = 2

Shortcut Trick

=> Add (1) and (2): −p + p + 2q − 3q − 3r + r = −9 + 6

=> −q − 2r = −3 → q + 2r = 3

=> Compare with next step → use elimination

=> From solving quickly: r = 2, q = −1

=> Put in (2): p − 3(−1) + 2 = 6 → p = 1

Therefore Answer = (p, q, r) = (1, −1, 2)

Alternate Method

Given:

=> −p + 2q − 3r = −9 ...(1)

=> p − 3q + r = 6 ...(2)

=> 2p − 5q + 5r = 17 ...(3)

Formula:

=> Elimination method

Calculation:

=> Add (1) and (2):

=> −p + p + 2q − 3q − 3r + r = −9 + 6

=> −q − 2r = −3 → q + 2r = 3 ...(4)

=> Multiply (2) by 2:

=> 2p − 6q + 2r = 12 ...(5)

=> Subtract (5) from (3):

=> (2p − 5q + 5r) − (2p − 6q + 2r) = 17 − 12

=> q + 3r = 5 ...(6)

=> Solve (4) and (6):

=> (q + 3r) − (q + 2r) = 5 − 3

=> r = 2

=> Put r = 2 in (4):

=> q + 4 = 3 → q = −1

=> Put q, r in (2):

=> p − 3(−1) + 2 = 6

=> p + 3 + 2 = 6

=> p = 1

Therefore Final Answer: (p, q, r) = (1, −1, 2)

Additional Information

1. Elimination: Add/subtract equations to remove variables

2. System of Equations: 3 variables need 3 independent equations

3. Back Substitution: Substitute values stepwise

4. Tip: Always reduce to 2 equations first

Q80. Answer: (a) 1,80,000

Shortcut Trick

=> Ratio = 3 : 5 : 4

=> After transfer: A = 3x + 15000, B = 5x − 15000, C = 4x

=> Given A = C => 3x + 15000 = 4x

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=> x = 15000
=> Total profit = (3+5+4)x = 12x = 180000
Therefore Answer = 180000
Alternate Method
Given:
=> Investment ratio = 3 : 5 : 4
=> B gives Rs. 15000 to A
=> After transfer: A's share = C's share
Formula:
=> Profit prop. to Investment
Calculation:
=> Let shares be 3x, 5x, 4x
=> After transfer:
=> A = 3x + 15000
=> B = 5x − 15000
=> C = 4x
=> Given A = C:
=> 3x + 15000 = 4x
=> x = 15000
=> Total profit = 3x + 5x + 4x = 12x
=> = 12 × 15000 = 180000
Therefore Final Answer: 180000
Additional Information
1. Partnership Rule: Profit prop. to Investment
2. Transfer Concept: One partner’s gain = another’s loss
3. Ratio Method: Assume shares as multiples of x
4. Shortcut: Equate after adjustment

Q81. Answer: (b) = LRN, % = NTP

The logic followed here is:
For, KQM → OUQ
Now, applying the same logic: LRN
Thus, the correct pair is # = LRN and % = NTP.
Hence, the correct answer is Option 2.

Q82. Answer: (c) 63

Shortcut Trick
=> A + B = 1/21, A = 1/28
=> B = 1/21 − 1/28 = (4 − 3)/84 = 1/84
=> B does full work in 84 days
=> 3/4 work = 84 × 3/4 = 63 days
Therefore Answer = 63 days
Alternate Method
Given:
=> A + B completes work in 21 days
=> A alone completes work in 28 days
Formula:
=> Work rate = Work ÷ Time
Calculation:
=> A + B rate = 1/21
=> A rate = 1/28
=> B rate = (1/21 − 1/28)

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=> = (4 − 3)/84 = 1/84

=> Time taken by B for full work = 84 days

=> Time for 3/4 work = 84 × 3/4 = 63 days

Therefore Final Answer: 63 days

Additional Information

1. Work Formula: Work = Rate × Time

2. Combined Work: Add individual rates

3. Fraction Work: Multiply total time by required fraction

4. Tip: Always find individual rate first

Q83. Answer: (c) Arches and domes

The correct answer is Arches and domes.

Key Points

• The transition from the Trabeate style to the Arcuate style marks the primary distinction between early Indian temple architecture and Mughal or Indo-Islamic architecture.

• In the Trabeate (or corbelled) style, roofs, doors, and windows were made by placing a horizontal beam across two vertical columns; this method was predominantly used in Indian temples until the 12th Century.

• The Arcuate style, characterized by the use of Arches and domes, became widespread during the Mughal Empire. In this style, the weight of the superstructure above the doors and windows was carried by arches.

• The center of the arch was supported by a keystone, which transferred the weight of the structure to the bases of the arch, allowing for the construction of massive, open internal spaces.

• Large domes became a hallmark of Mughal buildings, often acting as the focal point of the structure, whereas earlier temple constructions relied on shikharas or stepped pyramids.

Additional Information

• Evolution of Mughal Architecture: It began with Babur in 1526 but reached its zenith during the reign of Shah Jahan. It is a unique blend of Persian, Turkish, and Indian architectural styles.

• Materials Used: While earlier constructions often used local stone or wood, Mughal architecture extensively used Red Sandstone and White Marble. For instance, the Red Fort in Delhi (completed in 1648) uses red sandstone, while the Taj Mahal (completed in 1653) is famous for its high-quality white marble.

• The Double Dome Technique: This was a significant feature introduced in Humayun's Tomb (1570). It consisted of a hollow space between the inner and outer layers of the dome to provide height to the exterior while maintaining a proportionate ceiling height inside.

• Ornamentation: Mughal buildings are known for Pietra Dura (inlay work of semi-precious stones like Lapis Lazuli and Jade) and Arabesque designs, which differ significantly from the figurative carvings found in ancient Hindu and Jain temples.

• Charbagh Style: Mughal structures were often placed in the center of a Charbagh (four-quartered garden), representing the Islamic concept of paradise. This is seen in Nilopher Garden and the gardens surrounding the Taj Mahal in Agra.

Important Points

• Comparison with Options:

• Corbelled roofs and stepped pyramids: These are features of the Trabeate style used in ancient and medieval Indian temples (e.g., Khajuraho or Chola temples). This statement does not distinguish Mughal style from them but rather describes the earlier style.

• Wooden beams and flat ceilings: While wood was used in early Mauryan architecture, the hallmark of the Mughal era was the shift toward stone masonry and arched structures.

• Circular codes and railings: These are typically associated with Buddhist Stupa architecture, such as the Sanchi Stupa (3rd Century BC), and are not the distinguishing features of the Mughal period.

• Structural Functions: The arch allowed Mughal architects to build taller and wider gateways, known as Buland Darwaza (built by Akbar in 1575 at Fatehpur Sikri), which would have been structurally impossible using simple trabeate beams.

• Symmetry: A defining characteristic of Mughal architecture is perfect bilateral symmetry along a central axis, a feature meticulously followed in the construction of the Jama Masjid and the Taj Mahal.

Q84. Answer: (d) BD–FH

The logic followed here is based on the alphabetical gap between corresponding letters in each pair:

Option 1: MO – PR

Option 2: JL – MO

Option 3: GI – JL

Option 4: BD – FH

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Thus, BD – FH does not follow the same pattern of +3 shift.

Hence, the odd one out is Option 4.

Q85. Answer: (c) S

Given:

Each of P, Q, R, S, T, U and V has an exam on a different day of a week starting from Monday to Sunday.

V has an exam on Thursday.

T has an exam on one of the days after P and on one of the days before U.

Q has an exam on one of the days after R but on one of the days before S.

R has an exam on one of the days after V.

Position	Day	Person
1	Monday	P
2	Tuesday	T
3	Wednesday	U
4	Thursday	V
5	Friday	R
6	Saturday	Q
7	Sunday	S

Now, S is on Sunday

Hence, the correct answer is Option 3.

Q86. Answer: (b) 2.5

Shortcut Trick

=> SI = 840, P = 8400, R = 4%

=> Time = (SI × 100) ÷ (P × R)

=> = (840 × 100) ÷ (8400 × 4)

=> = 84000 ÷ 33600 = 2.5 years

Therefore Answer = 2.5 years

Alternate Method

Given:

=> Principal (P) = 8400

=> Simple Interest (SI) = 840

=> Rate (R) = 4%

Formula:

=> SI = (P × R × T) ÷ 100

Calculation:

=> 840 = (8400 × 4 × T) ÷ 100

=> 840 = (33600T) ÷ 100

=> 840 = 336T

=> T = 840 ÷ 336 = 2.5 years

Therefore Final Answer: 2.5 years

Additional Information

1. SI Formula: SI = (P × R × T) ÷ 100
2. Rearranged: T = (SI × 100) ÷ (P × R)
3. Units: Time in years, Rate in %
4. Tip: Cancel values early for faster calculation

Q87. Answer: (d) 16 : 15

Shortcut Trick

=> Ratio = 4 : 5

=> Apply change: 4 × 120% = 4 × 1.2 = 4.8

=> 5 × 90% = 5 × 0.9 = 4.5

=> New ratio = 4.8 : 4.5 = 48 : 45 = 16 : 15

Therefore Answer = 16 : 15

Alternate Method

Given:

=> A : B = 4 : 5

=> A increased by 20%

=> B decreased by 10%

Formula:

=> New value = Original × (1 ± % change)

Calculation:

=> Let A = 4x, B = 5x

=> New A = 4x × 1.2 = 4.8x

=> New B = 5x × 0.9 = 4.5x

=> New ratio = 4.8x : 4.5x

=> = 48 : 45

=> = 16 : 15

Therefore Final Answer: 16 : 15

Additional Information

1. Percentage Change: Increase → ×1.2, Decrease → ×0.9
2. Ratio Simplification: Remove decimals by multiplying
3. Shortcut: Apply percentage directly on ratio terms
4. Tip: Always reduce to simplest form

Q88. Answer: (c) Primary memory

The correct answer is Primary memory.

Key Points

• The Primary memory, also known as Main Memory or Random Access Memory (RAM), is the only memory that is directly accessible by the CPU (Central Processing Unit). Before any data stored on a hard disk can be processed, it must be loaded into the Primary memory.

• The CPU interacts with the Primary memory using the address bus and data bus. Because the CPU operates at very high speeds, it requires a storage medium that can provide data at a comparable rate, which Secondary memory like a hard disk cannot do.

• When a user opens a program or a file, the Operating System (OS) fetches the data from the Secondary memory (the Hard Disk Drive or Solid State Drive) and places it into the RAM. This process is essential because the access time of Primary memory is measured in nanoseconds, whereas hard disk access time is measured in milliseconds.

• Primary memory is volatile in nature, meaning it loses its data when the power is turned off. However, its high-speed read/write capabilities make it the indispensable workspace for the CPU during active computations.

Additional Information

• BIOS memory:

• BIOS stands for Basic Input/Output System. It is typically stored on a ROM (Read-Only Memory) chip on the motherboard.

• Its primary function is to perform the POST (Power-On Self-Test) and initialize the hardware components during the booting process. It is non-volatile and does not act as the workspace for general CPU data processing.

• Secondary memory:

• This includes devices like Hard Disk Drives (HDD), Solid State Drives (SSD), and Magnetic Tapes.

• These are non-volatile storage units used for permanent data storage. While they have a large storage capacity (ranging from 500 GB to 16 TB or more), they are significantly slower than Primary memory.

• CD-ROM storage:

• CD-ROM stands for Compact Disc Read-Only Memory. It is an optical storage medium.

• It is used for the distribution of software, music, and data. The CPU cannot access data directly from a CD-ROM for execution; the data must first be copied to the RAM or hard disk.

Important Points

• Memory Hierarchy: In a computer system, memory is organized in a hierarchy based on speed and cost. At the top are Registers

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(inside the CPU), followed by Cache memory (L1, L2, L3), then Primary memory (RAM), and finally Secondary memory.

• Data Transfer Rate: The speed at which data moves from the hard disk to the RAM depends on the interface used, such as SATA or NVMe. NVMe SSDs have significantly reduced the time taken to load data into the Primary memory compared to traditional HDDs.

• Virtual Memory: If the Primary memory is full, the Operating System uses a portion of the hard disk as "Virtual Memory" to simulate additional RAM, although this significantly slows down system performance due to the slower access speed of the disk.

Q89. Answer: (c) Only conclusion I follows.

Given Statements:

All hands are legs.

Some hands are ears.

Some ears are arms.

The least possible Venn diagram for the given statement is:

Conclusions:

I. Some legs are ears - True (Since Some hands are ears and all hands are legs, therefore those hands which are ears are also legs, so some legs are ears).

II. Some hands are arms - False (There is no direct or necessary relation between hands and arms given in the statements).

So, only conclusion I follows.

Hence, the correct answer is "Option 3".

Q90. Answer: (d) 9

Given: (Left) $ 8 6 2 @ $ # 1 5 # % * 9 7 5 @ 3 # 1 * 4 $ (Right)

Now,

All symbols are to be removed from the series.

Symbols are: $, @, #, %, *

After removing all symbols, the remaining numbers are: 8 6 2 1 5 9 7 5 3 1 4

Now, we need to find the 6th from the right: 8 6 2 1 5 9 7 5 3 1 4

So, the 6th element from the right is 9.

Hence, the correct answer is Option 4.

Q91. Answer: (a) 8

Given:

'NICE' is coded as '8246'

'COST' is coded as '3851'

Here, the correct code for 'C' is 8.

Therefore, the correct answer is Option 1.

Q92. Answer: (b) -31/5

Shortcut Trick

=> Convert all to same base: (4/17) = (17/4)^(−1)

=> Expression becomes: (17/4)^9 × (17/4)^(−8) × (17/4)^(15)

=> = (17/4)^(9 − 8 + 15) = (17/4)^(16)

=> RHS = (4/17)^(5m+15) = (17/4)^(−(5m+15))

=> Equate powers: 16 = −(5m + 15)

=> 5m + 15 = −16 → 5m = −31 → m = −31/5

Therefore Answer = −31/5

Alternate Method

Given:

=> (17/4)^9 × (4/17)^8 × (17/4)^(15) = (4/17)^(5m+15)

Formula:

=> a^m × a^n = a^(m+n)

=> a^(−n) = 1/a^n

Calculation:

=> Convert (4/17)^8 = (17/4)^(−8)

=> LHS = (17/4)^9 × (17/4)^(−8) × (17/4)^(15)

=> = (17/4)^(9 − 8 + 15)

=> = (17/4)^(16)

=> RHS = (4/17)^(5m+15) = (17/4)^(−(5m+15))

=> Equate powers:

=> 16 = −(5m + 15)

=> 16 = −5m − 15

=> 5m = −31

=> m = −31/5

Therefore Final Answer: −31/5

Additional Information

1. Law of Exponents: Add powers when bases are same

2. Negative Power: a^(−n) = $1/a^n$

3. Reciprocal Base: $(a/b)^n$ = (b/a)^(−n)

4. Tip: Convert all terms to one base first

Q93. Answer: (a) 135.46 billion dollars

The correct answer is 135.46 billion dollars.

Key Points

• In the fiscal year 2024–25, India set a new record for remittances with the following highlights:

• Total Amount: A record-breaking US$ 135.46 billion.

• Growth: This was a 14% increase over the previous year ($119 billion).

• Global Rank: India remains the world’s top recipient of remittances, far ahead of Mexico and China.

• Economic Impact: The money sent home covered nearly half (47%) of India's total trade deficit.

• Top Sources: Most of the money came from the USA, UK, and Singapore (45% combined), followed by the Gulf countries.

Additional Information

• Sources of Remittances:

• The United States remains the largest source of remittances for India, accounting for over 23% of the total share. This is largely due to the high concentration of Indian professionals in the technology and healthcare sectors.

• The United Arab Emirates (UAE) is the second-largest source, contributing about 18%, thanks to the Comprehensive Economic Partnership Agreement (CEPA) which has eased labor and capital movement.

• Global Context:

• Globally, remittances to low- and middle-income countries reached an estimated 669 billion dollars in 2023. India remains far ahead of other top recipients like Mexico, China, and the Philippines.

• The World Bank notes that remittances have become a more stable source of external finance compared to Foreign Direct Investment (FDI) and Official Development Assistance (ODA).

• The Impact of Unified Payments Interface (UPI):

• The expansion of UPI for cross-border transactions in countries like Singapore, France, and UAE has significantly reduced the cost of transfers, encouraging more frequent and formal remittance flows.

Important Points

• Migration Trends: A notable trend is the shift from less-skilled to high-skilled migration. While the Gulf Cooperation Council (GCC) countries used to be the dominant source, high-income OECD nations now play a massive role in capital inflow to India.

• Economic Stability: High remittance levels help India maintain its foreign exchange reserves, which reached record levels of over 640 billion dollars in early 2024.

• Cost of Sending Money: Despite the record inflows, the global average cost of sending 200 dollars remains high at approximately 6.2%. The United Nations Sustainable Development Goals (SDGs) aim to reduce this cost to less than 3% by 2030.

• Future Projections: For the year 2025, experts predict a continued growth of 3-5% in remittances to India, provided that the U.S. economy avoids a major recession and the demand for tech talent persists.

Q94. Answer: (b) R

Given: (Left) 5 C £ T R 6 B $ D © 9 6 * 9 # Z 7 2 R $ O K (Right)

Now,

All symbols are to be removed from the series.

Symbols here are: £, $, ©, *, #

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So removing all symbols, the remaining sequence becomes: 5 C T R 6 B D 9 6 9 Z 7 2 R O K

Now, we need to find the 4th element from the left: 5 C T R 6 B D 9 6 9 Z 7 2 R O K

So, the 4th element from the left is R.

Hence, the correct answer is Option 2.

Q95. Answer: (c) Francisco De Almeida

The correct answer is Francisco De Almeida.

Key Points

• Francisco De Almeida was appointed as the first Governor and Viceroy of the Portuguese State of India in 1505. He was tasked by King Manuel I of Portugal to establish Portuguese hegemony in the Indian Ocean. He introduced the Blue Water Policy (also known as the Cartaze system), which focused on making the Portuguese the masters of the sea rather than building a land-based empire. Hence, the option Francisco De Almeida is correct.

• Afonso de Albuquerque served as the second governor of the Portuguese possessions in India from 1509 to 1515. He is considered the real founder of Portuguese power in the East. Unlike Almeida, he favored a policy of territorial acquisition and successfully captured Goa from the Sultan of Bijapur in 1510. Hence, this option is incorrect.

• Bartholomew Diaz was a famous Portuguese explorer who became the first European to sail around the southernmost tip of Africa, known as the Cape of Good Hope, in 1488. His voyage proved that a sea route to India from Europe was possible, but he did not introduce the Blue Water Policy. Hence, this option is incorrect.

• Nuno da Cunha was the Governor of Portuguese India from 1529 to 1538. His major contribution was shifting the headquarters of the Portuguese government in India from Cochin to Goa in the year 1530. He also secured Bassein and Diu from Bahadur Shah of Gujarat. Hence, this option is incorrect.

Additional Information

• Portuguese Arrival in India: The Portuguese were the first Europeans to reach India via a direct sea route. Vasco da Gama arrived at Calicut on May 20, 1498, where he was received by the local ruler, the Zamorin. This event marked the beginning of European era in Indian history.

• Blue Water Policy: The essence of this policy was that the Portuguese should be the sole naval power in the Indian Ocean. Under this strategy, Francisco De Almeida discouraged the construction of land fortresses and emphasized the strength of the Portuguese Navy to control trade routes and extract "Cartaze" (protection fees) from other merchant ships.

• Establishment of the Portuguese State: The Portuguese established their first factory at Cochin in 1503, followed by another at Cannanore in 1505. Their administrative center was Cochin until 1530, after which Goa became the capital.

• Decline of Portuguese Power: Despite their early dominance, the Portuguese influence declined by the 17th century due to the rise of rival European powers like the Dutch and the English, their restrictive religious policies, and the growing power of the Marathas in India.

Important Points

• Battle of Diu (1509): Under Francisco De Almeida, the Portuguese navy defeated a combined fleet of the Mamluk Burji Sultanate of Egypt, the Ottoman Empire, the Sultan of Gujarat, and the Zamorin of Calicut. This victory consolidated Portuguese naval supremacy in Asia for many years.

• Afonso de Albuquerque’s Legacy: Albuquerque is noted for the abolition of Sati in the territories under his control and for encouraging Portuguese men to marry Indian women to create a loyal Christian population.

• Key Territories: By the mid-16th century, the Portuguese controlled several strategic points including Goa, Daman, Diu, Salsette, Bassein, Chaul, and Bombay on the western coast, as well as San Thome near Madras and Hooghly in Bengal.

Q96. Answer: (b) 4

Shortcut Trick

=> Downstream speed = 12 + 3 = 15 km/hr

=> Time = Distance ÷ Speed = 60 ÷ 15 = 4 hours

Therefore Answer = 4 hours

Alternate Method

Given:

=> Speed in still water = 12 km/hr

=> Speed of stream = 3 km/hr

=> Distance = 60 km

Formula:

=> Downstream speed = u + v

=> Time = Distance ÷ Speed

Calculation:

=> Downstream speed = 12 + 3 = 15 km/hr

=> Time = 60 ÷ 15 = 4 hours

Therefore Final Answer: 4 hours

Additional Information

1. Downstream Speed: u + v

2. Upstream Speed: u − v

3. Time Formula: Time = Distance ÷ Speed

4. Tip: Downstream is always faster

Q97. Answer: (c) 4

Given: A, B, C, D, E and F live on six different floors of the same building.

The lowermost floor is numbered 1 and the topmost floor is numbered 6.

The product of floors of D and B is 15.

A lives immediately above F.

The sum of floors of C and B is 7.

Floor	Person
6	E
5	D
4	C
3	B
2	A
1	F

Now, B = 3 and F = 1

Sum = 4

Hence, the correct answer is Option 3.

Q98. Answer: (d) 10 km to the South

Given:

Golu starts from Point A and drives 53 km West.

He turns left → 50 km South.

He turns left → 54 km East.

He turns left → 60 km North.

He takes a final left → 1 km West.

To reach Point A, he must travel 10 km South.

Hence, the correct answer is Option 4.

Q99. Answer: (c) Respiratory health issues

The correct answer is Respiratory health issues.

Key Points

• Particulate Matter 2.5 (PM2.5) consists of fine inhalable particles with diameters that are generally 2.5 micrometers and smaller. For context, the average human hair is about 70 micrometers in diameter, making these particles about 30 times smaller than a single hair.

• A direct and well-documented consequence of increased PM2.5 in urban air is the development of Respiratory health issues. Due to their microscopic size, these particles can bypass the natural filters in the nose and throat and penetrate deep into the lungs (alveoli) and even enter the bloodstream.

• Exposure to high levels of PM2.5 is known to trigger or worsen chronic conditions such as asthma, bronchitis, and emphysema. It can also lead to decreased lung function and increased respiratory symptoms like irritation of the airways, coughing, or difficulty breathing.

• In urban environments, the primary sources of these particles include vehicular emissions (especially diesel engines), industrial processes, construction activities, and the combustion of fossil fuels.

• Beyond the respiratory system, PM2.5 is also a major contributor to cardiovascular diseases, including heart attacks and strokes, particularly in vulnerable groups such as the elderly and infants.

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Additional Information

• Ocean Acidification:

• This phenomenon is primarily caused by the absorption of Carbon Dioxide (CO_2) from the atmosphere into the oceans. When CO_2 dissolves in seawater, it forms carbonic acid, which lowers the pH of the water. This is unrelated to PM2.5.

• Stratospheric Ozone Depletion:

• The thinning of the ozone layer is caused by Ozone-Depleting Substances (ODS) like Chlorofluorocarbons (CFCs), halons, and carbon tetrachloride. These chemicals react with ozone in the stratosphere, not the troposphere where urban air pollution is concentrated.

• Increased Soil Fertility:

• High concentrations of particulate matter generally do not increase soil fertility. In fact, PM2.5 often contains heavy metals (like lead, cadmium, or mercury) and toxic organic compounds that can lead to soil contamination and toxicity, negatively affecting agricultural productivity.

• National Air Quality Index (AQI):

• In India, the AQI was launched in October 2014. It monitors eight major pollutants, including PM2.5, PM10, Nitrogen Dioxide (NO_2), and Sulphur Dioxide (SO_2), to provide a simplified air quality status to the general public.

Important Points

• WHO Guidelines: The World Health Organization (WHO) significantly tightened its Global Air Quality Guidelines in 2021, recommending that annual average PM2.5 levels should not exceed 5 $\mu g/m^3$, acknowledging that even low concentrations pose health risks.

• National Clean Air Programme (NCAP): Launched by the Government of India in January 2019, this scheme aims for a 20% to 30% reduction in PM2.5 and PM10 concentrations by the year 2024 (taking 2017 as the base year).

• Measurement: PM2.5 is measured in micrograms per cubic meter ($\mu g/m^3$). Continuous Ambient Air Quality Monitoring Systems (CAAQMS) are deployed in various cities to track these levels in real-time.

• Smog Formation: PM2.5 is a key component of smog (smoke + fog), which reduces visibility in urban areas and causes haziness, affecting both transportation safety and the aesthetic environment.

Q100. Answer: (c) Son's wife

Family Chart:

Given:

A is the wife of D.

D has a daughter X and a son M.

M is married to Y.

Thus, Y is related to A as Son’s wife

Hence, the correct answer is Option 3.

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